



Autorizzata ai sensi del DPR 06/06/01 n. 380 art.59 - Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**OGGETTO:** SERVIZIO DI INDAGINI GEOGNOSTICHE E PROVE GEOTECNICHE DI  
LABORATORIO

**COMMITTENTE:** COMUNE DI PALERMO AREA DELLA PIANIFICAZIONE DEL TERRITORIO  
SETTORE PIANIFICAZIONE TERRITORIALE E MOBILITA'

**DITTA ESECUTRICE:** TRIVELSICILIA DI CASTELLI DOMENICO S.R.L.

**METODOLOGIA SISMICA PASSIVA ESEGUITA CON**  
**TROMOGRAFO DIGITALE TROMINO**

LA DITTA ESECUTRICE

**TRIVELSICILIA DI CASTELLI D. S.R.L.**

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## ***PREMESSA***

Nell'ambito dei lavori di **"Affidamento del servizio di indagini geognostiche e prove geotecniche di laboratorio – COD. CIG:483764354 A"**, il Committente, **COMUNE DI PALERMO**, ha incaricato lo scrivente per la consulenza circa gli aspetti geofisici nell'area sede dello studio sopra menzionato.

Le considerazioni riportate di seguito sono il risultato di un'indagine di sismica passiva attraverso analisi realizzata con tomografo elettronico digitale TROMINO® ai soli fini della determinazione delle caratteristiche elastiche del terreno ottenute dalla analisi spettrale delle componenti vibrazionali del terreno, ossia attraverso l'analisi dei rumori del terreno.

La campagna di indagine ha previsto l'esecuzione di n.250 basi sismiche, oltre 9 basi sismiche ripetute per verificare la ripetibilità del segnale, eseguite su uno spazio temporale ben definito e su una superficie opportunamente predisposta.

Dalle tracce sismiche ottenute, attraverso un processo di elaborazione (trasformata in serie di Fourier del segnale sismico, pulitura di disturbi spontanei, ipotesi di modellizzazione inversa) si è individuata la frequenza di risonanza fondamentale del terreno.

La restituzione dei dati, con relativa interpretazione del profilo sismico, è riportata di seguito.

## **METODOLOGIA SISMICA PASSIVA ESEGUITA CON TROMOGRAFO DIGITALE TROMINO®**

Le indagini geosismiche sono state realizzate avvalendosi del metodo sismico che utilizza l'acquisizione del rumore sismico di fondo come funzione di eccitazione.

Il rumore sismico, generato dai fenomeni atmosferici (onde oceaniche, vento) e dall'attività antropica, è presente ovunque sulla superficie terrestre, si chiama anche microtremore poiché riguarda oscillazioni molto più piccole di quelle indotte dai terremoti nel campo prossimo all'epicentro.

I microtremori sono solo in parte costituiti da onde di volume, P o S. In essi giocano un ruolo fondamentale le onde superficiali, che hanno velocità prossime a quella delle onde S (vedi ad es. Lachet e Bard, 1994), il che spiega la dipendenza di tutta la formulazione dalla velocità di queste ultime. Dai primi studi di Kanai (1957) in poi, diversi metodi sono stati proposti per estrarre l'informazione relativa al sottosuolo dal rumore sismico registrato in un sito. Tra questi, la tecnica che si è maggiormente consolidata nell'uso è quella dei rapporti spettrali tra le componenti del moto orizzontale e quella verticale (Horizontal to Vertical Spectral Ratio, HVSR o H/V), proposta da Nogoshi e Igarashi (1970). La tecnica è universalmente riconosciuta come efficace nel fornire stime affidabili della frequenza fondamentale di risonanza del sottosuolo (Field e Jacob, 1993; Lachet e Bard, 1994; Lermo e Chavez-Garcia, 1993, 1994; Bard, 1998; Ibs-von Seht e Wohlenberg, 1999; Fah et al., 2001; solo per citarne alcune).

Le basi teoriche dell'H/V sono relativamente facili da comprendere in un mezzo del tipo strato + bedrock (o strato assimilabile al bedrock) in cui i parametri sono costanti in ciascuno strato. Considerando un sistema in cui gli strati 1 e 2 si distinguono per le diverse densità ( $\rho_1$  e  $\rho_2$ ) e le diverse velocità delle onde sismiche ( $V_1$  e  $V_2$ ), un'onda che viaggia nel mezzo 1 viene (parzialmente) riflessa dall'interfaccia che separa i due strati. L'onda così riflessa interferisce con quelle incidenti, sommandosi e raggiungendo le ampiezze massime (condizione di risonanza) quando la lunghezza dell'onda incidente ( $\lambda$ ) è 4 volte (o suoi multipli dispari) lo spessore  $H$  del primo strato. La frequenza fondamentale di risonanza ( $f_r$ ) dello strato 1 relativa alle onde S è pari a

$$f_r = V_{s1} / 4H \quad (1)$$

Questo effetto è sommabile, anche se non in modo lineare e senza una corrispondenza 1:1, ciò significa che la curva H/V relativa ad un sistema a più strati contiene l'informazione relativa alle frequenze di risonanza (e quindi allo spessore) di ciascuno di essi, ma è interpretabile attraverso opportuni fattori di correlazione.

L'analisi H/V permette pertanto di identificare i contrasti di impedenza tra strati, la successiva determinazione della velocità delle onde S fino a profondità notevoli (ben oltre i 100 m di profondità) e strettamente dipendenti dallo spazio temporale di acquisizione; quindi l'elaborazione del Vs30, avviene attraverso una formulazione specifica adottando come punto di partenza la relazione (1) mostrata in precedenza.

## **STRUMENTAZIONE UTILIZZATA**

Le misure di microtremore ambientale sono state effettuate per mezzo di un tromografo digitale portatile progettato specificamente per l'acquisizione del rumore sismico. Lo strumento (Tromino®, Micromed SpA, 10 x 7 x 14 cm per 1 kg di peso) è dotato di tre sensori elettrodinamici (velocimetri) orientati N-S, E-W e verticalmente, alimentato da 2 batterie AA da 1.5 V, senza cavi esterni. I dati di rumore, amplificati e digitalizzati a 24 bit equivalenti, sono stati acquisiti alle frequenze di campionamento di 128 Hz.

## **INTERPRETAZIONE DEI RISULTATI OTTENUTI**

Dalle registrazioni del rumore sismico ambientale in campo libero, per una durata temporale pari a 30.00 minuti, sono state ricavate le curve H/V, secondo la procedura descritta in Castellaro et al. (2005), utilizzando i seguenti parametri:

- larghezza delle finestre d'analisi 20 s;
- lisciamento secondo finestra triangolare con ampiezza pari al 5% della frequenza centrale;
- rimozione dei transienti sulla serie temporale degli H/V.

Le ragioni per la scelta del lisciamento triangolare al posto del lisciamento Konno e Omachi (1998) proposto dalle linee guida SESAME (2005) risiedono nel fatto che quest'ultimo non dà alcuna differenza statisticamente rilevante rispetto al lisciamento triangolare, pertanto si è deciso di adottare il lisciamento più semplice.

Le ragioni per l'effettuazione della rimozione dei transienti sulla serie temporale degli H/V e non sulla serie temporale delle tracce pre-analisi H/V sono spiegate per esempio in Castellaro e Mulargia (2008).

Nella fattispecie sono state eseguite n.250 basi sismiche, oltre 9 basi simiche rieseguite per verificare la ripetibilità del segnale, che verranno descritte in dettaglio nei paragrafi successivi.



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n. prot. 3513 del 16/03/2012

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0000				
<b>Coordinate</b>	UTM	4229464.50	N	353157.15	E
	Gauss Boaga	4229463.242	N	2373152.327	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	24/04/2014, 07:55				
<b>Nome file</b>	0000				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			



**Documentazione fotografica**

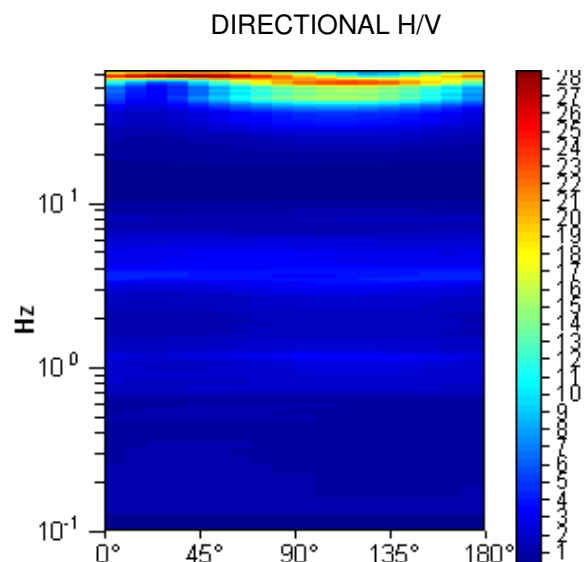
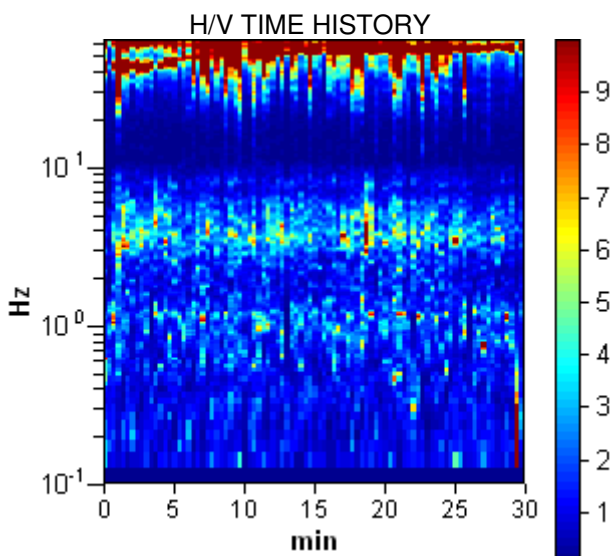
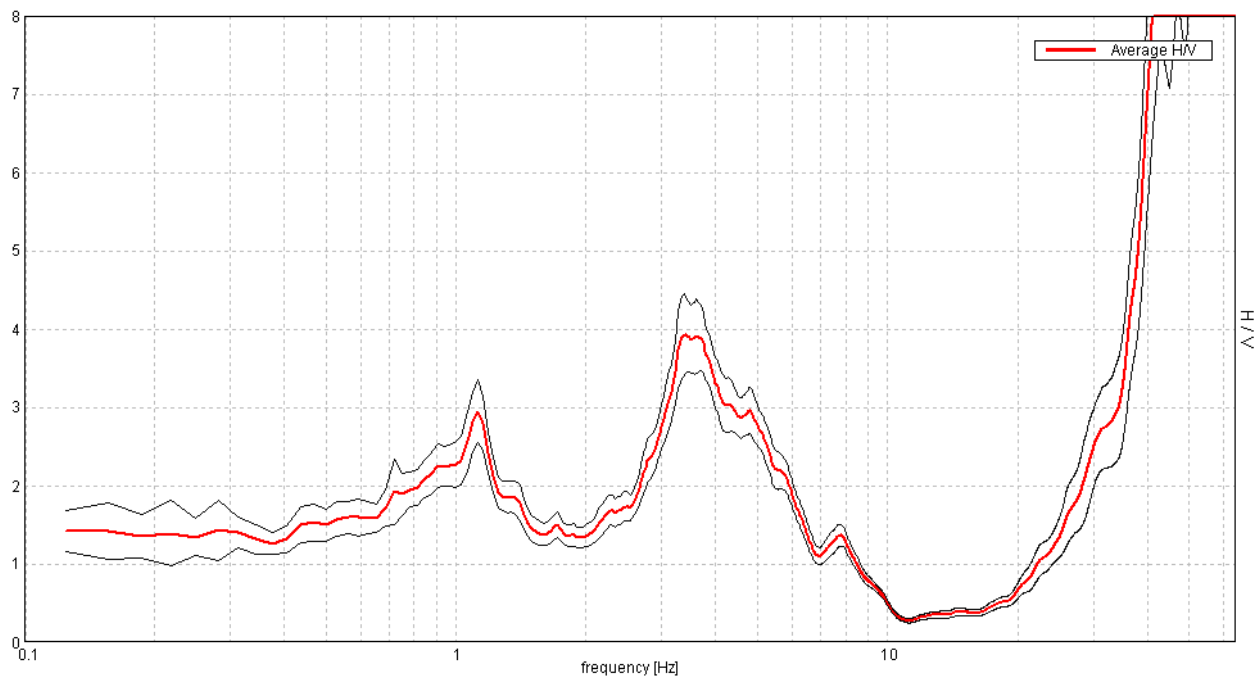
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Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

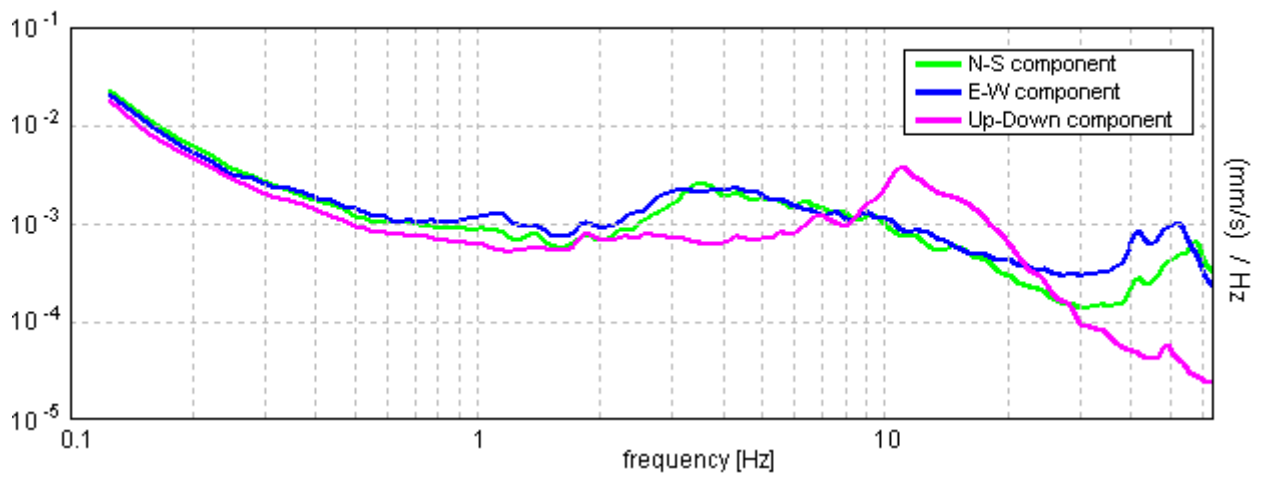
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

Max. H/V at  $3.38 \pm 0.57$  Hz. (In the range 0.0 - 30.0 Hz).



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 3.38 ± 0.57 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	3.38 > 0.50	OK	
$n_c(f_0) > 200$	6075.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 163 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	2.656 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	5.969 Hz	OK	
$A_0 > 2$	3.93 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.08461  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.28554 < 0.16875$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.2612 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0001			
<b>Coordinate</b>	<i>UTM</i>	4229444.84	N	352711.52	E
	<i>Gauss Boaga</i>	4229443.576	N	2372706.675	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		24/04/2014, 08:40			
<b>Nome file</b>		0001			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>No</b>		
		<b>Altro</b>	<b>No</b>		

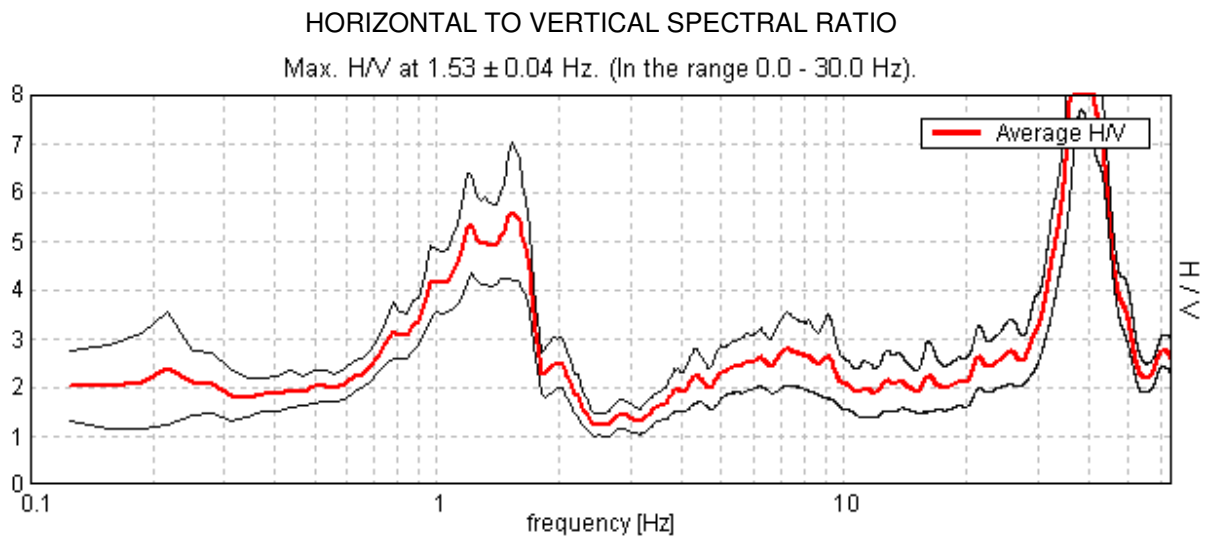
**Documentazione fotografica**



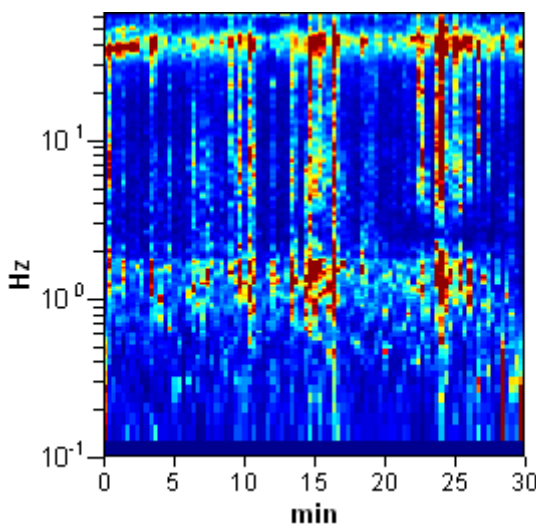
## TRIVELSICILIA PALERMO, PALERMO 0001

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Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

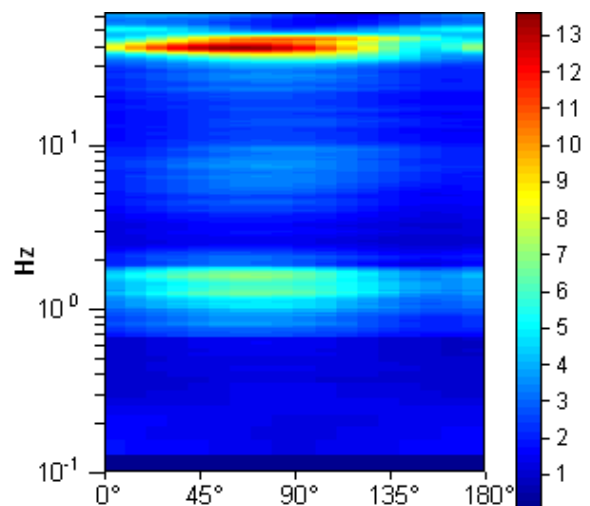
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



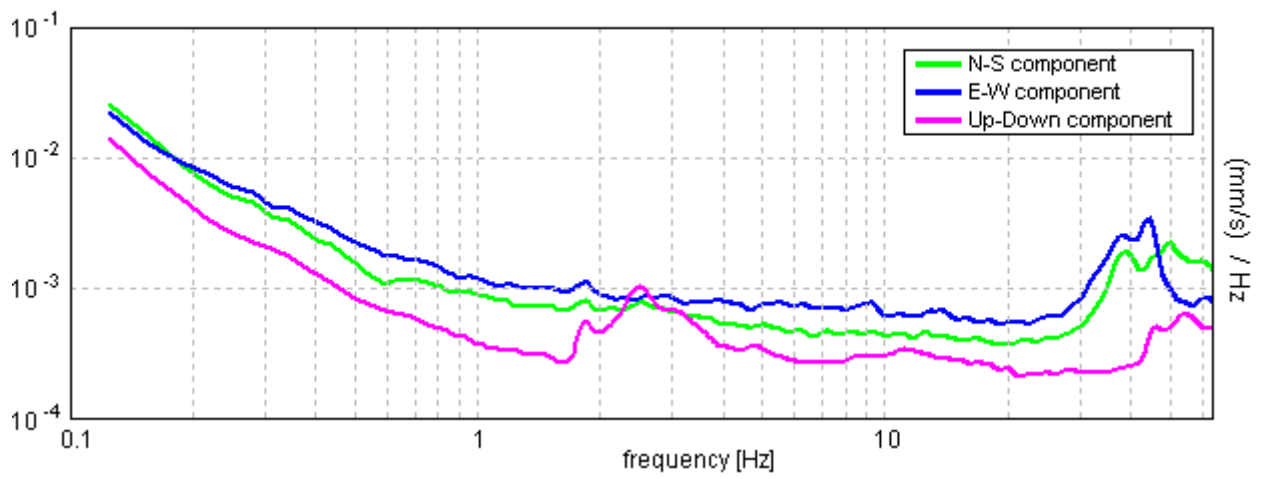
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.53 ± 0.04 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.53 > 0.50	OK	
$n_c(f_0) > 200$	2756.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 74 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.719 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.781 Hz	OK	
$A_0 > 2$	5.60 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01197  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01833 < 0.15313$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.7096 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0002			
<b>Coordinate</b>	<i>UTM</i>	4229082.00	N	351974.00	E
	<i>Gauss Boaga</i>	4229080.712	N	2371969.108	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		24/04/2014, 10:10			
<b>Nome file</b>		0002			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			

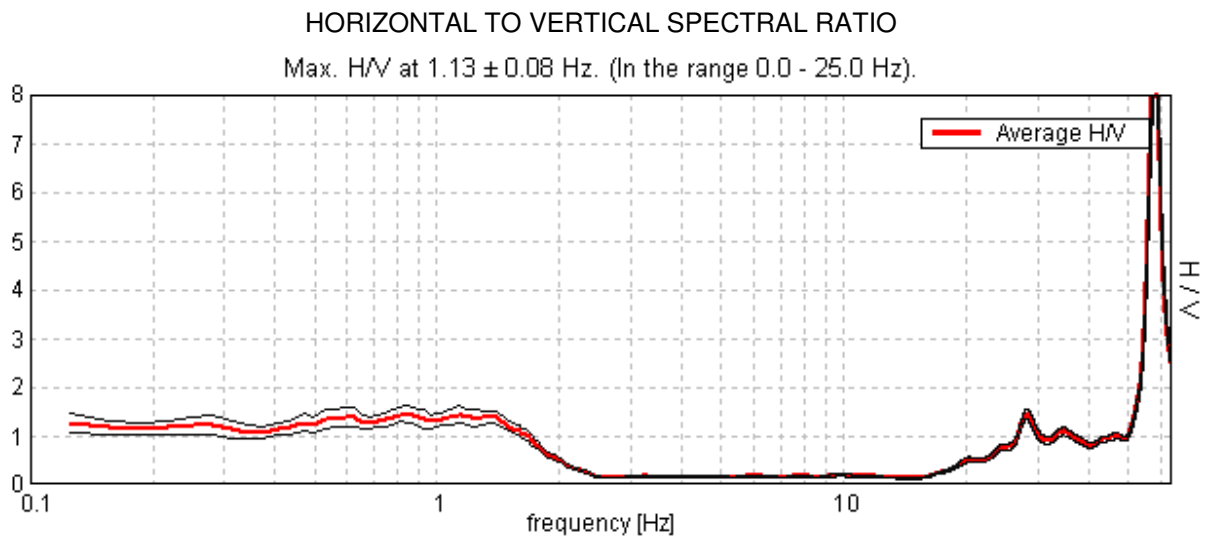


**Documentazione fotografica**

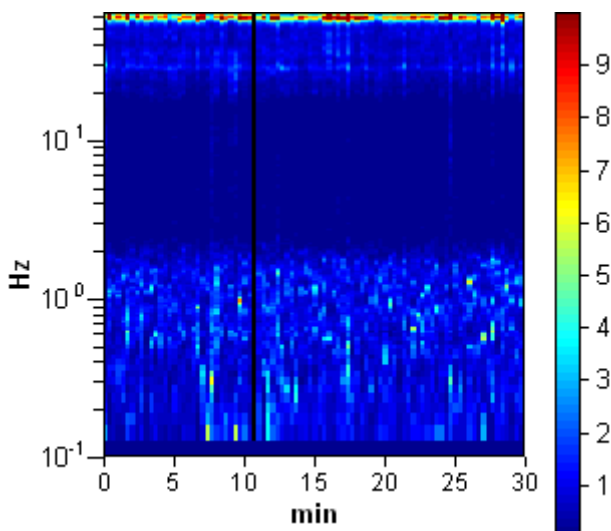
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Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

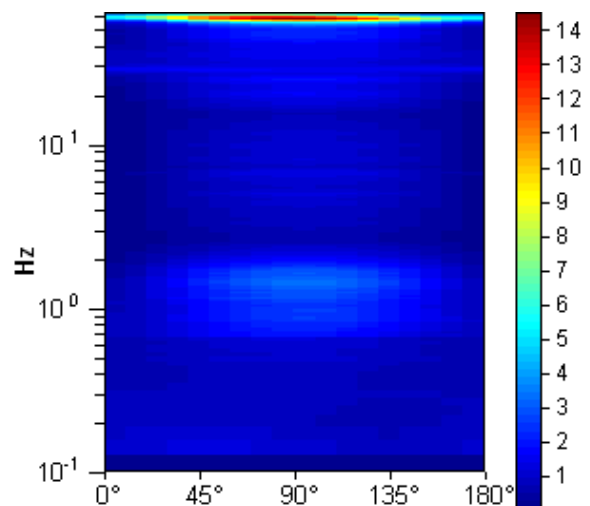
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Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



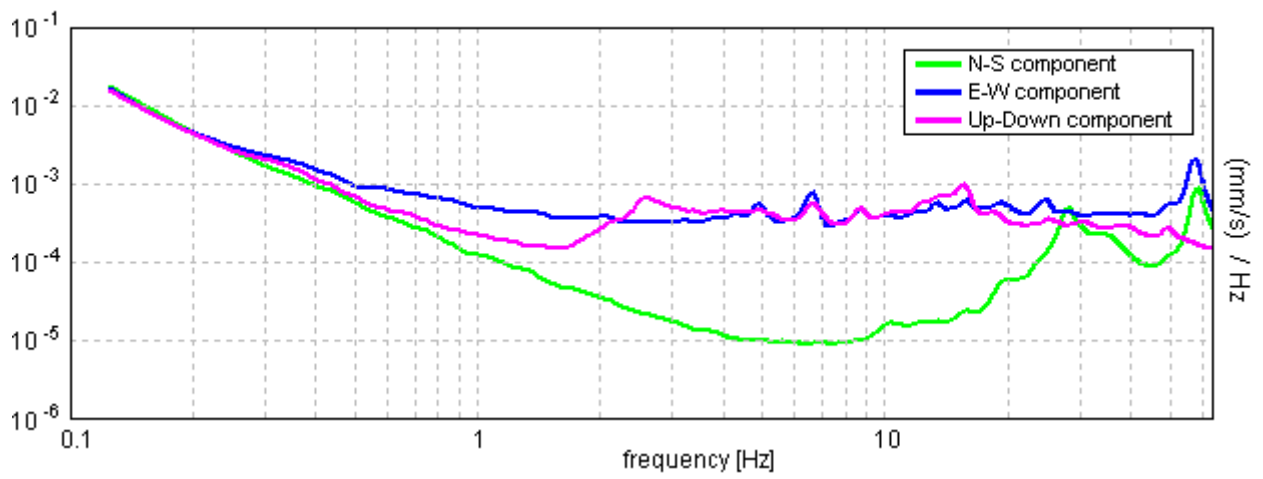
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.13 ± 0.08 Hz. (in the range 0.0 - 25.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.13 > 0.50	OK	
$n_c(f_0) > 200$	2002.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 55 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.813 Hz	OK	
<b><math>A_0 &gt; 2</math></b>	1.43 > 2		<b>NO</b>
<b><math>f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%</math></b>	$ 0.03527  < 0.05$	OK	
<b><math>\sigma_f &lt; \varepsilon(f_0)</math></b>	$0.03968 < 0.1125$	OK	
<b><math>\sigma_A(f_0) &lt; \theta(f_0)</math></b>	$0.0875 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0003			
<b>Coordinate</b>	UTM	4229059.78	N	352351.69	E
	Gauss Boaga	4229058.495	N	2372346.815	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		24/04/2014, 09:30			
<b>Nome file</b>		0003			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	No			
	<b>Altro</b>	No			



**Documentazione fotografica**

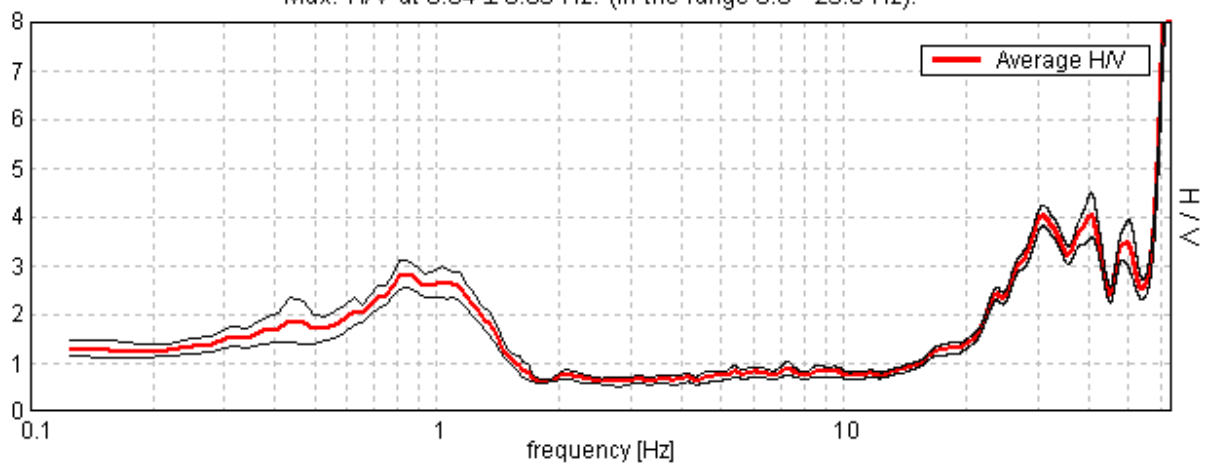
## TRIVELSICILIA PALERMO, PALERMO 0003

Start recording: 24/04/14 09:30:26      End recording: 24/04/14 10:00:27  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

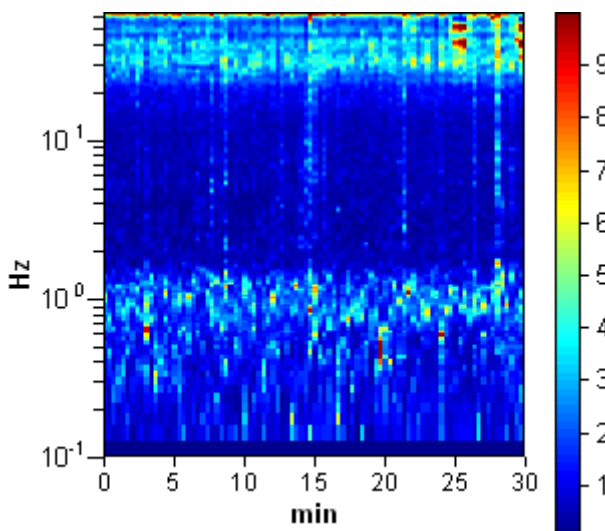
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

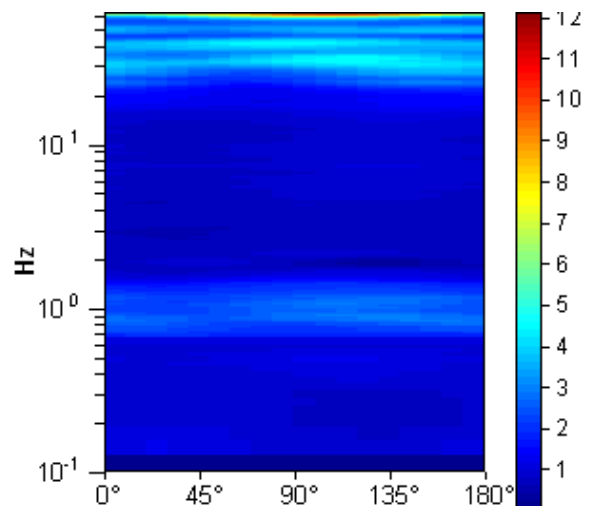
Max. H/V at  $0.84 \pm 0.03$  Hz. (In the range 0.0 - 25.0 Hz).



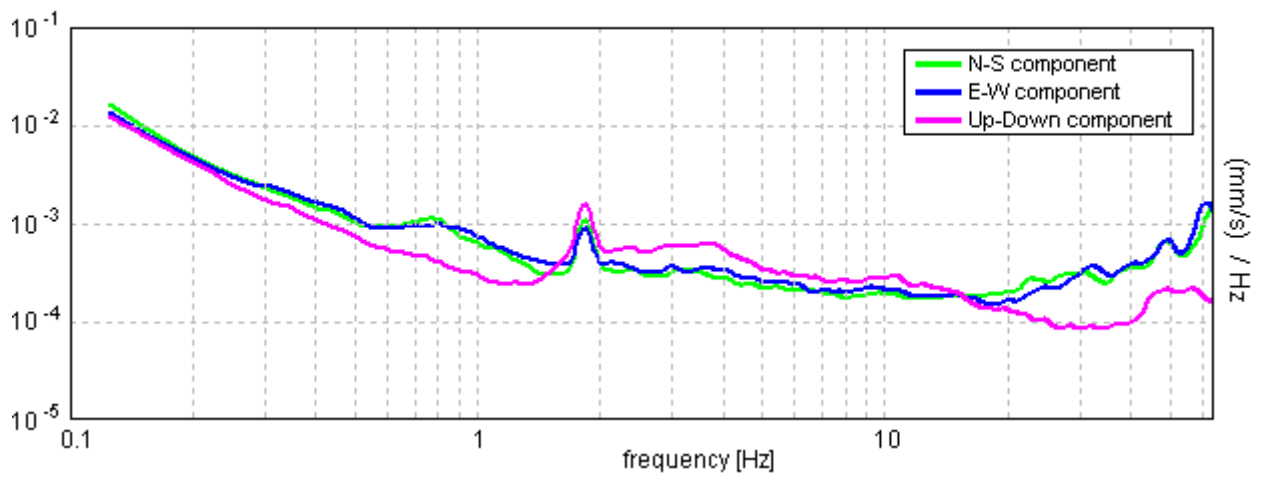
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 0.84 ± 0.03 Hz. (in the range 0.0 - 25.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.84 > 0.50	OK	
$n_c(f_0) > 200$	1518.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 42 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.281 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.438 Hz	OK	
$A_0 > 2$	2.82 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01663  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01404 < 0.12656$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.137 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0004			
<b>Coordinate</b>	UTM	4229083.00	N	352763.00	E
	Gauss Boaga	4229081.722	N	2372758.145	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		24/04/2014, 10:50			
<b>Nome file</b>		0004			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>No</b>		
		<b>Altro</b>	<b>No</b>		

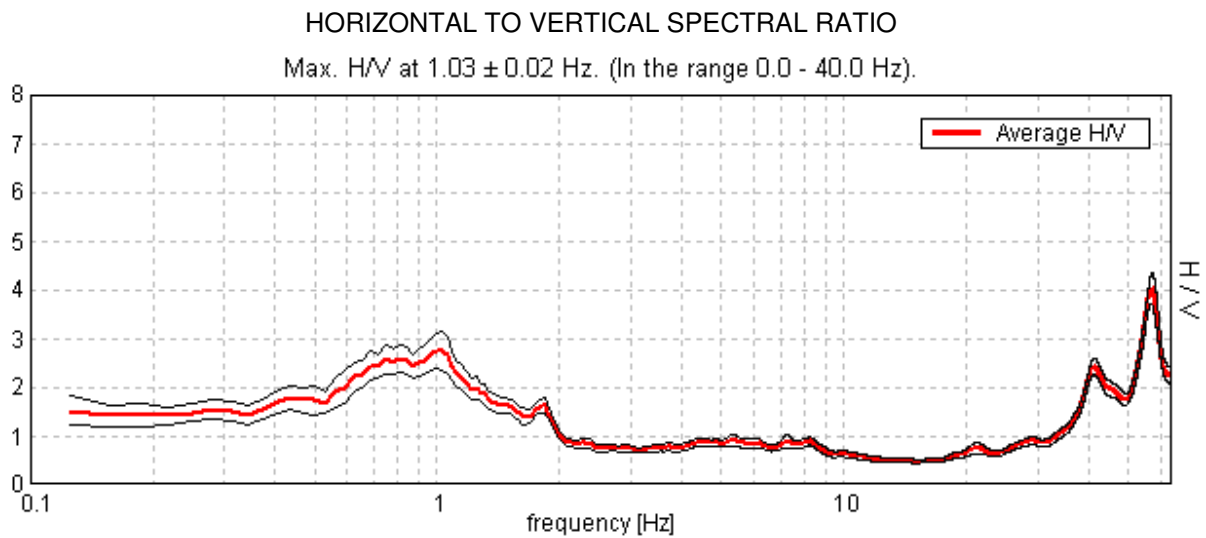


**Documentazione fotografica**

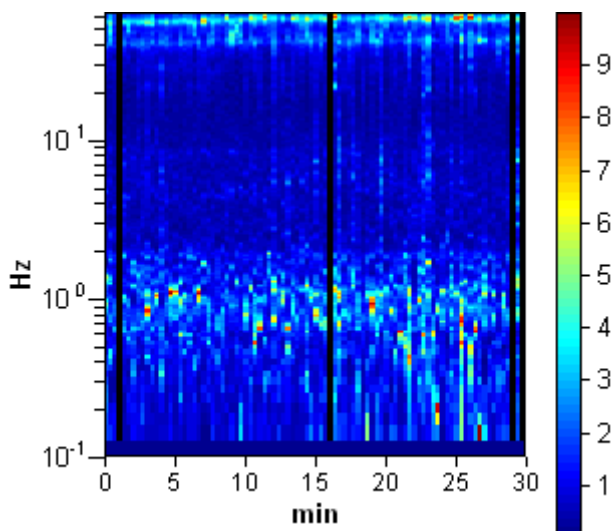
## TRIVELSICILIA PALERMO, PALERMO 0004

Start recording: 24/04/14 10:50:14      End recording: 24/04/14 11:20:15  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

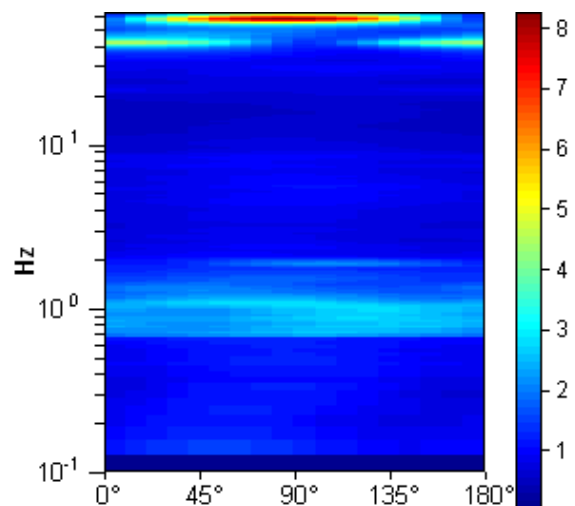
Trace length: 0h30'00".      Analyzed 96% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



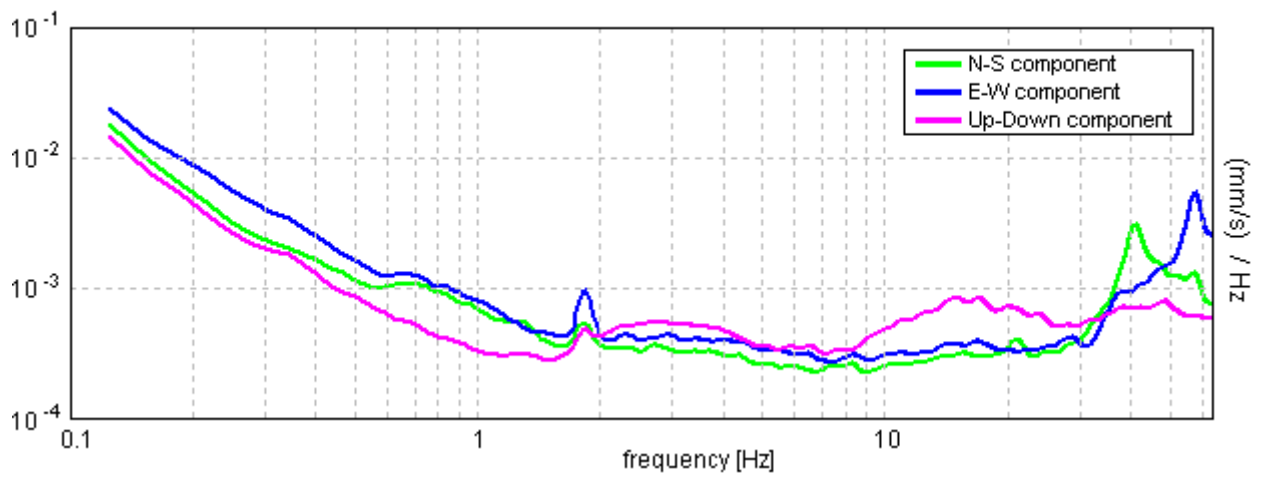
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.03 ± 0.02 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.03 > 0.50	OK	
$n_c(f_0) > 200$	1773.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 50 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.906 Hz	OK	
$A_0 > 2$	2.75 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00949  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.00979 < 0.10313$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2039 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

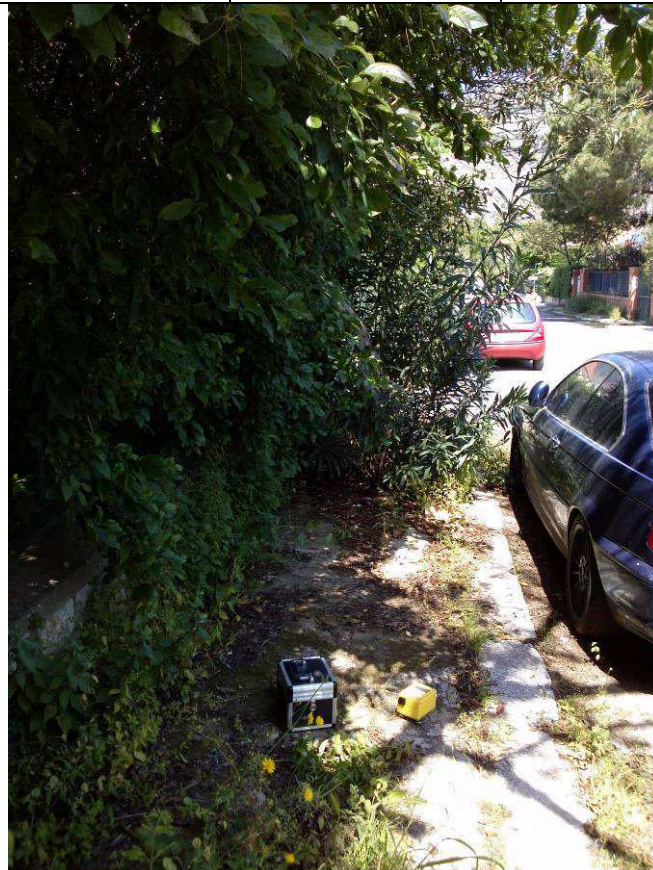
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0005			
<b>Coordinate</b>	<i>UTM</i>	4229082.37	N	353145.36	E
	<i>Gauss Boaga</i>	4229081.096	N	2373140.523	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		24/04/2014, 11:28			
<b>Nome file</b>		0005			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>No</b>		
		<b>Altro</b>	<b>No</b>		



**Documentazione fotografica**

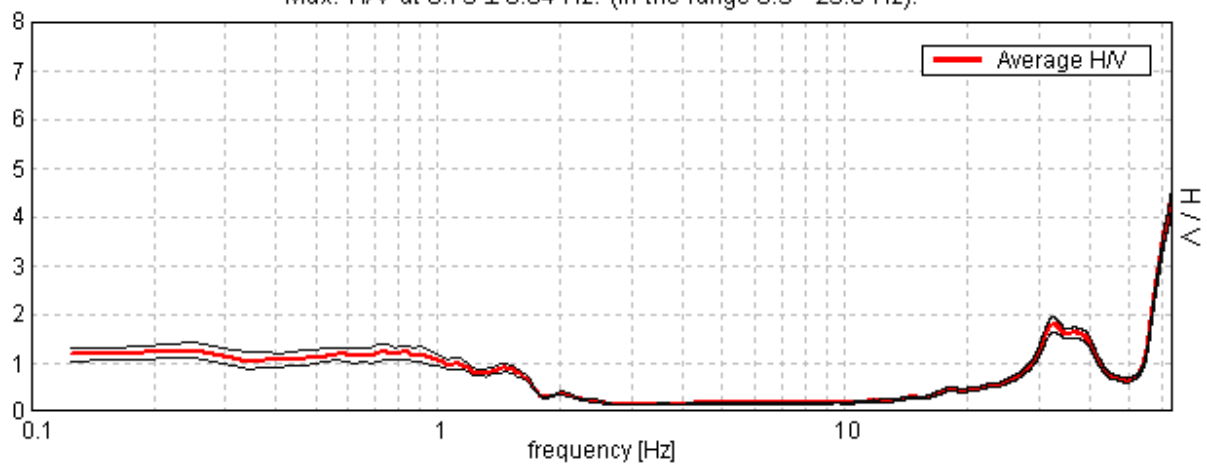
## TRIVELSICILIA PALERMO, PALERMO 0005

Start recording: 24/04/14 11:28:23      End recording: 24/04/14 11:58:24  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

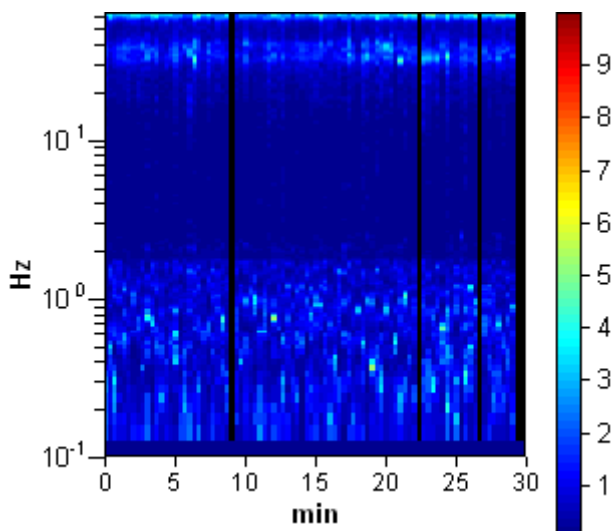
Trace length: 0h30'00".      Analyzed 94% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

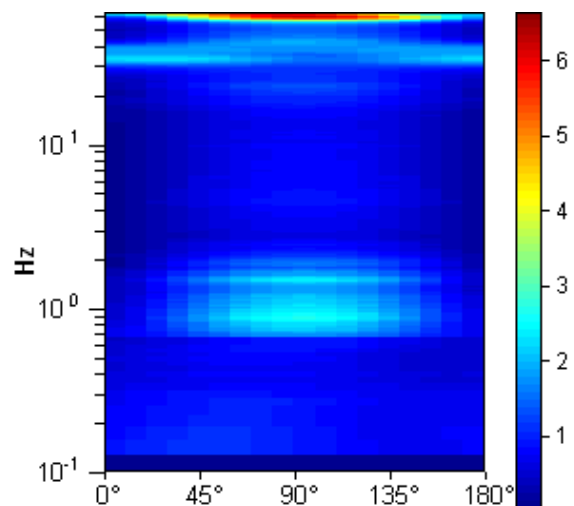
Max. H/V at  $0.75 \pm 0.04$  Hz. (In the range 0.3 - 25.0 Hz).



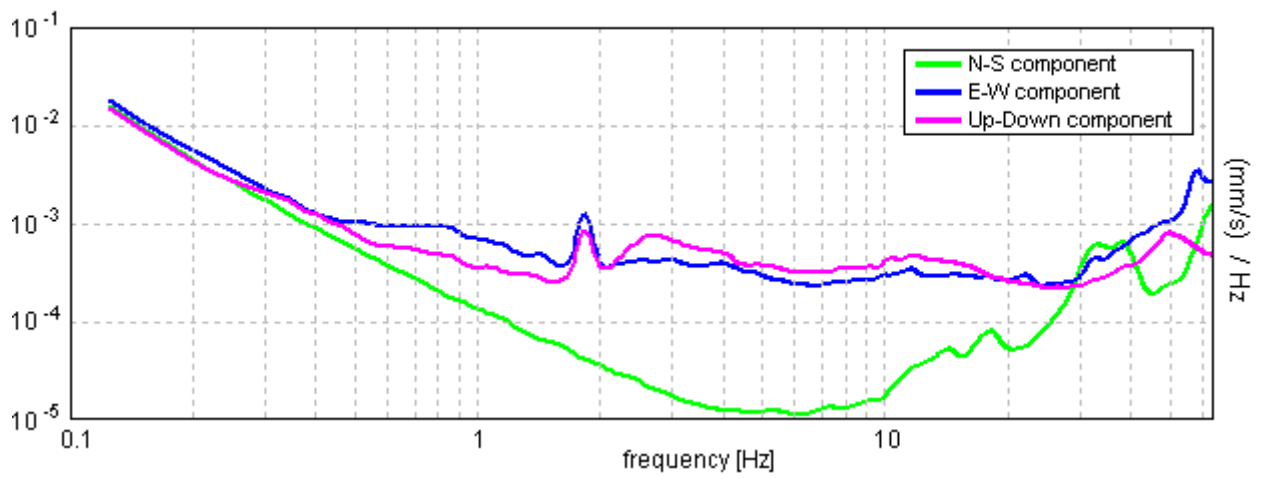
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 0.75 ± 0.04 Hz. (in the range 0.3 - 25.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.75 > 0.50	OK	
$n_c(f_0) > 200$	1275.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 37 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.688 Hz	OK	
<b><math>A_0 &gt; 2</math></b>	1.22 > 2		<b>NO</b>
<b><math>f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%</math></b>	$ 0.02386  < 0.05$	OK	
<b><math>\sigma_f &lt; \varepsilon(f_0)</math></b>	$0.0179 < 0.1125$	OK	
<b><math>\sigma_A(f_0) &lt; \theta(f_0)</math></b>	$0.0815 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0006			
<b>Coordinate</b>	UTM	4229089.87	N	353583.49	E
	Gauss Boaga	4229088.602	N	2373578.674	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		24/04/2014, 12:09			
<b>Nome file</b>		0006			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>No</b>		
		<b>Altro</b>	<b>No</b>		



**Documentazione fotografica**

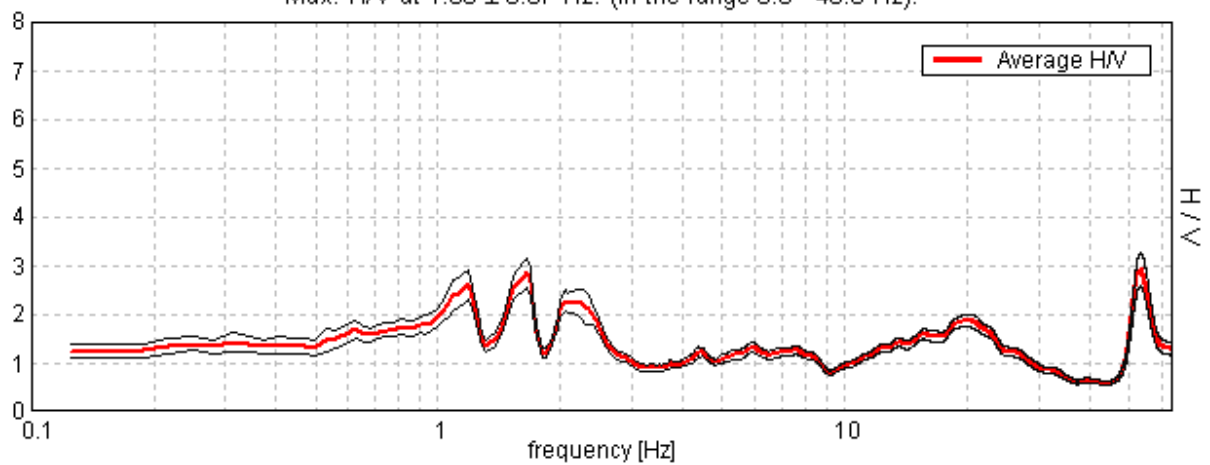
## TRIVELSICILIA PALERMO, PALERMO 0006

Start recording: 24/04/14 12:08:28      End recording: 24/04/14 12:38:29  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

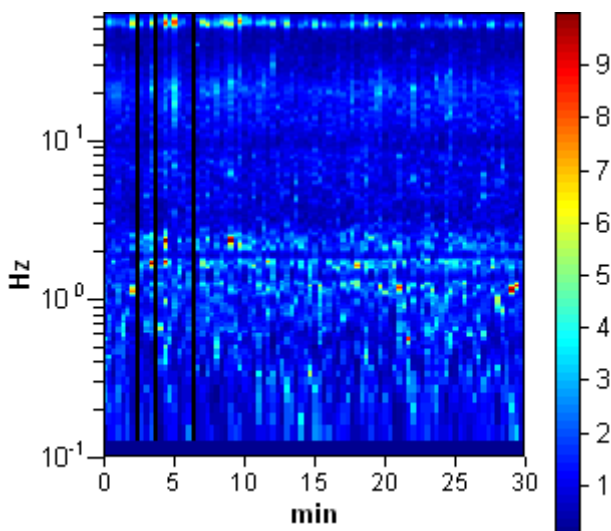
Trace length: 0h30'00".      Analyzed 97% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

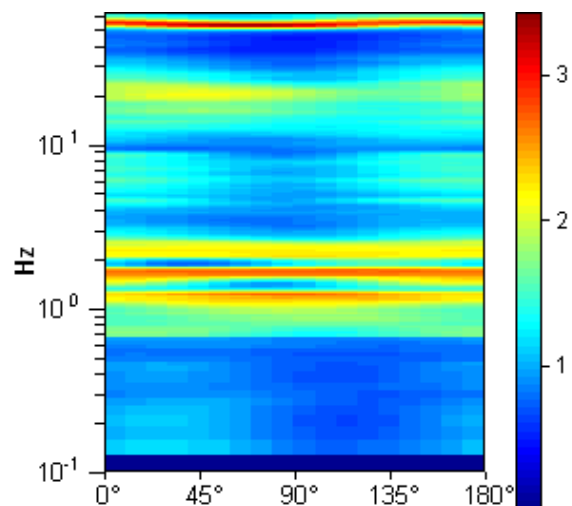
Max. H/V at  $1.66 \pm 0.07$  Hz. (In the range 0.0 - 40.0 Hz).



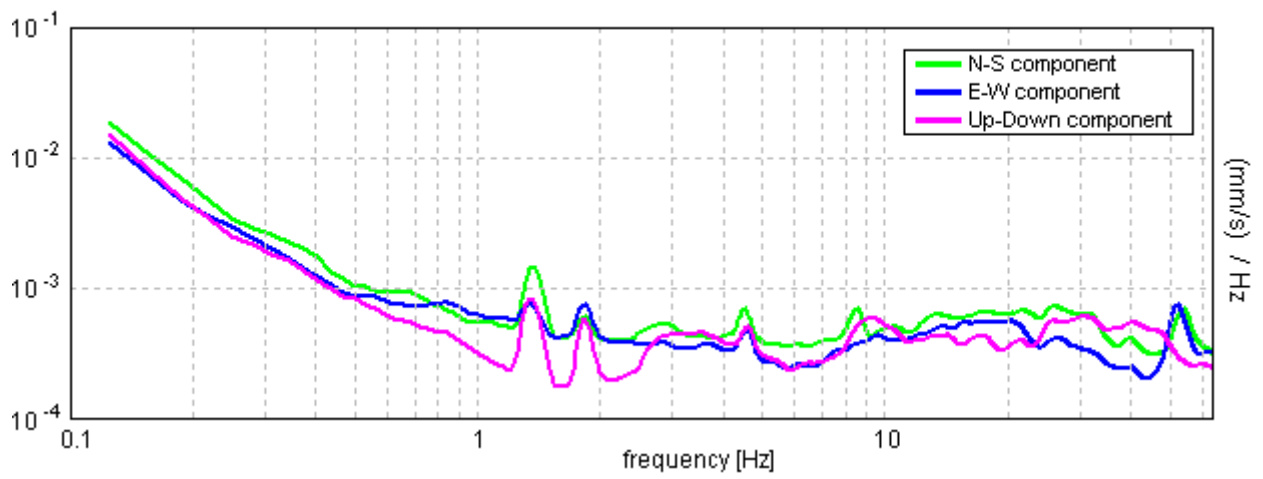
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.66 ± 0.07 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.66 > 0.50	OK	
$n_c(f_0) > 200$	2881.9 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 80 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	1.344 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.781 Hz	OK	
$A_0 > 2$	2.84 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02127  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.03523 < 0.16563$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1567 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0007			
<b>Coordinate</b>	UTM	4228655.91	N	353539.15	E
	Gauss Boaga	4228654.624	N	2373534.316	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		24/04/2014, 13:08			
<b>Nome file</b>		0007			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			



**Documentazione fotografica**

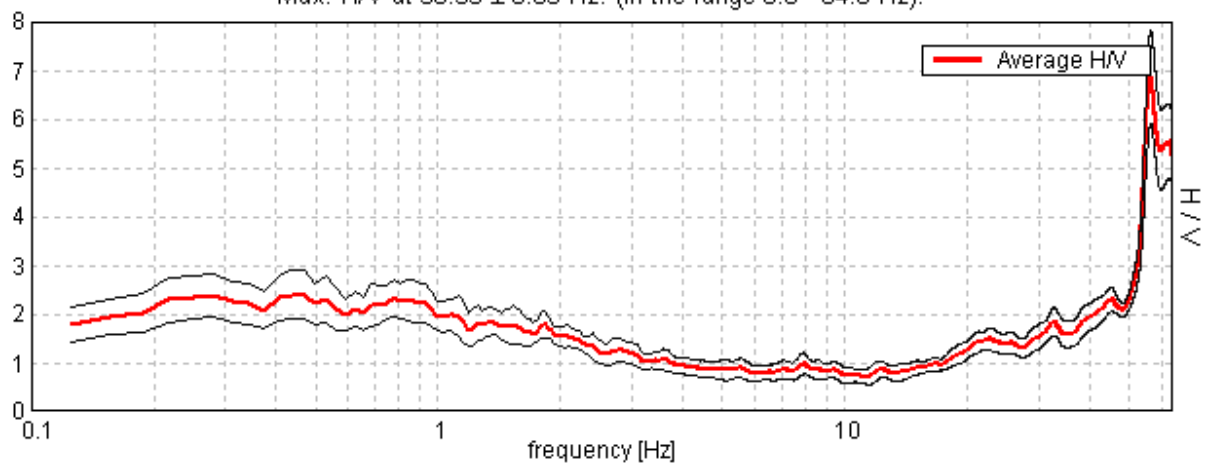
## TRIVELSICILIA PALERMO, PALERMO 0007

Start recording: 24/04/14 13:07:52      End recording: 24/04/14 13:37:53  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

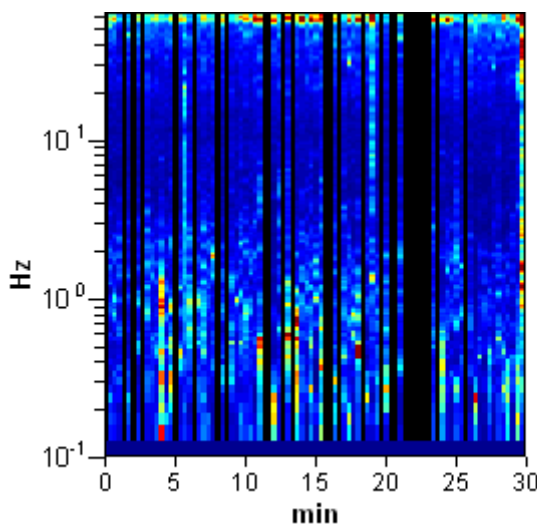
Trace length: 0h30'00".      Analyzed 70% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

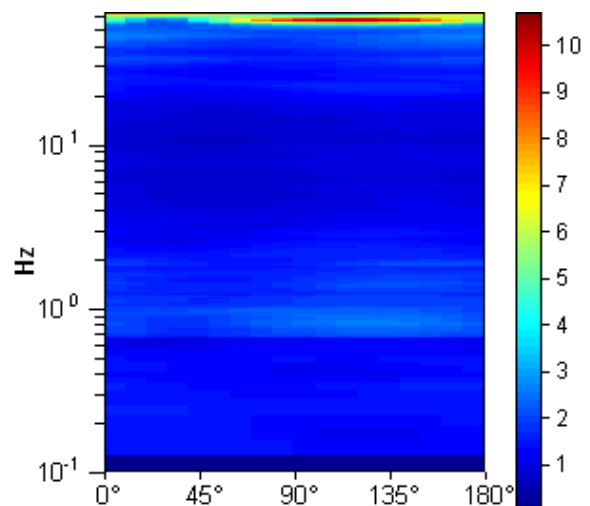
Max. H/V at  $56.53 \pm 0.03$  Hz. (In the range 0.0 - 64.0 Hz).



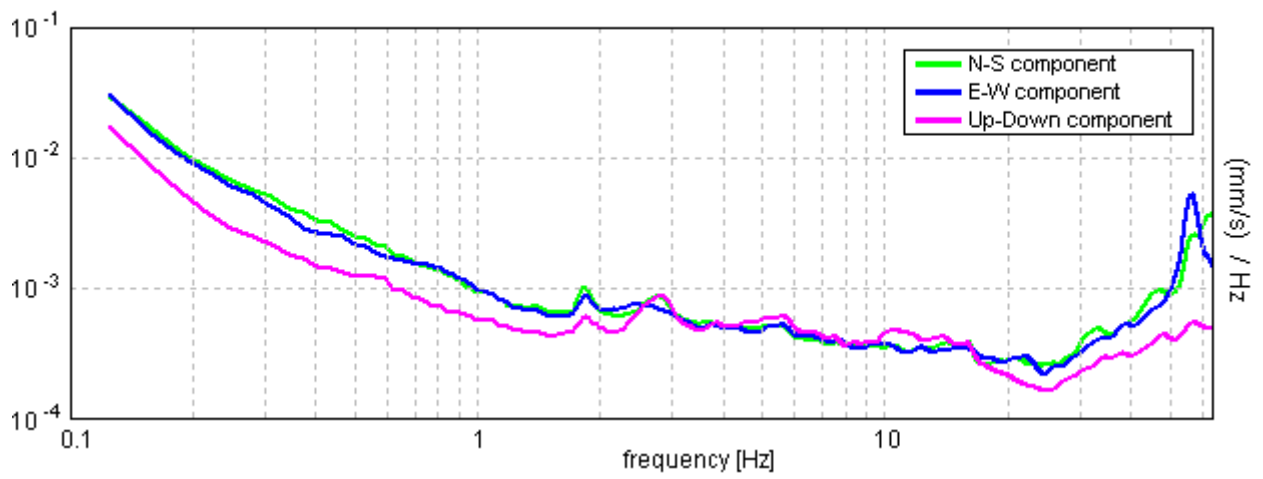
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 56.53 ± 0.03 Hz. (in the range 0.0 - 64.0 Hz).**

<b>Criteria for a reliable HVSR curve</b> [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	56.53 > 0.50	<b>OK</b>	
$n_c(f_0) > 200$	71229.4 > 200	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 1144 times	<b>OK</b>	
<b>Criteria for a clear HVSR peak</b> [At least 5 out of 6 should be fulfilled]			
<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	53.188 Hz	<b>OK</b>	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>			<b>NO</b>
$A_0 > 2$	6.86 > 2	<b>OK</b>	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00031  < 0.05$	<b>OK</b>	
$\sigma_f < \varepsilon(f_0)$	0.01733 < 2.82656	<b>OK</b>	
$\sigma_A(f_0) < \theta(f_0)$	0.4741 < 1.58	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for $\sigma_f$ and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0008			
<b>Coordinate</b>	UTM	4228741.06	N	353263.29	E
	Gauss Boaga	4228739.774	N	2373258.447	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		24/04/2014, 13:44			
<b>Nome file</b>		0008			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	No			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			



**Documentazione fotografica**

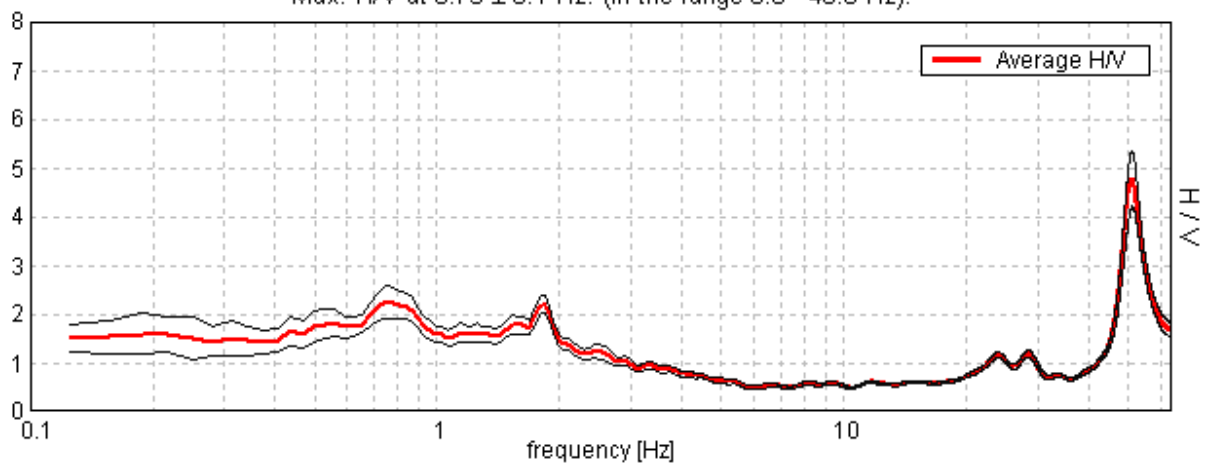
## TRIVELSICILIA PALERMO, PALERMO 0008

Start recording: 24/04/14 13:44:52      End recording: 24/04/14 14:14:53  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

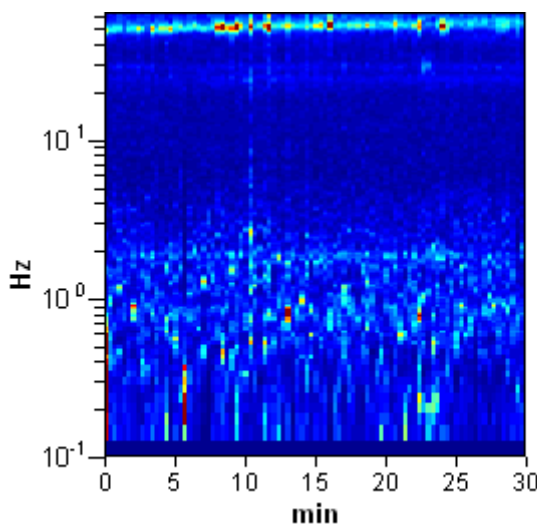
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

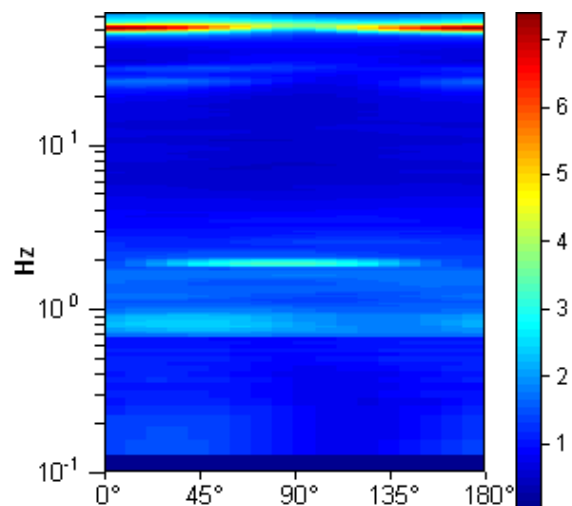
Max. H/V at  $0.75 \pm 0.1$  Hz. (In the range 0.0 - 40.0 Hz).



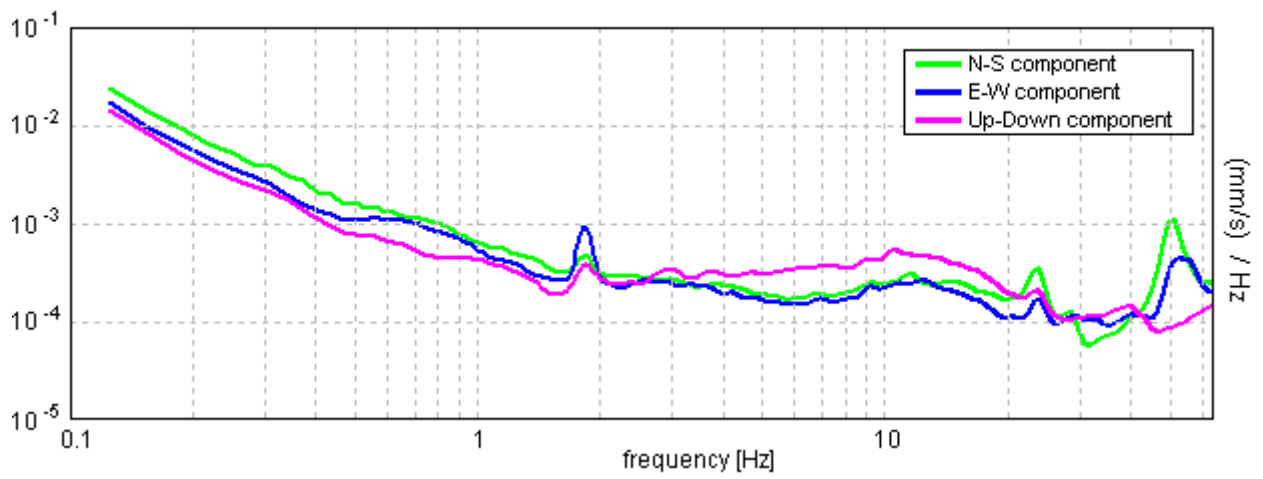
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $0.75 \pm 0.1$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.75 > 0.50$	OK	
$n_c(f_0) > 200$	$1350.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 37 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.688 Hz	OK	
$A_0 > 2$	$2.25 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.06403  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.04802 < 0.1125$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1728 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>				
<b>Nome base sismica</b>	0009				
<b>Coordinate</b>	<i>UTM</i>	4228669.38	N	352794.77	E
	<i>Gauss Boaga</i>	4228668.085	N	2372789.902	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	24/04/2014, 14:26				
<b>Nome file</b>	0009				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			



**Documentazione fotografica**

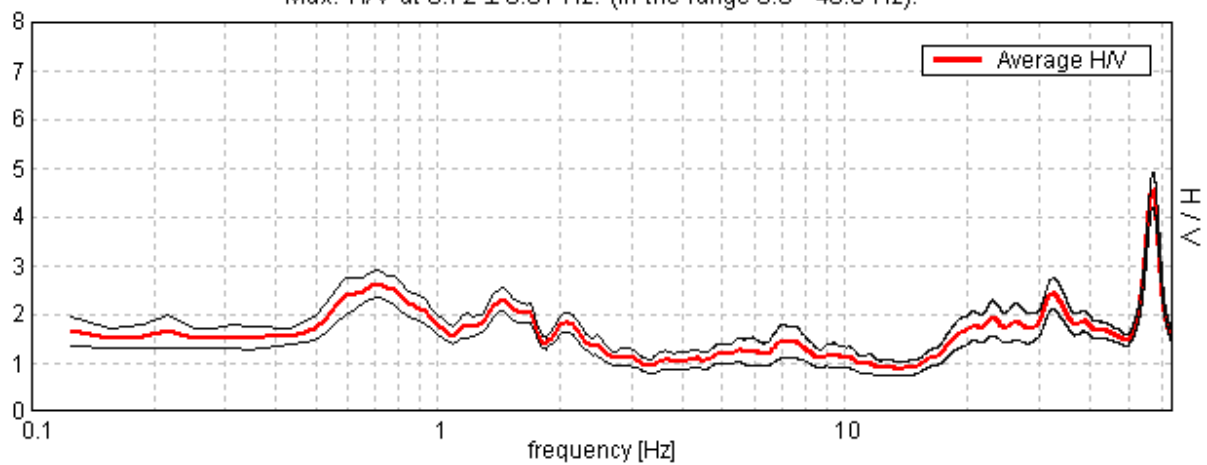
## TRIVELSICILIA PALERMO, PALERMO 0009

Start recording: 24/04/14 14:26:21      End recording: 24/04/14 14:56:22  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

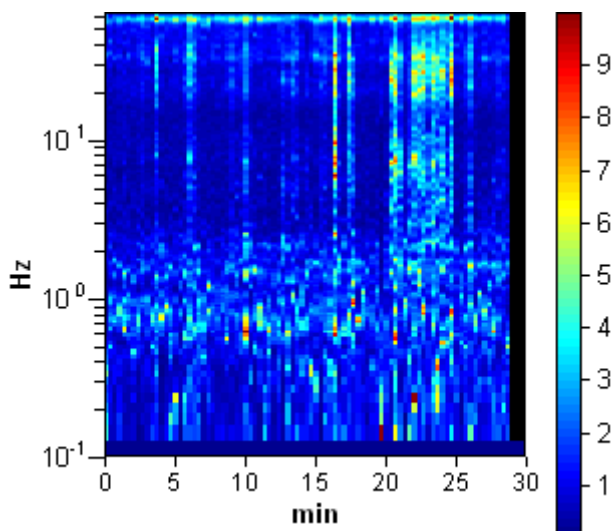
Trace length: 0h30'00".      Analyzed 97% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

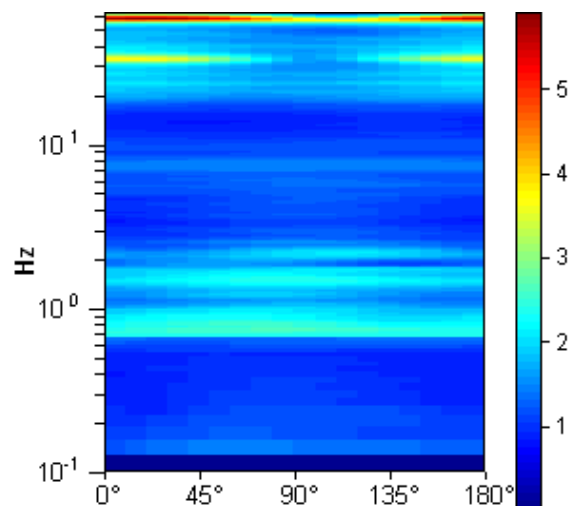
Max. H/V at  $0.72 \pm 0.01$  Hz. (In the range 0.0 - 40.0 Hz).



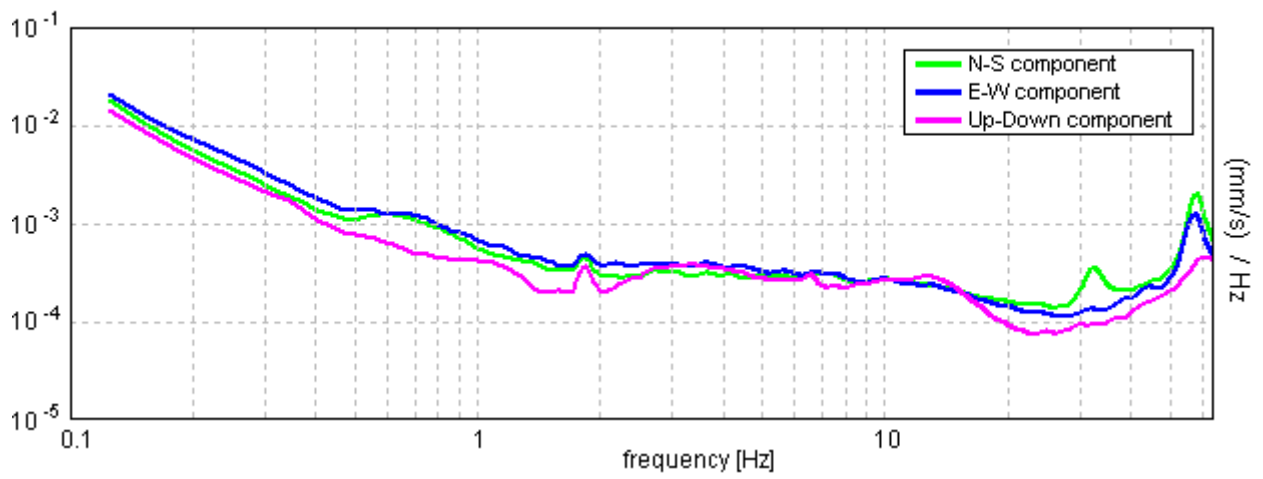
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 0.72 ± 0.01 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.72 > 0.50	OK	
$n_c(f_0) > 200$	1250.6 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 36 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.531 Hz	OK	
$A_0 > 2$	2.62 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00964  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.00693 < 0.10781$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1386 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>			
<b>Nome base sismica</b>		0010			
<b>Coordinate</b>	<i>UTM</i>	4228627.67	N	352375.46	E
	<i>Gauss Boaga</i>	4228626.368	N	2372370.571	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		24/04/2014, 15:11			
<b>Nome file</b>		0010			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

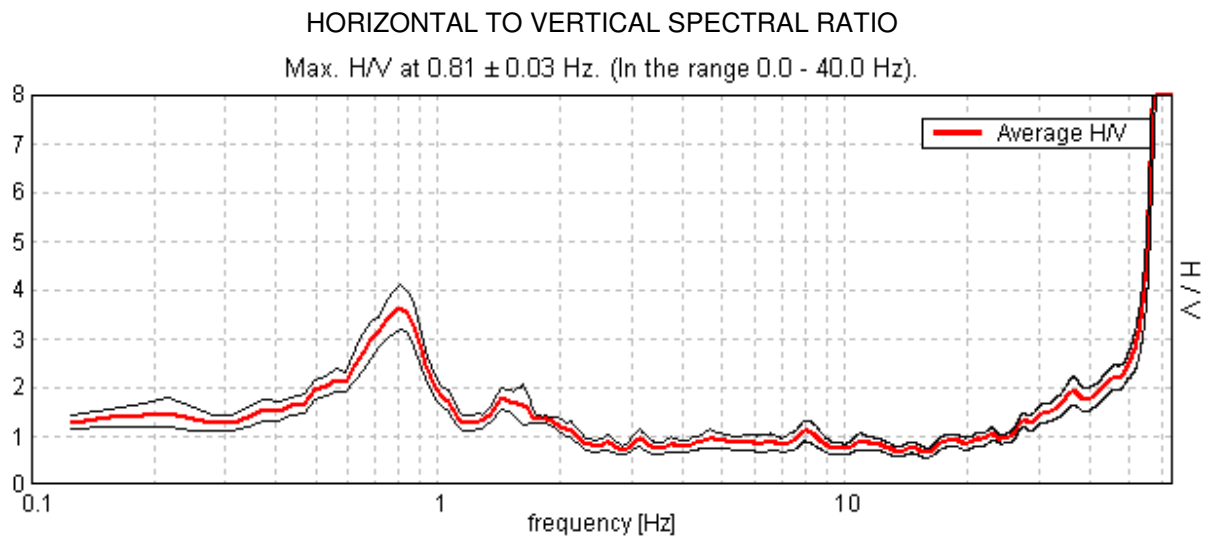


**Documentazione fotografica**

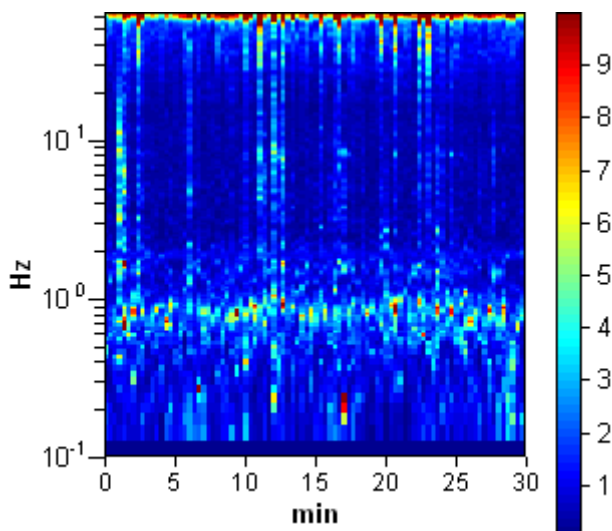
## TRIVELSICILIA PALERMO, PALERMO 0010

Start recording: 24/04/14 15:12:04      End recording: 24/04/14 15:42:05  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

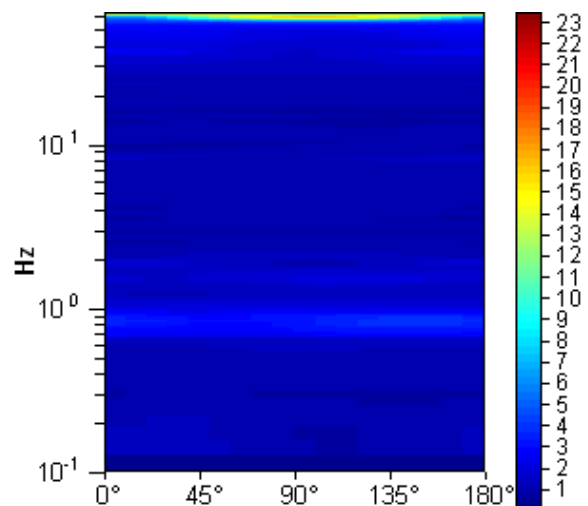
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



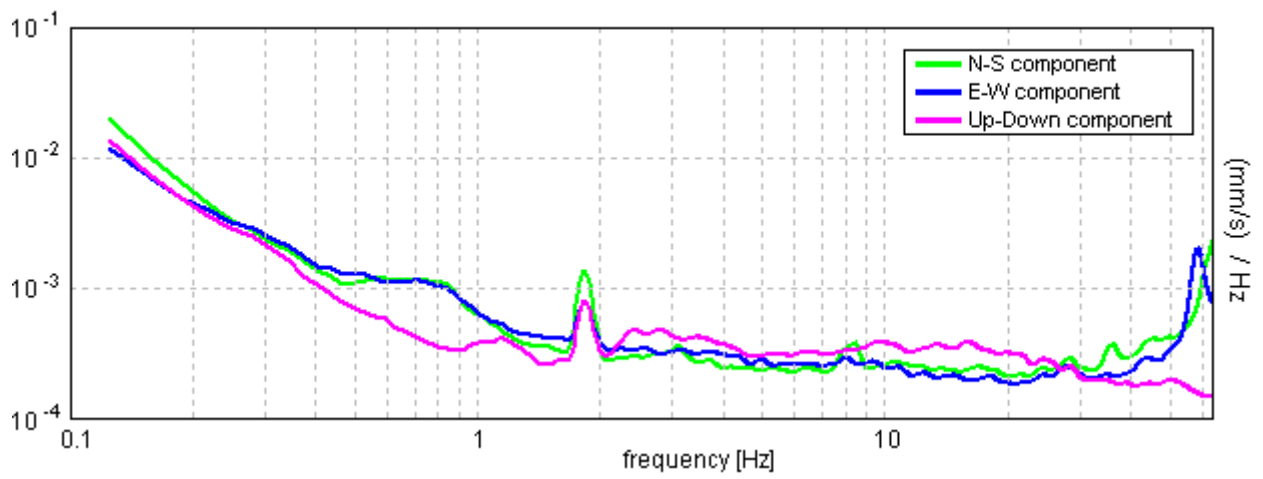
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 0.81 ± 0.03 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.81 > 0.50	OK	
$n_c(f_0) > 200$	1462.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 40 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.469 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.031 Hz	OK	
$A_0 > 2$	3.64 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01571  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01277 < 0.12188$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2267 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0011			
<b>Coordinate</b>	UTM	4228628.28	N	352003.15	E
	Gauss Boaga	4228626.973	N	2371998.244	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		24/04/2014, 15:51			
<b>Nome file</b>		0011			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>No</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			



**Documentazione fotografica**

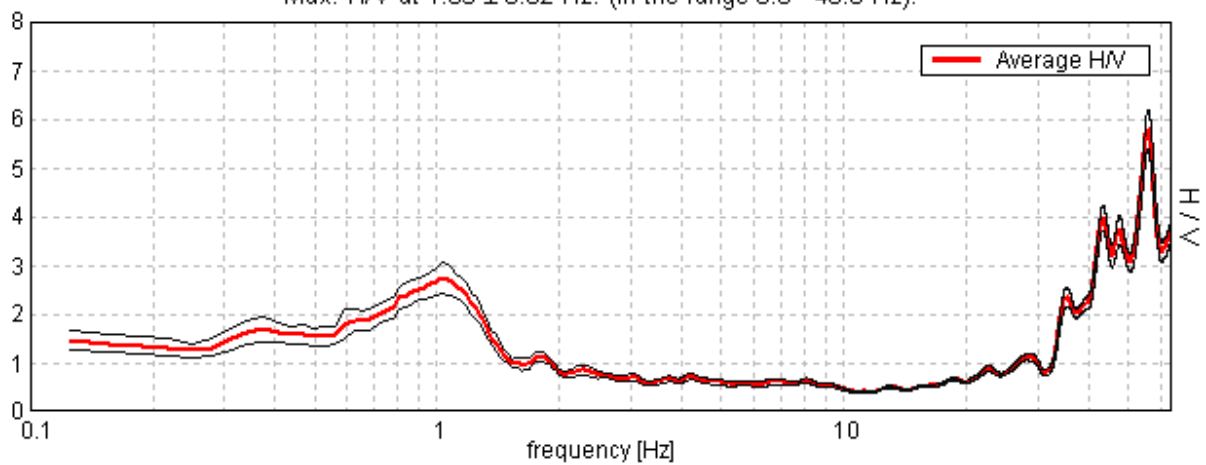
## TRIVELSICILIA PALERMO, PALERMO 0011

Start recording: 24/04/14 15:51:04      End recording: 24/04/14 16:21:05  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

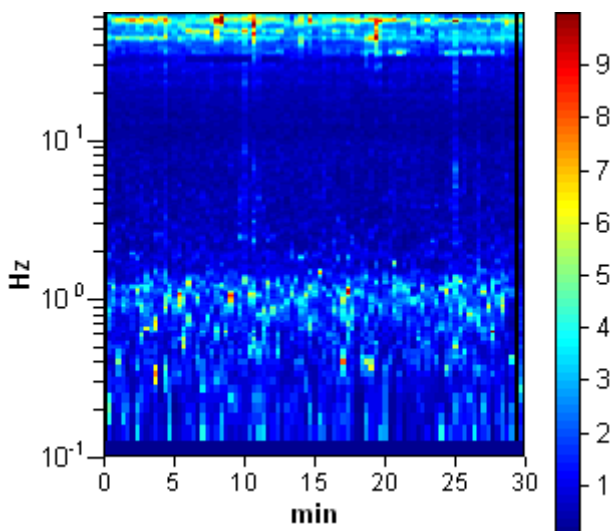
Trace length: 0h30'00".      Analyzed 98% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

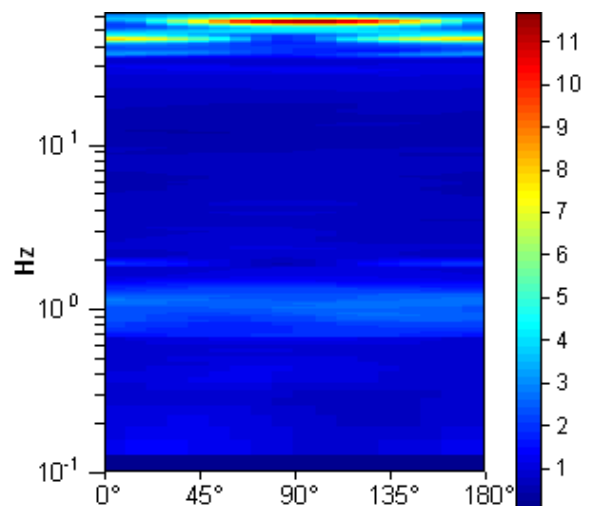
Max. H/V at  $1.03 \pm 0.02$  Hz. (In the range 0.0 - 40.0 Hz).



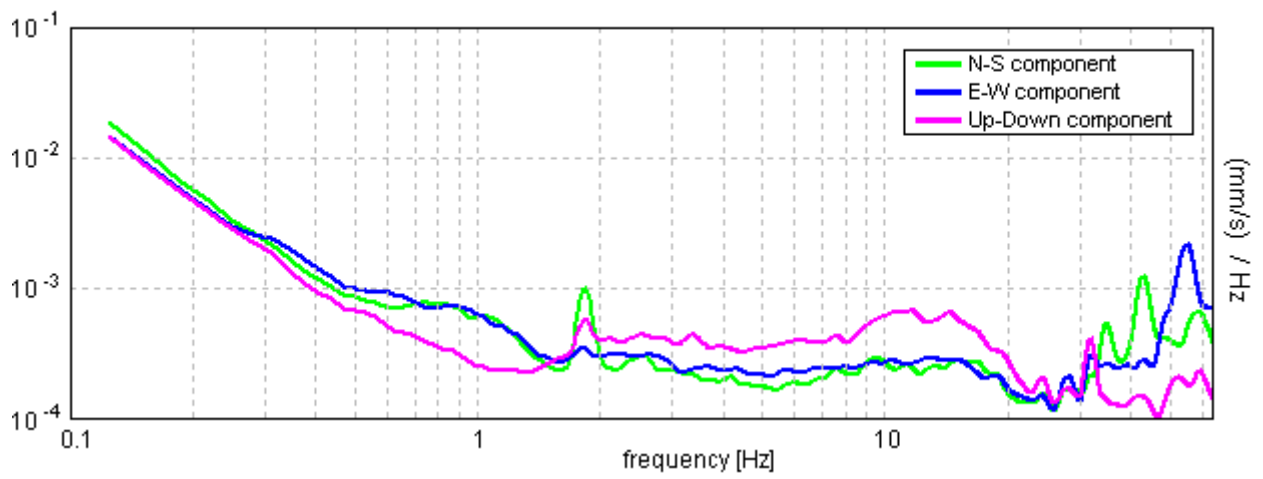
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.03 ± 0.02 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.03 > 0.50	OK	
$n_c(f_0) > 200$	1815.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 50 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.281 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.438 Hz	OK	
$A_0 > 2$	2.73 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01153  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.01189 < 0.10313	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1634 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0012			
<b>Coordinate</b>	<i>UTM</i>	4228663.49	N	351594.98	E
	<i>Gauss Boaga</i>	4228662.179	N	2371590.056	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia, Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		28/04/2014, 12:33			
<b>Nome file</b>		0012			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			



**Documentazione fotografica**

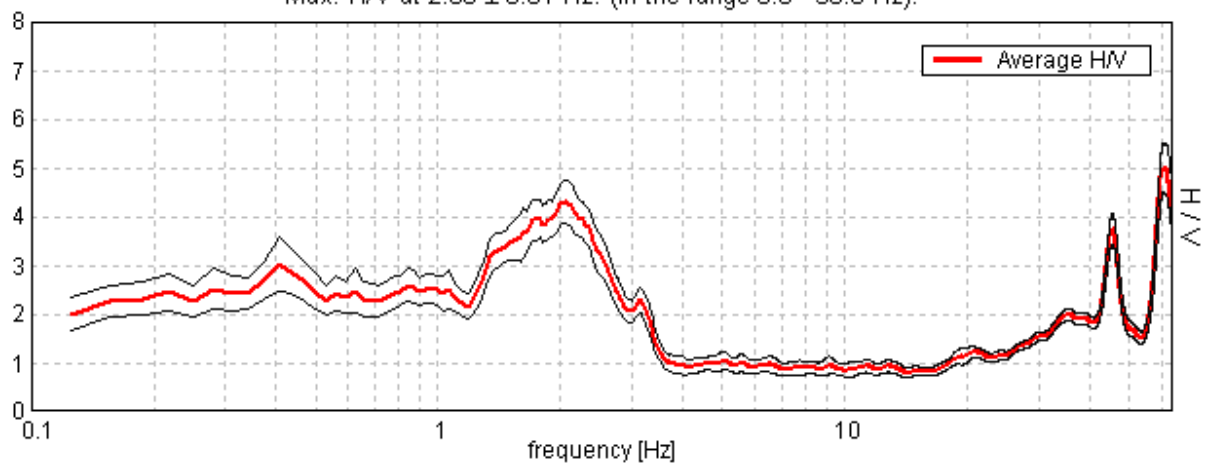
## TRIVELSICILIA PALERMO, PALERMO 0012

Start recording: 28/04/14 12:34:22      End recording: 28/04/14 13:04:23  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

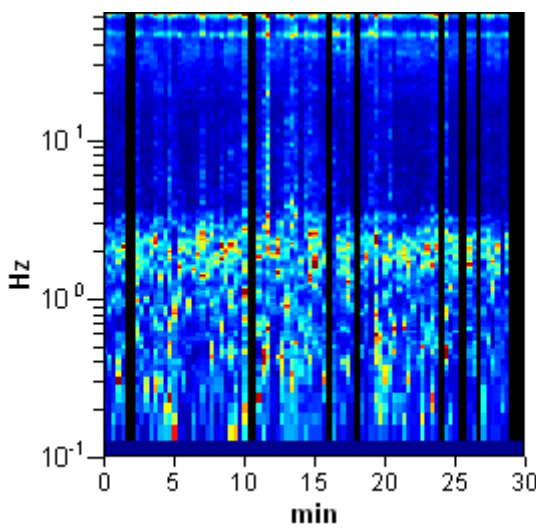
Trace length: 0h30'00".      Analyzed 86% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

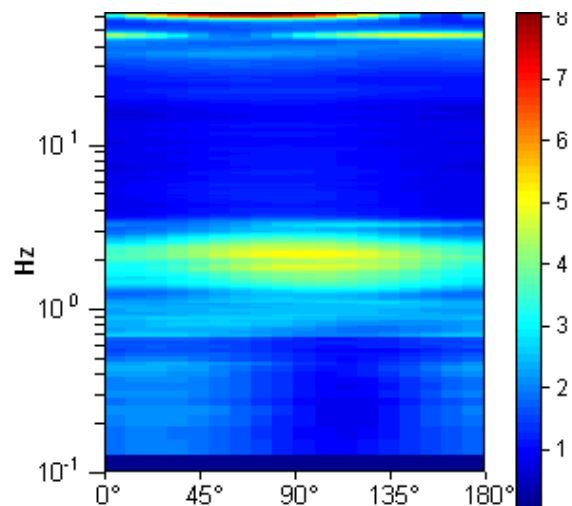
Max. H/V at  $2.06 \pm 0.01$  Hz. (In the range 0.0 - 30.0 Hz).



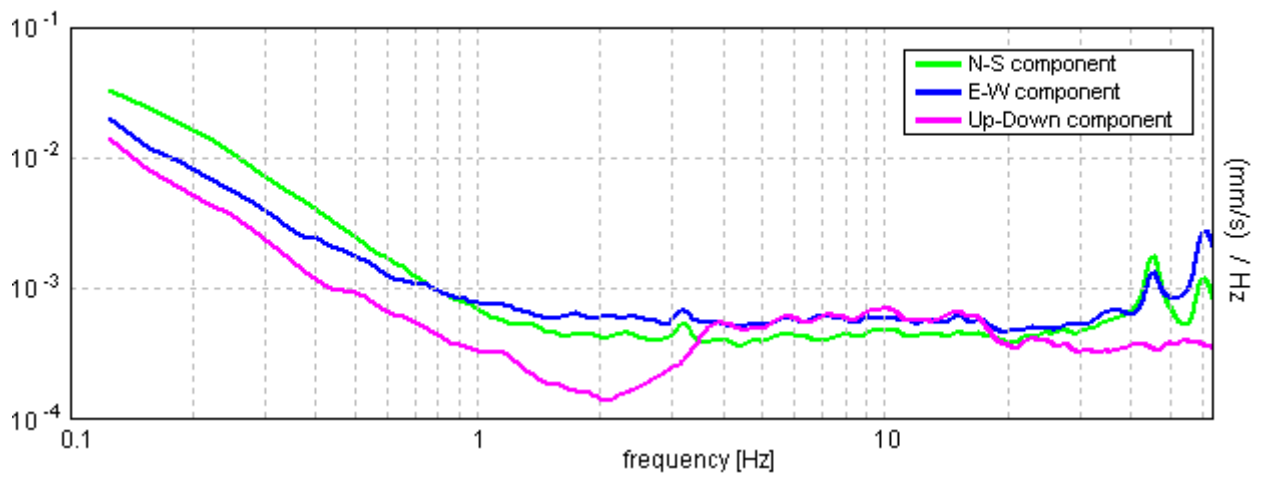
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 2.06 ± 0.01 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.06 > 0.50	OK	
$n_c(f_0) > 200$	3176.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 100 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	1.188 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.906 Hz	OK	
$A_0 > 2$	4.30 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00328  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.00677 < 0.10313$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2262 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

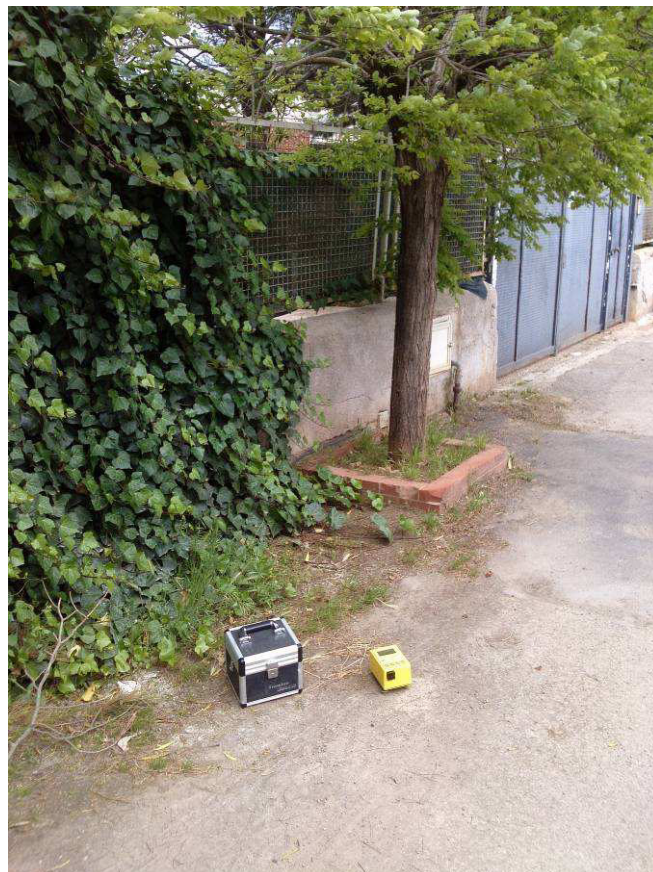
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0013			
<b>Coordinate</b>	UTM	4228245.57	N	351516.76	E
	Gauss Boaga	4228244.241	N	2371511.818	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia, Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		28/04/2014, 11:55			
<b>Nome file</b>		0013			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			



**Documentazione fotografica**

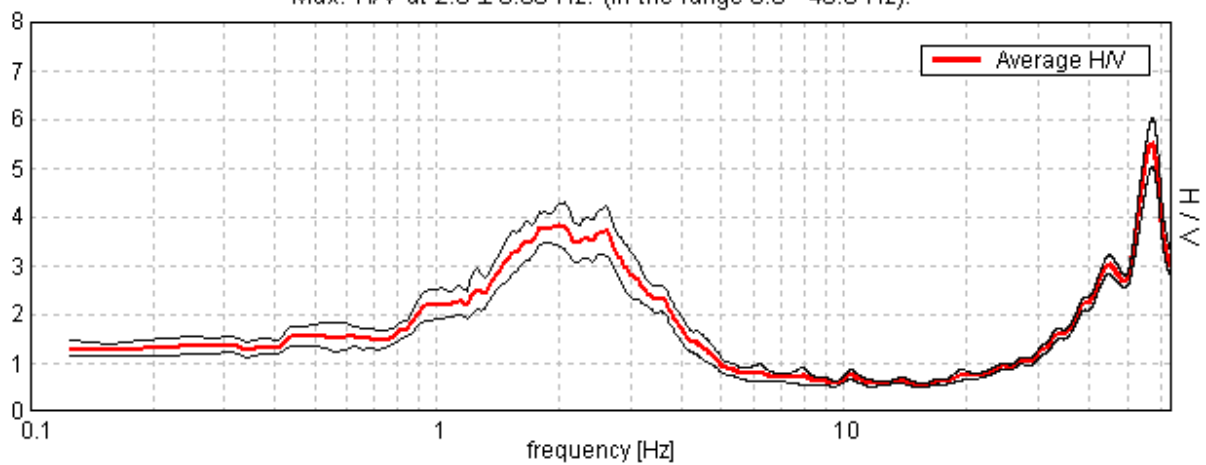
## TRIVELSICILIA PALERMO, PALERMO 0013

Start recording: 28/04/14 11:55:46      End recording: 28/04/14 12:25:47  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

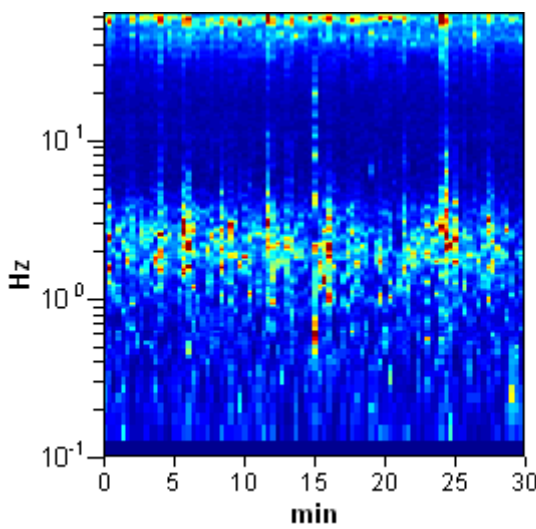
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

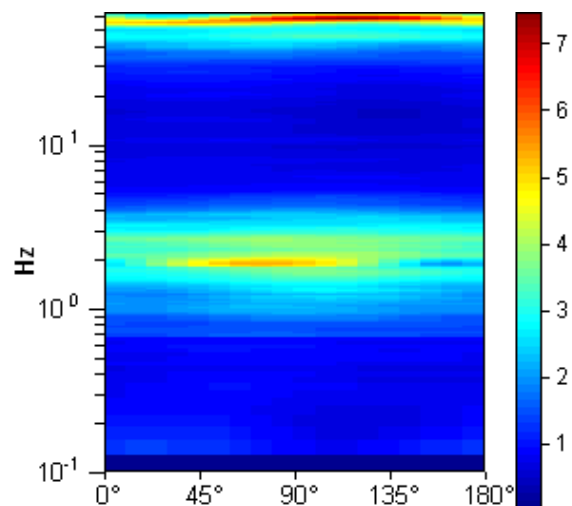
Max. H/V at  $2.0 \pm 0.08$  Hz. (In the range 0.0 - 40.0 Hz).



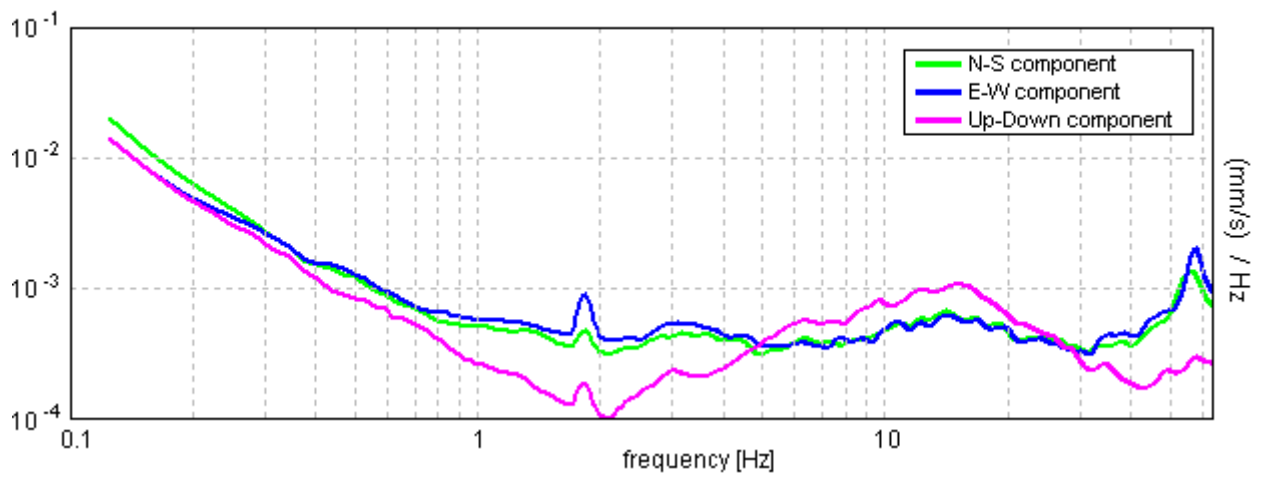
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $2.0 \pm 0.08$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$2.00 > 0.50$	OK	
$n_c(f_0) > 200$	$3600.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 97 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.875 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	3.844 Hz	OK	
$A_0 > 2$	$3.82 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01919  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.03839 < 0.1$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2196 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0014			
<b>Coordinate</b>	UTM	4228189.18	N	351902.67	E
	Gauss Boaga	4228187.853	N	2371897.744	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		29/04/2014, 09:54			
<b>Nome file</b>		0014			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	Si			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	No			
	<b>Altro</b>	No			

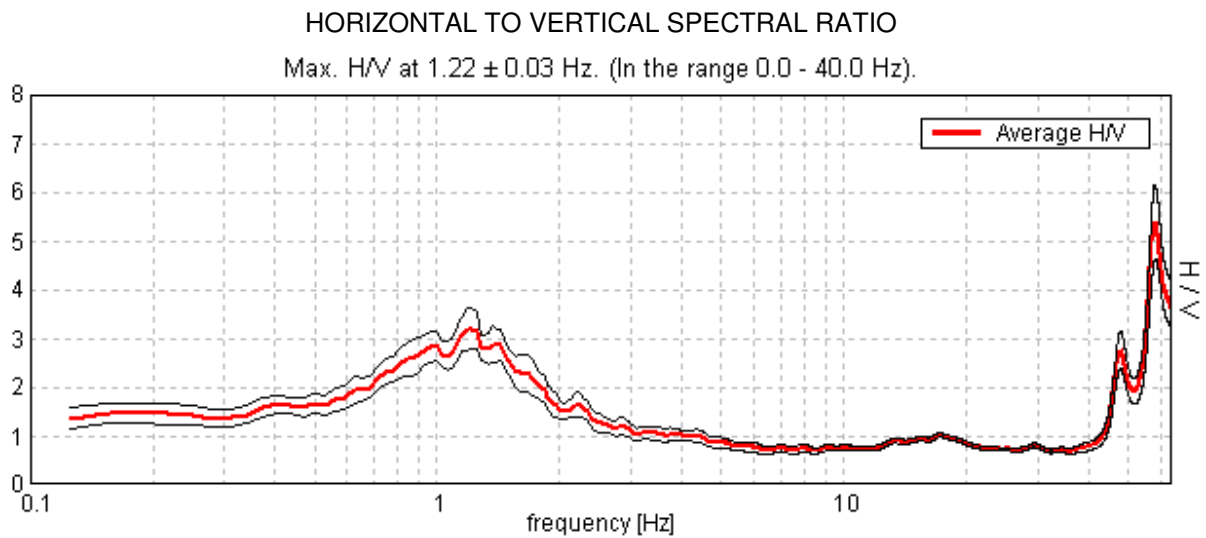


**Documentazione fotografica**

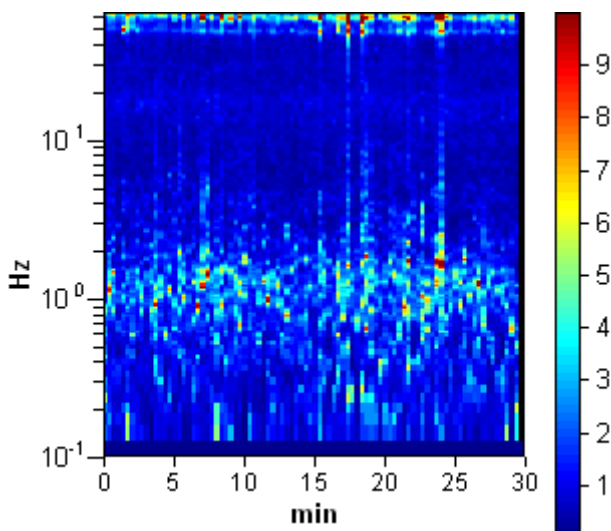
## TRIVELSICILIA PALERMO, PALERMO 0014

Start recording: 29/04/14 09:54:46      End recording: 29/04/14 10:24:47  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

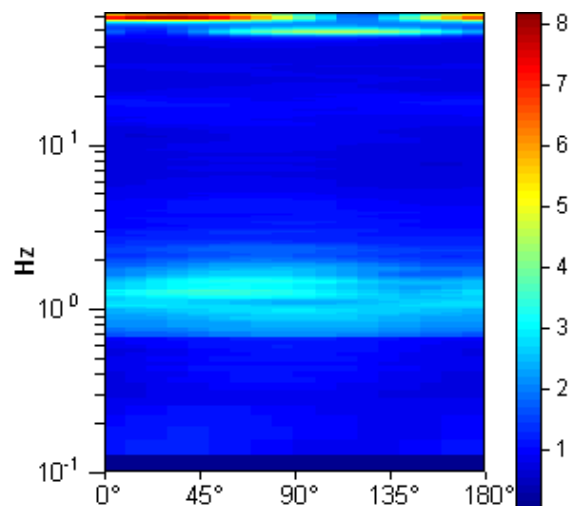
Trace length: 0h30'00".      Analyzed 99% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



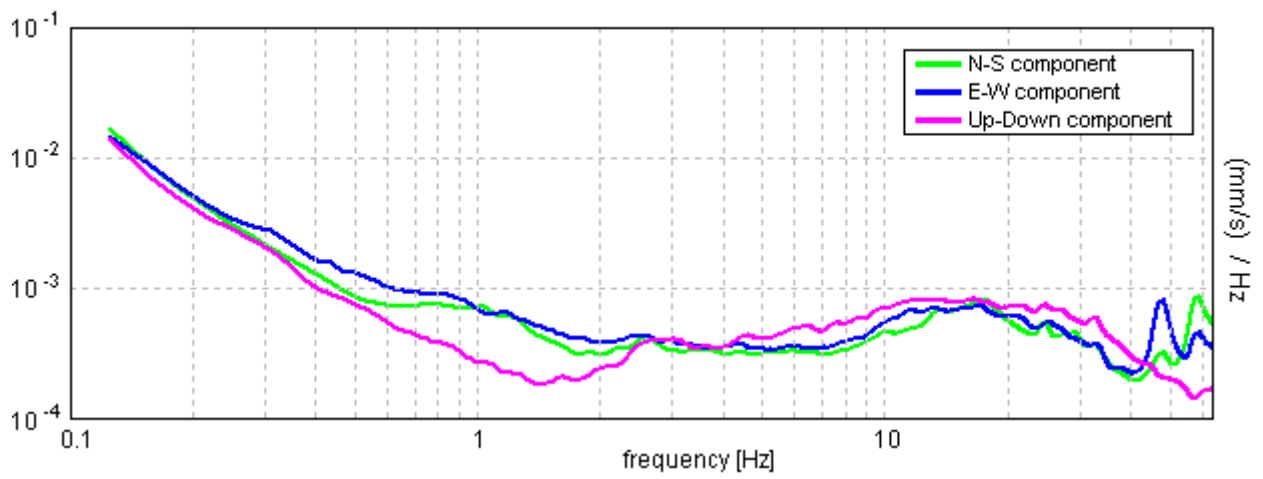
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.22 ± 0.03 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.22 > 0.50	OK	
$n_c(f_0) > 200$	2169.4 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 60 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.469 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.0 Hz	OK	
$A_0 > 2$	3.19 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01189  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.01449 < 0.12188	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.2088 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0015			
<b>Coordinate</b>	UTM	4228266.49	N	352398.09	E
	Gauss Boaga	4228265.173	N	2372393.190	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		29/04/2014, 09:10			
<b>Nome file</b>		0015			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>No</b>	
	<b>Pedoni</b>			<b>No</b>	
	<b>Altro</b>			<b>No</b>	

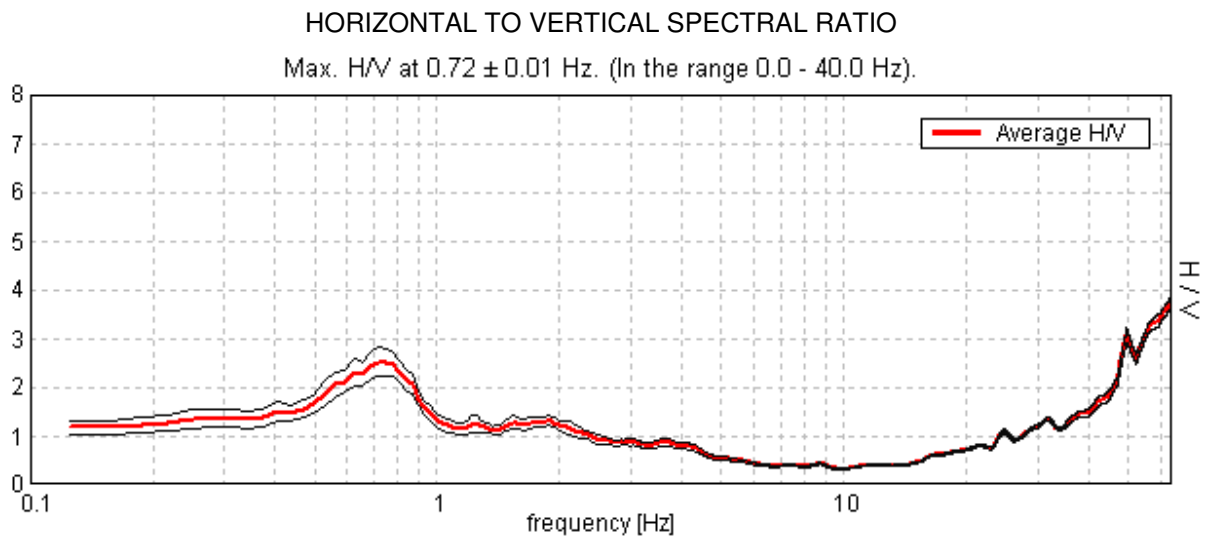


**Documentazione fotografica**

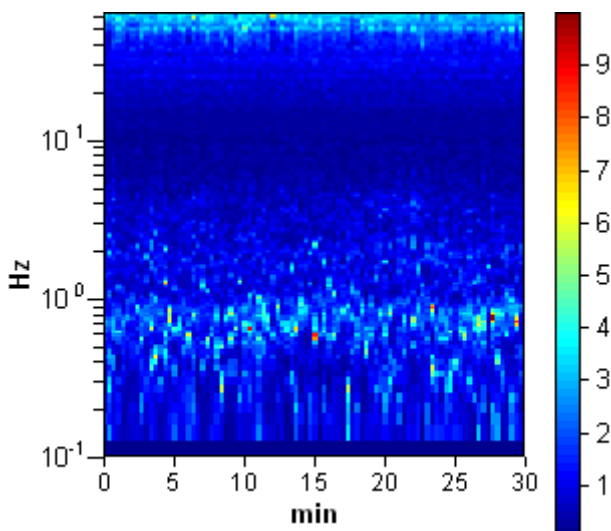
## TRIVELSICILIA PALERMO, PALERMO 0015

Start recording: 29/04/14 09:09:12      End recording: 29/04/14 09:39:13  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

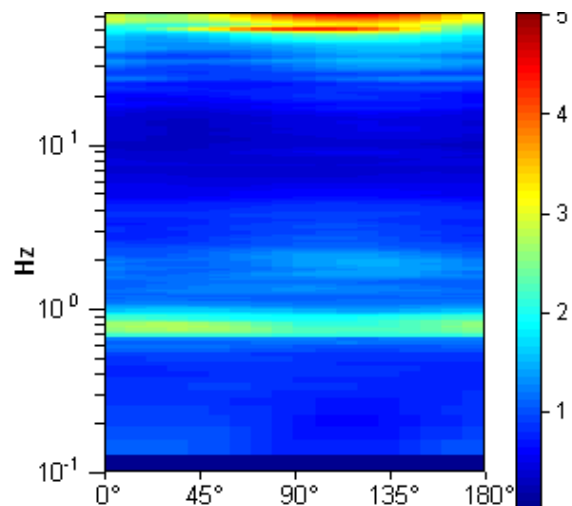
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



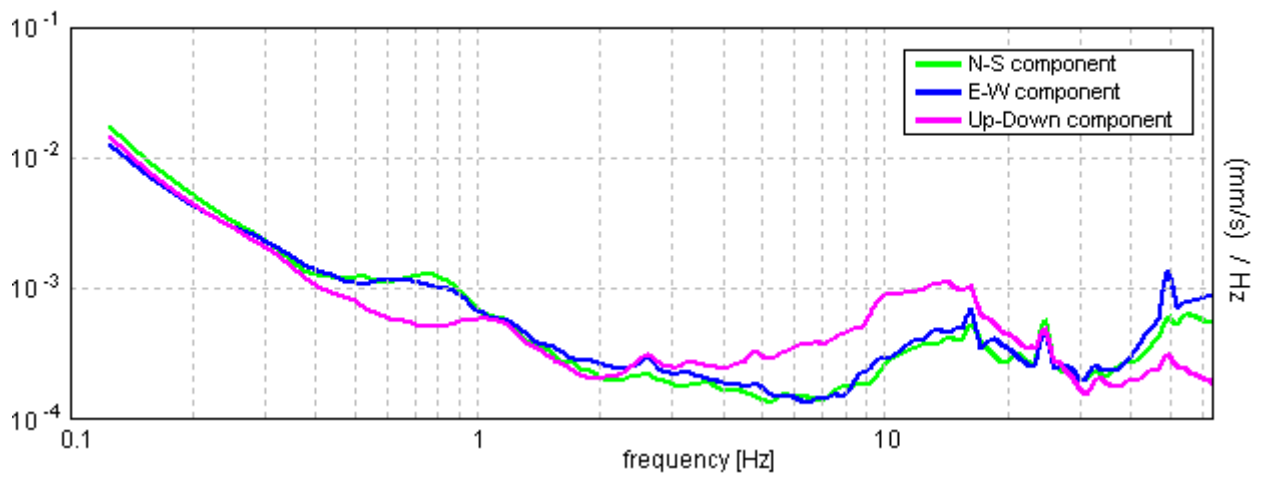
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 0.72 ± 0.01 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.72 > 0.50	OK	
$n_c(f_0) > 200$	1293.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 36 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.188 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.031 Hz	OK	
$A_0 > 2$	2.51 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00845  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.00607 < 0.10781	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1481 < 2.0	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0016			
<b>Coordinate</b>	UTM	4228123.84	N	352782.44	E
	Gauss Boaga	4228122.522	N	2372777.553	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		29/04/2014, 08:30			
<b>Nome file</b>		0016			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

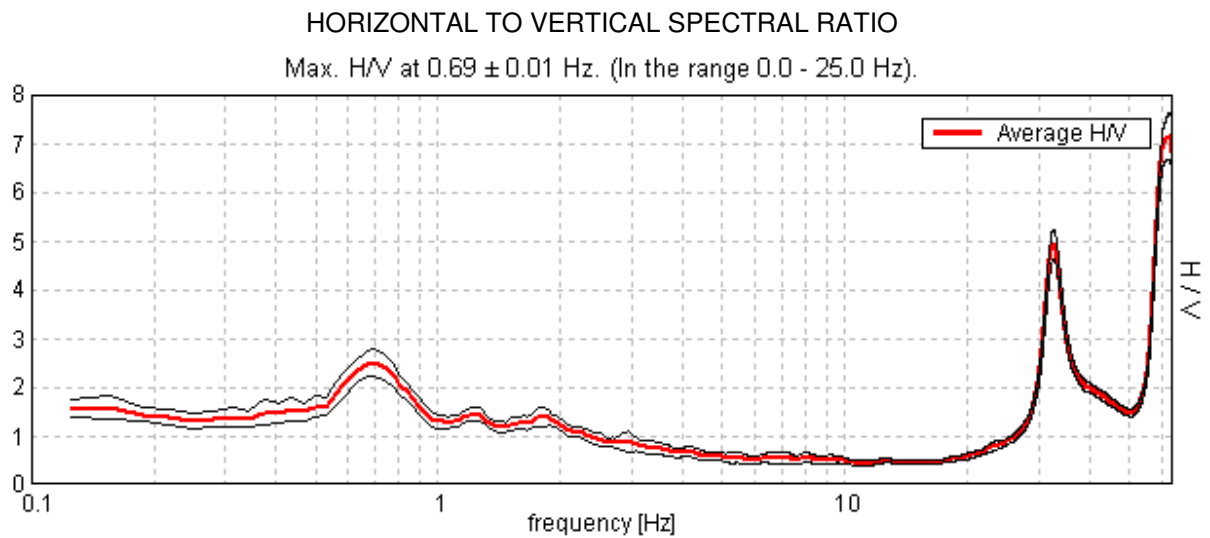


**Documentazione fotografica**

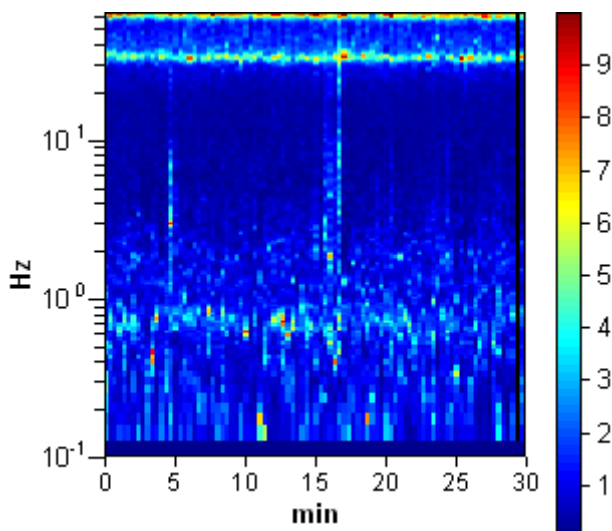
## TRIVELSICILIA PALERMO, PALERMO 0016

Start recording: 29/04/14 08:30:02      End recording: 29/04/14 09:00:03  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

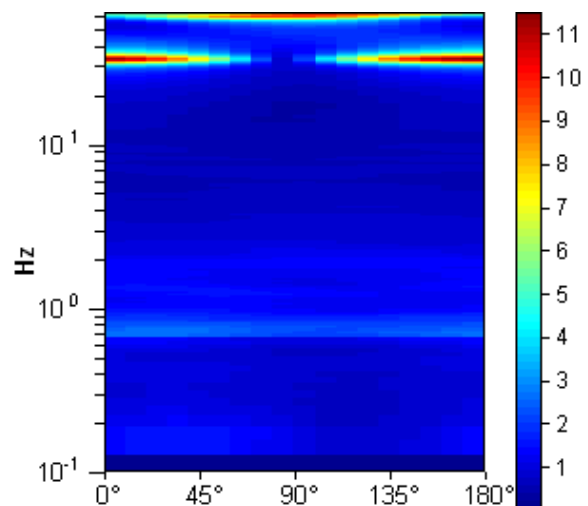
Trace length: 0h30'00".      Analyzed 99% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



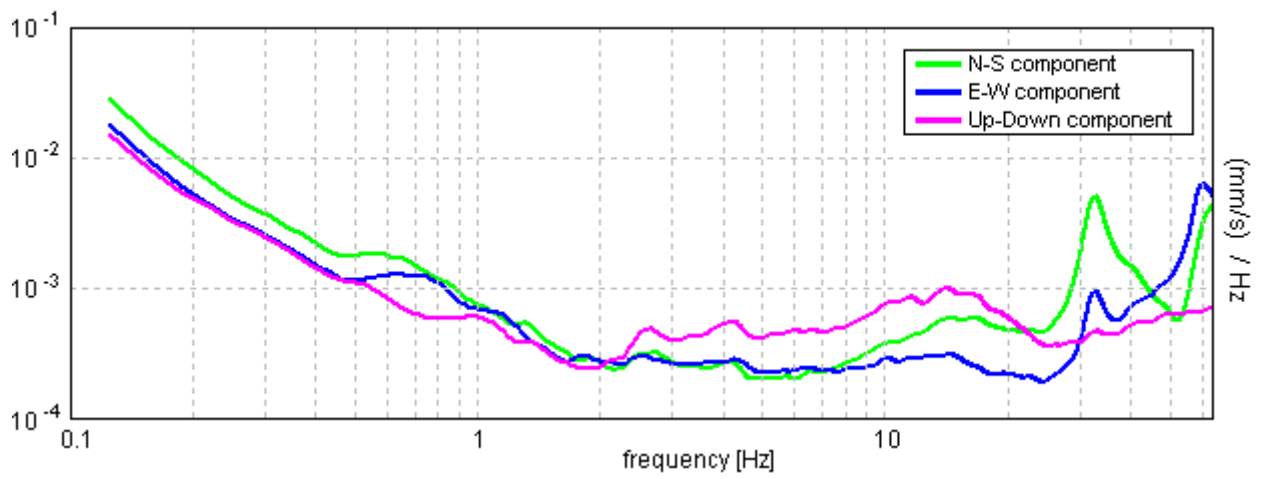
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 0.69 ± 0.01 Hz. (in the range 0.0 - 25.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.69 > 0.50	OK	
$n_c(f_0) > 200$	1223.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 34 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.344 Hz	OK	
$A_0 > 2$	2.50 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00858  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.0059 < 0.10313	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1469 < 2.0	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0017			
<b>Coordinate</b>	<i>UTM</i>	4228206.35	N	353163.57	E
	<i>Gauss Boaga</i>	4228205.040	N	2373158.703	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		29/04/2014, 07:50			
<b>Nome file</b>		0017			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

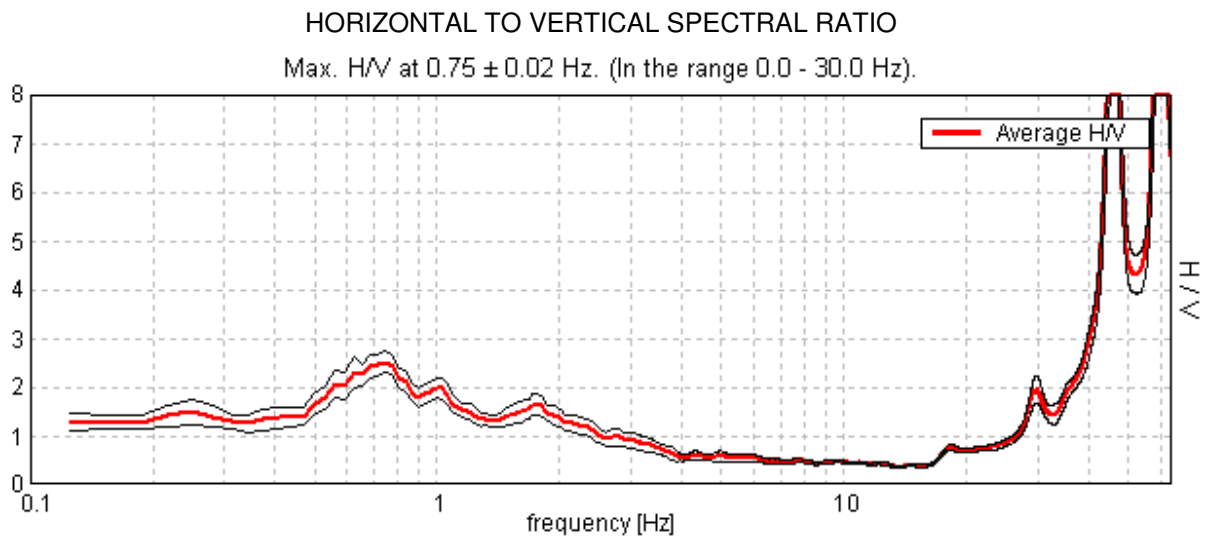


**Documentazione fotografica**

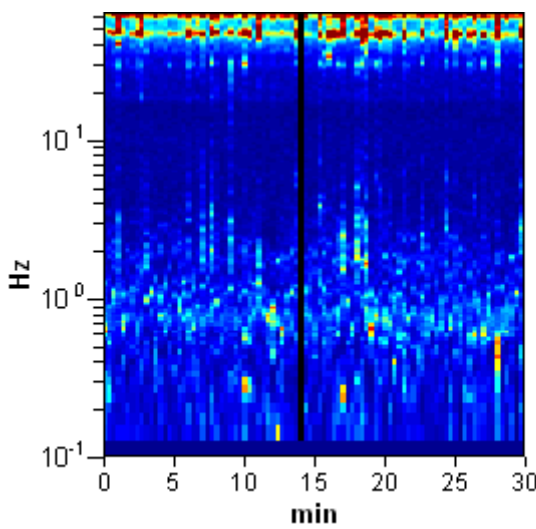
## TRIVELSICILIA PALERMO, PALERMO 0017

Start recording: 29/04/14 07:50:51      End recording: 29/04/14 08:20:52  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

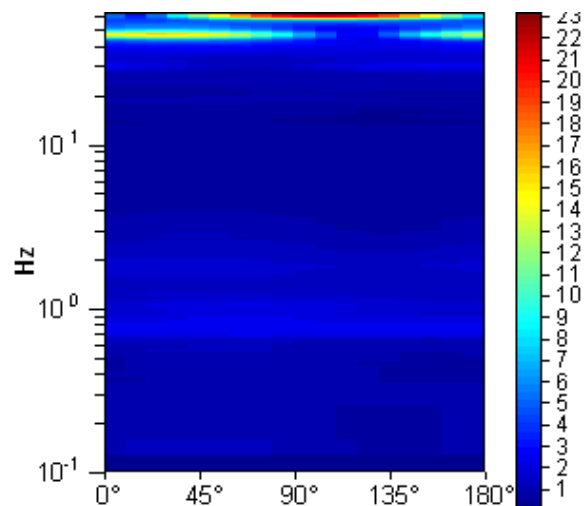
Trace length: 0h30'00".      Analyzed 99% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



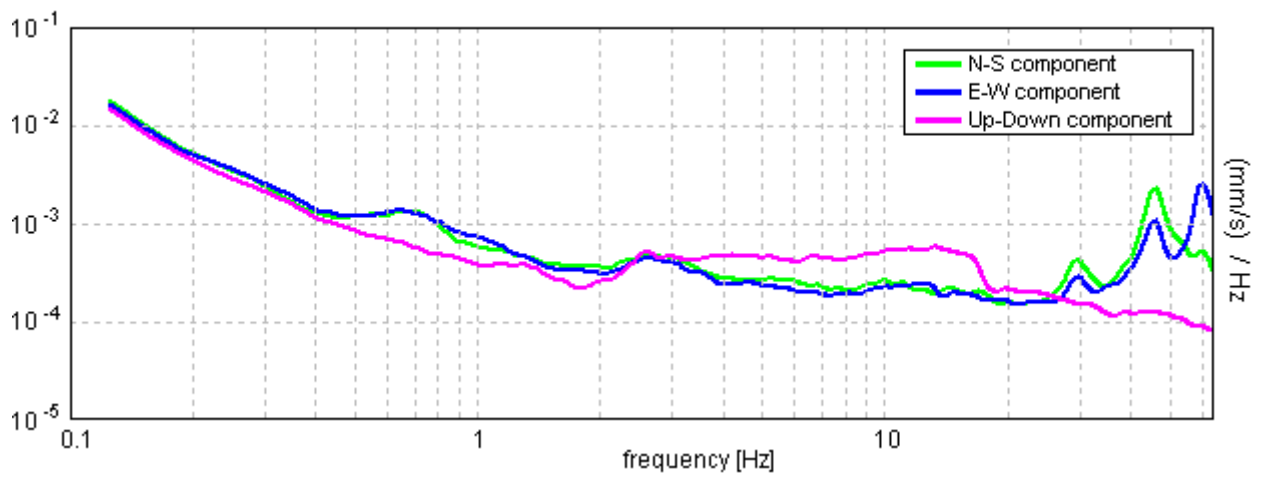
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $0.75 \pm 0.02$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.75 > 0.50$	OK	
$n_c(f_0) > 200$	$1335.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 37 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.344 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.094 Hz	OK	
$A_0 > 2$	$2.52 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01068  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.00801 < 0.1125$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.116 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>				
<b>Nome base sismica</b>	0018				
<b>Coordinate</b>	<i>UTM</i>	4227897.54	N	353189.62	E
	<i>Gauss Boaga</i>	4227896.218	N	2373184.744	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	30/04/2014, 07:40				
<b>Nome file</b>	0018				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Terreno				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			

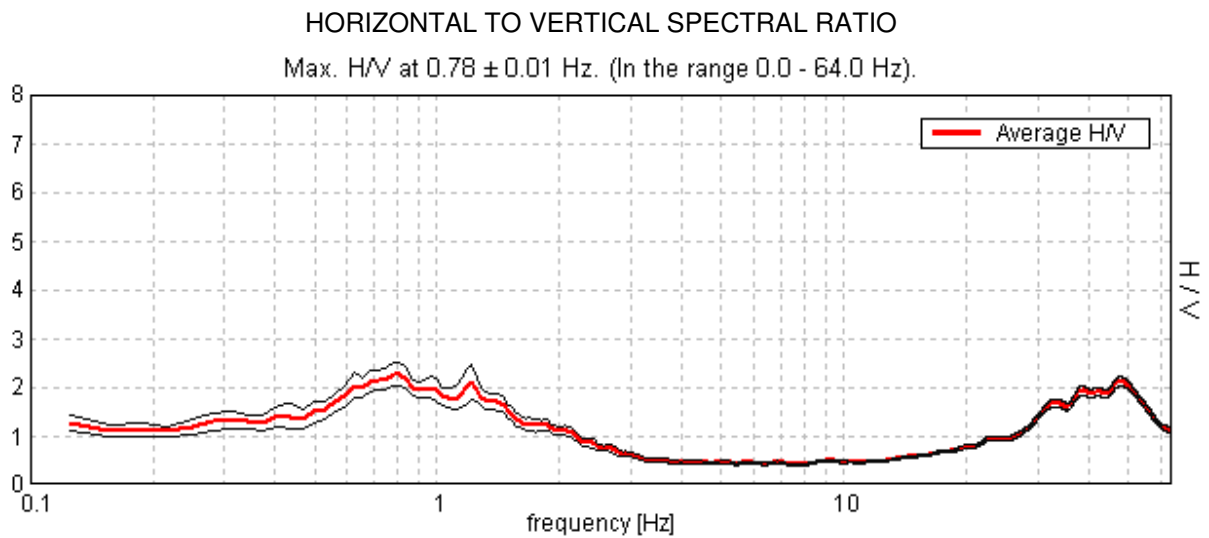


**Documentazione fotografica**

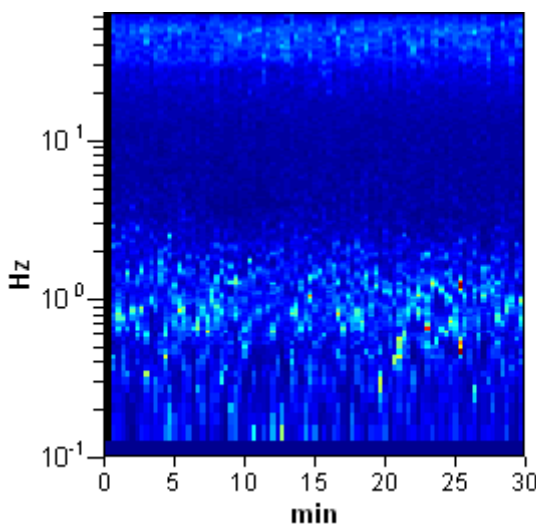
## TRIVELSICILIA PALERMO, PALERMO 0018

Start recording: 30/04/14 07:39:23      End recording: 30/04/14 08:09:24  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

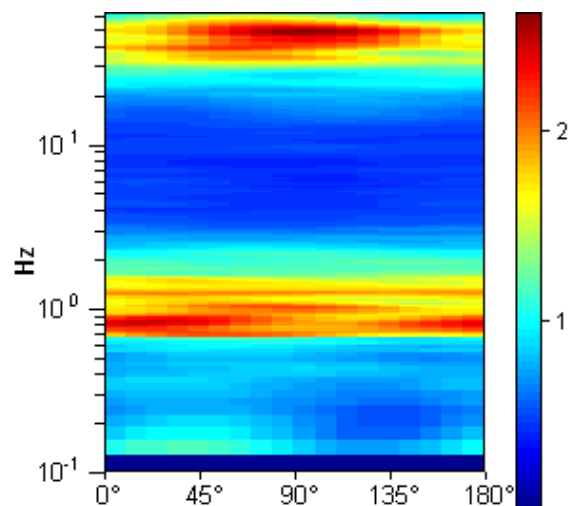
Trace length: 0h30'00".      Analyzed 98% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



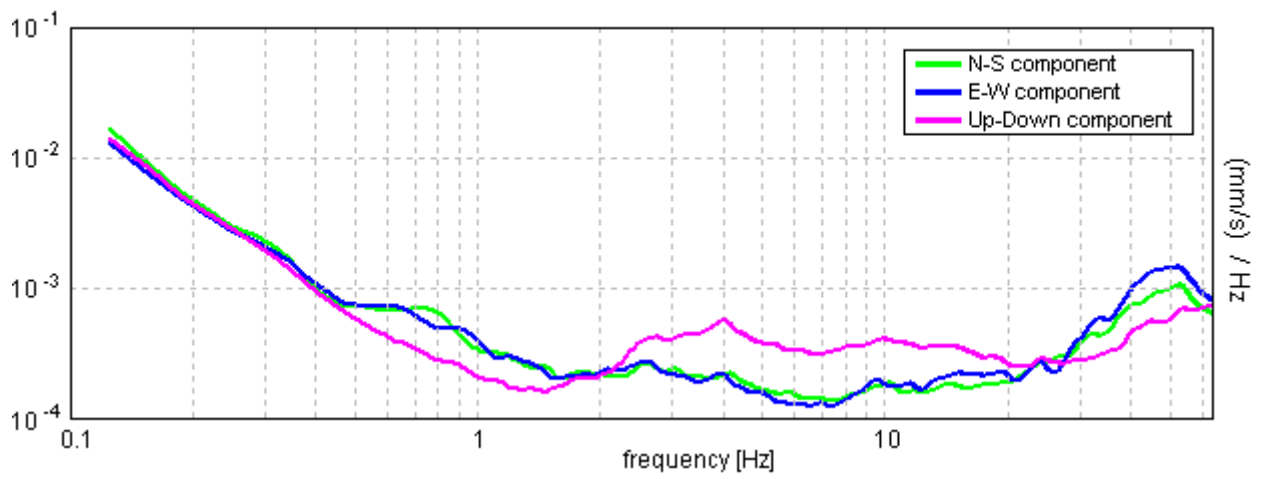
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $0.78 \pm 0.01$  Hz. (in the range 0.0 - 64.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.78 > 0.50$	OK	
$n_c(f_0) > 200$	$1375.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 38 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.219 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	1.938 Hz	OK	
$A_0 > 2$	$2.26 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.0067  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.00523 < 0.11719$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1242 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0019			
<b>Coordinate</b>	UTM	4227850.52	N	352721.50	E
	Gauss Boaga	4227849.190	N	2372716.601	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		07/05/2014, 07:43			
<b>Nome file</b>		0019			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			



**Documentazione fotografica**

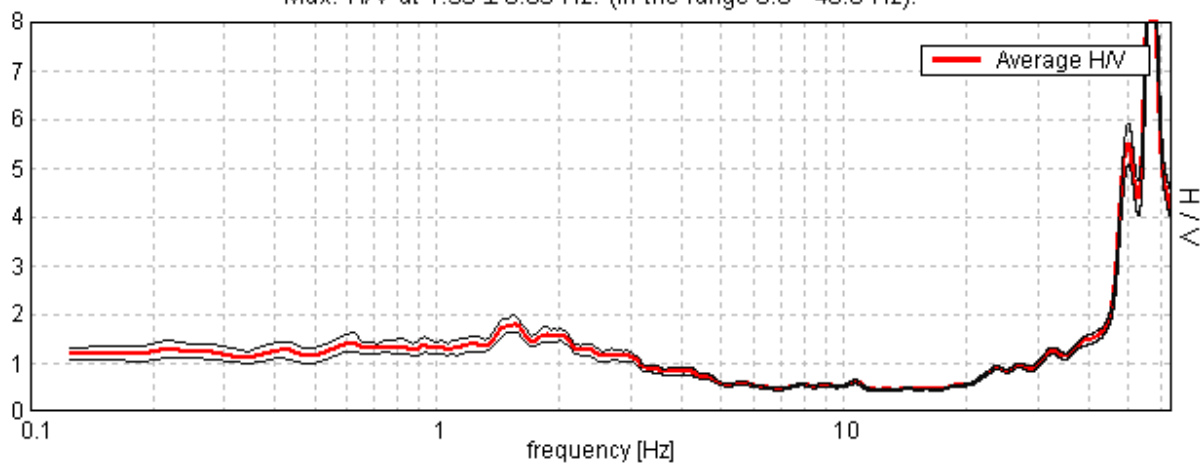
## TRIVELSICILIA PALERMO, PALERMO 0019

Start recording: 07/05/14 07:44:17      End recording: 07/05/14 08:14:18  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

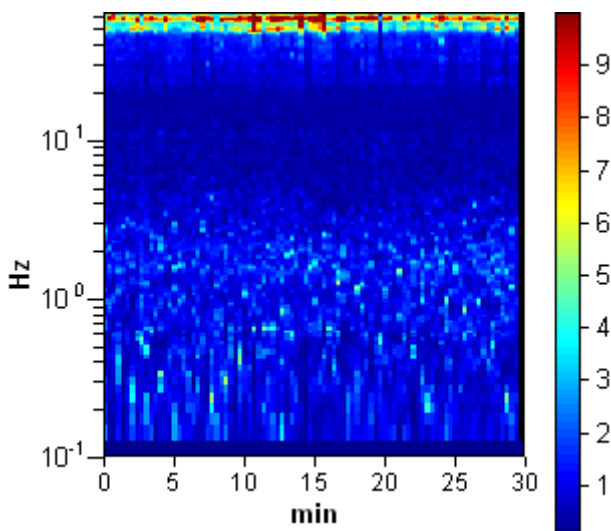
Trace length: 0h30'00".      Analyzed 99% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

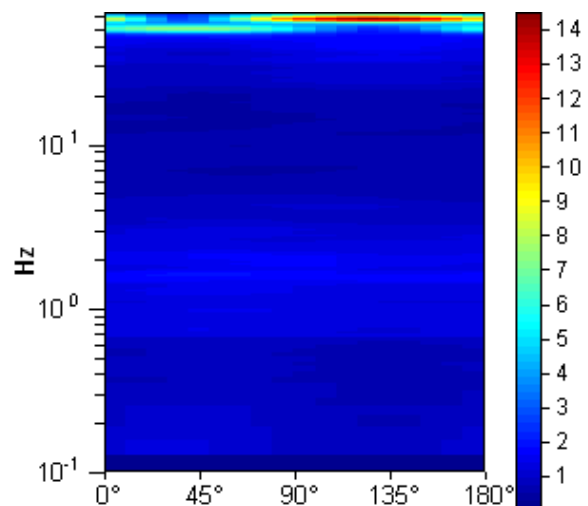
Max. H/V at  $1.53 \pm 0.05$  Hz. (In the range 0.0 - 40.0 Hz).



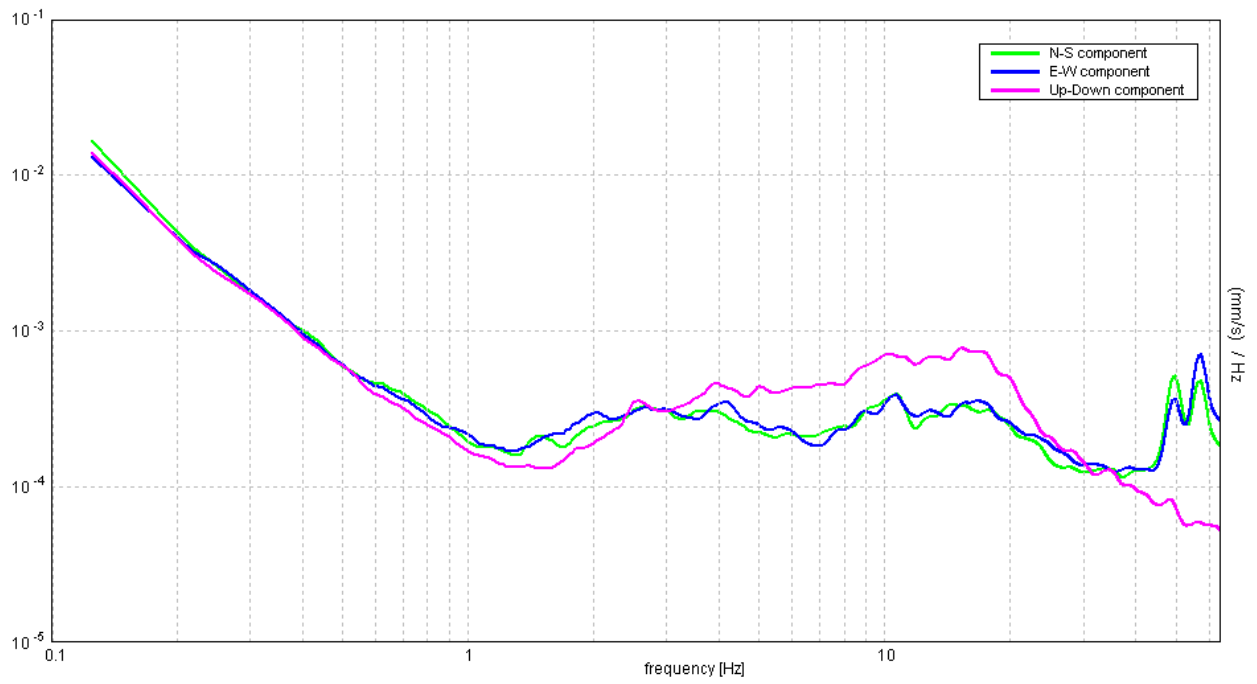
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.53 ± 0.05 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.53 > 0.50	OK	
$n_c(f_0) > 200$	2725.6 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 74 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	3.25 Hz	OK	
$A_0 > 2$	1.80 > 2		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.0176  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02694 < 0.15313$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.0819 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0020			
<b>Coordinate</b>	UTM	4227782.00	N	352367.00	E
	Gauss Boaga	4227780.662	N	2372362.082	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia, Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		23/04/2014, 10:40			
<b>Nome file</b>		0020			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>Si</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>No</b>	
	<b>Altro</b>			<b>No</b>	

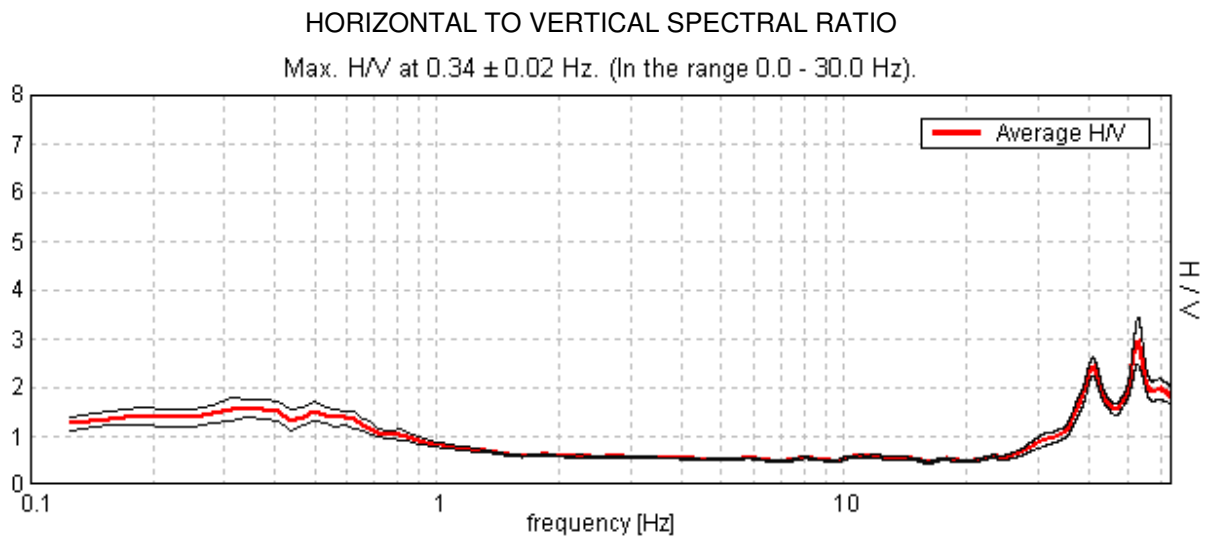


**Documentazione fotografica**

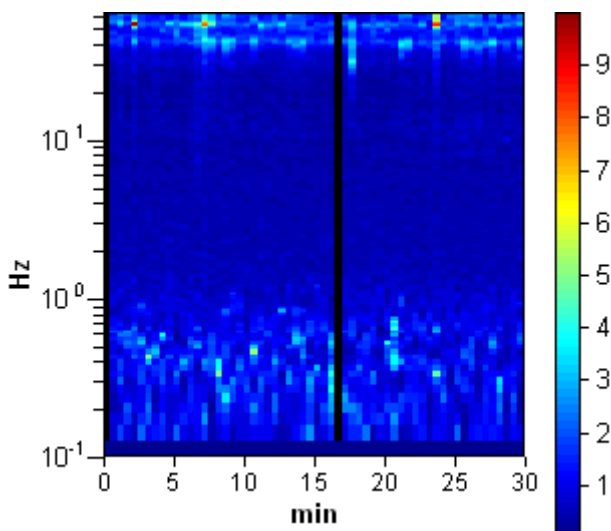
## TRIVELSICILIA PALERMO, PALERMO 0020

Start recording: 23/04/14 10:39:32      End recording: 23/04/14 11:09:33  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

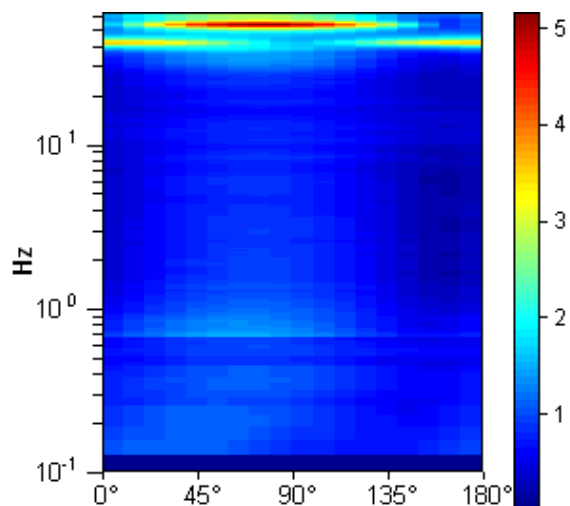
Trace length: 0h30'00".      Analyzed 97% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 30 s  
Smoothing window: Triangular window  
Smoothing: 5%



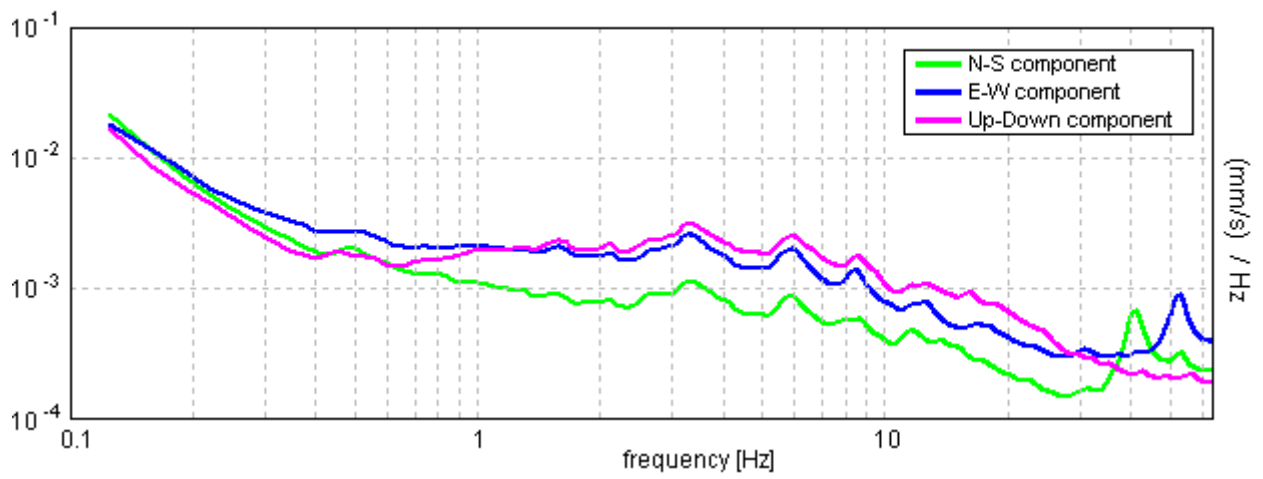
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $0.34 \pm 0.02$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.34 > 0.33$	OK	
$n_c(f_0) > 200$	$598.1 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 18 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.094 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	1.063 Hz	OK	
$A_0 > 2$	$1.56 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03139  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01079 < 0.06875$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.0875 < 2.5$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0021				
<b>Coordinate</b>	<i>UTM</i>	4227847.99	N	352013.26	E
	<i>Gauss Boaga</i>	4227846.651	N	2372008.327	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia, Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	28/04/2014, 11:17				
<b>Nome file</b>	0021				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapièpe				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			

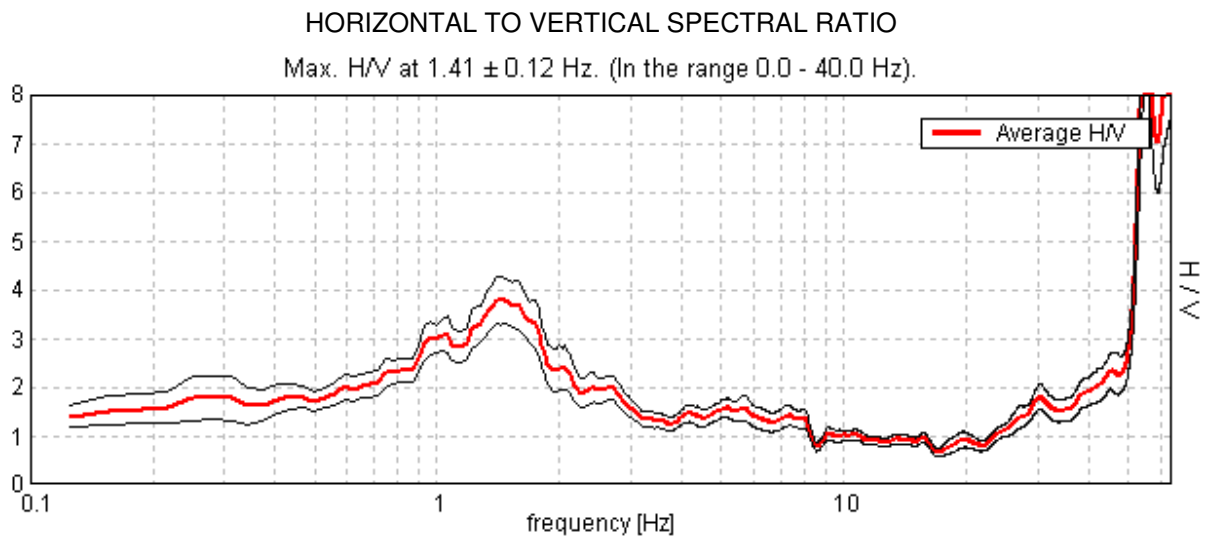
**Documentazione fotografica**



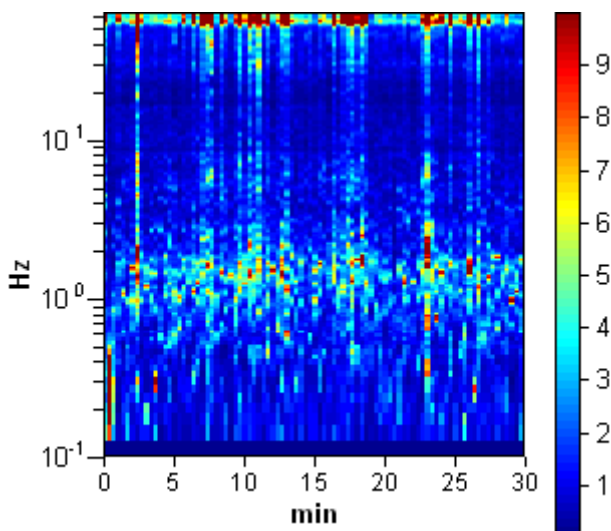
## TRIVELSICILIA PALERMO, PALERMO 0021

Start recording: 28/04/14 11:17:29      End recording: 28/04/14 11:47:30  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

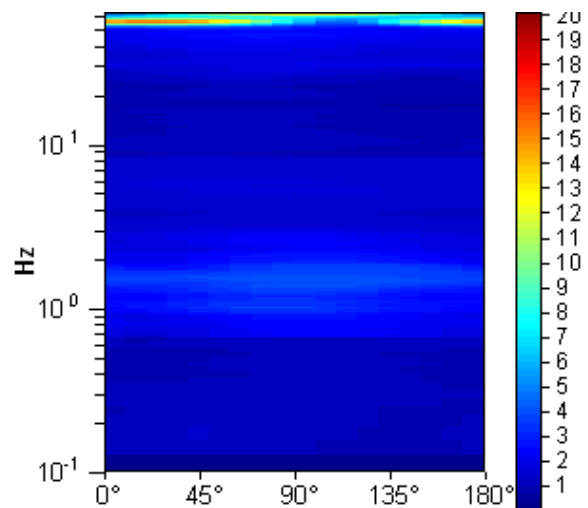
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



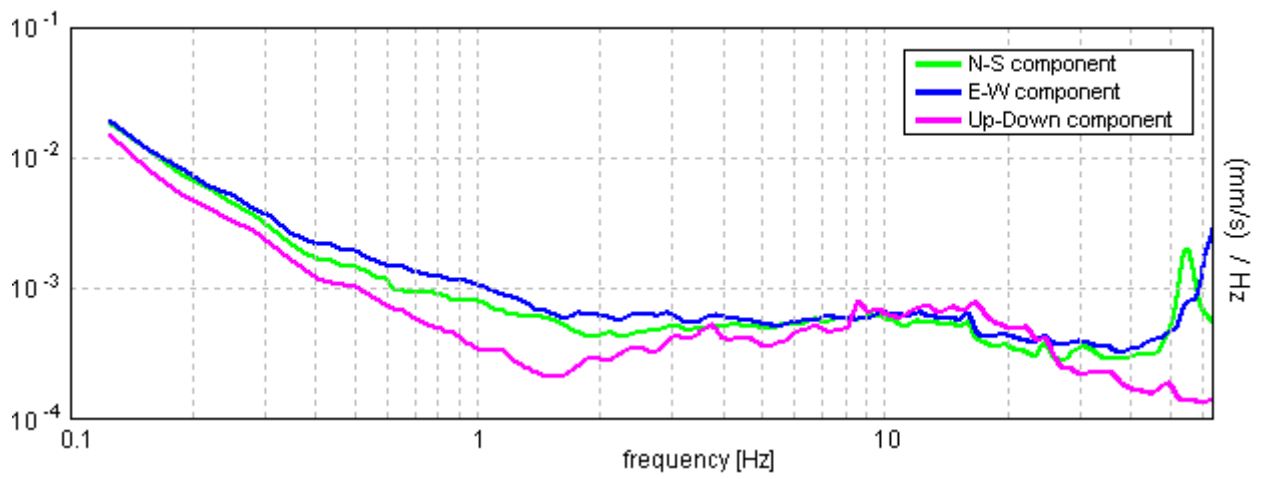
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.41 ± 0.12 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.41 > 0.50	OK	
$n_c(f_0) > 200$	2531.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 68 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.563 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.25 Hz	OK	
$A_0 > 2$	3.78 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.04103  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.0577 < 0.14063	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.2343 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0022				
<b>Coordinate</b>	<i>UTM</i>	4227939.70	N	351550.10	E
	<i>Gauss Boaga</i>	4227938.359	N	2371545.149	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia, Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	28/04/2014, 10:42				
<b>Nome file</b>	0022				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Terreno				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			

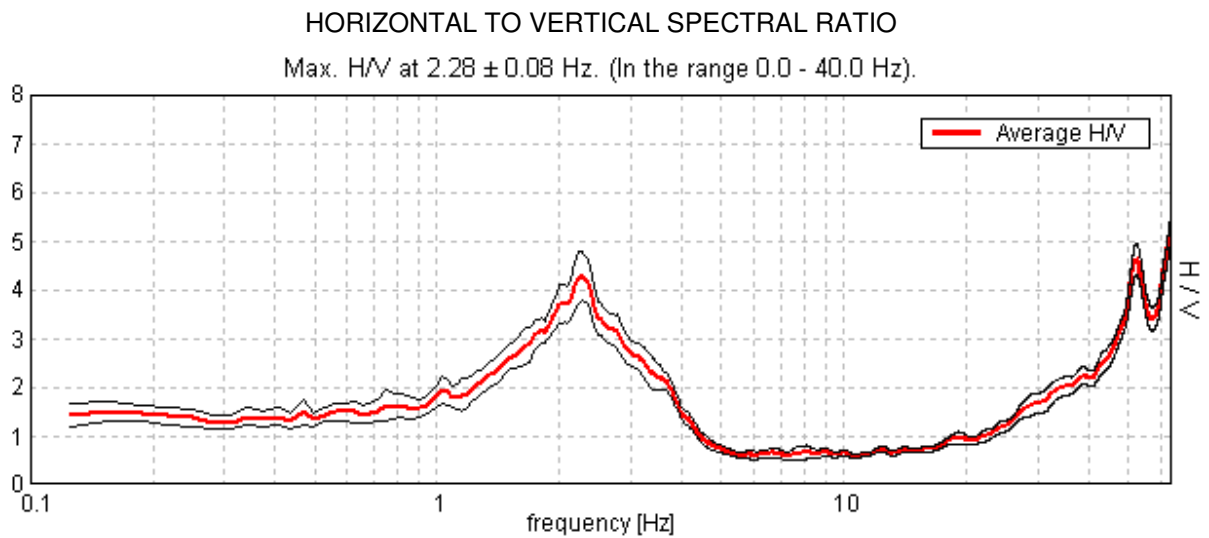
**Documentazione fotografica**



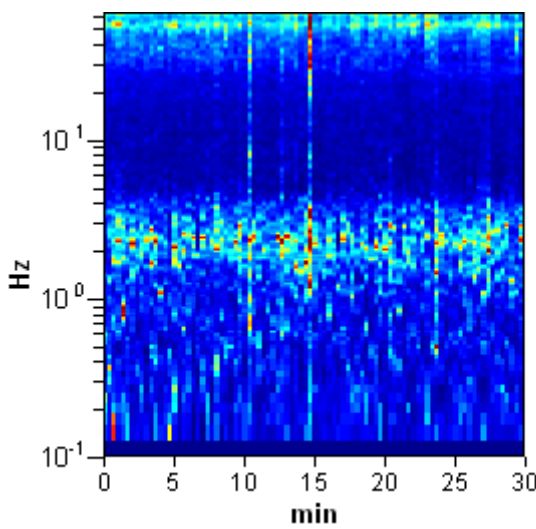
## TRIVELSICILIA PALERMO, PALERMO 0022

Start recording: 28/04/14 10:43:17      End recording: 28/04/14 11:13:18  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

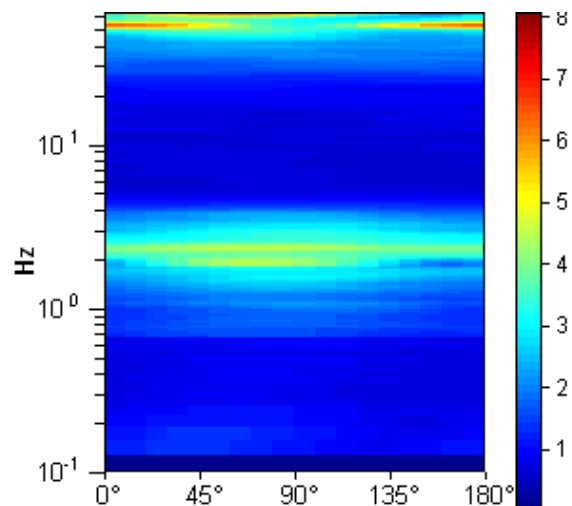
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



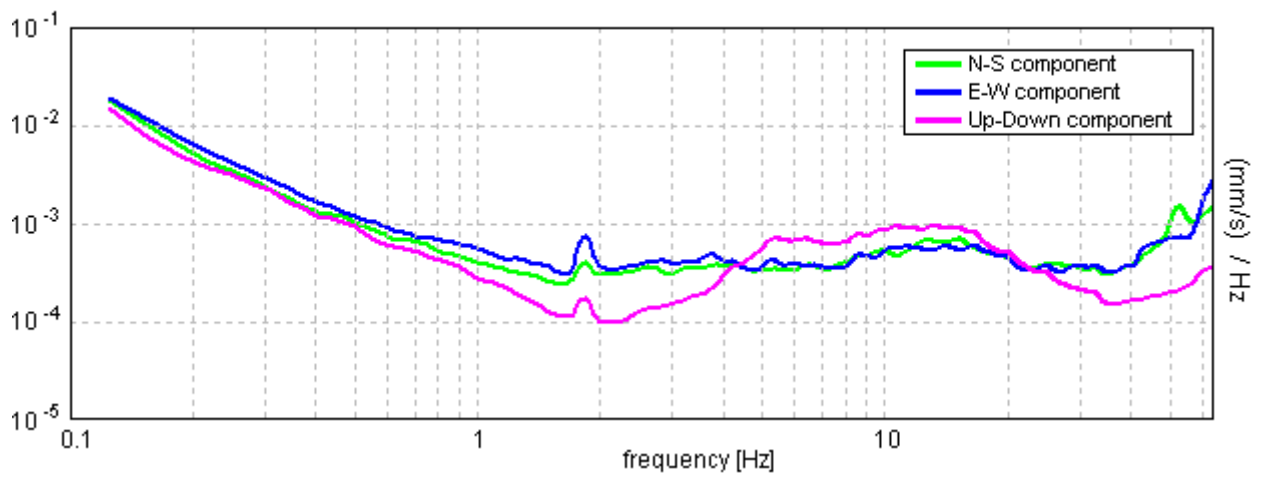
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 2.28 ± 0.08 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.28 > 0.50	OK	
$n_c(f_0) > 200$	4106.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 110 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	1.281 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	3.625 Hz	OK	
$A_0 > 2$	4.29 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01727  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.03939 < 0.11406$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2526 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

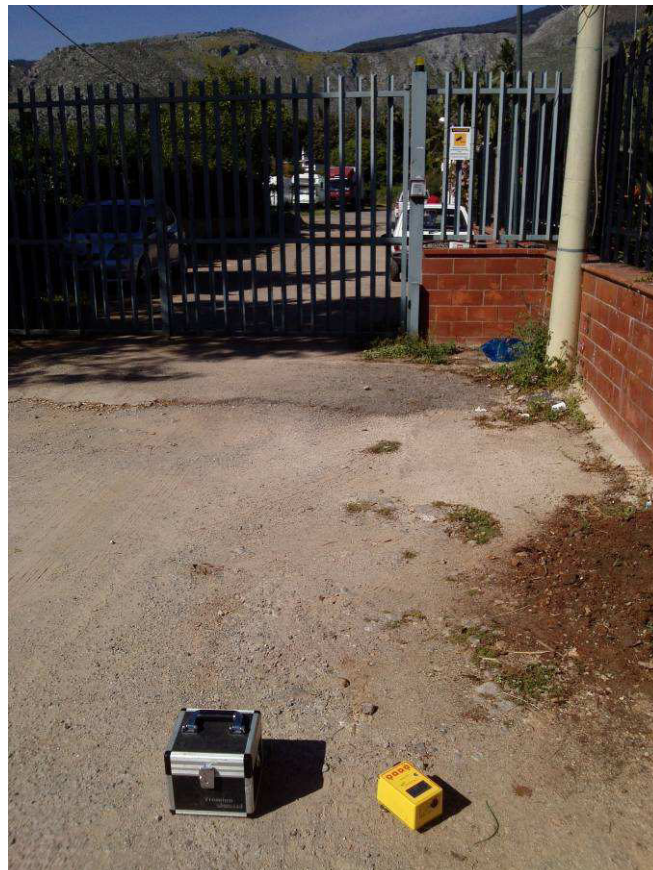


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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0023				
<b>Coordinate</b>	<i>UTM</i>	4227422.96	N	351311.87	E
	<i>Gauss Boaga</i>	4227421.594	N	2371306.890	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	07/05/2014, 09:43				
<b>Nome file</b>	0023				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



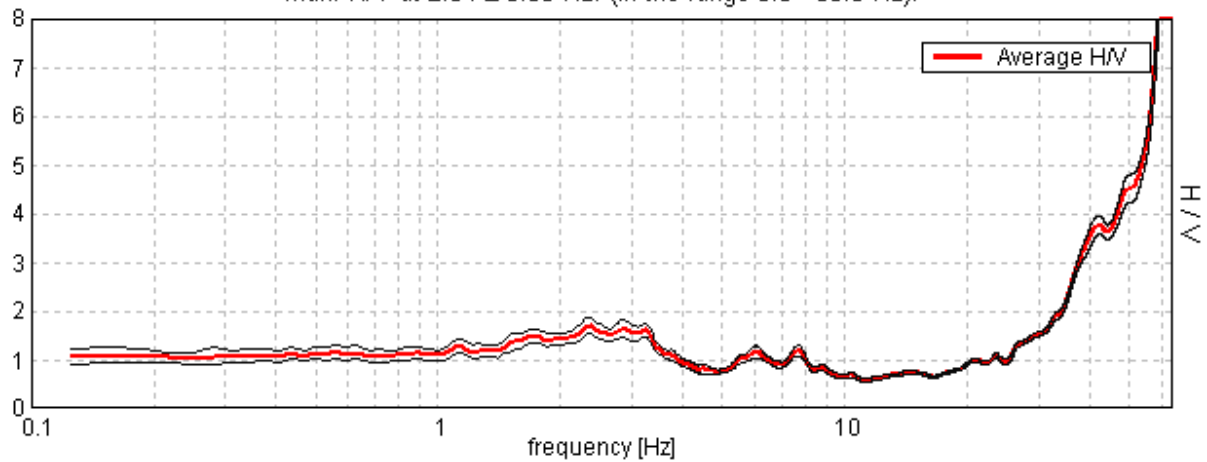
### TRIVELSICILIA PALERMO, PALERMO 0023

Start recording: 07/05/14 09:44:03      End recording: 07/05/14 10:14:04  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

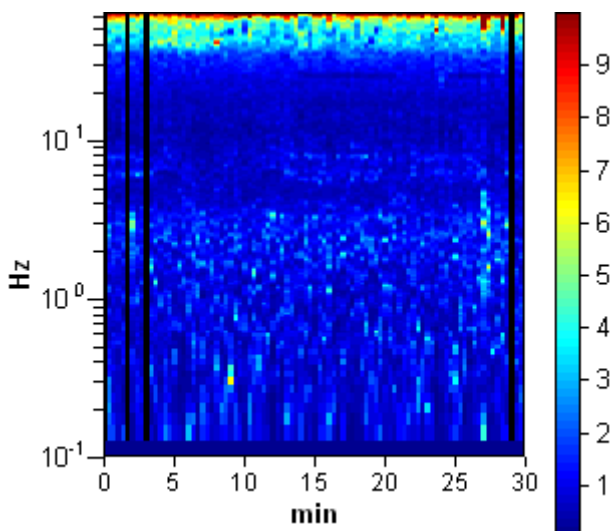
Trace length: 0h30'00".      Analyzed 96% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

#### HORIZONTAL TO VERTICAL SPECTRAL RATIO

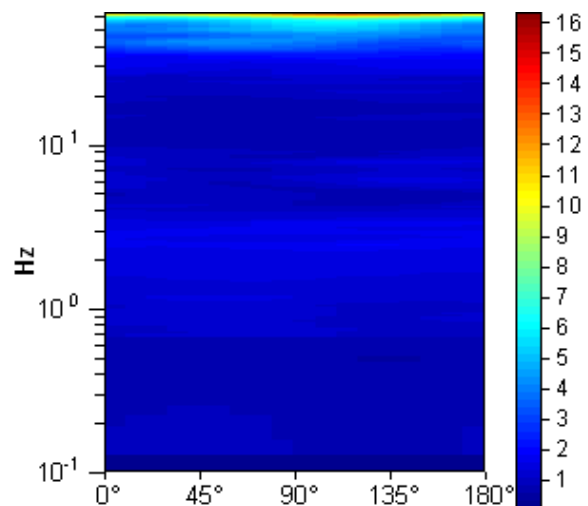
Max. H/V at  $2.34 \pm 0.08$  Hz. (In the range 0.0 - 30.0 Hz).



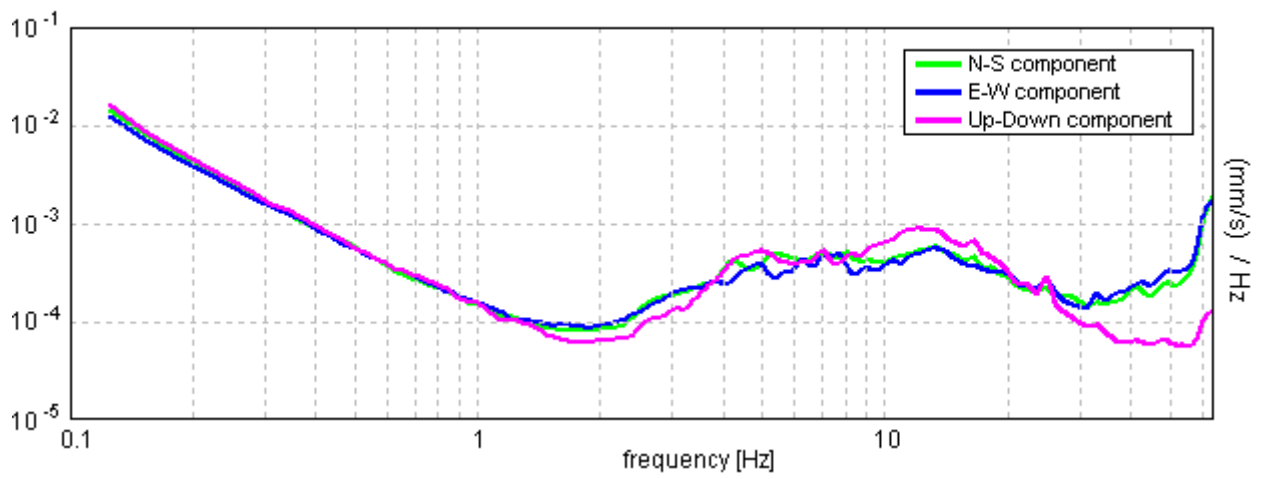
#### H/V TIME HISTORY



#### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 2.34 ± 0.08 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.34 > 0.50	OK	
$n_c(f_0) > 200$	4031.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 114 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	4.25 Hz	OK	
<b><math>A_0 &gt; 2</math></b>	1.71 > 2		<b>NO</b>
<b><math>f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%</math></b>	$ 0.01712  < 0.05$	OK	
<b><math>\sigma_f &lt; \varepsilon(f_0)</math></b>	$0.04012 < 0.11719$	OK	
<b><math>\sigma_A(f_0) &lt; \theta(f_0)</math></b>	$0.0818 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0024			
<b>Coordinate</b>	UTM	4227452.45	N	351553.35	E
	Gauss Boaga	4227451.088	N	2371548.382	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia, Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		28/04/2014, 10:05			
<b>Nome file</b>		0024			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>No</b>	
	<b>Altro</b>			<b>No</b>	
<b>Nota</b>		Base sismica ripetuta per l'inattendibilità del segnale			

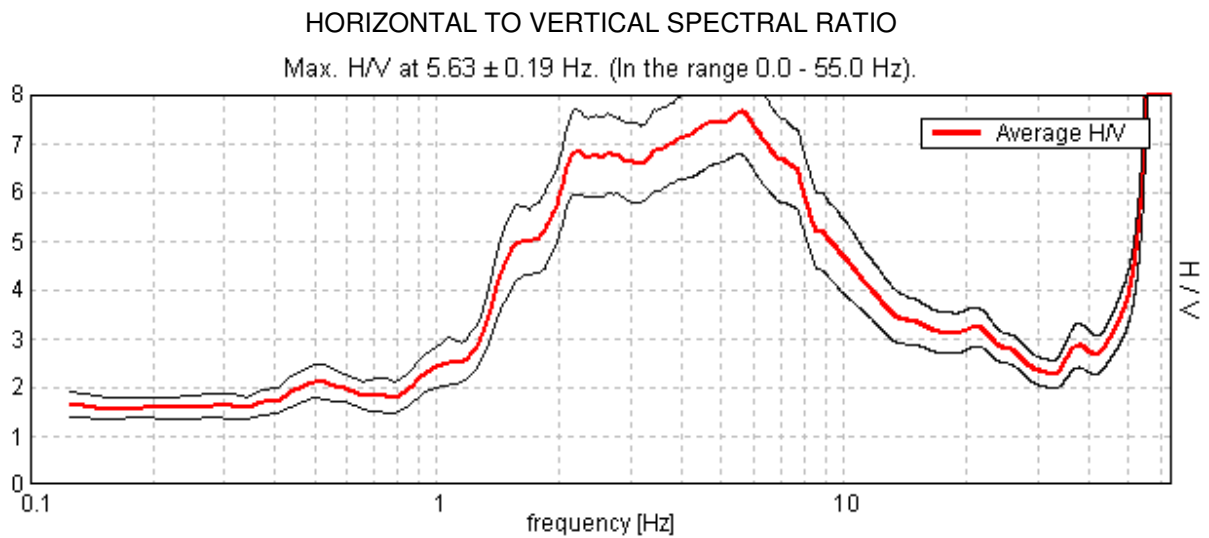
**Documentazione fotografica**



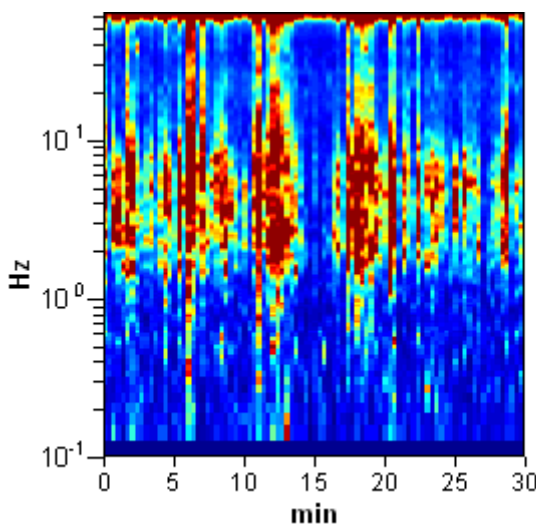
## TRIVELSICILIA PALERMO, PALERMO 0024

Start recording: 28/04/14 10:06:13      End recording: 28/04/14 10:36:14  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

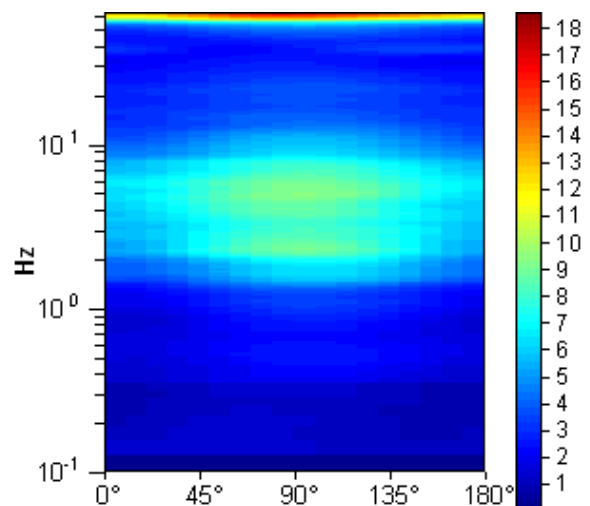
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 10%



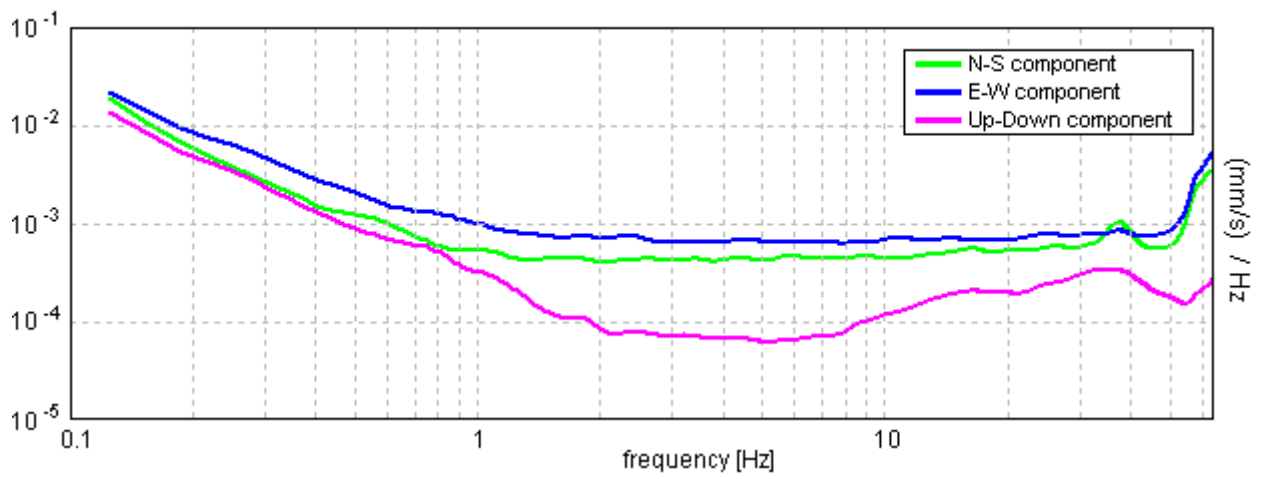
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 5.63 ± 0.19 Hz. (in the range 0.0 - 55.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	5.63 > 0.50	OK	
$n_c(f_0) > 200$	10125.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 271 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	12.219 Hz	OK	
$A_0 > 2$	7.66 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01691  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.09511 < 0.28125	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.4368 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0024 bis				
<b>Coordinate</b>	<i>UTM</i>	4227497.10	N	351573.64	E
	<i>Gauss Boaga</i>	4227495.740	N	2371568.675	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	16/06/2014, 09:15				
<b>Nome file</b>	0024 bis				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	MarciapiEDE				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			

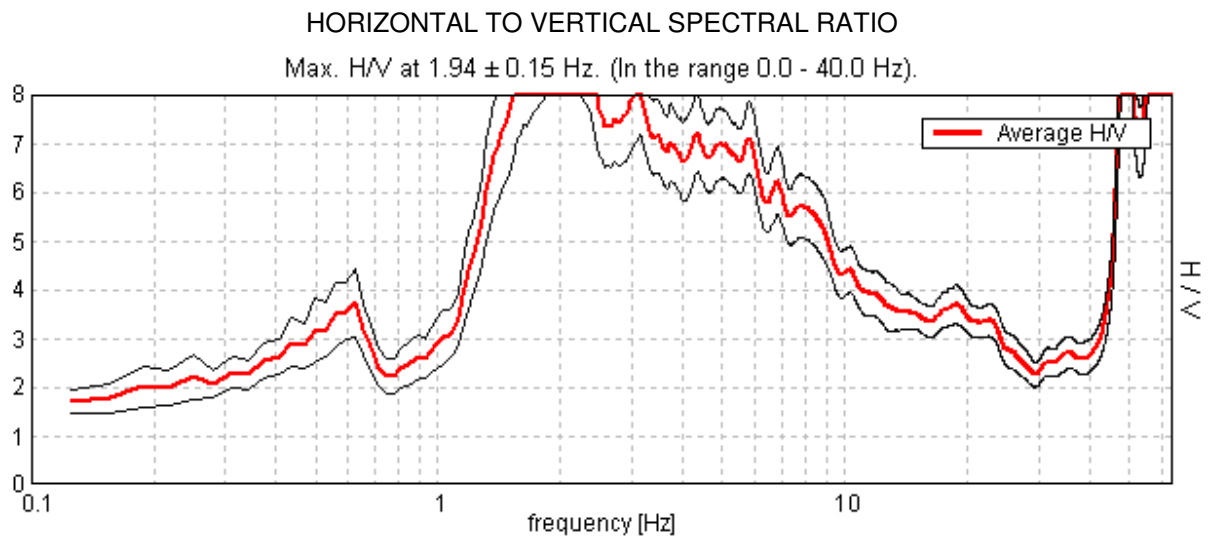
**Documentazione fotografica**



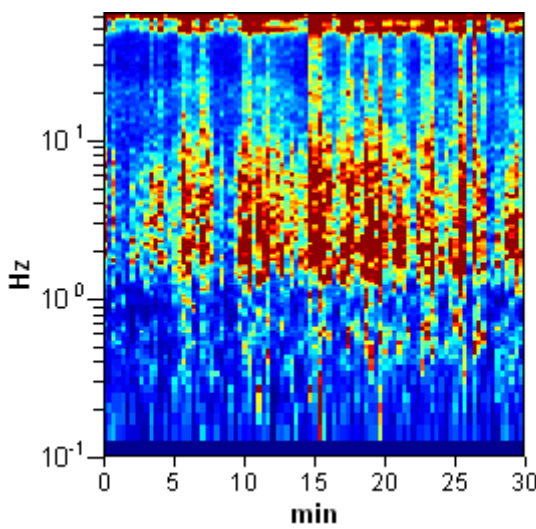
## TRIVEL SICILIA PALERMO, PALERMO 0024 BIS

Start recording: 16/06/14 14:22:27      End recording: 16/06/14 14:52:28  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

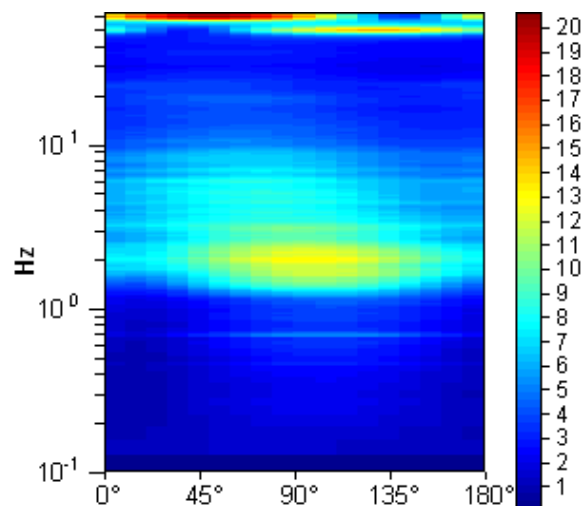
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



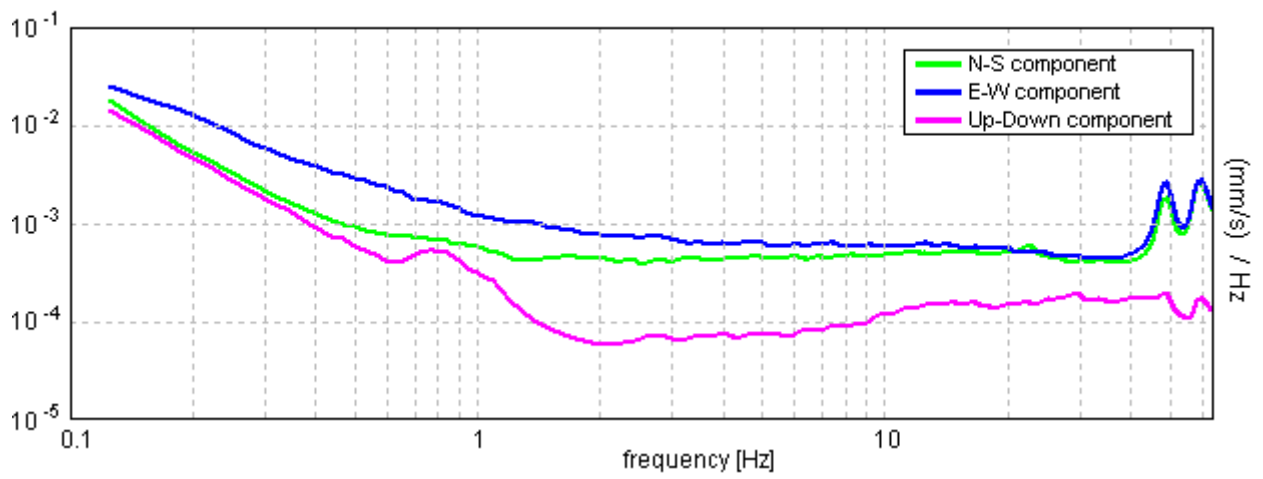
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.94 ± 0.15 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.94 > 0.50	OK	
$n_c(f_0) > 200$	3487.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 94 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	1.25 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>			NO
$A_0 > 2$	10.23 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03993  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.07737 < 0.19375$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.8168 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0025				
<b>Coordinate</b>	<i>UTM</i>	4227469.47	N	351972.28	E
	<i>Gauss Boaga</i>	4227468.114	N	2371967.332	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia, Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	23/04/2014, 13:23				
<b>Nome file</b>	0025				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>Si</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



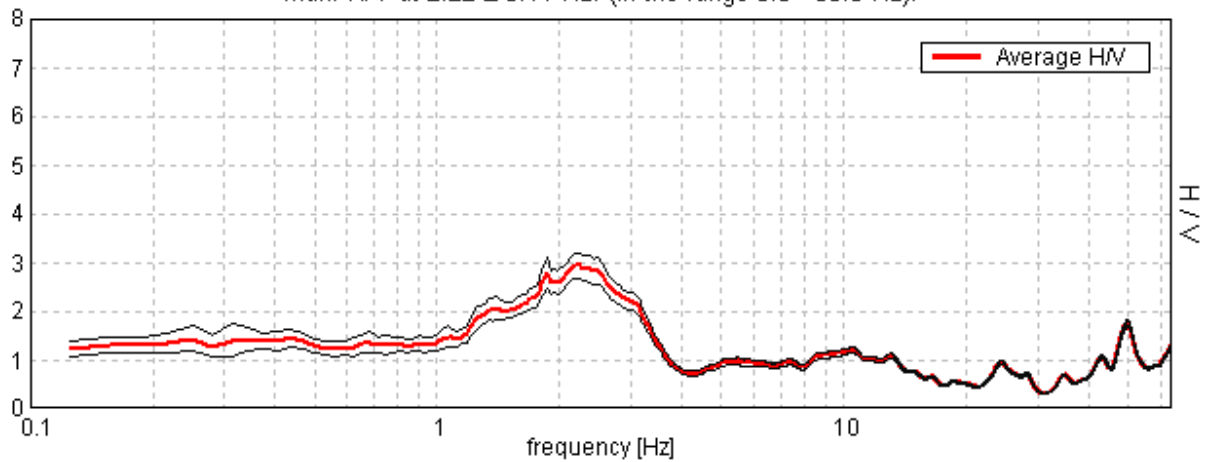
## TRIVELSICILIA PALERMO, PALERMO 0025

Start recording: 23/04/14 13:22:25      End recording: 23/04/14 13:52:26  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

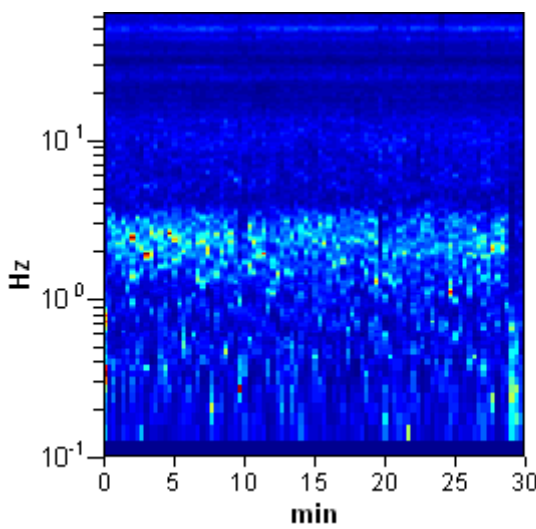
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

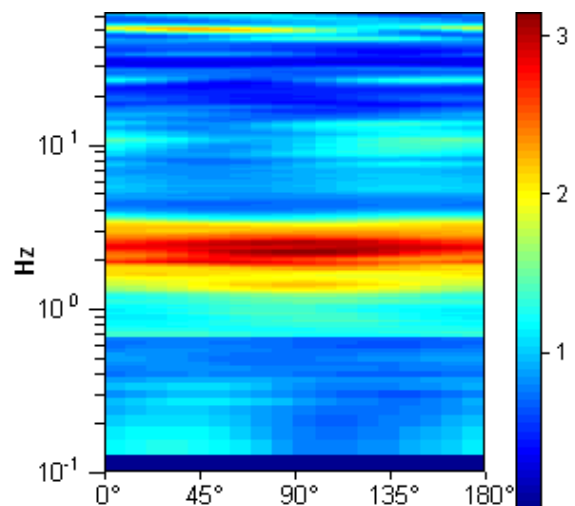
Max. H/V at  $2.22 \pm 0.11$  Hz. (In the range 0.0 - 60.0 Hz).



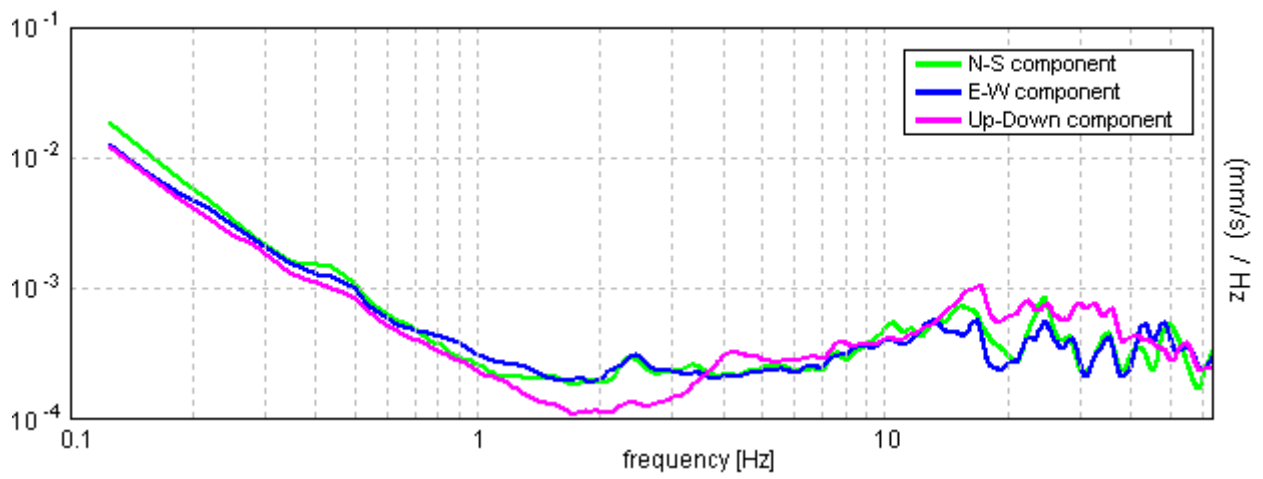
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 2.22 ± 0.11 Hz. (in the range 0.0 - 60.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.22 > 0.50	OK	
$n_c(f_0) > 200$	3993.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 108 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	1.125 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	3.438 Hz	OK	
$A_0 > 2$	2.93 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02491  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.05527 < 0.11094$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1297 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0026			
<b>Coordinate</b>	UTM	4227477.79	N	352361.84	E
	Gauss Boaga	4227476.440	N	2372356.911	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia, Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		28/04/2014, 08:09			
<b>Nome file</b>		0026			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>No</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



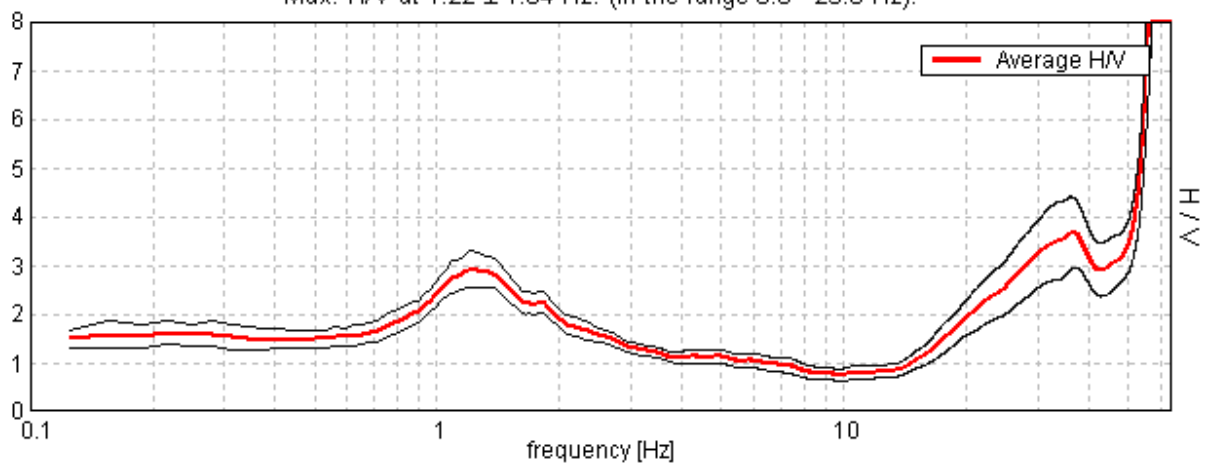
## TRIVELSICILIA PALERMO, PALERMO 0026

Start recording: 28/04/14 08:11:12      End recording: 28/04/14 08:41:13  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

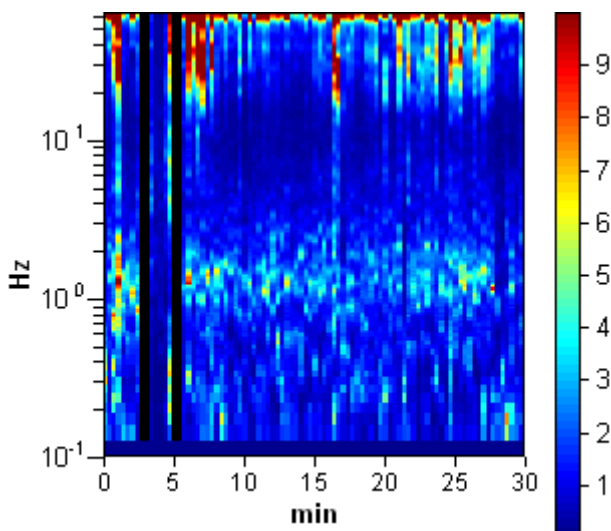
Trace length: 0h30'00".      Analyzed 96% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 10%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

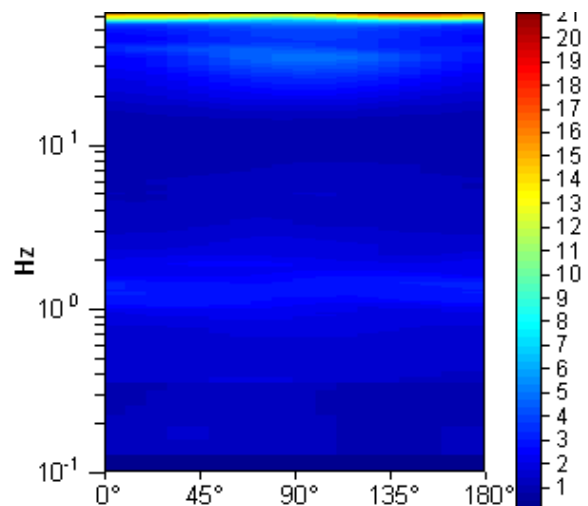
Max. H/V at  $1.22 \pm 1.84$  Hz. (In the range 0.0 - 25.0 Hz).



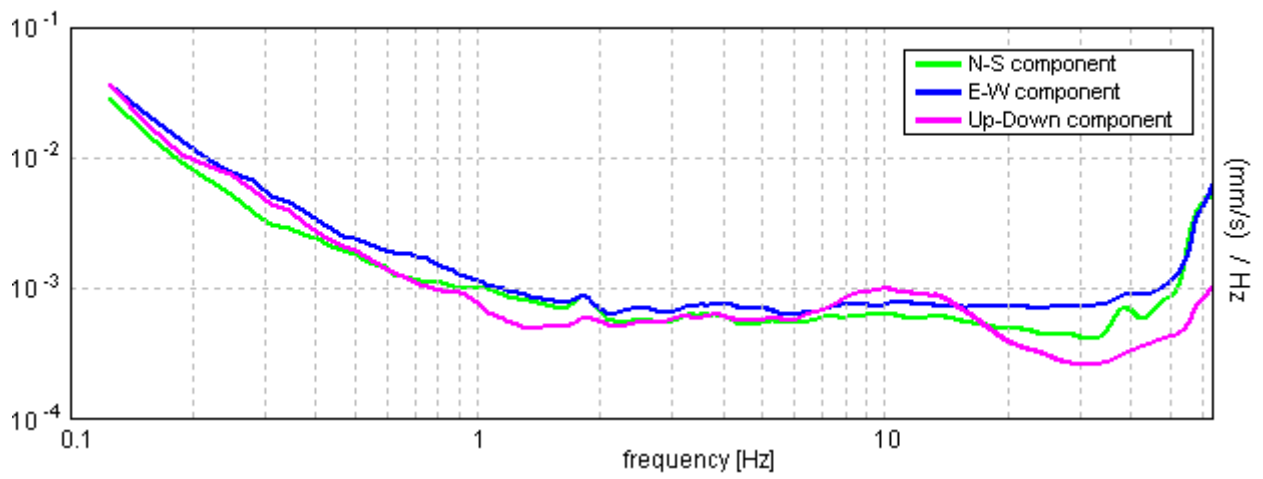
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.22 ± 1.84 Hz. (in the range 0.0 - 25.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.22 > 0.50	OK	
$n_c(f_0) > 200$	2096.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 60 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.75 Hz	OK	
$A_0 > 2$	2.91 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.75268  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	$0.91733 < 0.12188$		<b>NO</b>
$\sigma_A(f_0) < \theta(f_0)$	$0.1962 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0027			
<b>Coordinate</b>	UTM	4227467.33	N	352768.09	E
	Gauss Boaga	4227465.984	N	2372763.180	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia, Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		23/04/2014, 11:21			
<b>Nome file</b>		0027			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>	Si			
	<b>Pioggia</b>	Si			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	No			
	<b>Altro</b>	No			

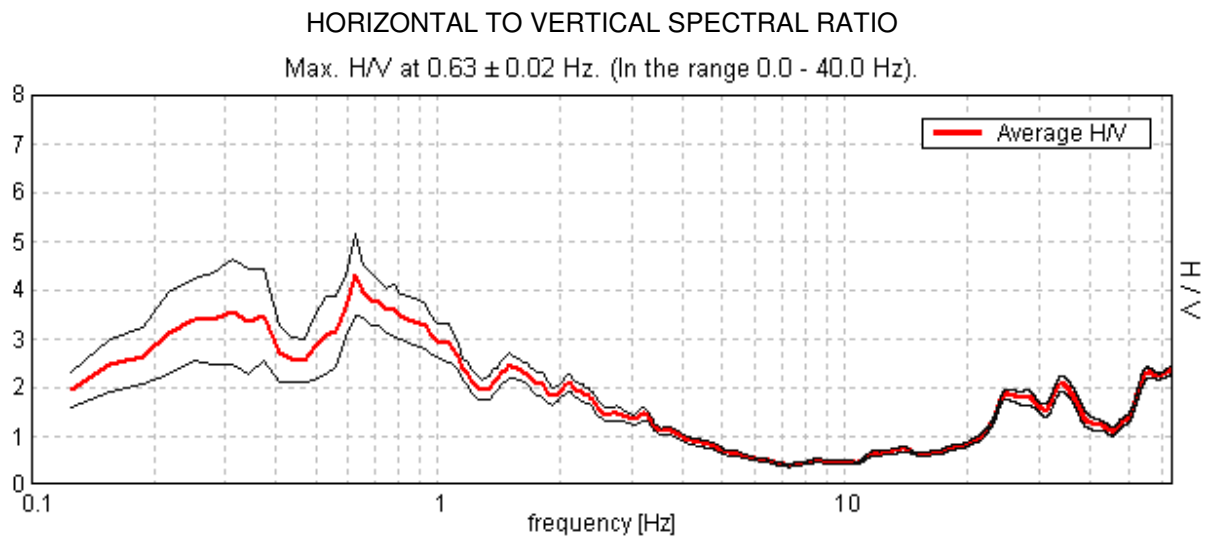
**Documentazione fotografica**



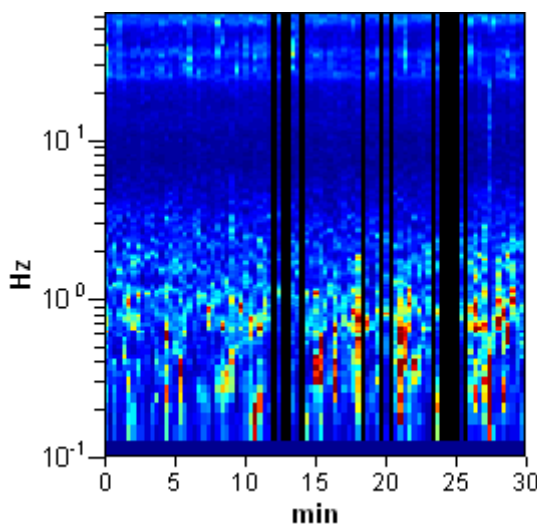
## TRIVELSICILIA PALERMO, PALERMO 0027

Start recording: 23/04/14 11:23:23      End recording: 23/04/14 11:53:24  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

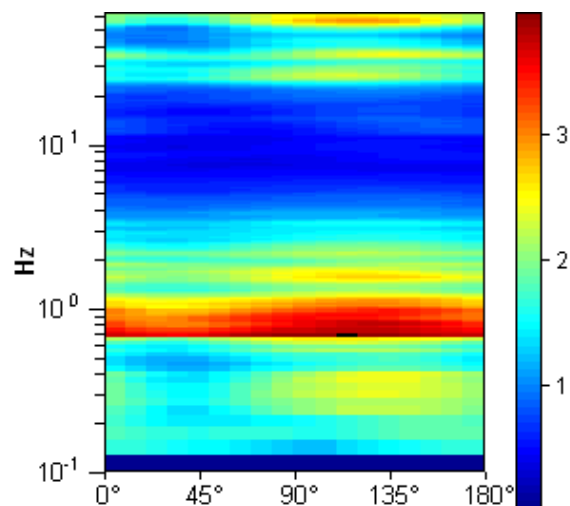
Trace length: 0h30'00".      Analyzed 86% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



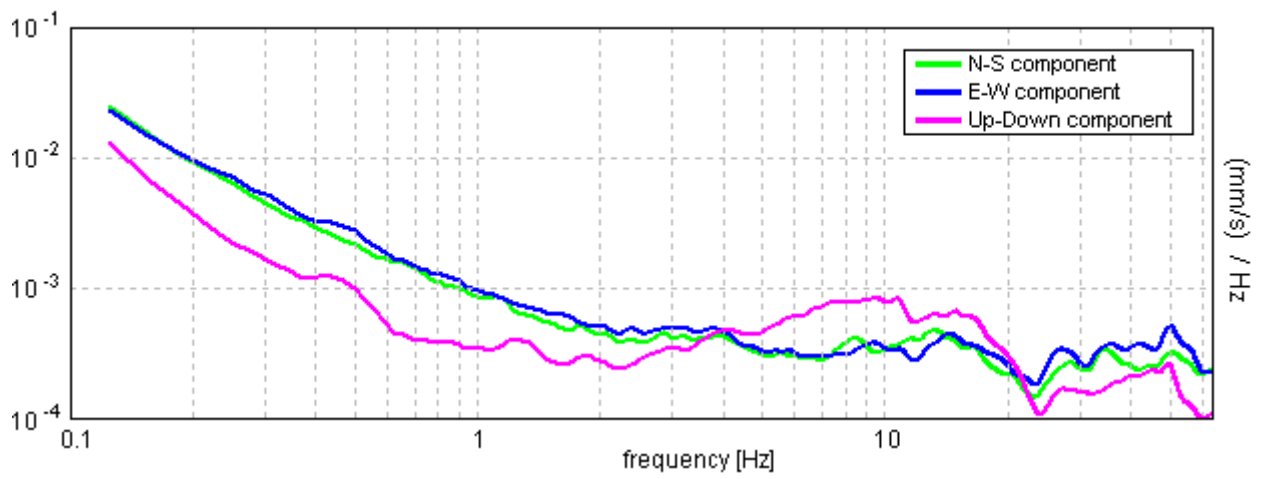
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 0.63 ± 0.02 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.63 > 0.50	OK	
$n_c(f_0) > 200$	962.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 31 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.219 Hz	OK	
$A_0 > 2$	4.31 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.016  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.01 < 0.09375	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.4205 < 2.0	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0028			
<b>Coordinate</b>	UTM	4227445.30	N	353132.76	E
	Gauss Boaga	4227443.958	N	2373127.866	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		30/04/2014, 07:40			
<b>Nome file</b>		0028			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>No</b>	
	<b>Pedoni</b>			<b>No</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



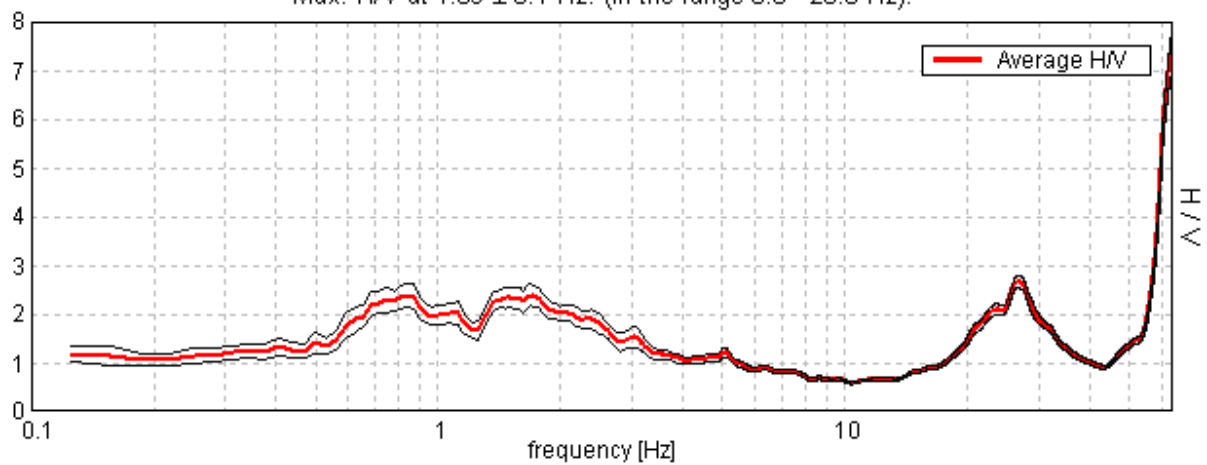
## TRIVELSICILIA PALERMO, PALERMO 0028

Start recording: 30/04/14 08:21:25      End recording: 30/04/14 08:51:26  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

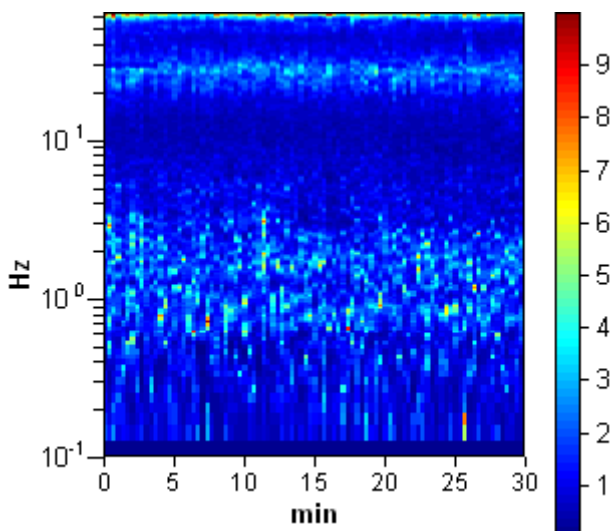
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

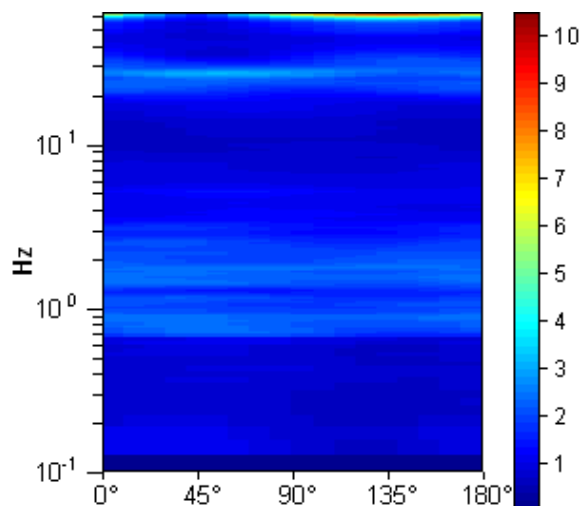
Max. H/V at  $1.69 \pm 0.1$  Hz. (In the range 0.0 - 20.0 Hz).



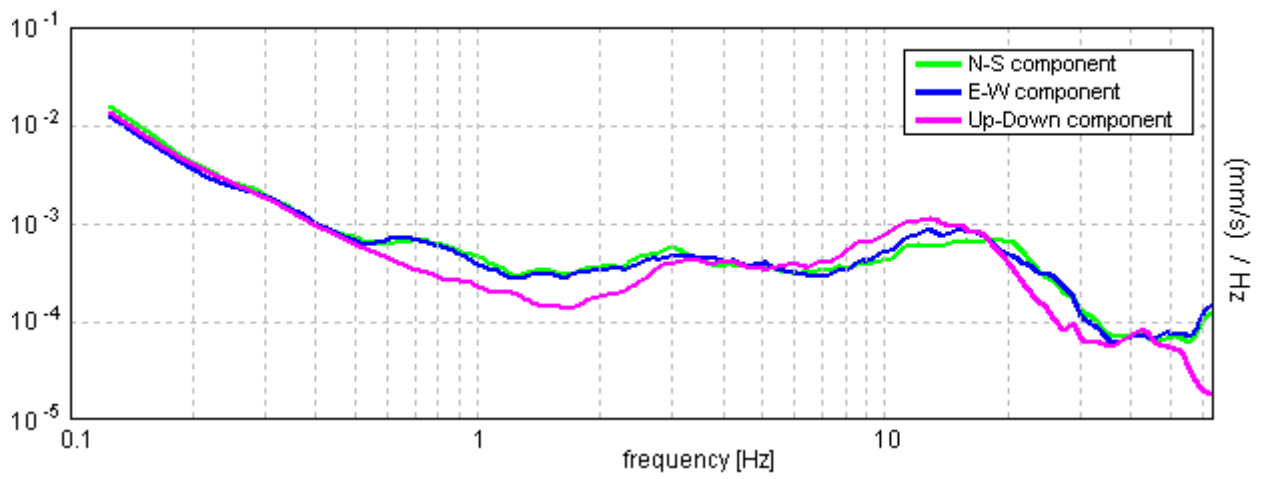
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.69 ± 0.1 Hz. (in the range 0.0 - 20.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.69 > 0.50	OK	
$n_c(f_0) > 200$	3037.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 82 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	3.375 Hz	OK	
$A_0 > 2$	2.40 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03091  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.05216 < 0.16875$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1131 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0029			
<b>Coordinate</b>	<i>UTM</i>	4227085.23	N	353094.61	E
	<i>Gauss Boaga</i>	4227083.872	N	2373089.702	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		30/04/2014, 09:00			
<b>Nome file</b>		0029			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>No</b>	
	<b>Pedoni</b>			<b>No</b>	
	<b>Altro</b>			<b>No</b>	

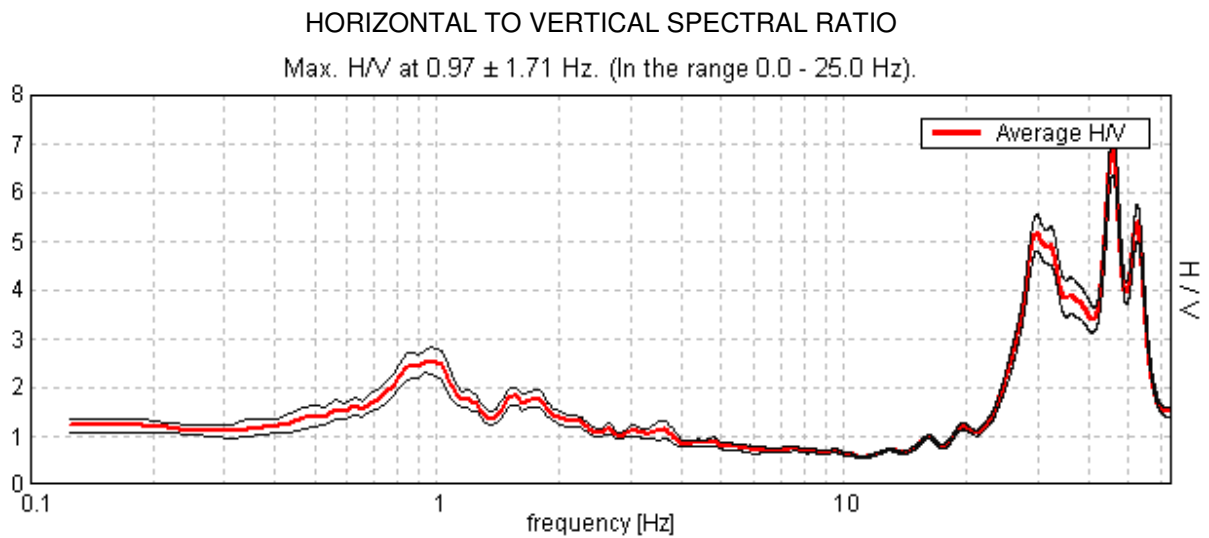
**Documentazione fotografica**



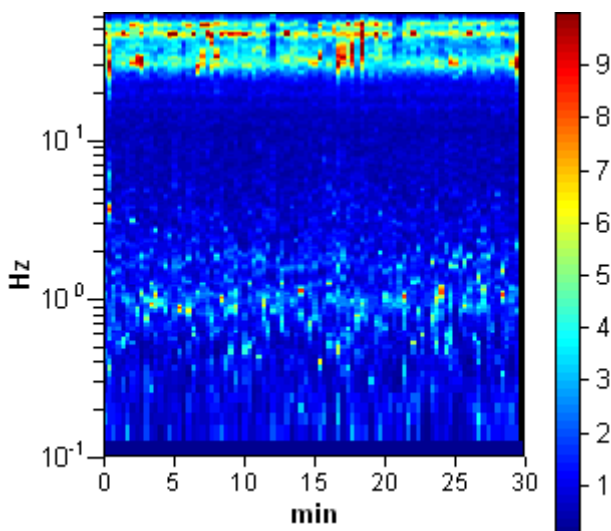
## TRIVELSICILIA PALERMO, PALERMO 0029

Start recording: 30/04/14 09:01:27      End recording: 30/04/14 09:31:28  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

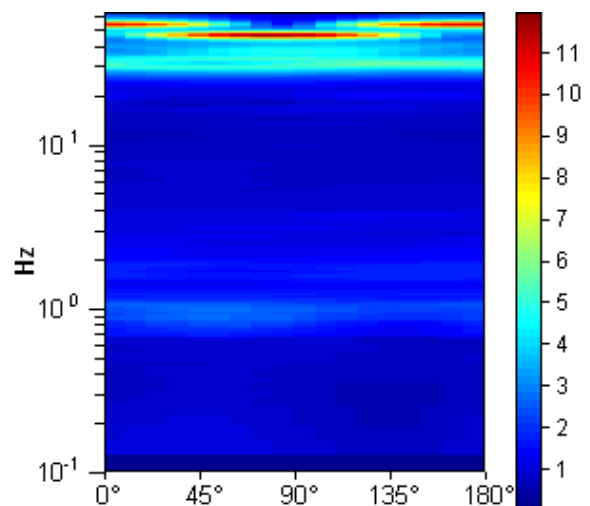
Trace length: 0h30'00".      Analyzed 99% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



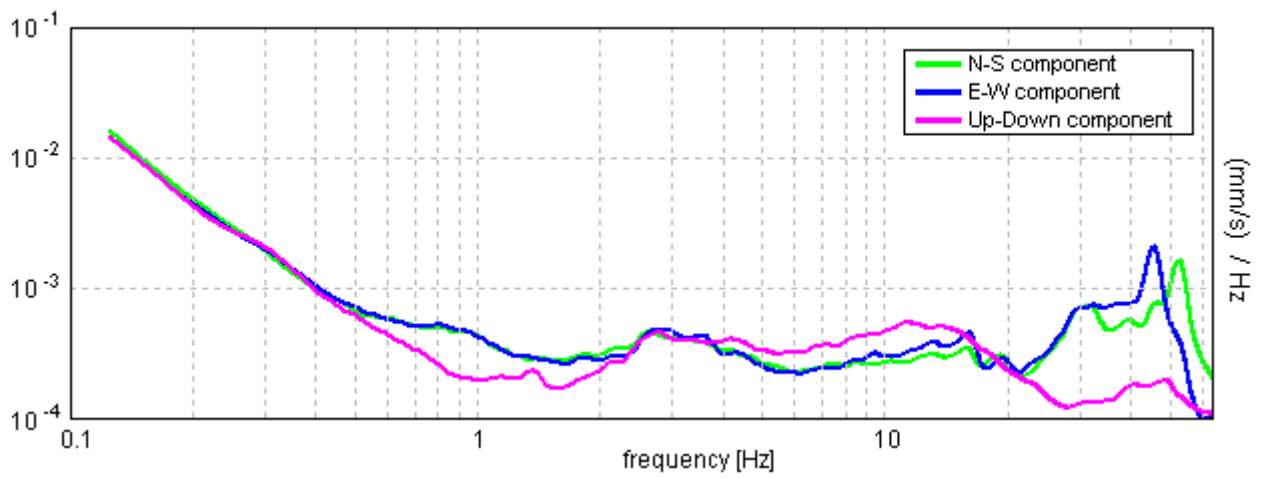
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $0.97 \pm 1.71$  Hz. (in the range 0.0 - 25.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.97 > 0.50$	OK	
$n_c(f_0) > 200$	$1724.4 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 48 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.406 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.281 Hz	OK	
$A_0 > 2$	$2.54 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.88144  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.8539 < 0.14531$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.1441 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0030			
<b>Coordinate</b>	UTM	4227151.20	N	352857.28	E
	Gauss Boaga	4227149.842	N	2372852.363	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia, Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		23/04/2014, 12:45			
<b>Nome file</b>		0030			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>Si</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>No</b>	
	<b>Altro</b>			<b>No</b>	

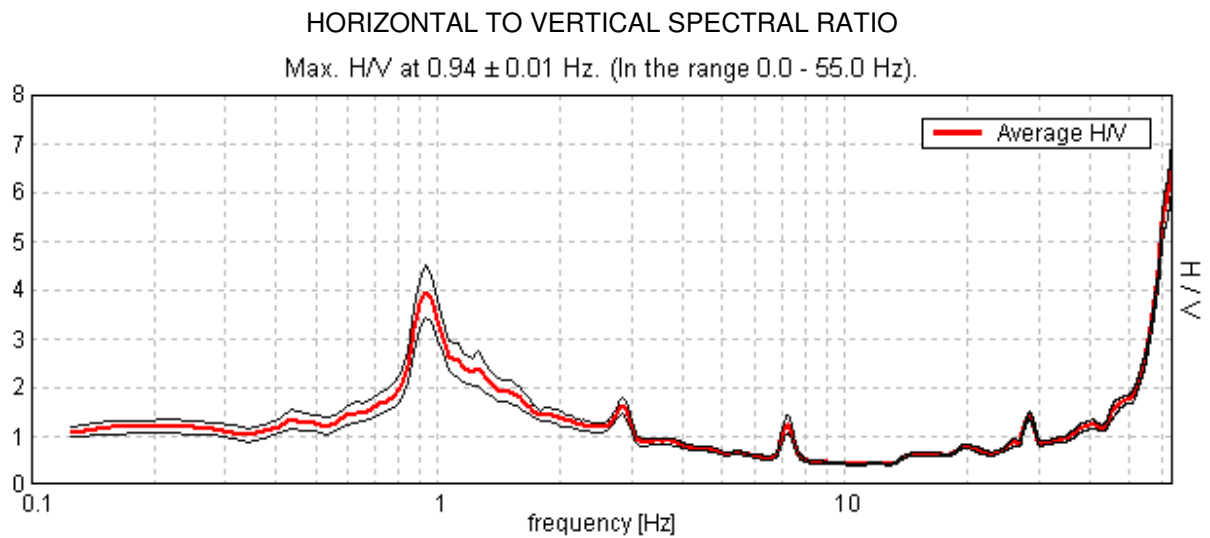
**Documentazione fotografica**



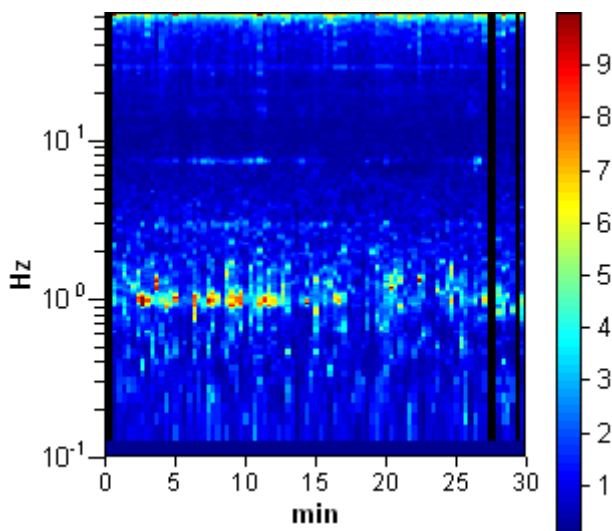
## TRIVELSICILIA PALERMO, PALERMO 0030

Start recording: 23/04/14 12:46:34      End recording: 23/04/14 13:16:35  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

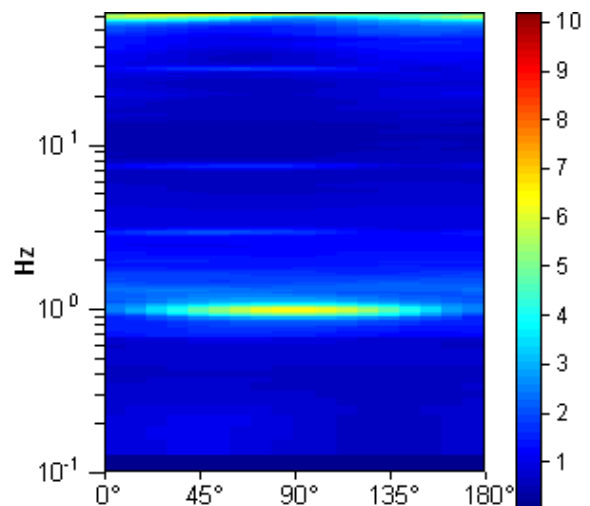
Trace length: 0h30'00".      Analyzed 94% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



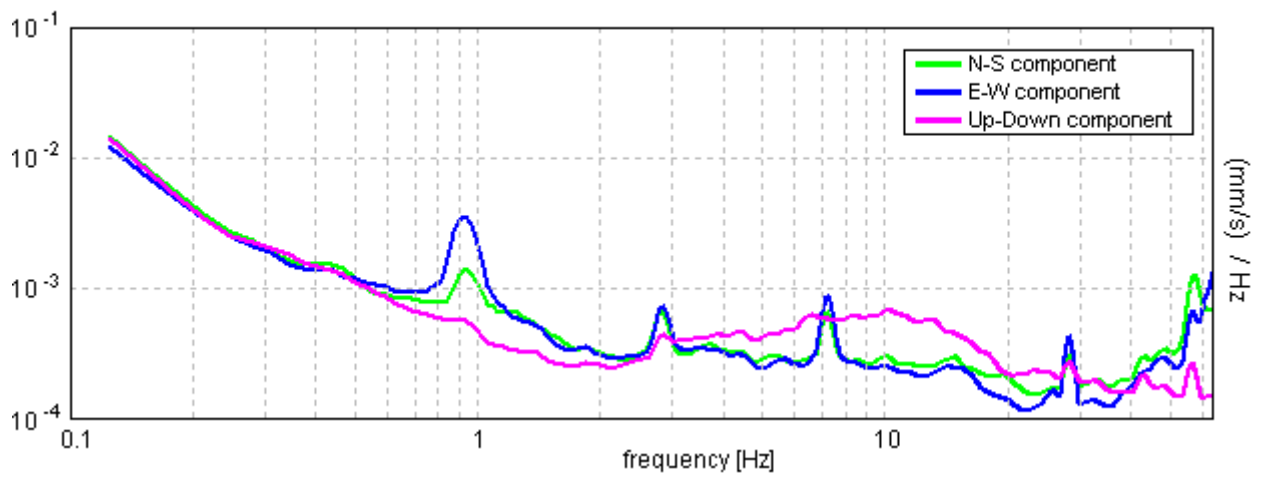
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 0.94 ± 0.01 Hz. (in the range 0.0 - 55.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.94 > 0.50	OK	
$n_c(f_0) > 200$	1593.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 46 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.781 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.406 Hz	OK	
$A_0 > 2$	3.95 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00321  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.00301 < 0.14063	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.2653 < 2.0	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0031			
<b>Coordinate</b>	UTM	4227118.70	N	352270.12	E
	Gauss Boaga	4227117.333	N	2372265.174	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia, Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		23/04/2014, 15:05			
<b>Nome file</b>		0031			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>		<b>Vento</b>	Si		
		<b>Pioggia</b>	Si		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	Si		
		<b>Pedoni</b>	No		
		<b>Altro</b>	No		

**Documentazione fotografica**



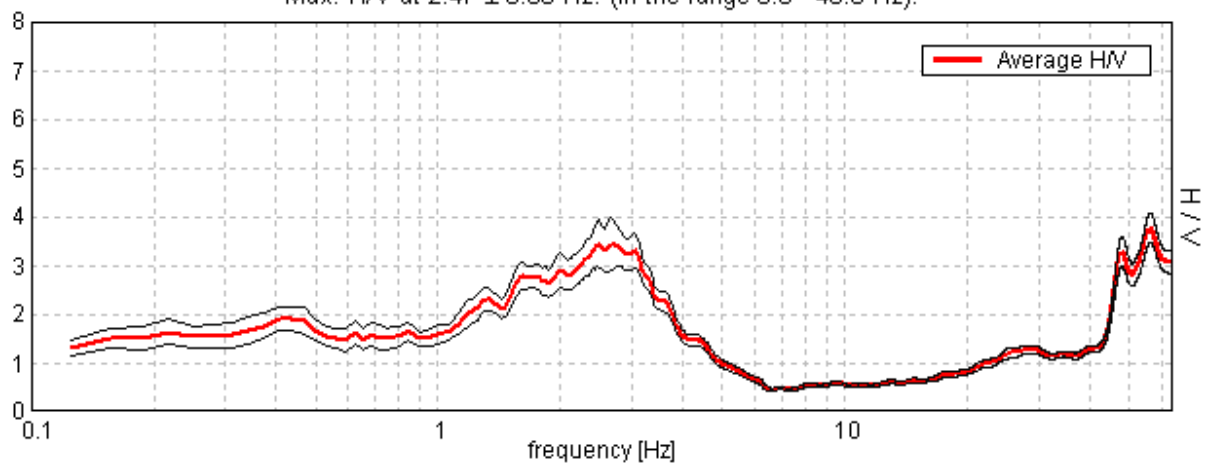
## TRIVELSICILIA PALERMO, PALERMO 0031

Start recording: 23/04/14 15:04:37      End recording: 23/04/14 15:34:38  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

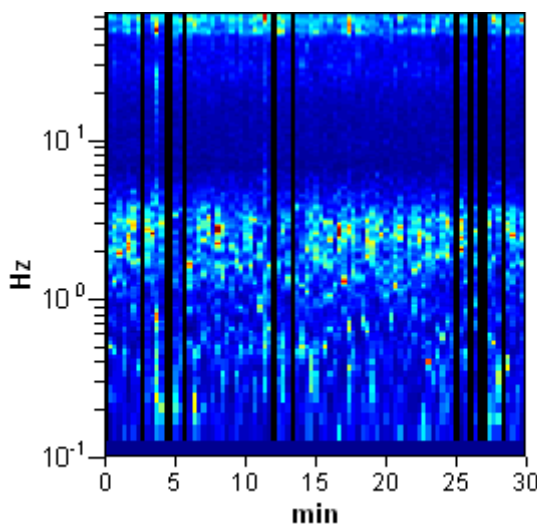
Trace length: 0h30'00".      Analyzed 87% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

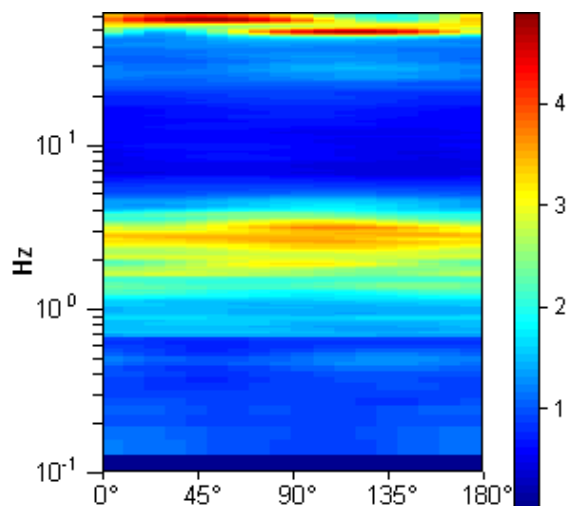
Max. H/V at  $2.47 \pm 0.08$  Hz. (In the range 0.0 - 40.0 Hz).



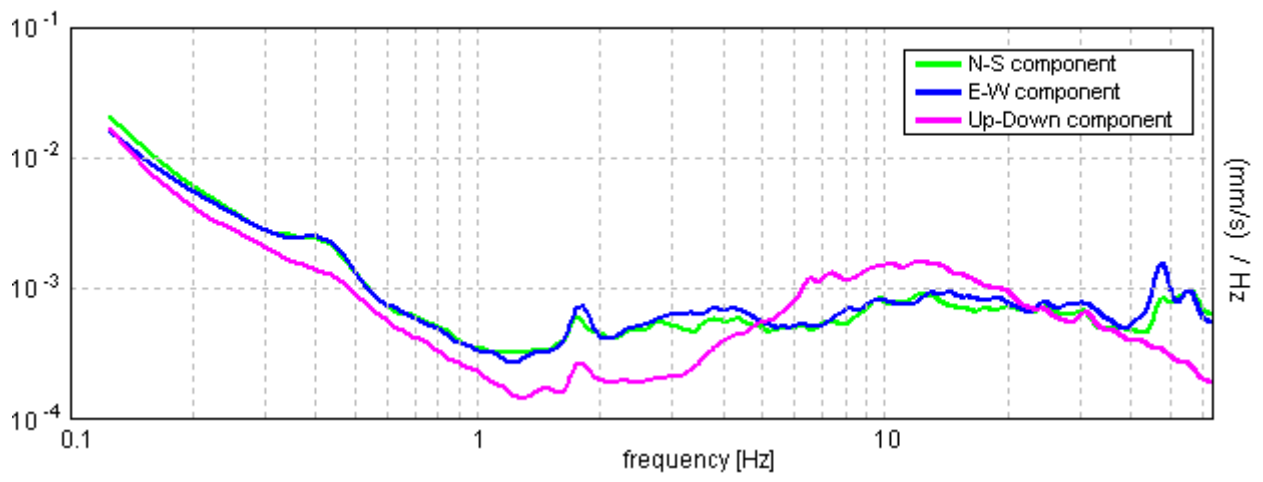
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $2.47 \pm 0.08$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$2.47 > 0.50$	OK	
$n_c(f_0) > 200$	$3851.3 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 120 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	1.094 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	3.906 Hz	OK	
$A_0 > 2$	$3.44 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01659  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.04097 < 0.12344$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2323 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>	0032			
<b>Coordinate</b>	<i>UTM</i>	4227087.38	N	351958.01 E
	<i>Gauss Boaga</i>	4227086.008	N	2371953.049 E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®			
<b>Operatore</b>	<b>Geol. Vito Ingrassia, Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>	23/04/2014, 14:27			
<b>Nome file</b>	0032			
<b>Durata</b>	30 min			
<b>Frequenza campionamento</b>	128 Hz			
<b>Accoppiamento strumento-suolo</b>	Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>		
	<b>Pioggia</b>	<b>Si</b>		
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>		
	<b>Pedoni</b>	<b>No</b>		
	<b>Altro</b>	<b>No</b>		
<b>Nota</b>	Base sismica ripetuta per l'inattendibilità del segnale			

**Documentazione fotografica**



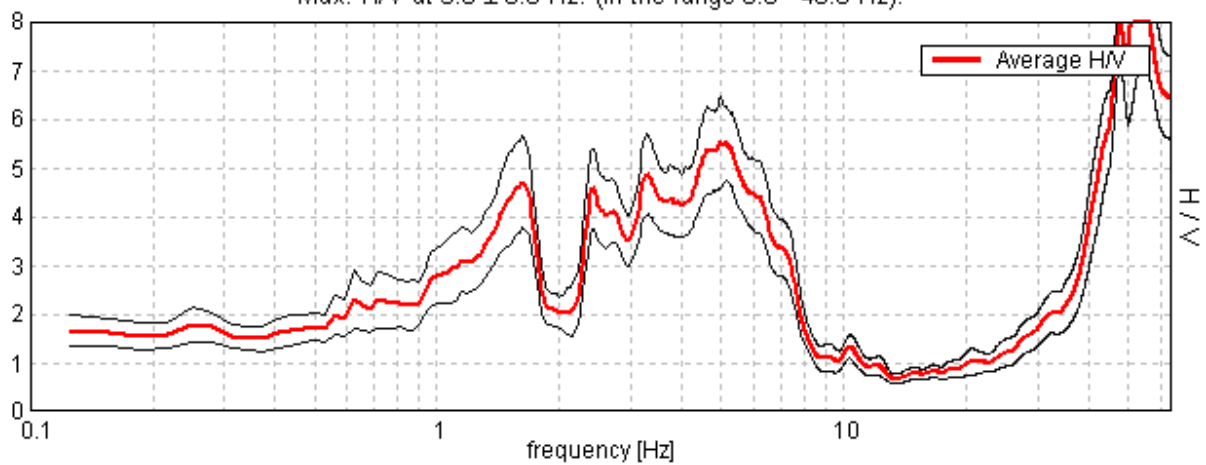
## TRIVELSICILIA PALERMO, PALERMO 0032

Start recording: 23/04/14 14:27:48      End recording: 23/04/14 14:57:49  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

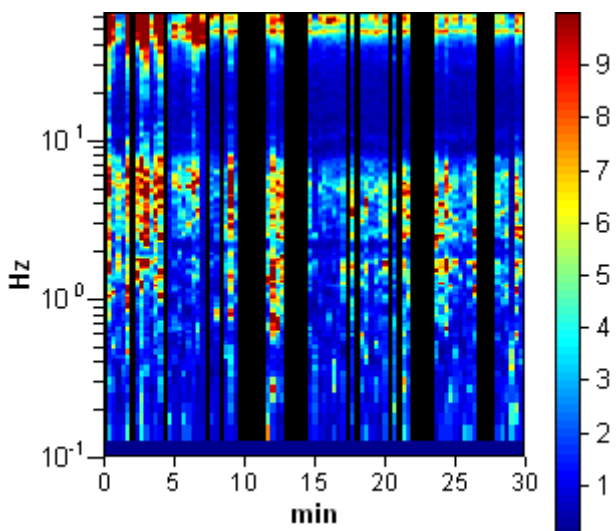
Trace length: 0h30'00".      Analyzed 68% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

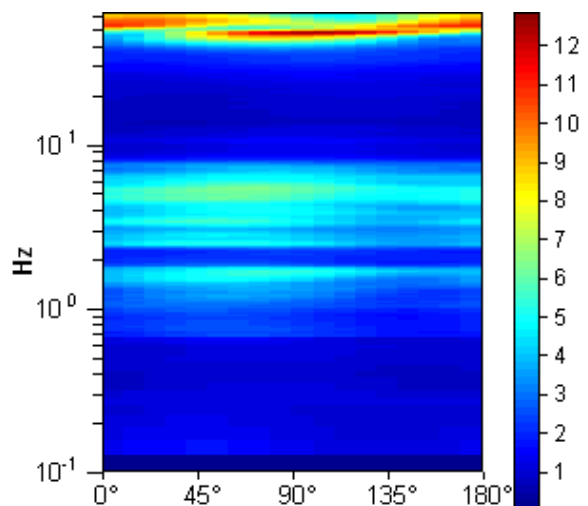
Max. H/V at 5.0 ± 0.0 Hz. (In the range 0.0 - 40.0 Hz).



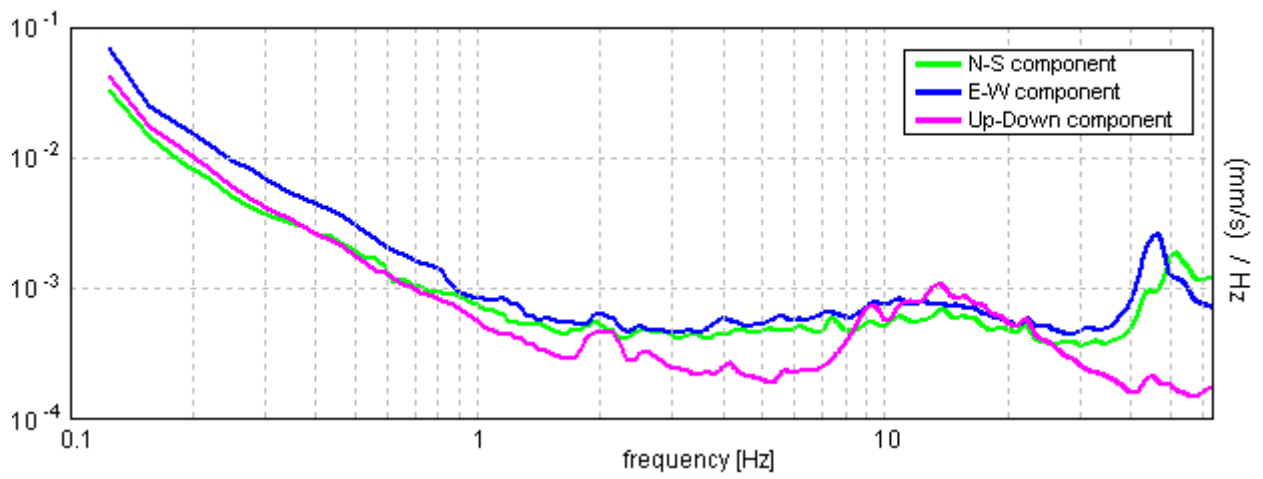
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 5.0 ± 0.0 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	5.00 > 0.50	OK	
$n_c(f_0) > 200$	6100.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 241 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	2.25 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	7.563 Hz	OK	
$A_0 > 2$	5.53 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00035  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.00177 < 0.25	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.4628 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0032 bis			
<b>Coordinate</b>	UTM	4227322.14	N	351935.52	E
	Gauss Boaga	4227320.778	N	2371930.566	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		16/06/2014, 14:55			
<b>Nome file</b>		0032 bis			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			

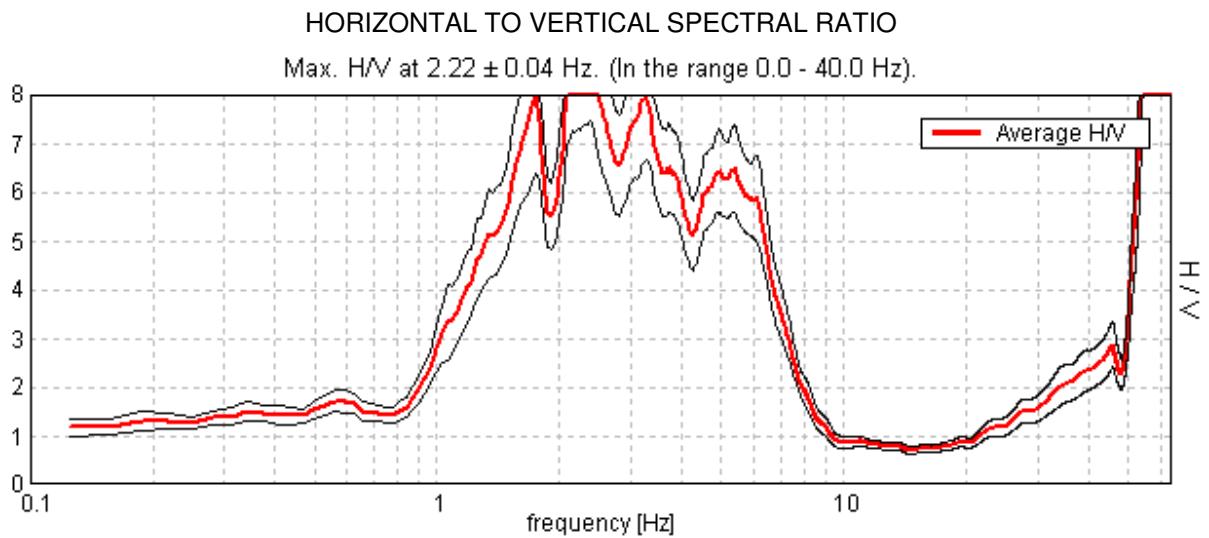
**Documentazione fotografica**



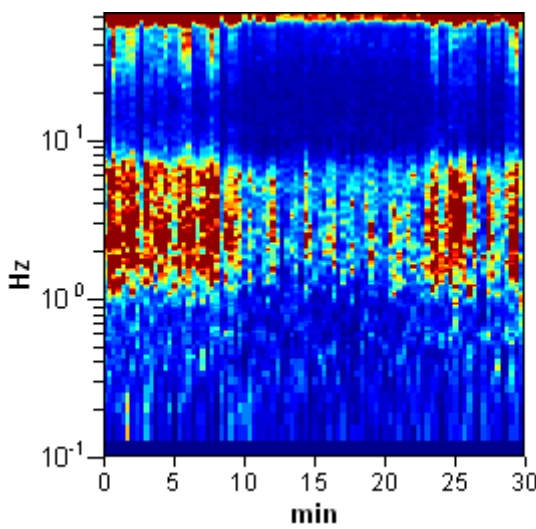
## TRIVEL SICILIA PALERMO, PALERMO 0032 BIS

Start recording: 16/06/14 14:58:35      End recording: 16/06/14 15:28:36  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

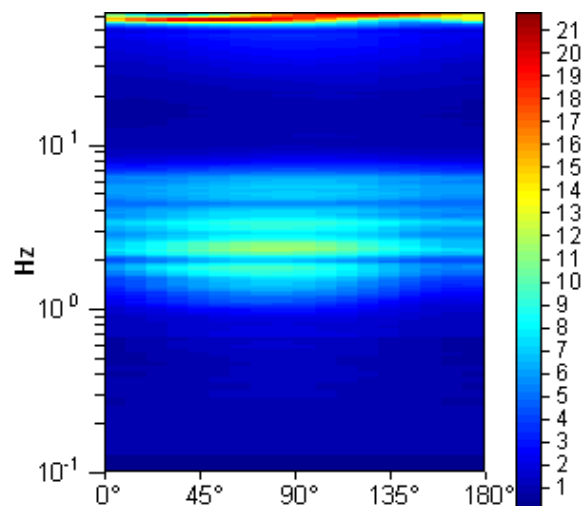
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



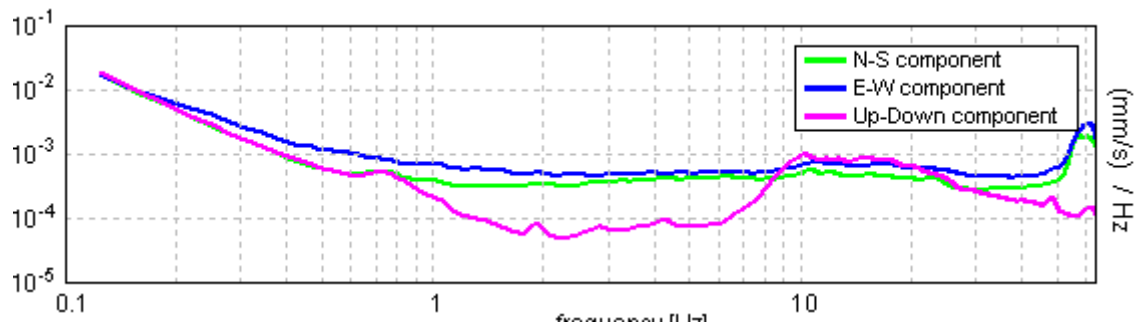
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 2.22 ± 0.04 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.22 > 0.50	OK	
$n_c(f_0) > 200$	3993.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 108 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	1.281 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	6.531 Hz	OK	
$A_0 > 2$	9.43 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01004  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02227 < 0.11094$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$1.073 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0033			
<b>Coordinate</b>	<i>UTM</i>	4227066.89	N	351560.91	E
	<i>Gauss Boaga</i>	4227065.512	N	2371555.929	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		29/04/2014, 10:35			
<b>Nome file</b>		0033			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>No</b>	
	<b>Pedoni</b>			<b>No</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



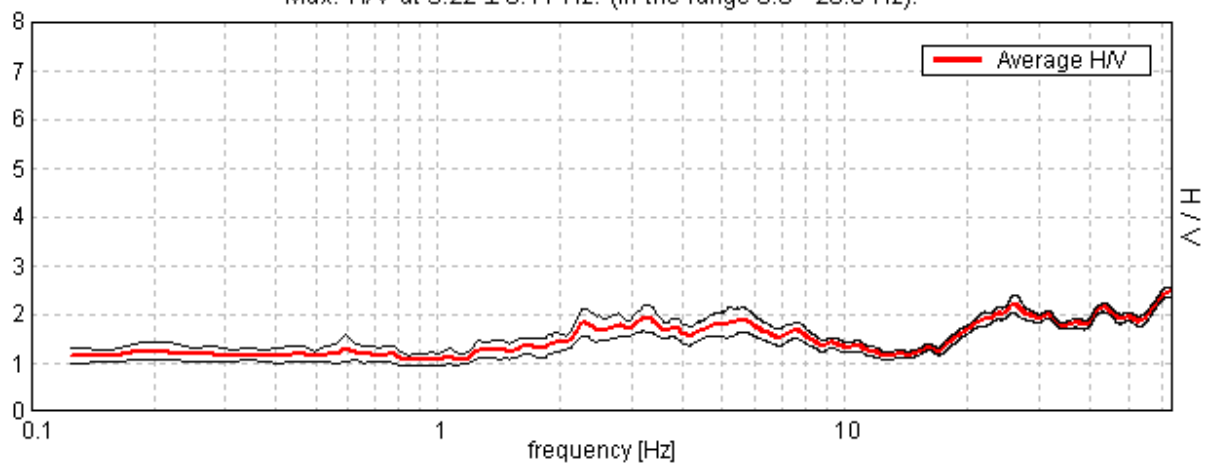
### TRIVELSICILIA PALERMO, PALERMO 0033

Start recording: 29/04/14 10:36:27      End recording: 29/04/14 11:06:28  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

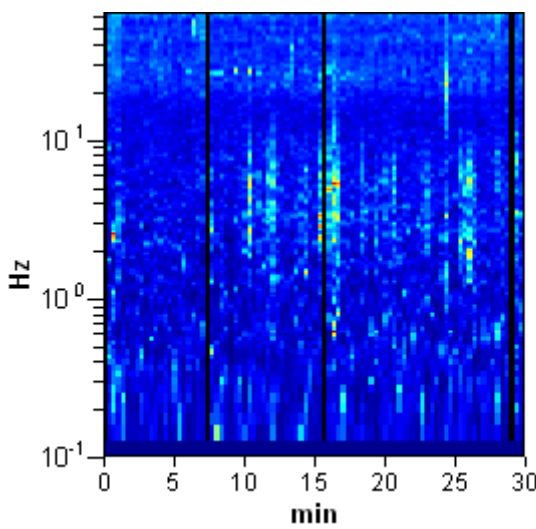
Trace length: 0h30'00".      Analyzed 96% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

#### HORIZONTAL TO VERTICAL SPECTRAL RATIO

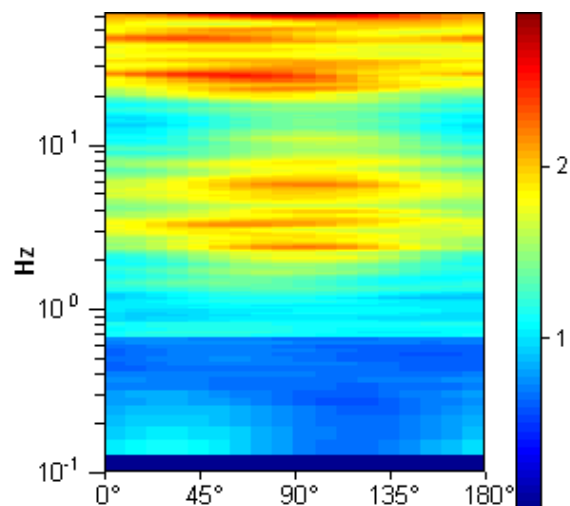
Max. H/V at  $3.22 \pm 0.11$  Hz. (In the range 0.0 - 20.0 Hz).



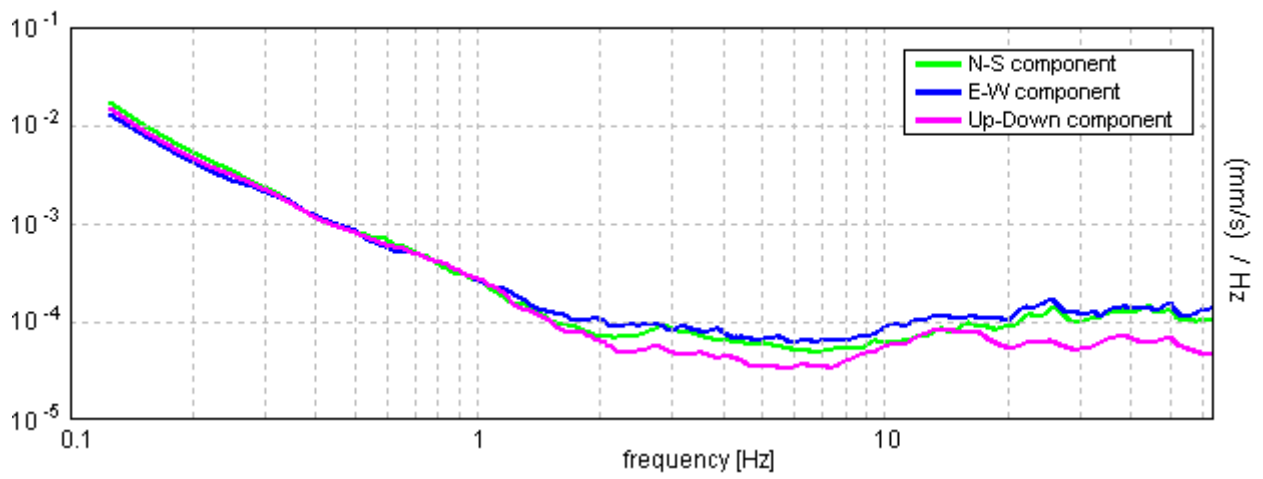
#### H/V TIME HISTORY



#### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $3.22 \pm 0.11$  Hz. (in the range 0.0 - 20.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$3.22 > 0.50$	OK	
$n_c(f_0) > 200$	$5536.3 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 156 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$1.93 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01765  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.0568 < 0.16094$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1369 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0034			
<b>Coordinate</b>	UTM	4227059.09	N	351144.56	E
	Gauss Boaga	4227057.707	N	2371139.560	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		07/05/2014, 08:40			
<b>Nome file</b>		0034			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	No			
	<b>Altro</b>	No			

**Documentazione fotografica**



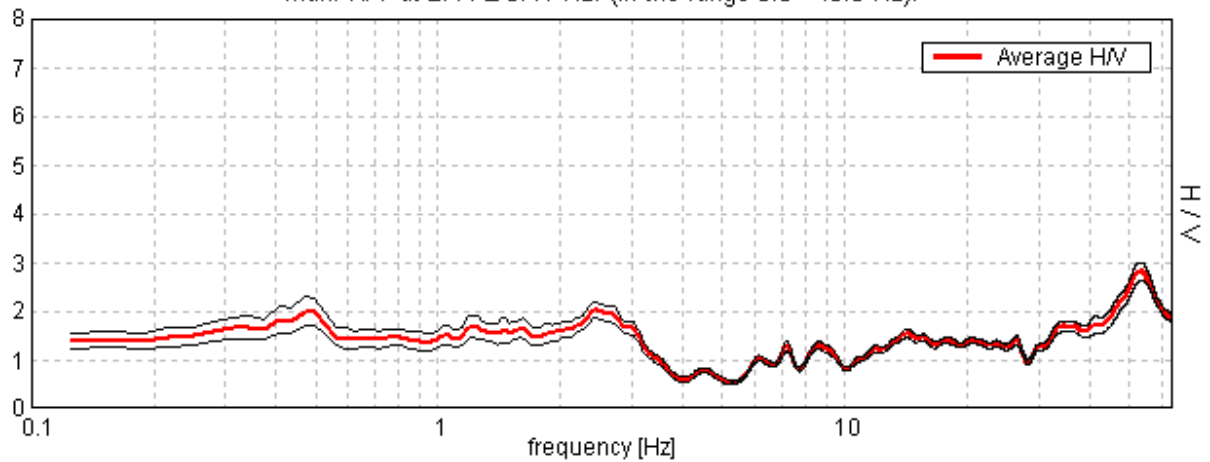
## TRIVELSICILIA PALERMO, PALERMO 0034

Start recording: 07/05/14 08:40:21      End recording: 07/05/14 09:10:22  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

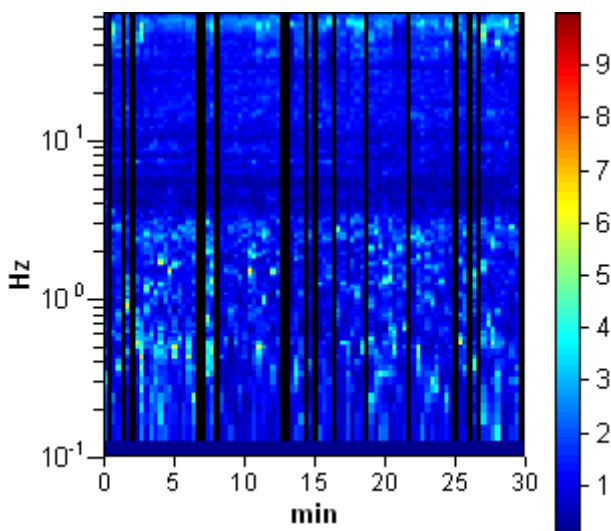
Trace length: 0h30'00".      Analyzed 81% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

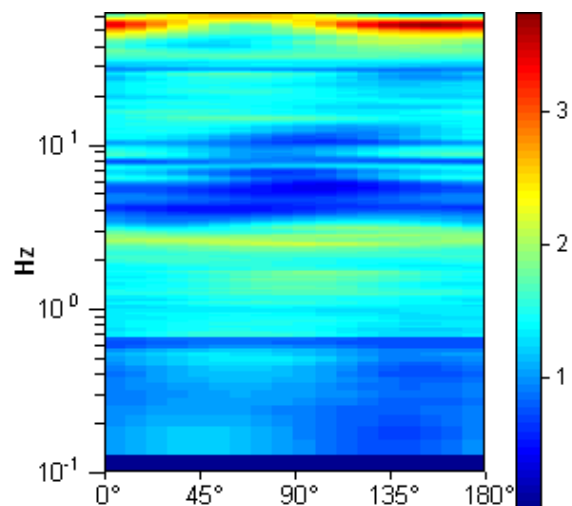
Max. H/V at  $2.44 \pm 0.41$  Hz. (In the range 0.0 - 40.0 Hz).



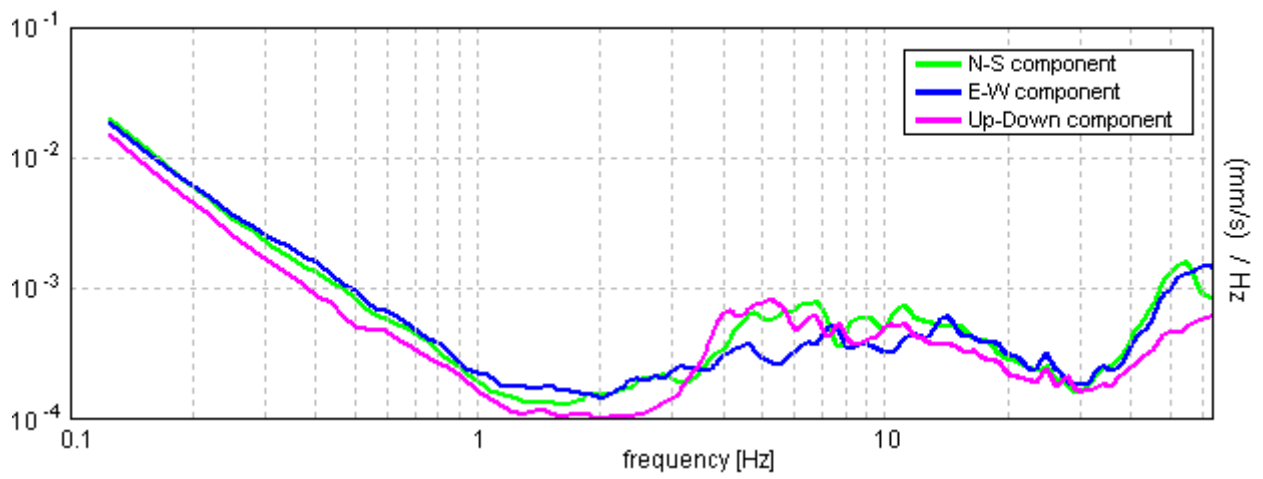
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $2.44 \pm 0.41$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$2.44 > 0.50$	OK	
$n_c(f_0) > 200$	$3558.8 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 118 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	3.438 Hz	OK	
$A_0 > 2$	$2.02 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.08331  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.20307 < 0.12188$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.0787 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

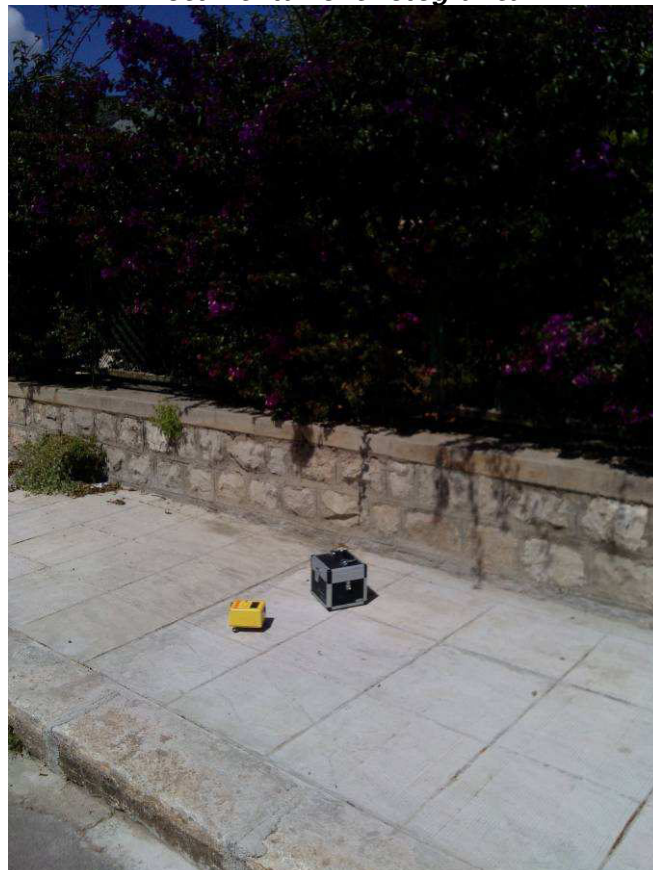
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0035				
<b>Coordinate</b>	UTM	4226622.35	N	351589.29	E
	Gauss Boaga	4226620.954	N	2371584.295	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	29/04/2014, 11:18				
<b>Nome file</b>	0035				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	MarciapiEDE				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



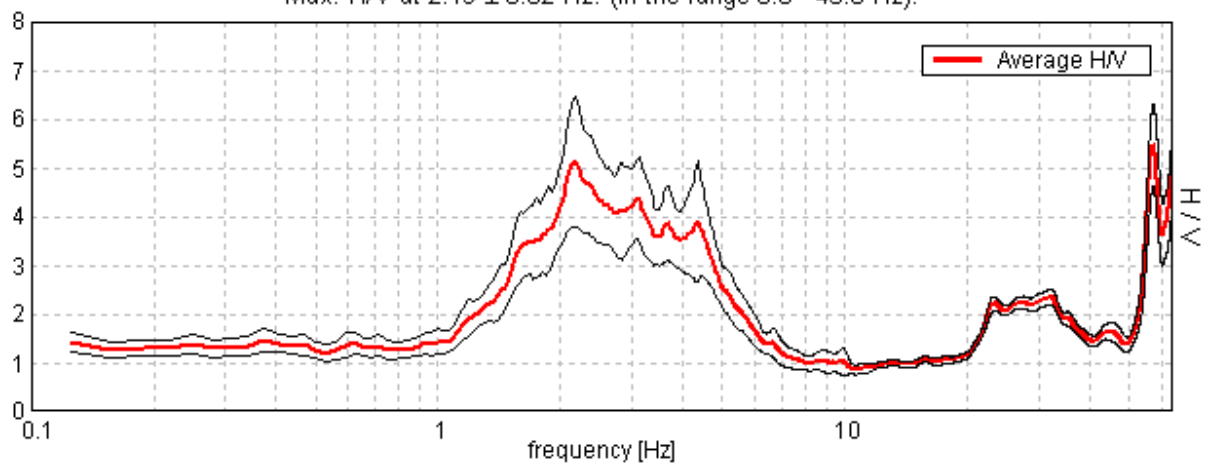
## TRIVELSICILIA PALERMO, PALERMO 0035

Start recording: 29/04/14 11:19:14      End recording: 29/04/14 11:49:15  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

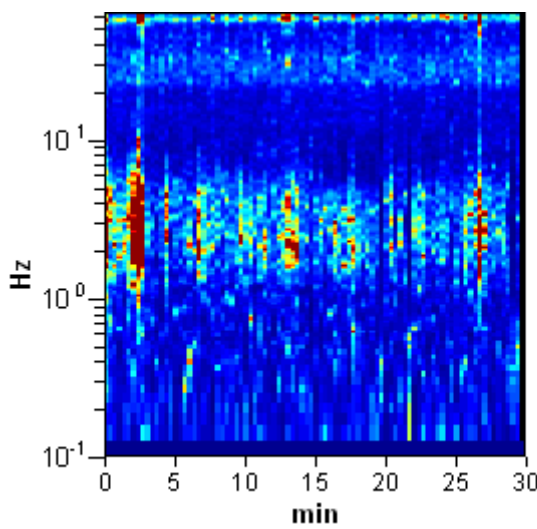
Trace length: 0h30'00".      Analyzed 99% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

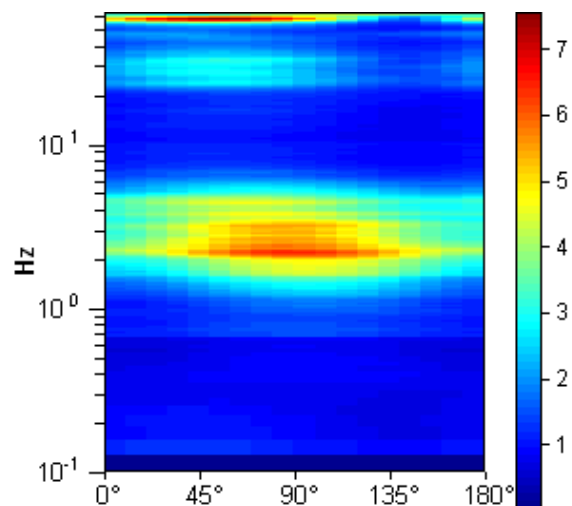
Max. H/V at  $2.19 \pm 0.02$  Hz. (In the range 0.0 - 45.0 Hz).



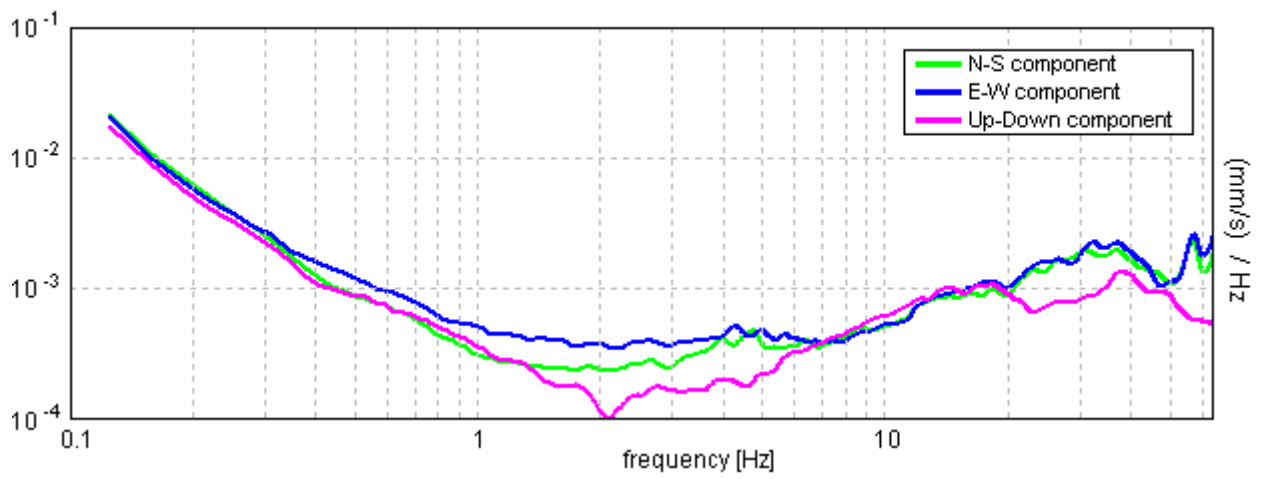
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 2.19 ± 0.02 Hz. (in the range 0.0 - 45.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.19 > 0.50	OK	
$n_c(f_0) > 200$	3893.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 106 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	1.469 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	5.0 Hz	OK	
$A_0 > 2$	5.13 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00525  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.01148 < 0.10938	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.6674 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0036			
<b>Coordinate</b>	<i>UTM</i>	4226708.20	N	351953.53	E
	<i>Gauss Boaga</i>	4226706.812	N	2371948.555	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		29/04/2014, 11:56			
<b>Nome file</b>		0036			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			

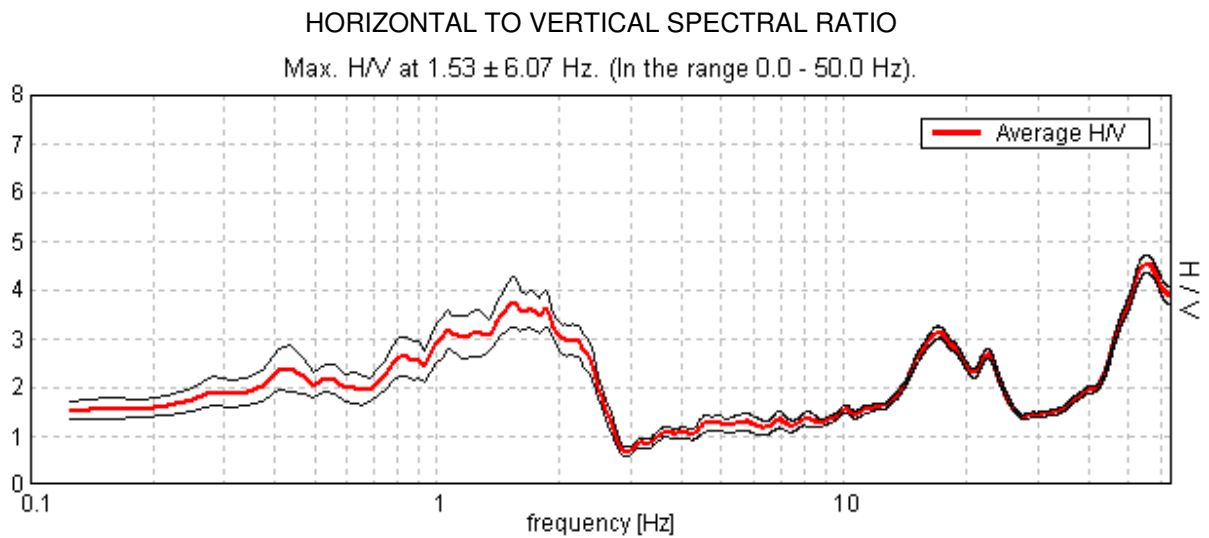
**Documentazione fotografica**



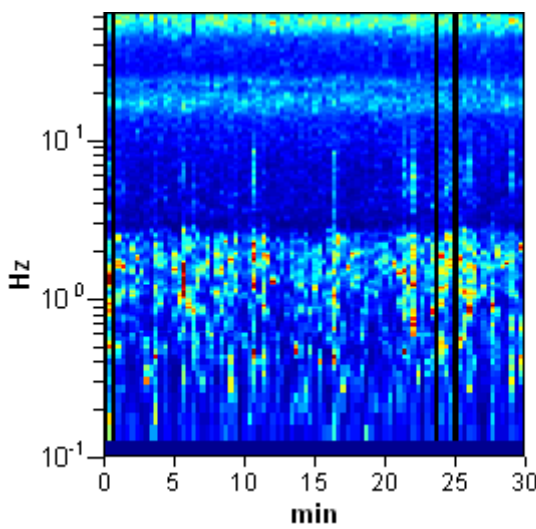
## TRIVELSICILIA PALERMO, PALERMO 0036

Start recording: 29/04/14 11:56:41      End recording: 29/04/14 12:26:42  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

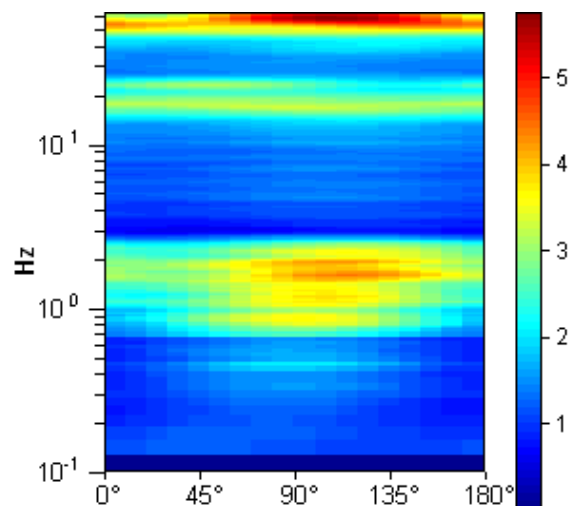
Trace length: 0h30'00".      Analyzed 96% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



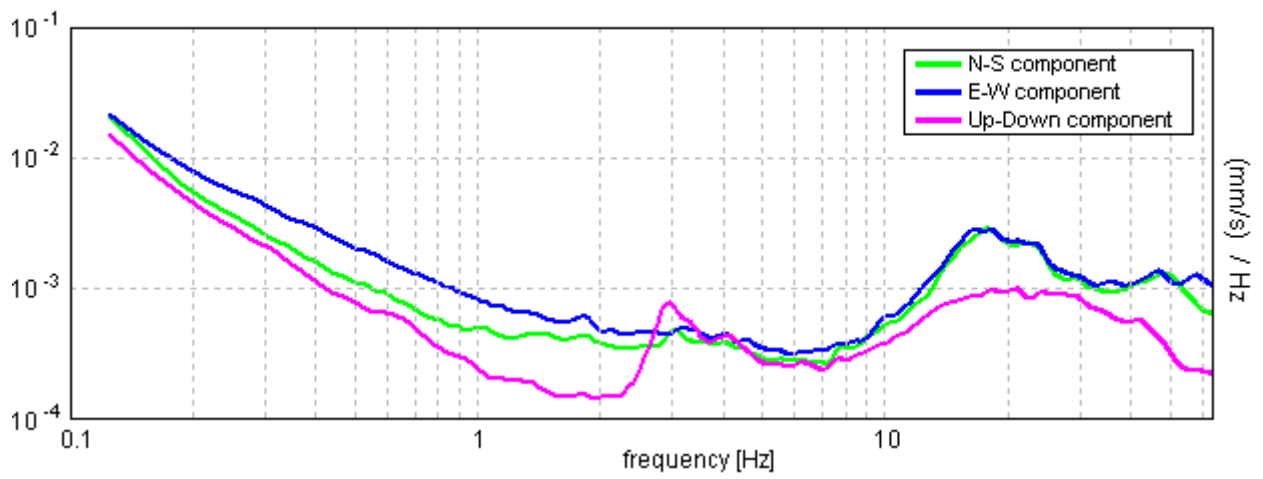
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.53 ± 6.07 Hz. (in the range 0.0 - 50.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.53 > 0.50	OK	
$n_c(f_0) > 200$	2633.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 74 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.531 Hz	OK	
$A_0 > 2$	3.73 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 1.98206  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	$3.03503 < 0.15313$		<b>NO</b>
$\sigma_A(f_0) < \theta(f_0)$	$0.2558 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0037				
<b>Coordinate</b>	<i>UTM</i>	4226630.44	N	352329.39	E
	<i>Gauss Boaga</i>	4226629.054	N	2372324.430	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia, Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	28/04/2014, 09:25				
<b>Nome file</b>	0037				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Terreno				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			

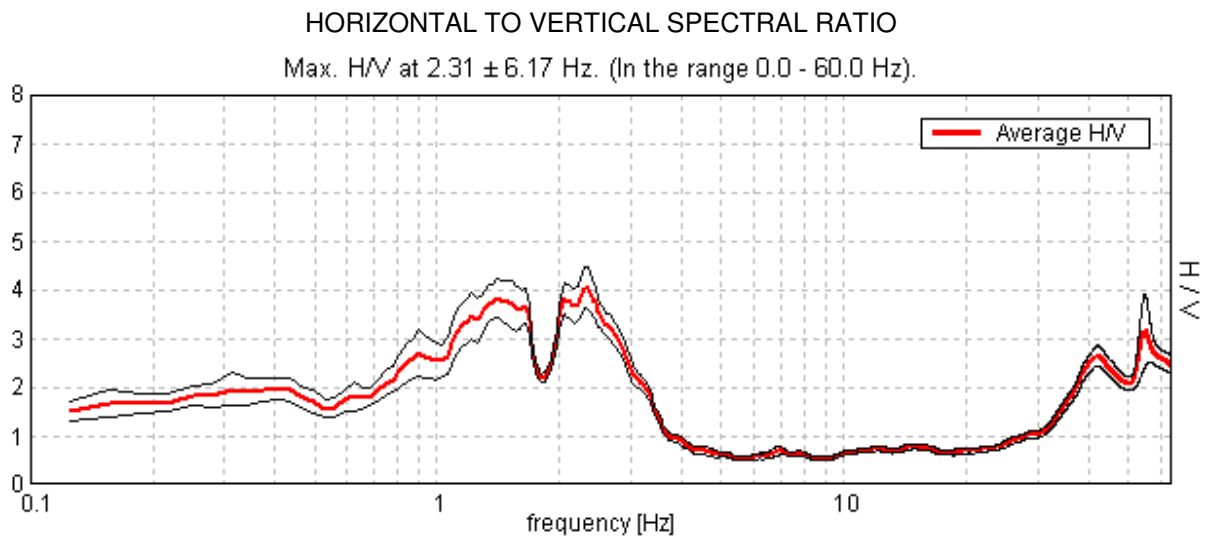
**Documentazione fotografica**



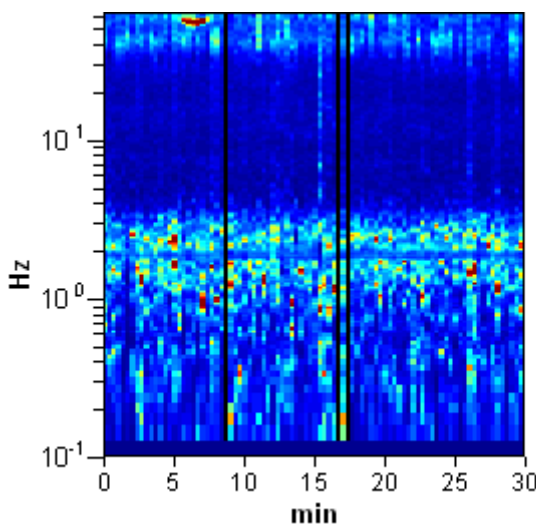
## TRIVELSICILIA PALERMO, PALERMO 0037

Start recording: 28/04/14 09:25:12      End recording: 28/04/14 09:55:13  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

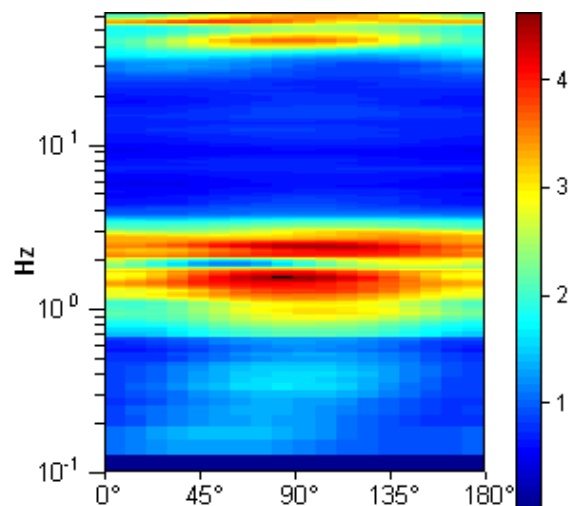
Trace length: 0h30'00".      Analyzed 97% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



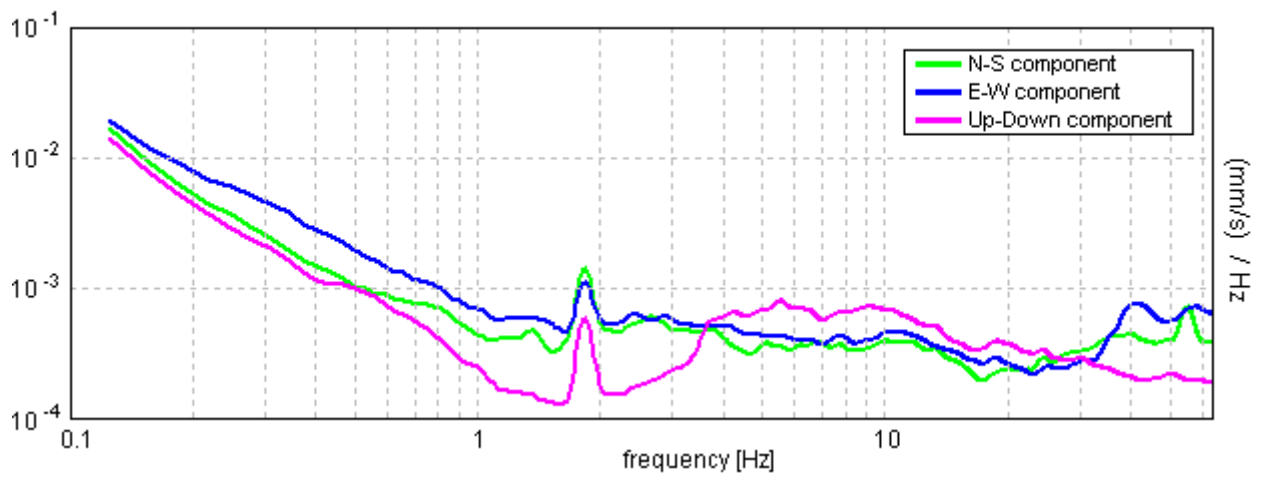
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 2.31 ± 6.17 Hz. (in the range 0.0 - 60.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.31 > 0.50	OK	
$n_c(f_0) > 200$	4023.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 112 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.719 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	3.25 Hz	OK	
$A_0 > 2$	4.03 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 1.33522  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	3.08769 < 0.11563		NO
$\sigma_A(f_0) < \theta(f_0)$	0.212 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0038			
<b>Coordinate</b>	<i>UTM</i>	4226562.89	N	352653.11	E
	<i>Gauss Boaga</i>	4226561.505	N	2372648.163	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia, Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		28/04/2014, 08:48			
<b>Nome file</b>		0038			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>No</b>	
	<b>Altro</b>			<b>No</b>	

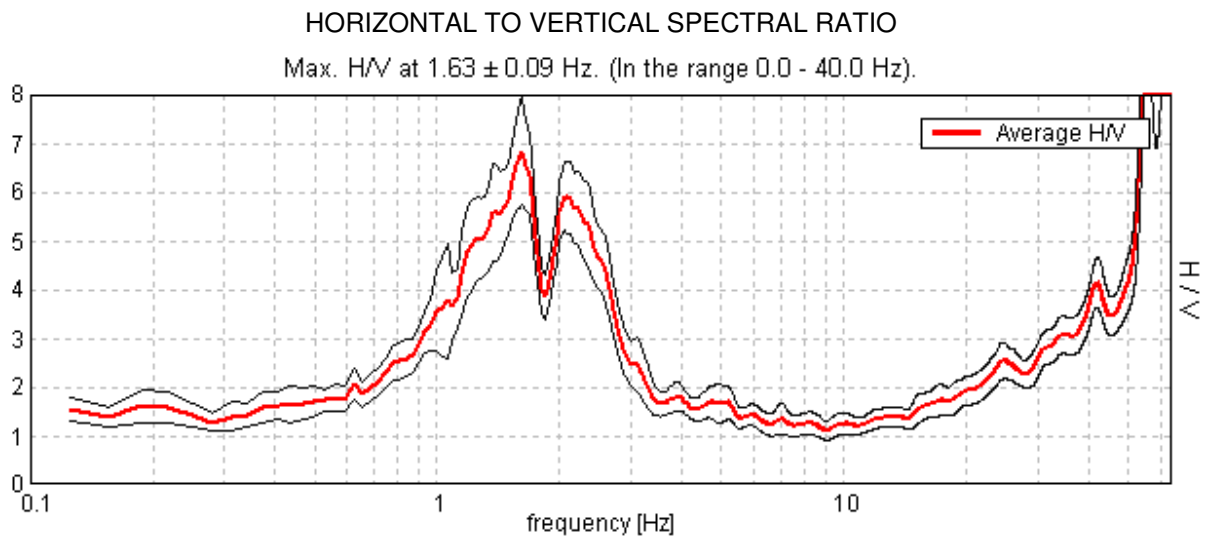
**Documentazione fotografica**



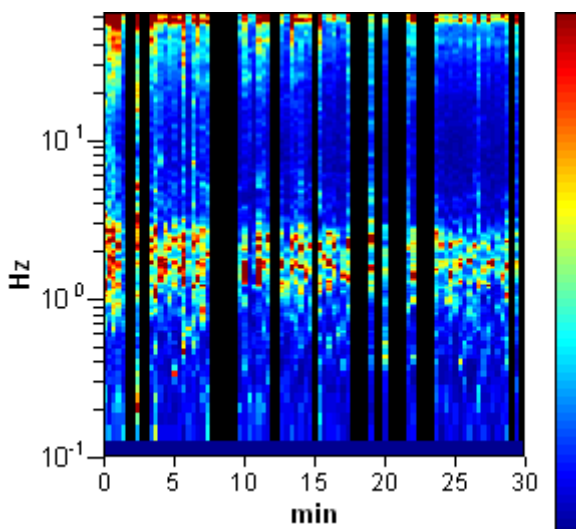
## TRIVELSICILIA PALERMO, PALERMO 0038

Start recording: 28/04/14 08:49:30      End recording: 28/04/14 09:19:31  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

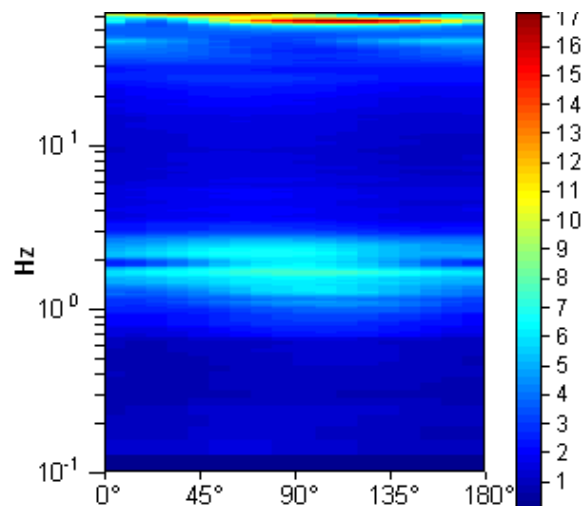
Trace length: 0h30'00".      Analyzed 68% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



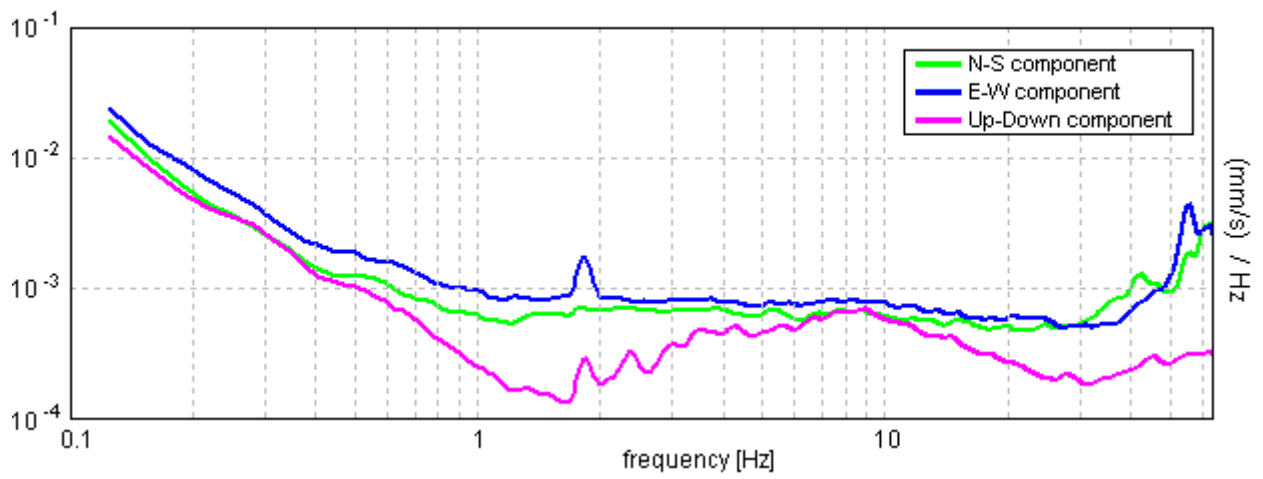
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.63 ± 0.09 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.63 > 0.50	OK	
$n_c(f_0) > 200$	1982.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 79 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.969 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.75 Hz	OK	
$A_0 > 2$	6.83 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02636  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.04284 < 0.1625	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.5383 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0039			
<b>Coordinate</b>	<i>UTM</i>	4226668.23	N	353135.74	E
	<i>Gauss Boaga</i>	4226666.856	N	2373130.819	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia, Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		23/04/2014, 12:03			
<b>Nome file</b>		0039			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>Si</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>No</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



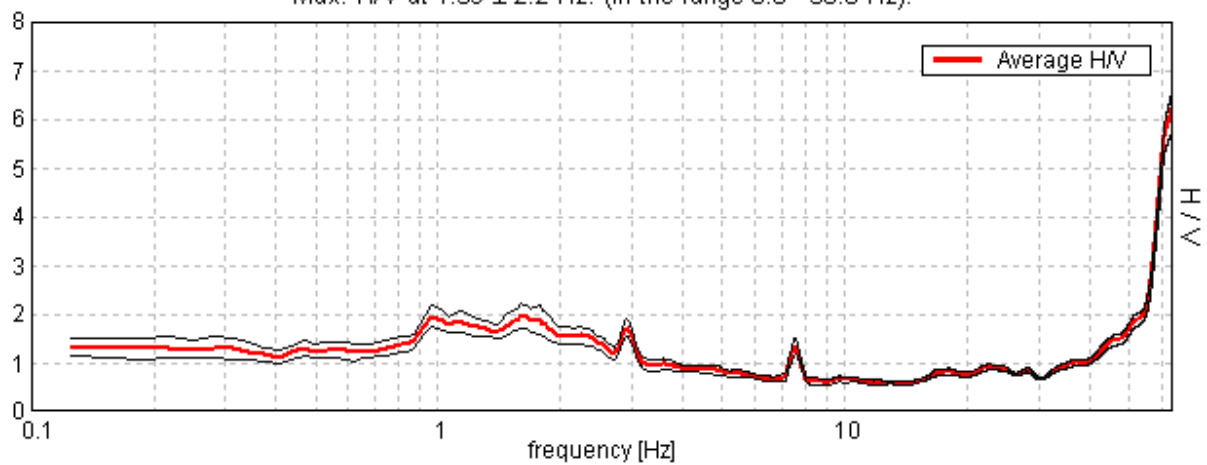
## TRIVELSICILIA PALERMO, PALERMO 0039

Start recording: 23/04/14 12:04:54      End recording: 23/04/14 12:34:55  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

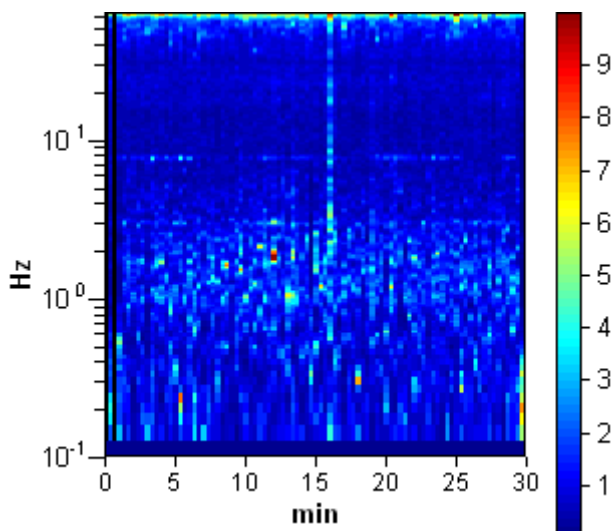
Trace length: 0h30'00".      Analyzed 98% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

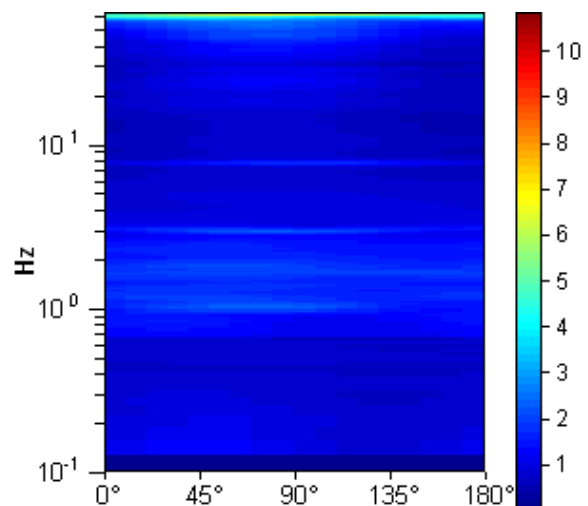
Max. H/V at  $1.59 \pm 2.2$  Hz. (in the range 0.0 - 50.0 Hz).



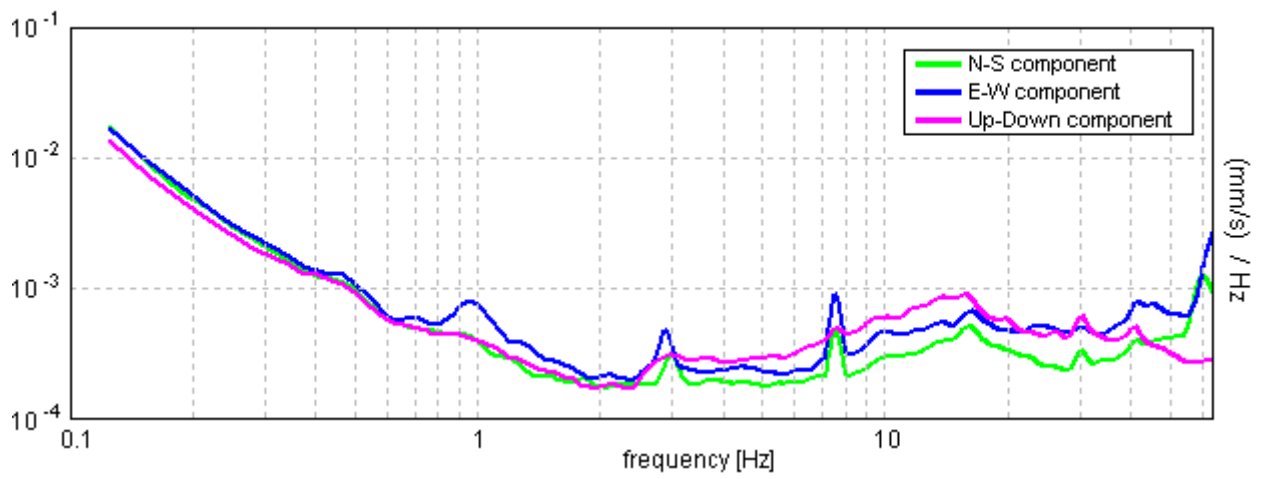
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $1.59 \pm 2.2$  Hz. (in the range 0.0 - 50.0 Hz).**

<b>Criteria for a reliable HVSR curve</b> [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	$1.59 > 0.50$	<b>OK</b>	
$n_c(f_0) > 200$	$2805.0 > 200$	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 78 times	<b>OK</b>	
<b>Criteria for a clear HVSR peak</b> [At least 5 out of 6 should be fulfilled]			
<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	$3.219$ Hz	<b>OK</b>	
$A_0 > 2$	$1.97 > 2$		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.69106  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	$1.10138 < 0.15938$		<b>NO</b>
$\sigma_A(f_0) < \theta(f_0)$	$0.1291 < 1.78$	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for $\sigma_f$ and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0040			
<b>Coordinate</b>	UTM	4226336.00	N	353604.38	E
	Gauss Boaga	4226334.618	N	2373599.470	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		30/04/2014, 09:43			
<b>Nome file</b>		0040			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			

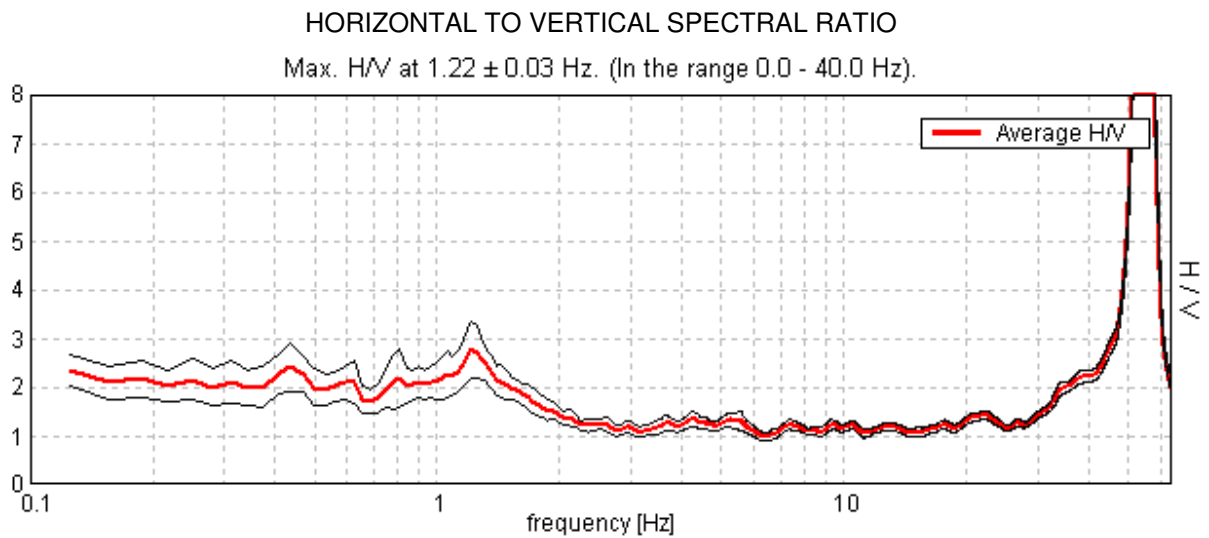
**Documentazione fotografica**



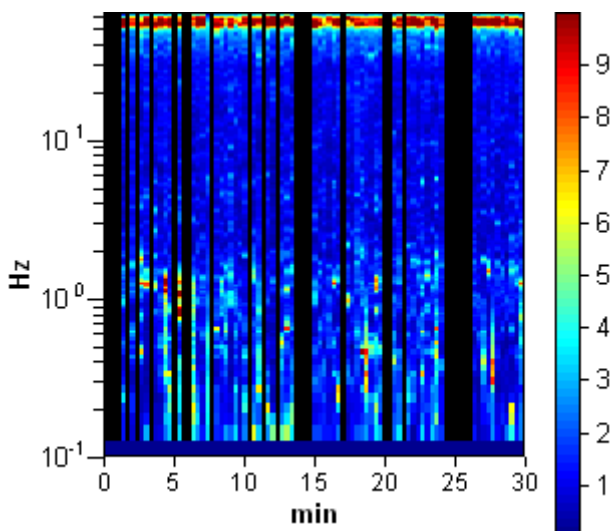
## TRIVELSICILIA PALERMO, PALERMO 0040

Start recording: 30/04/14 09:43:24      End recording: 30/04/14 10:13:25  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

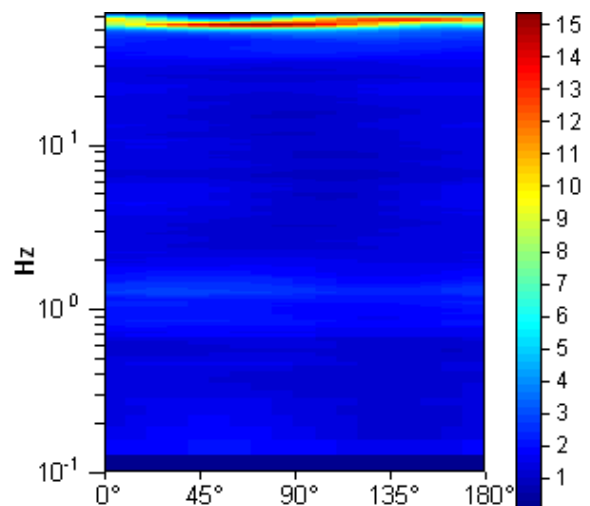
Trace length: 0h30'00".      Analyzed 69% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



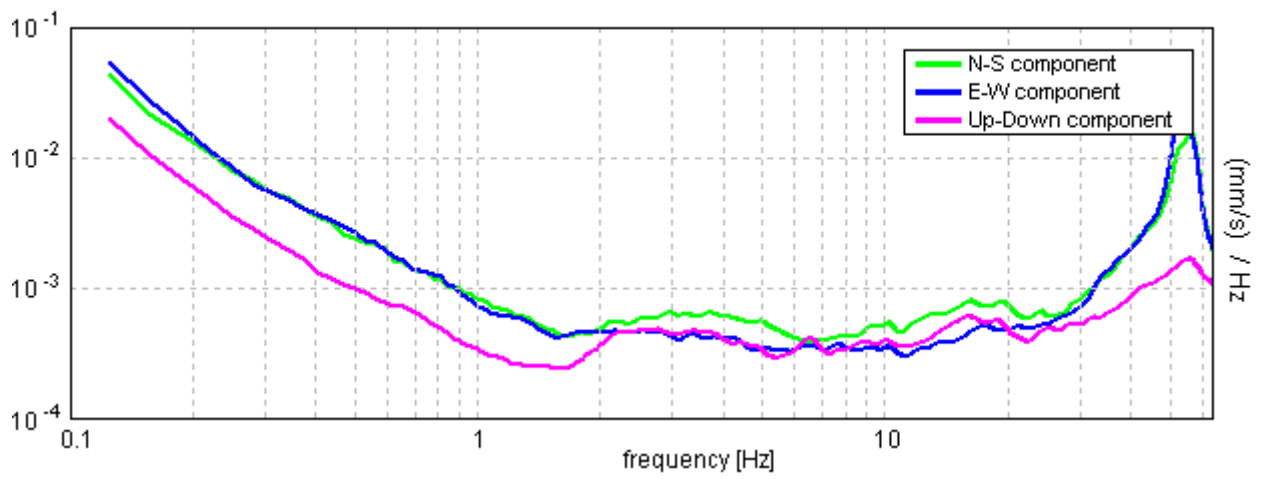
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.22 ± 0.03 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.22 > 0.50	OK	
$n_c(f_0) > 200$	1511.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 60 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.031 Hz	OK	
$A_0 > 2$	2.76 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01396  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01702 < 0.12188$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2847 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>				
<b>Nome base sismica</b>	0041				
<b>Coordinate</b>	<i>UTM</i>	4226265.66	N	353230.69	E
	<i>Gauss Boaga</i>	4226264.270	N	2373225.760	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	30/04/2014, 10:23				
<b>Nome file</b>	0041				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>No</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



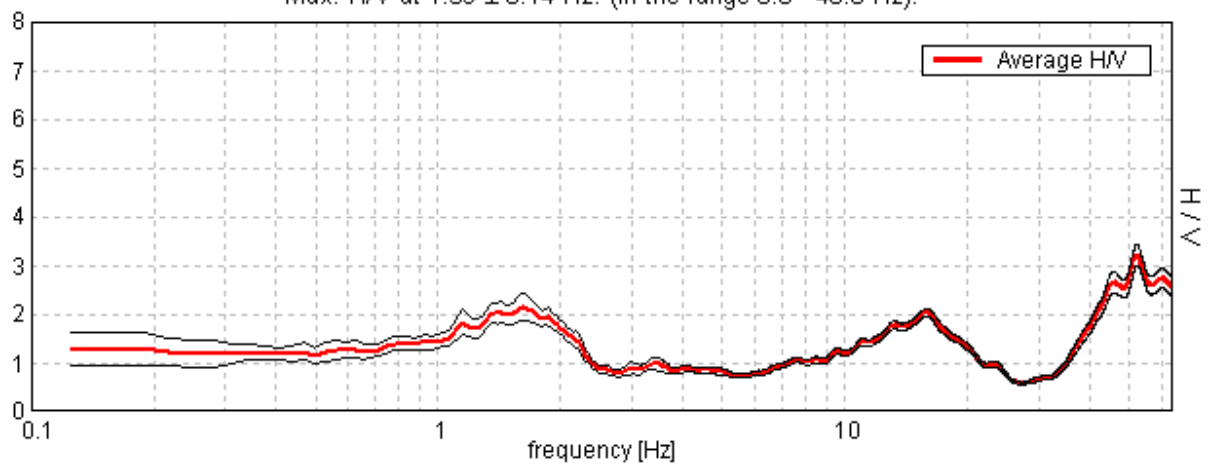
## TRIVELSICILIA PALERMO, PALERMO 0041

Start recording: 30/04/14 10:22:06      End recording: 30/04/14 10:52:07  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

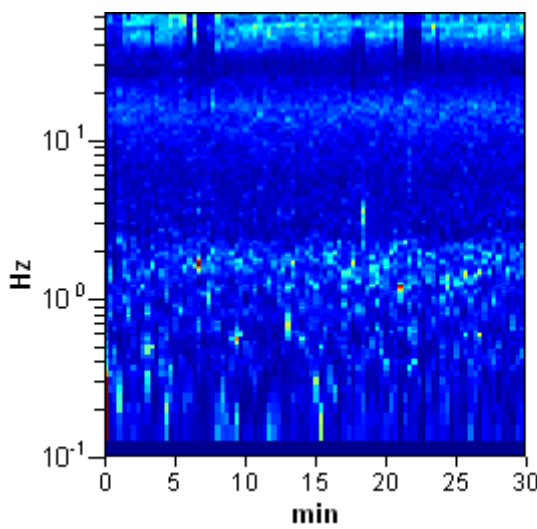
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

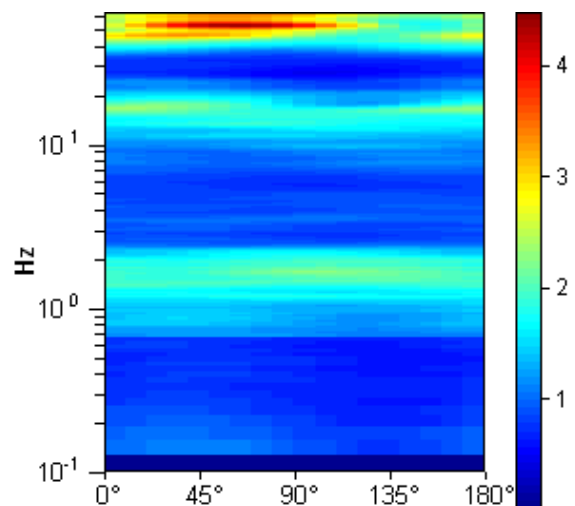
Max. H/V at  $1.59 \pm 0.14$  Hz. (In the range 0.0 - 40.0 Hz).



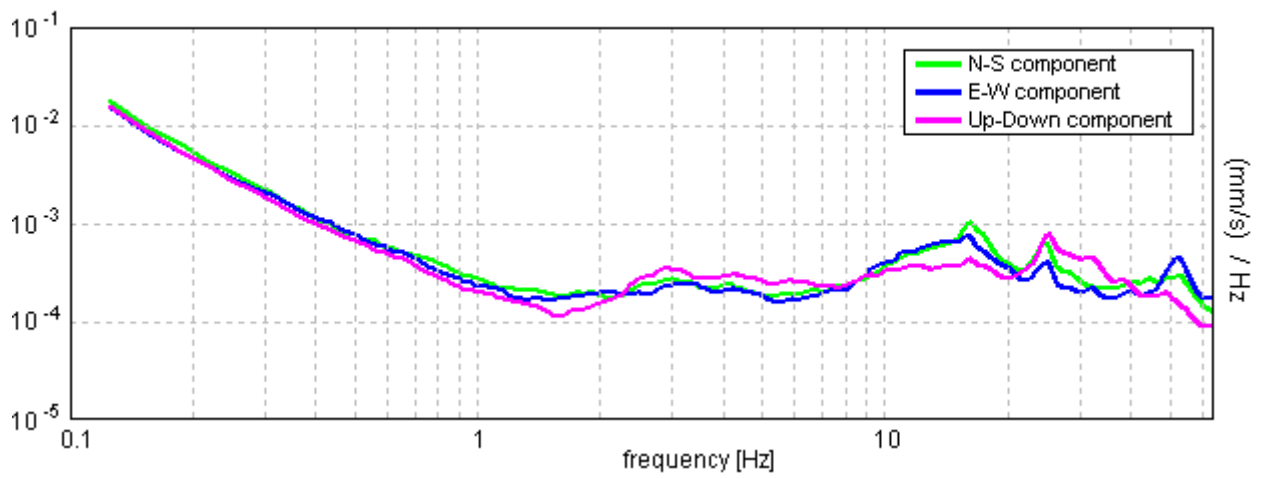
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.59 ± 0.14 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.59 > 0.50	OK	
$n_c(f_0) > 200$	2868.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 78 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.344 Hz	OK	
$A_0 > 2$	2.14 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.04416  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.07038 < 0.15938$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1363 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0042			
<b>Coordinate</b>	<i>UTM</i>	4226311.33	N	352751.99	E
	<i>Gauss Boaga</i>	4226309.936	N	2372747.039	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		30/04/2014, 11:03			
<b>Nome file</b>		0042			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>No</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



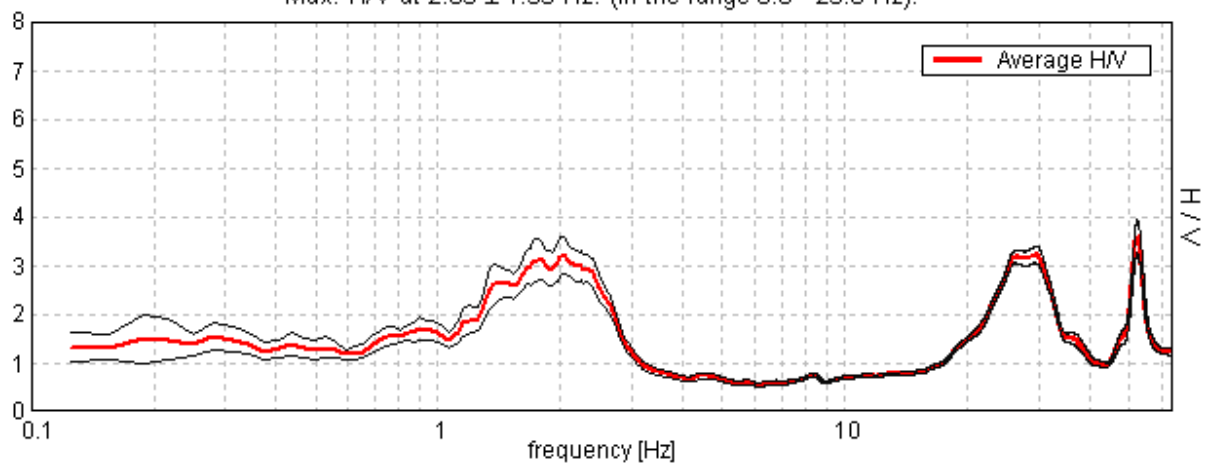
## TRIVELSICILIA PALERMO, PALERMO 0042

Start recording: 30/04/14 11:04:06      End recording: 30/04/14 11:34:07  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

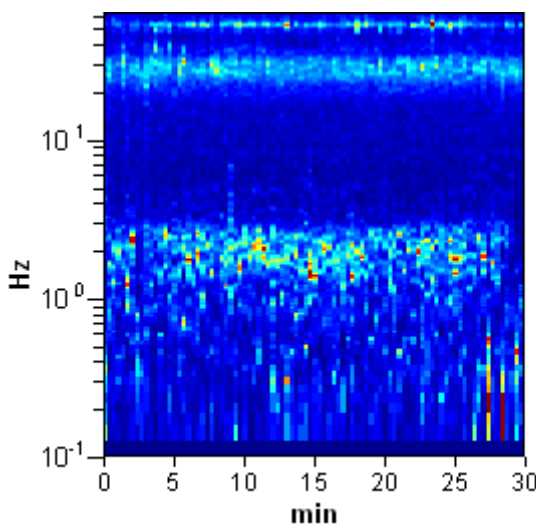
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

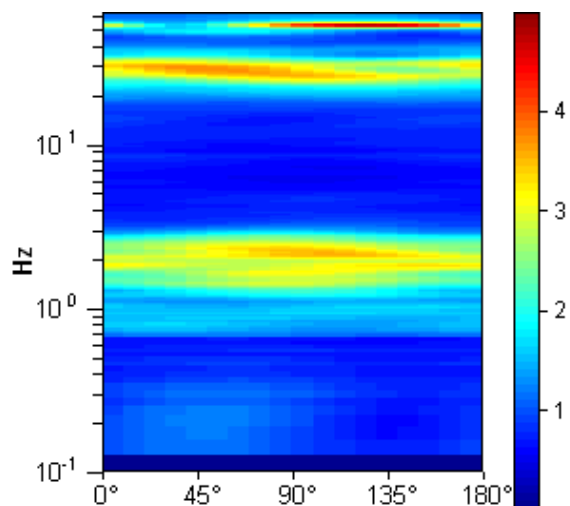
Max. H/V at  $2.03 \pm 1.35$  Hz. (In the range 0.0 - 25.0 Hz).



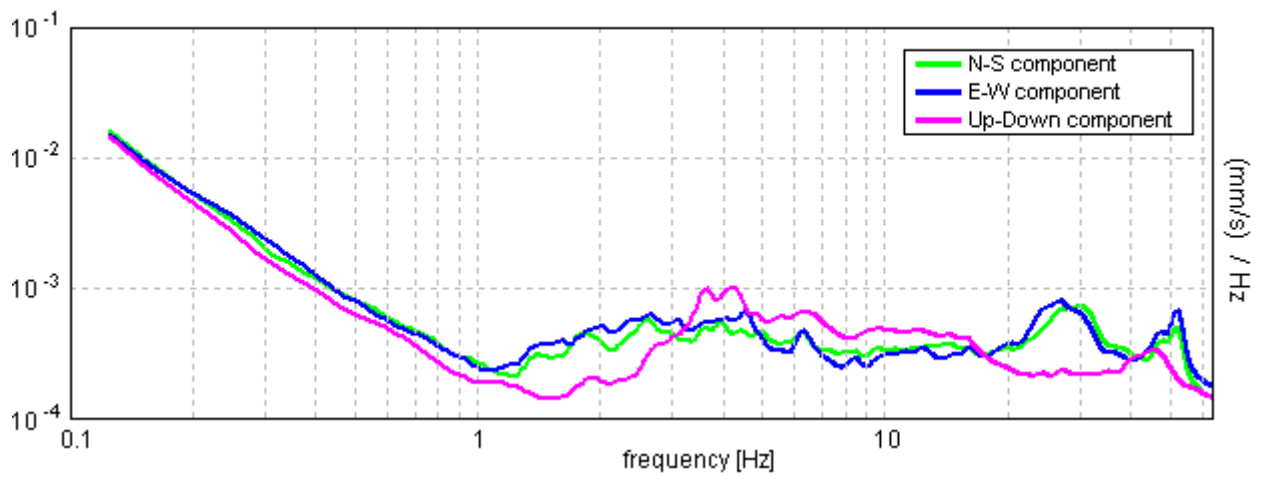
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 2.03 ± 1.35 Hz. (in the range 0.0 - 25.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.03 > 0.50	OK	
$n_c(f_0) > 200$	3656.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 98 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	1.094 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.844 Hz	OK	
$A_0 > 2$	3.20 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.33269  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	0.67578 < 0.10156		NO
$\sigma_A(f_0) < \theta(f_0)$	0.1871 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0043			
<b>Coordinate</b>	<i>UTM</i>	4226208.99	N	352275.47	E
	<i>Gauss Boaga</i>	4226207.586	N	2372270.493	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		02/05/2014, 13:59			
<b>Nome file</b>		0043			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>No</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



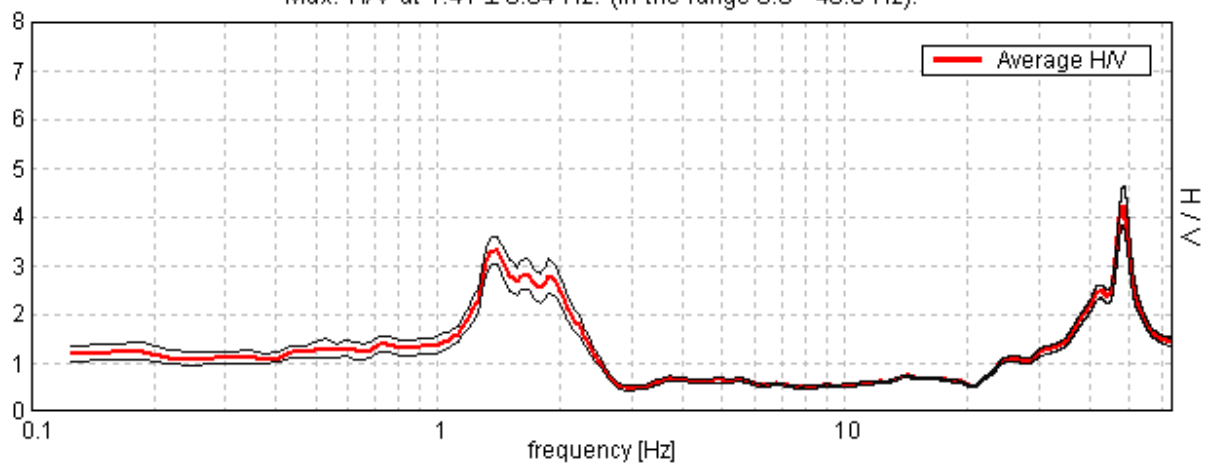
### TRIVELSICILIA PALERMO, PALERMO 0043

Start recording: 02/05/14 13:59:13      End recording: 02/05/14 14:29:14  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

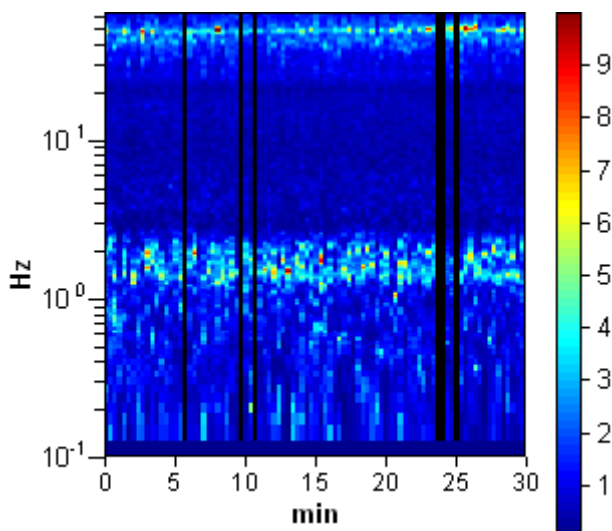
Trace length: 0h30'00".      Analyzed 93% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

#### HORIZONTAL TO VERTICAL SPECTRAL RATIO

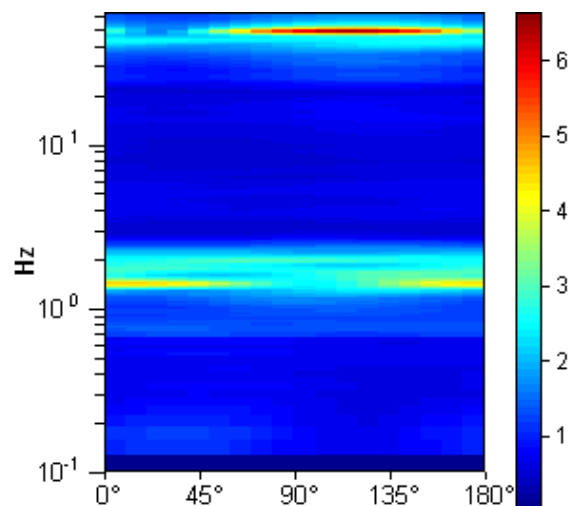
Max. H/V at  $1.41 \pm 0.04$  Hz. (In the range 0.0 - 40.0 Hz).



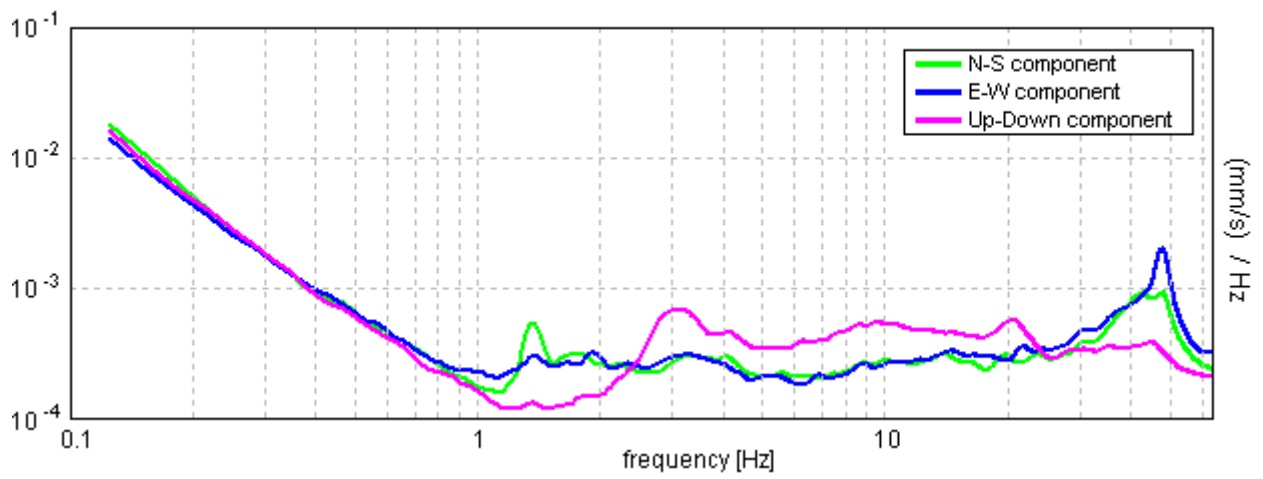
#### H/V TIME HISTORY



#### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.41 ± 0.04 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.41 > 0.50	OK	
$n_c(f_0) > 200$	2362.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 68 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	1.125 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.281 Hz	OK	
$A_0 > 2$	3.32 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01443  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.0203 < 0.14063	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1397 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0044				
<b>Coordinate</b>	<i>UTM</i>	4226240.21	N	351915.78	E
	<i>Gauss Boaga</i>	4226238.802	N	2371910.787	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	29/04/2014, 12:34				
<b>Nome file</b>	0044				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



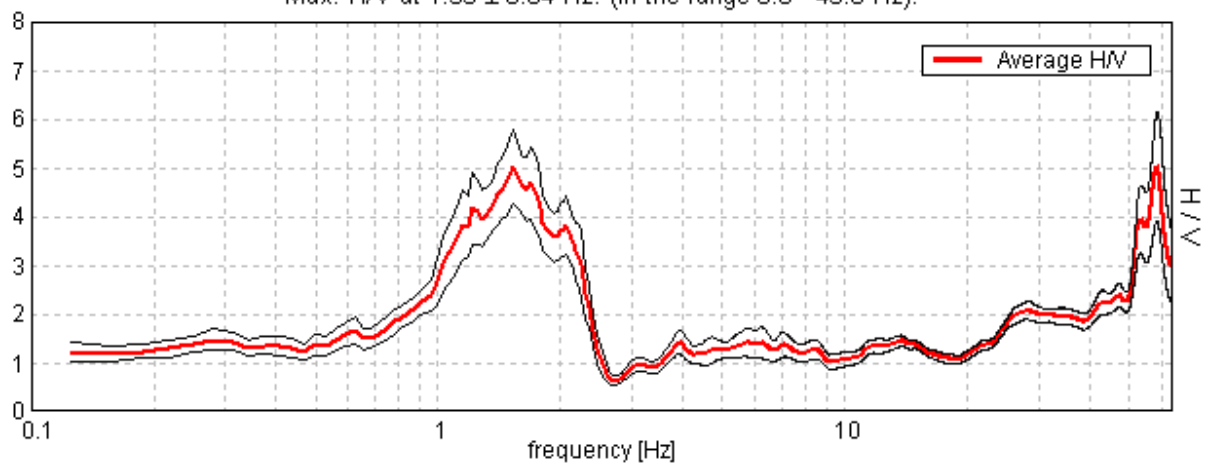
## TRIVELSICILIA PALERMO, PALERMO 0044

Start recording: 29/04/14 12:34:13      End recording: 29/04/14 13:04:14  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

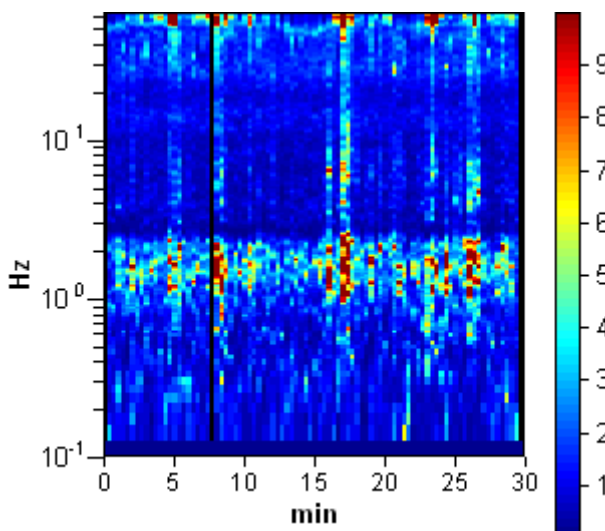
Trace length: 0h30'00".      Analyzed 97% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

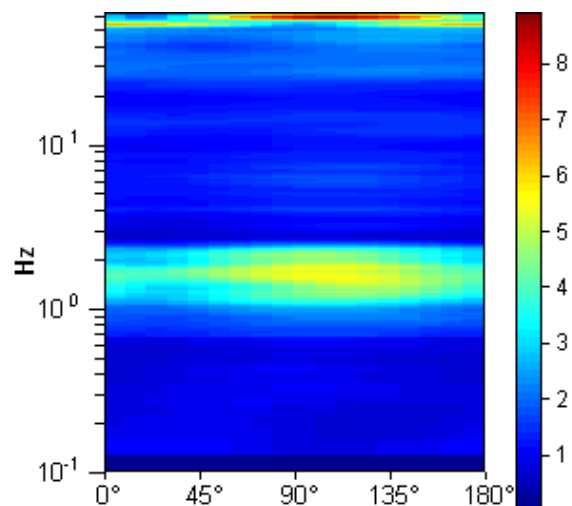
Max. H/V at  $1.53 \pm 0.04$  Hz. (In the range 0.0 - 45.0 Hz).



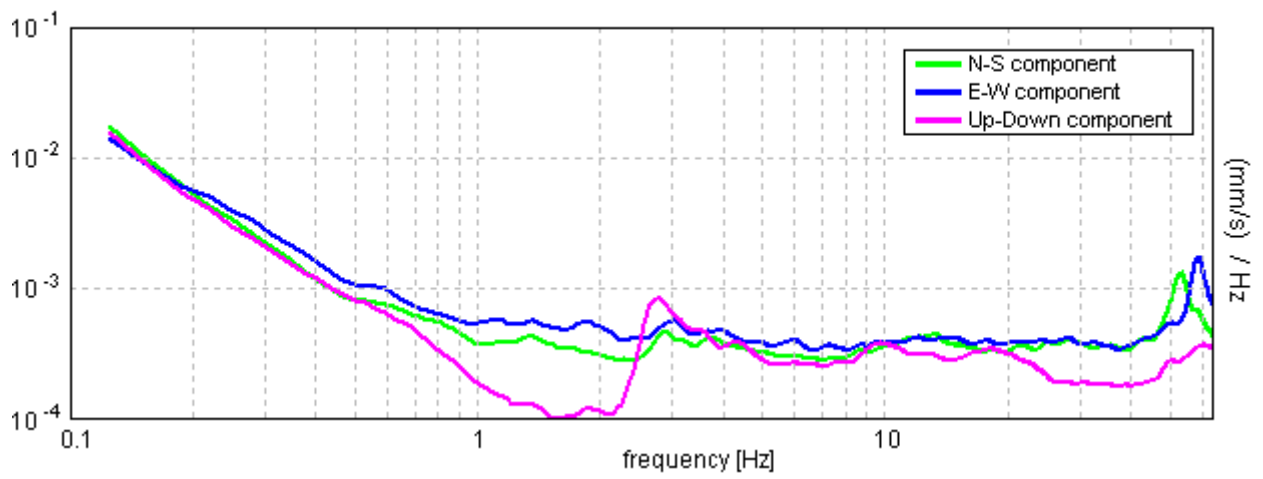
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.53 ± 0.04 Hz. (in the range 0.0 - 45.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.53 > 0.50	OK	
$n_c(f_0) > 200$	2664.4 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 74 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.969 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.313 Hz	OK	
$A_0 > 2$	5.01 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01374  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.02104 < 0.15313	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.3792 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0045				
<b>Coordinate</b>	<i>UTM</i>	4225901.79	N	352381.86	E
	<i>Gauss Boaga</i>	4225900.374	N	2372376.878	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	29/04/2014, 13:13				
<b>Nome file</b>	0045				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



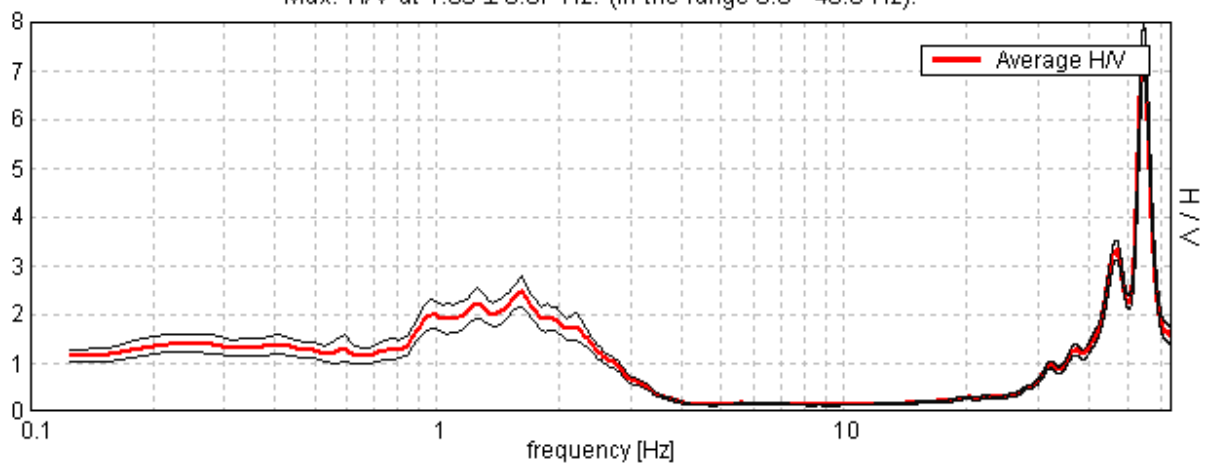
## TRIVELSICILIA PALERMO, PALERMO 0045

Start recording: 29/04/14 13:12:37      End recording: 29/04/14 13:42:38  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

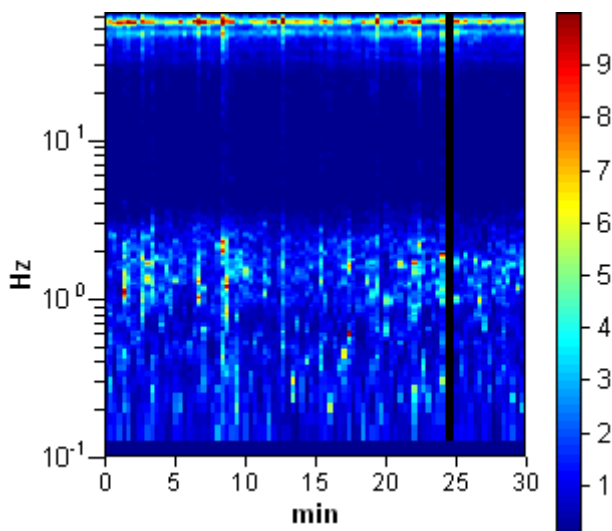
Trace length: 0h30'00".      Analyzed 98% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

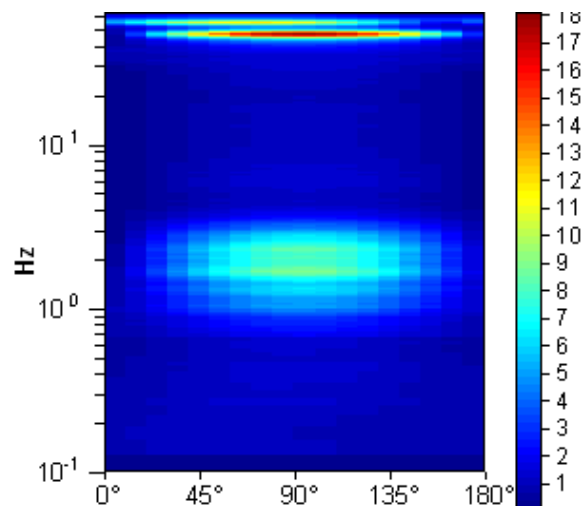
Max. H/V at  $1.63 \pm 0.07$  Hz. (In the range 0.0 - 40.0 Hz).



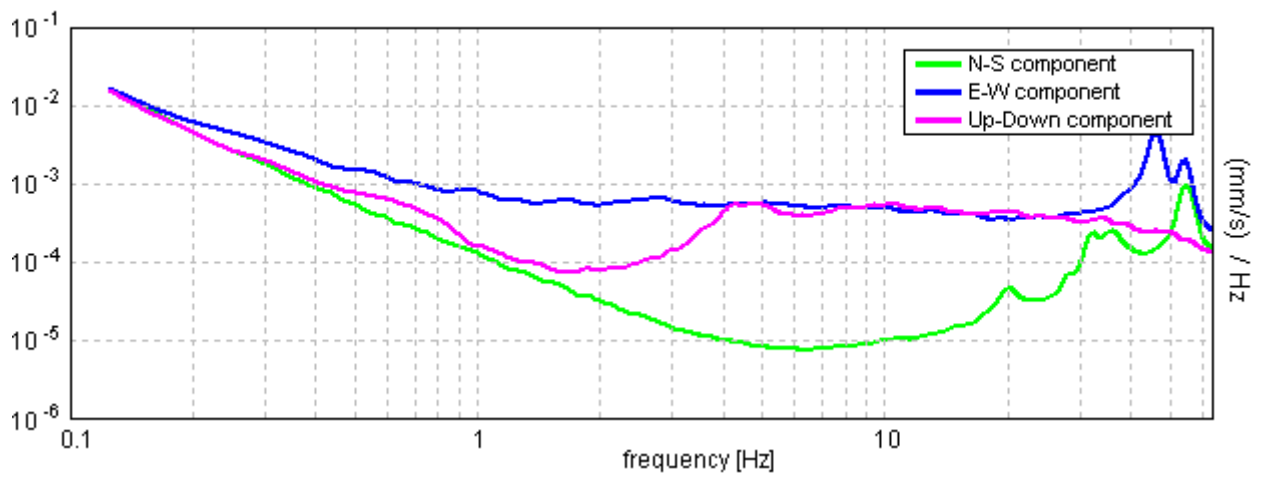
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.63 ± 0.07 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.63 > 0.50	OK	
$n_c(f_0) > 200$	2860.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 79 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.719 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.5 Hz	OK	
$A_0 > 2$	2.46 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02299  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.03735 < 0.1625$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1627 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0046			
<b>Coordinate</b>	UTM	4226045.14	N	352808.02	E
	Gauss Boaga	4226043.735	N	2372803.062	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		30/04/2014, 11:47			
<b>Nome file</b>		0046			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>No</b>	
	<b>Altro</b>			<b>No</b>	

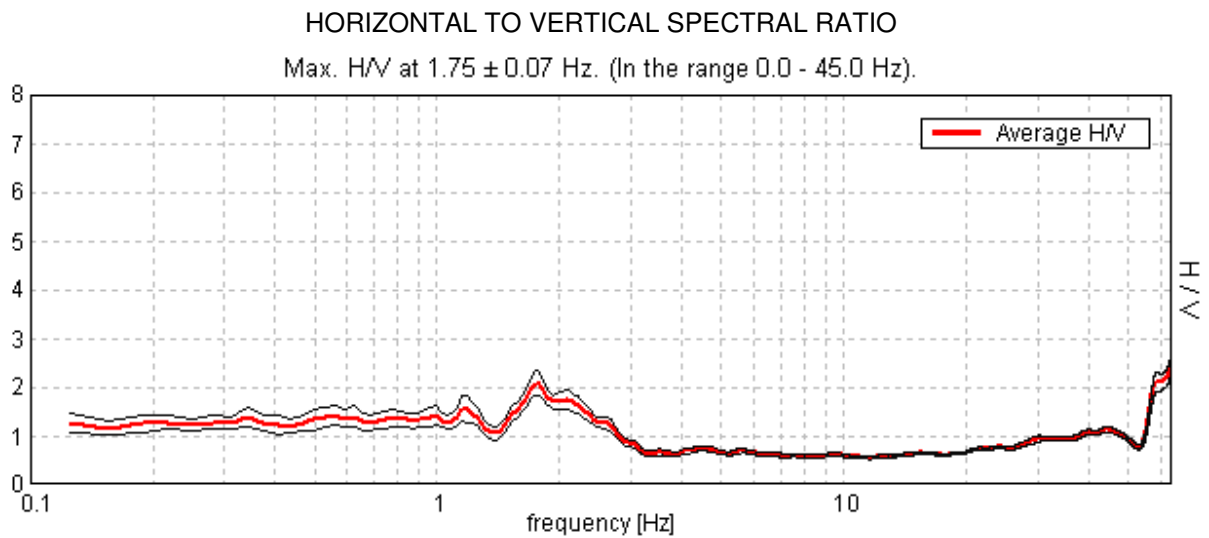
**Documentazione fotografica**



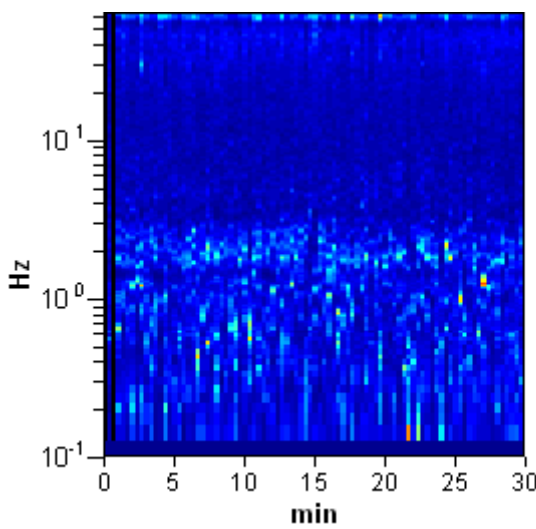
## TRIVELSICILIA PALERMO, PALERMO 0046

Start recording: 30/04/14 11:48:27      End recording: 30/04/14 12:18:28  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

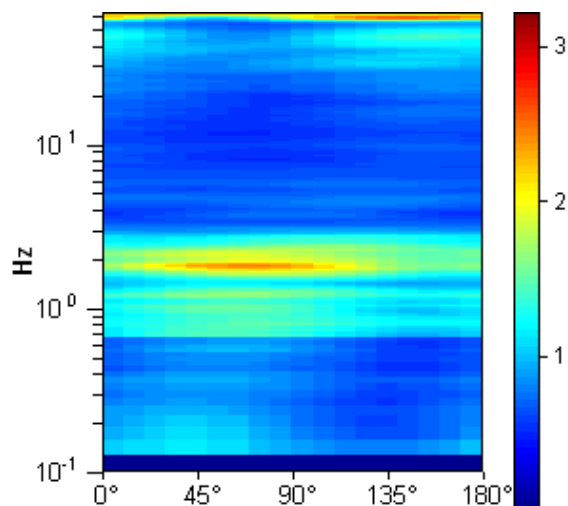
Trace length: 0h30'00".      Analyzed 98% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



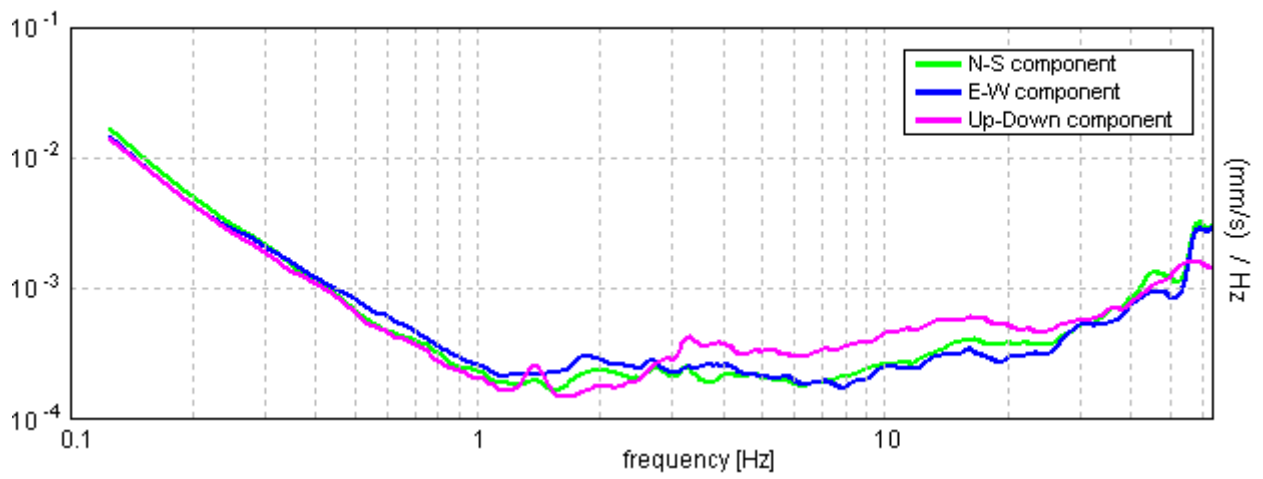
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.75 ± 0.07 Hz. (in the range 0.0 - 45.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.75 > 0.50	OK	
$n_c(f_0) > 200$	3080.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 85 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.781 Hz	OK	
$A_0 > 2$	2.07 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02006  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.0351 < 0.175$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1278 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0047				
<b>Coordinate</b>	<i>UTM</i>	4225860.06	N	353152.76	E
	<i>Gauss Boaga</i>	4225858.652	N	2373147.812	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	30/04/2014, 12:33				
<b>Nome file</b>	0047				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			

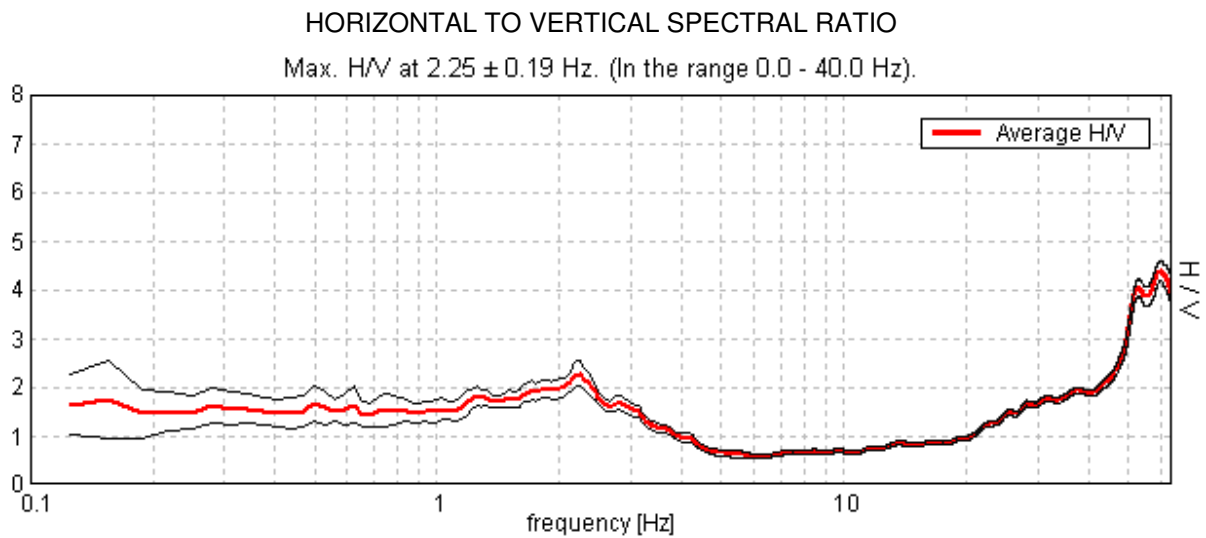
**Documentazione fotografica**



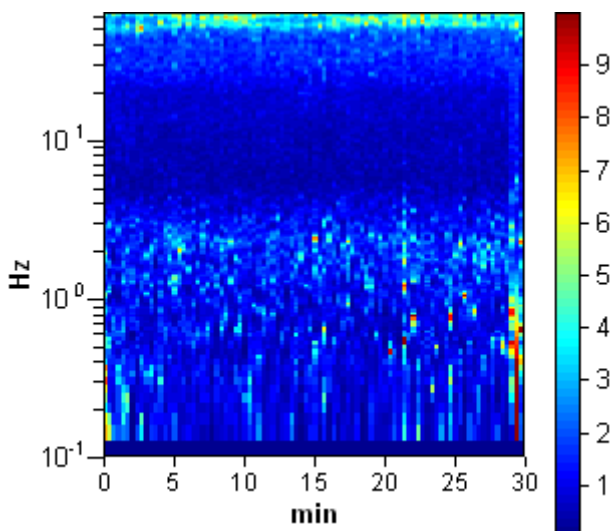
## TRIVELSICILIA PALERMO, PALERMO 0047

Start recording: 30/04/14 12:34:14      End recording: 30/04/14 13:04:15  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

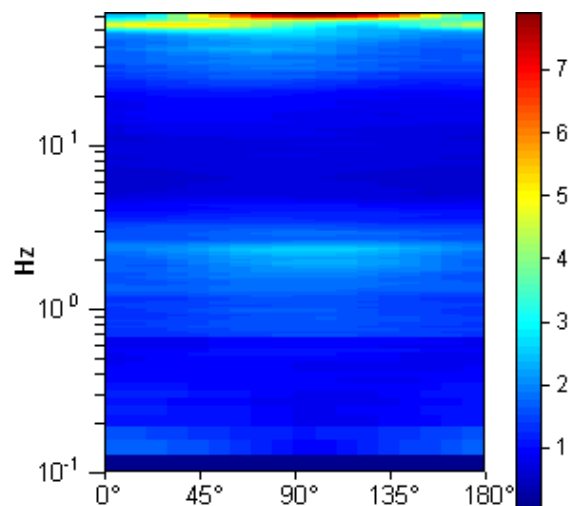
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



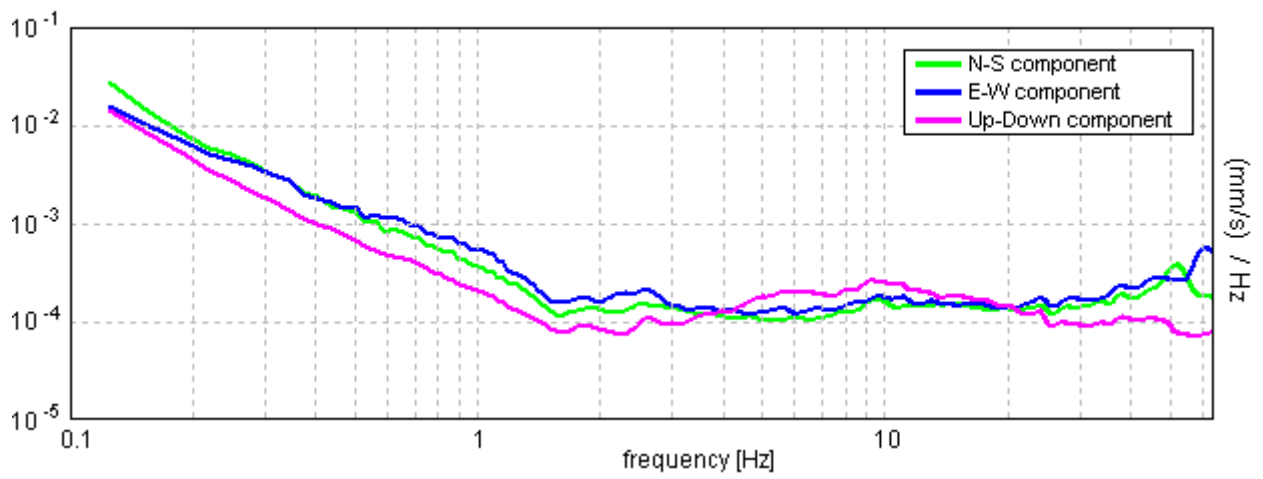
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 2.25 ± 0.19 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.25 > 0.50	OK	
$n_c(f_0) > 200$	4050.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 109 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	3.594 Hz	OK	
$A_0 > 2$	2.27 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.0433  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.09743 < 0.1125	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1289 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0048				
<b>Coordinate</b>	<i>UTM</i>	4225889.58	N	353567.36	E
	<i>Gauss Boaga</i>	4225888.179	N	2373562.432	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	30/04/2014, 13:12				
<b>Nome file</b>	0048				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	MarciapiEDE				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



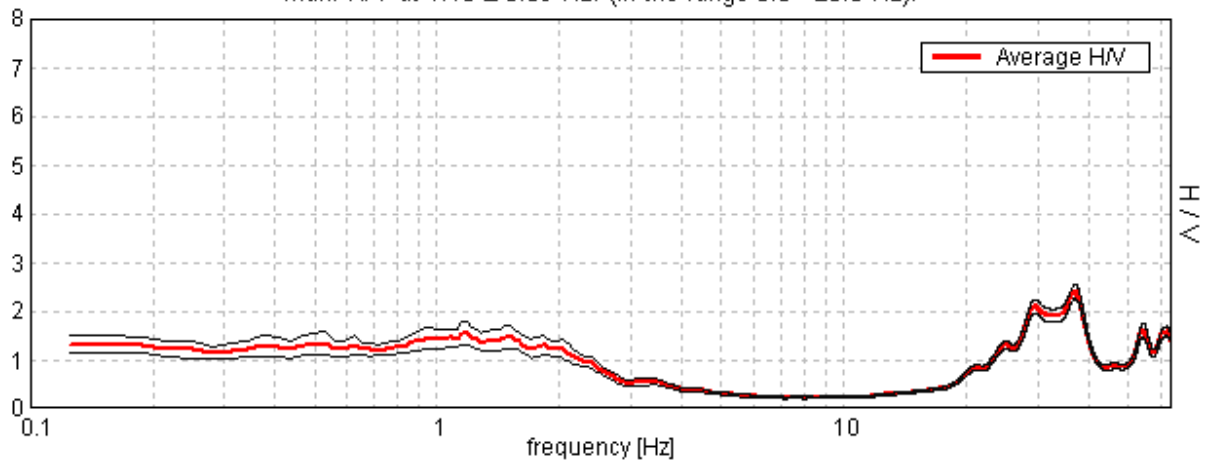
## TRIVELSICILIA PALERMO, PALERMO 0048

Start recording: 30/04/14 13:12:17      End recording: 30/04/14 13:42:18  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

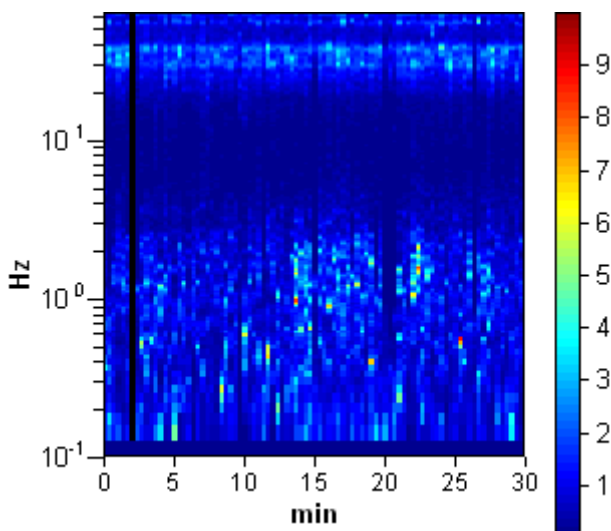
Trace length: 0h30'00".      Analyzed 99% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

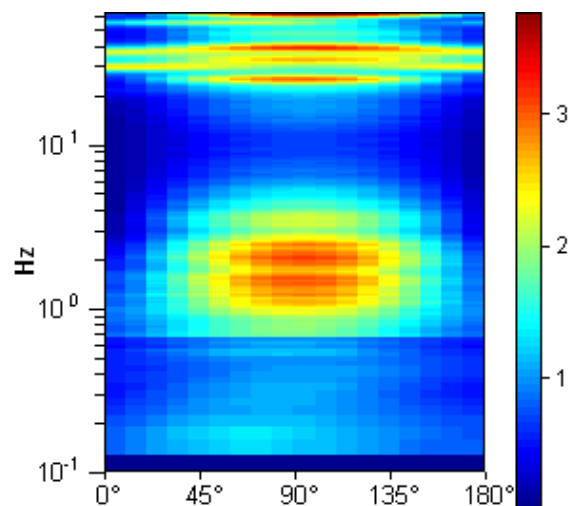
Max. H/V at  $1.16 \pm 0.09$  Hz. (In the range 0.0 - 25.0 Hz).



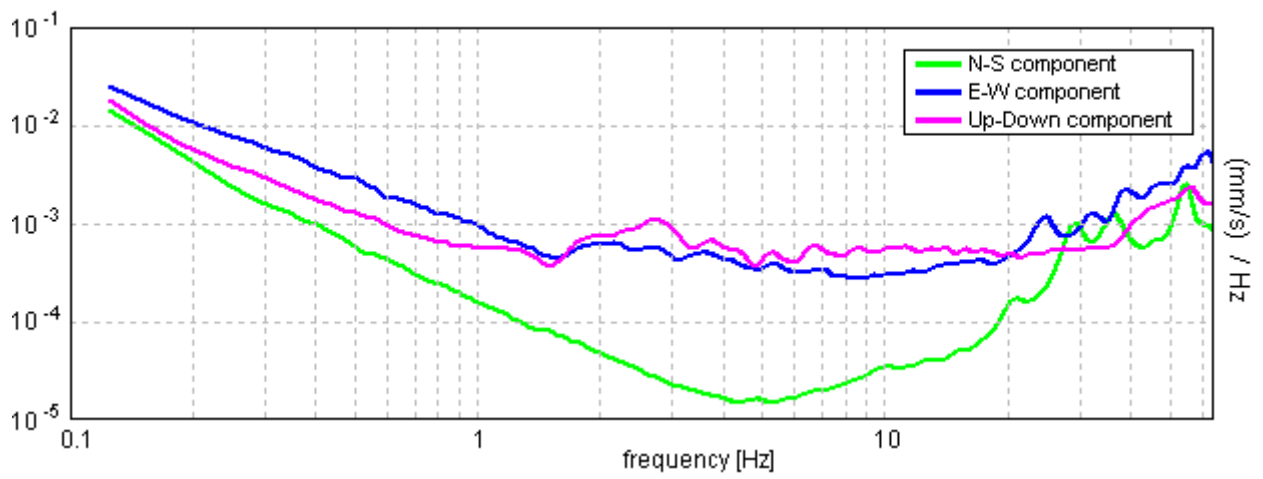
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.16 ± 0.09 Hz. (in the range 0.0 - 25.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.16 > 0.50	OK	
$n_c(f_0) > 200$	2058.1 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 56 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.563 Hz	OK	
<b><math>A_0 &gt; 2</math></b>	1.55 > 2		<b>NO</b>
<b><math>f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%</math></b>	$ 0.03977  < 0.05$	OK	
<b><math>\sigma_f &lt; \varepsilon(f_0)</math></b>	$0.04599 < 0.11563$	OK	
<b><math>\sigma_A(f_0) &lt; \theta(f_0)</math></b>	$0.1152 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

**Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$**

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

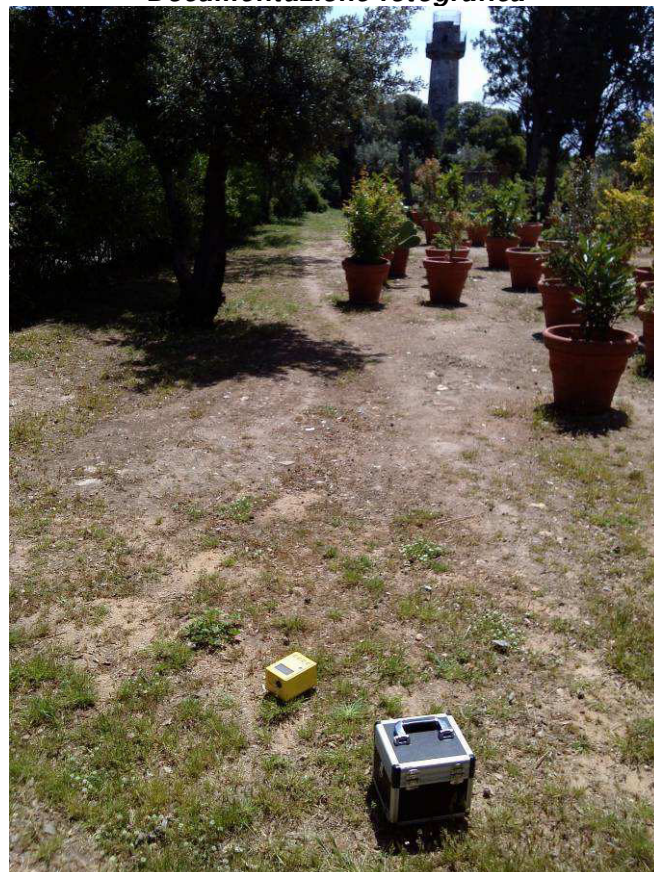


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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>			
<b>Nome base sismica</b>		0049			
<b>Coordinate</b>	<i>UTM</i>	4225830.25	N	353950.66	E
	<i>Gauss Boaga</i>	4225828.851	N	2373945.748	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		02/05/2014, 12:35			
<b>Nome file</b>		0049			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>No</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



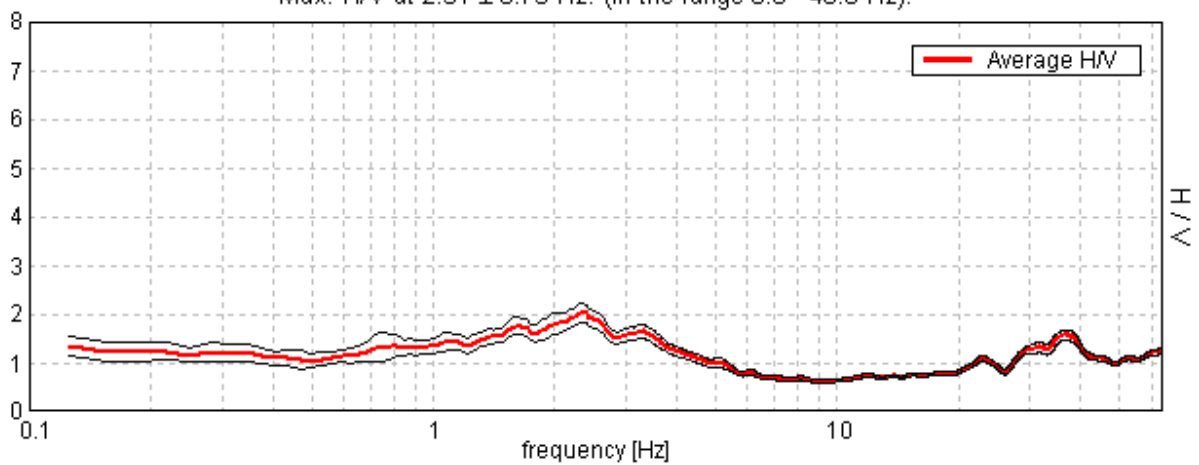
## TRIVELSICILIA PALERMO, PALERMO 0049

Start recording: 02/05/14 12:36:16      End recording: 02/05/14 13:06:17  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

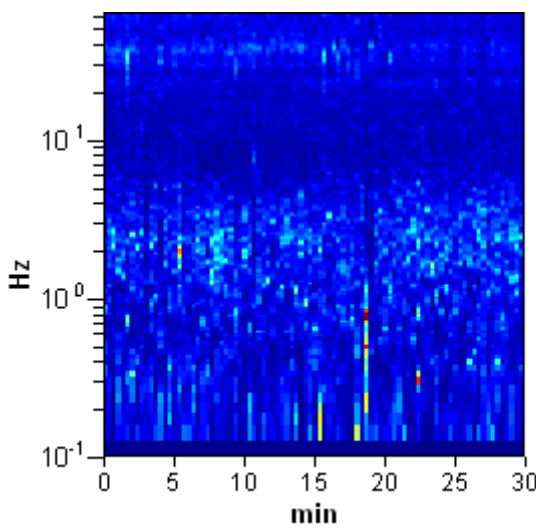
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

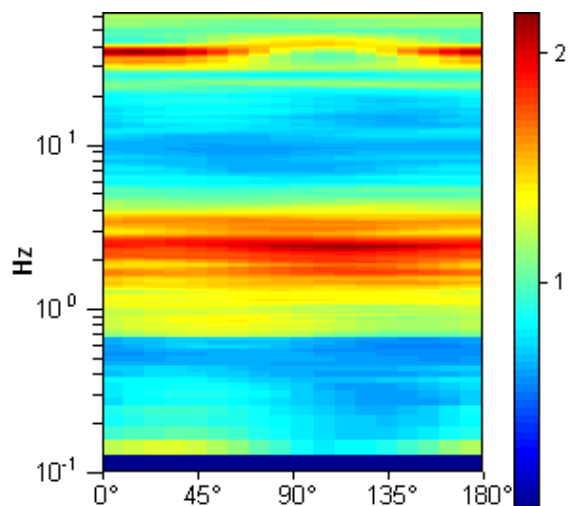
Max. H/V at  $2.31 \pm 0.75$  Hz. (In the range 0.0 - 40.0 Hz).



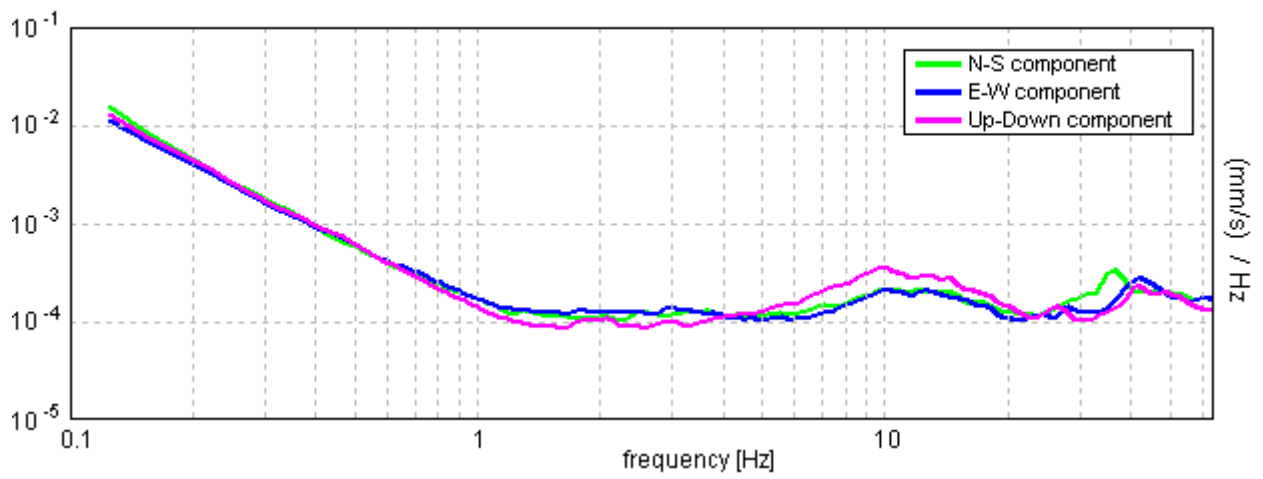
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 2.31 ± 0.75 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.31 > 0.50	OK	
$n_c(f_0) > 200$	4162.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 112 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	4.781 Hz	OK	
$A_0 > 2$	2.02 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.16228  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	$0.37527 < 0.11563$		<b>NO</b>
$\sigma_A(f_0) < \theta(f_0)$	$0.0997 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0050			
<b>Coordinate</b>	<i>UTM</i>	4225453.89	N	353960.93	E
	<i>Gauss Boaga</i>	4225452.475	N	2373956.006	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		30/04/2014, 13:50			
<b>Nome file</b>		0050			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>No</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



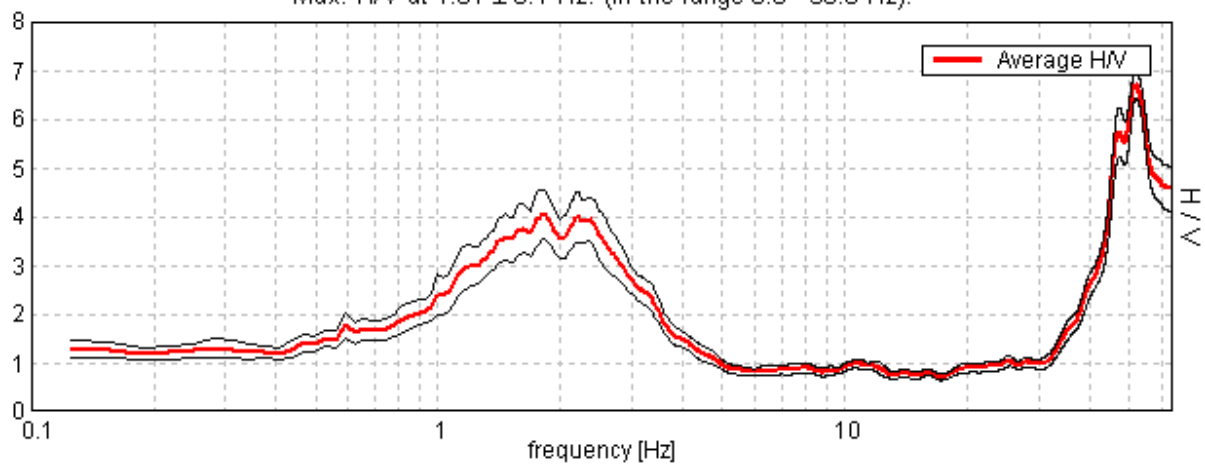
## TRIVELSICILIA PALERMO, PALERMO 0050

Start recording: 30/04/14 13:50:28      End recording: 30/04/14 14:20:29  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

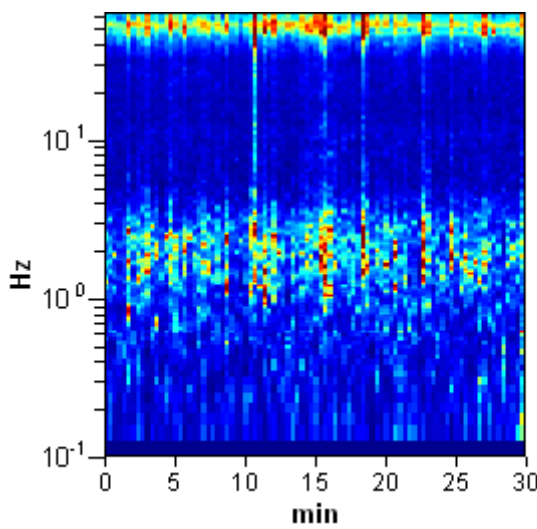
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

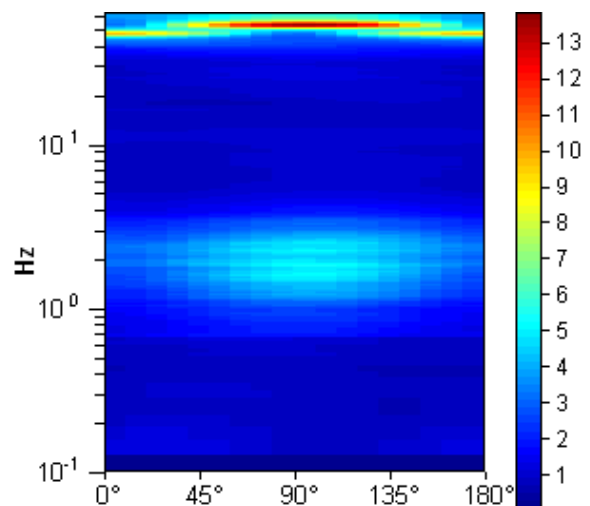
Max. H/V at  $1.81 \pm 0.1$  Hz. (In the range 0.0 - 30.0 Hz).



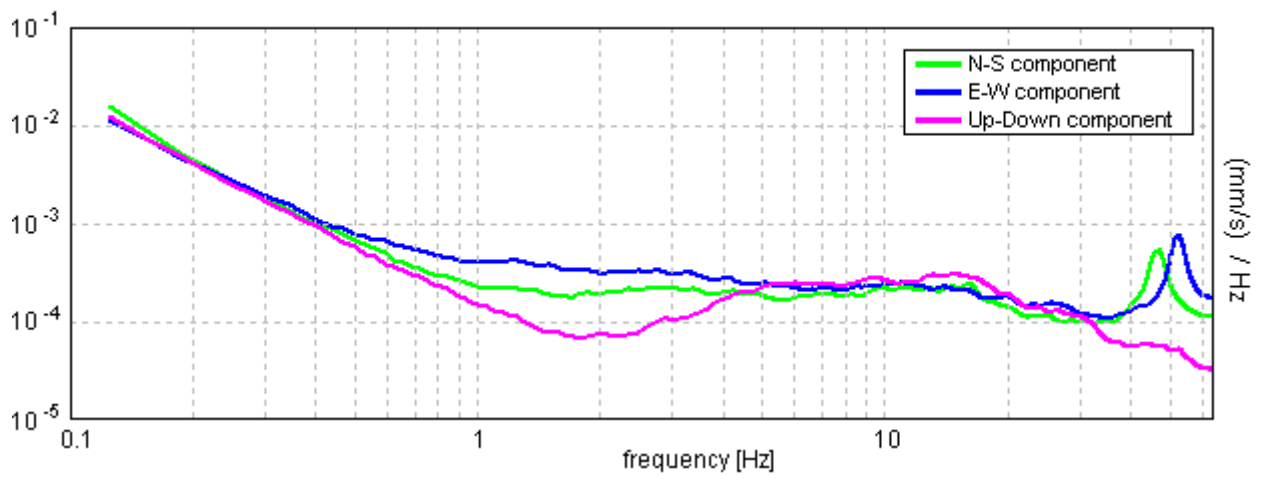
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.81 ± 0.1 Hz. (in the range 0.0 - 30.0 Hz).**

<b>Criteria for a reliable HVSR curve</b> [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	$1.81 > 0.50$	<b>OK</b>	
$n_c(f_0) > 200$	$3262.5 > 200$	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 88 times	<b>OK</b>	
<b>Criteria for a clear HVSR peak</b> [At least 5 out of 6 should be fulfilled]			
<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.875 Hz	<b>OK</b>	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	3.531 Hz	<b>OK</b>	
$A_0 > 2$	$4.04 > 2$	<b>OK</b>	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02695  < 0.05$	<b>OK</b>	
$\sigma_f < \varepsilon(f_0)$	$0.04884 < 0.18125$	<b>OK</b>	
$\sigma_A(f_0) < \theta(f_0)$	$0.2573 < 1.78$	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for $\sigma_f$ and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0051			
<b>Coordinate</b>	UTM	4225512.12	N	353638.21	E
	Gauss Boaga	4225510.704	N	2373633.273	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		02/05/2014, 11:49			
<b>Nome file</b>		0051			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>		<b>Vento</b>	No		
		<b>Pioggia</b>	No		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	No		
		<b>Pedoni</b>	No		
		<b>Altro</b>	No		

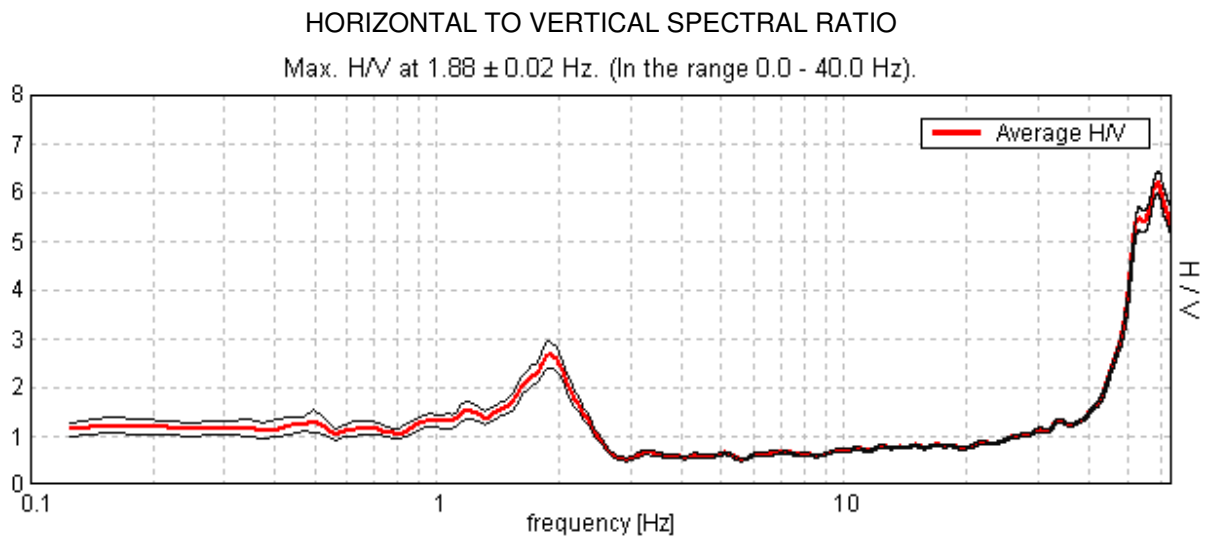
**Documentazione fotografica**



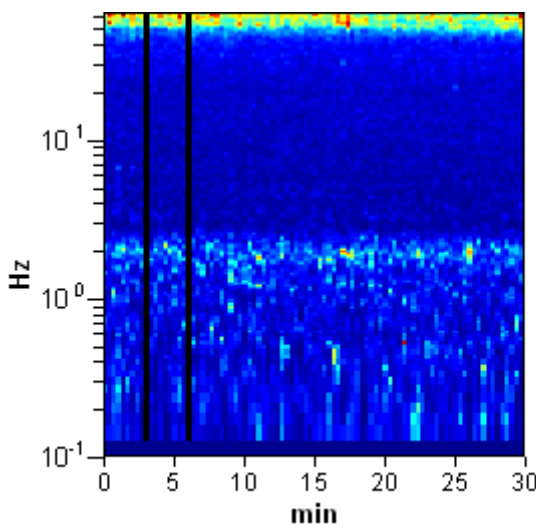
## TRIVELSICILIA PALERMO, PALERMO 0051

Start recording: 02/05/14 11:50:15      End recording: 02/05/14 12:20:16  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

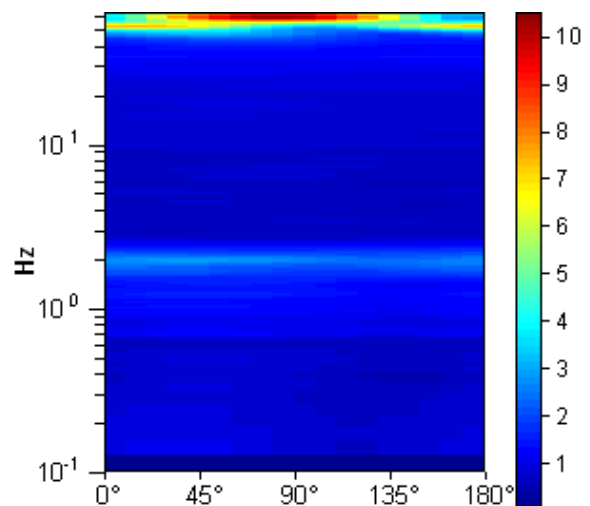
Trace length: 0h30'00".      Analyzed 98% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



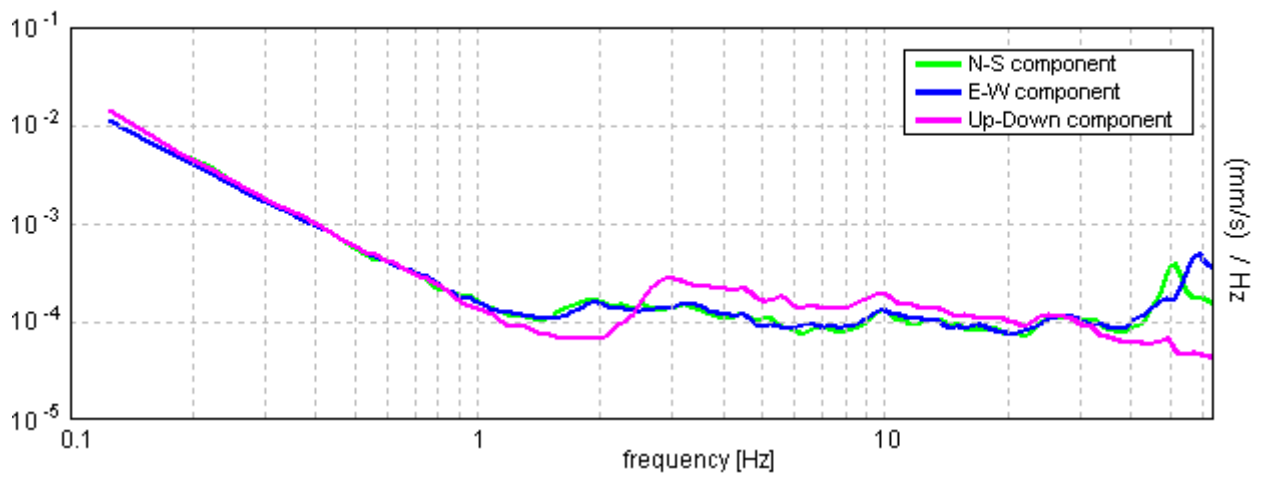
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.88 ± 0.02 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.88 > 0.50	OK	
$n_c(f_0) > 200$	3300.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 91 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	1.094 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.375 Hz	OK	
$A_0 > 2$	2.67 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00514  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.00963 < 0.1875$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.139 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0052			
<b>Coordinate</b>	UTM	4225437.20	N	353176.76	E
	Gauss Boaga	4225435.775	N	2373171.799	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		02/05/2014, 11:12			
<b>Nome file</b>		0052			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>Si</b>		
		<b>Altro</b>	<b>No</b>		

**Documentazione fotografica**



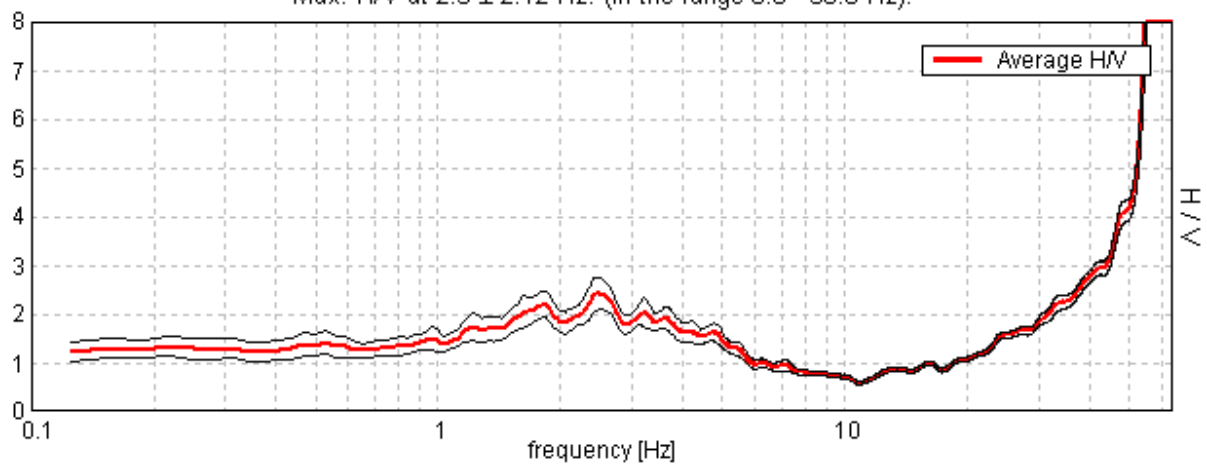
## TRIVELSICILIA PALERMO, PALERMO 0052

Start recording: 02/05/14 11:12:31      End recording: 02/05/14 11:42:32  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

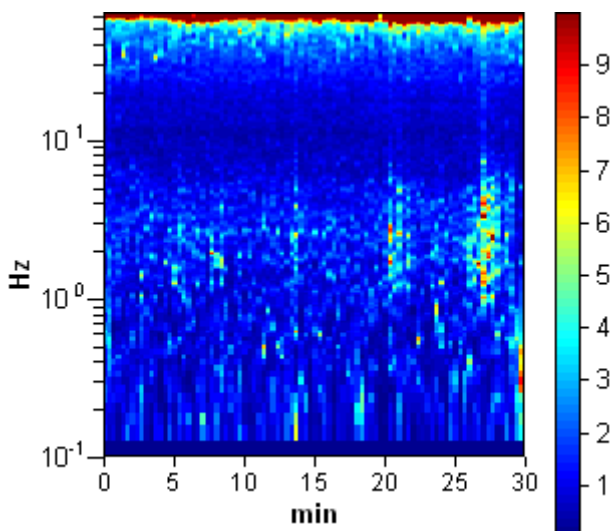
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

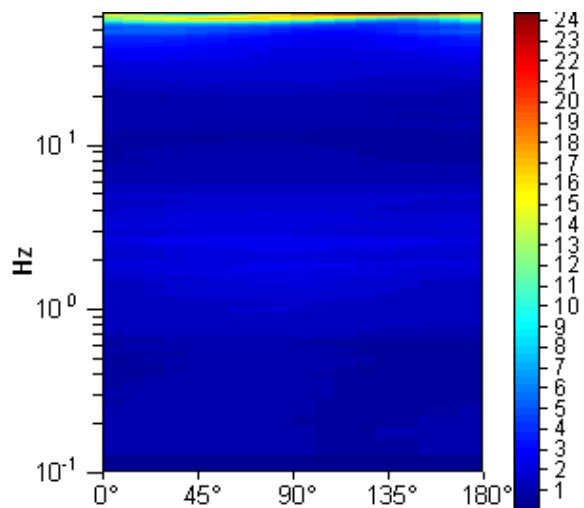
Max. H/V at  $2.5 \pm 2.12$  Hz. (In the range 0.0 - 30.0 Hz).



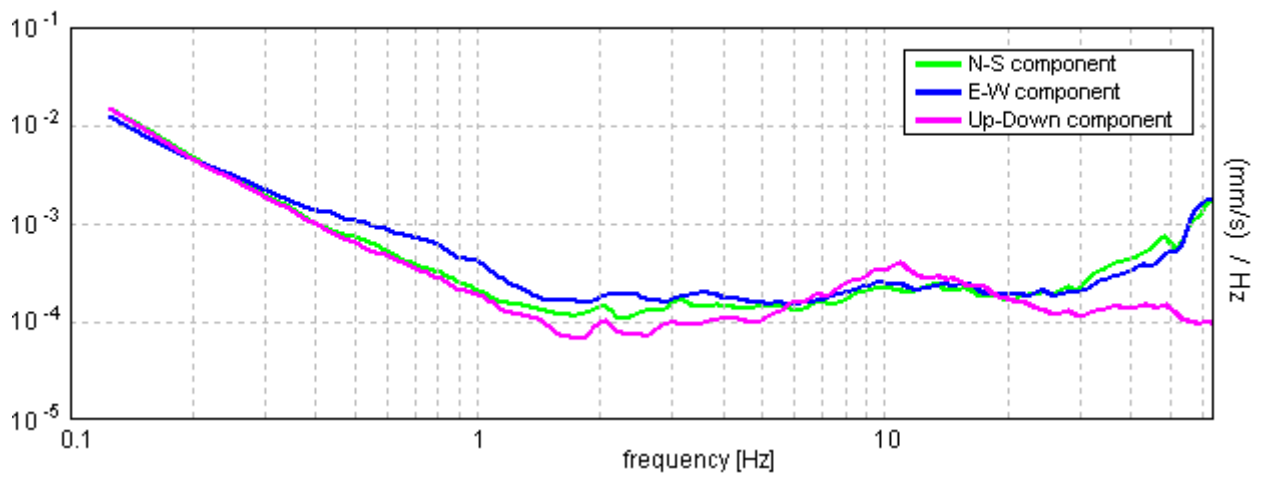
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $2.5 \pm 2.12$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$2.50 > 0.50$	OK	
$n_c(f_0) > 200$	$4500.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 121 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	5.656 Hz	OK	
$A_0 > 2$	$2.41 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.42345  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$1.05863 < 0.125$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.1599 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

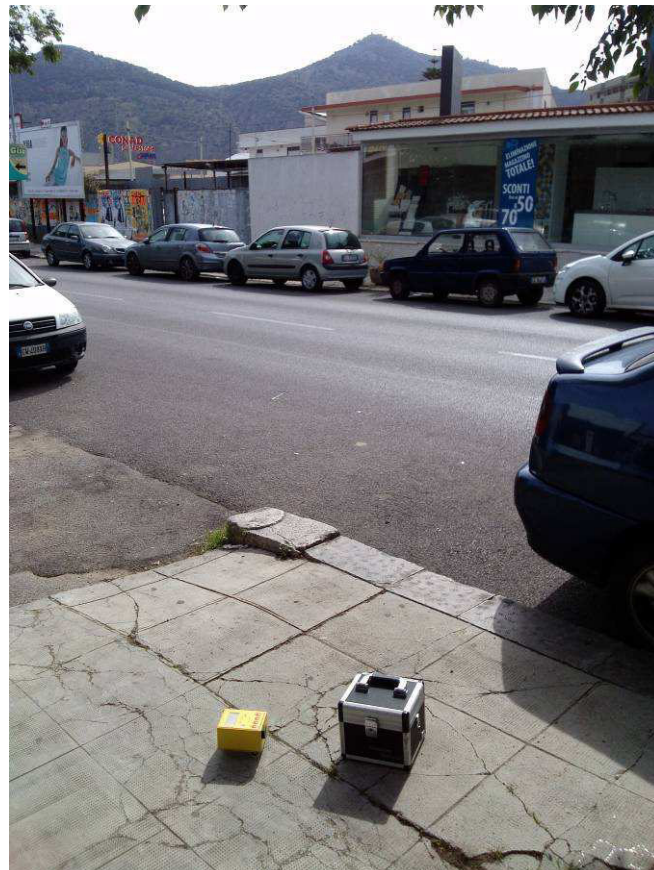


Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0053				
<b>Coordinate</b>	<i>UTM</i>	4225428.97	N	352779.81	E
	<i>Gauss Boaga</i>	4225427.539	N	2372774.830	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	02/05/2014, 09:41				
<b>Nome file</b>	0053				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	MarciapiEDE				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



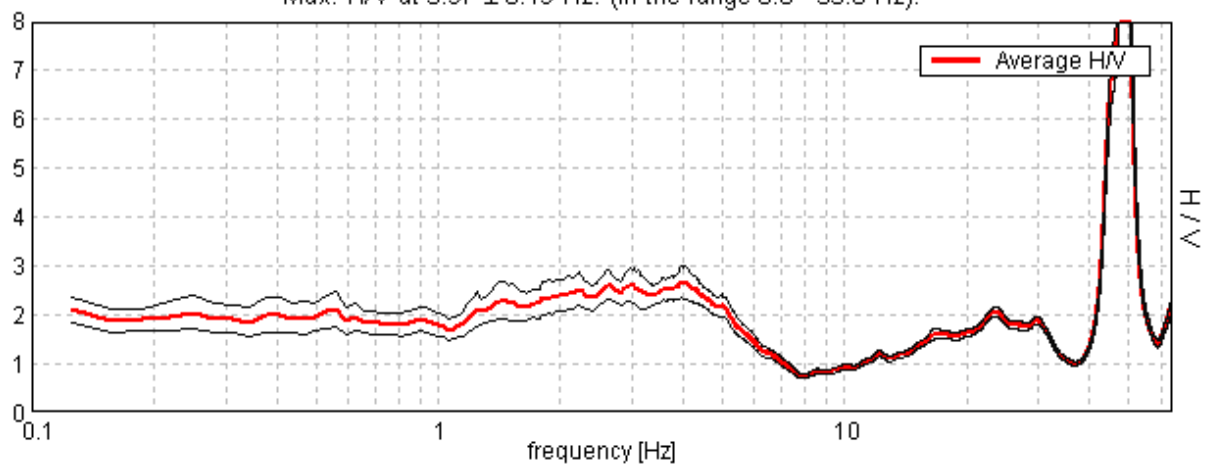
## TRIVELSICILIA PALERMO, PALERMO 0053

Start recording: 02/05/14 09:41:25      End recording: 02/05/14 10:11:26  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

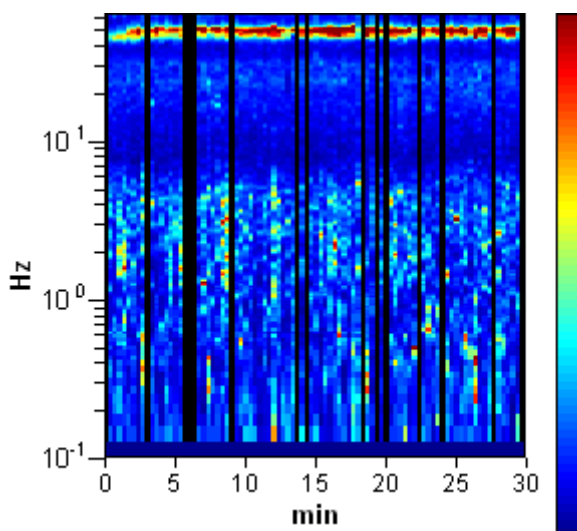
Trace length: 0h30'00".      Analyzed 83% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

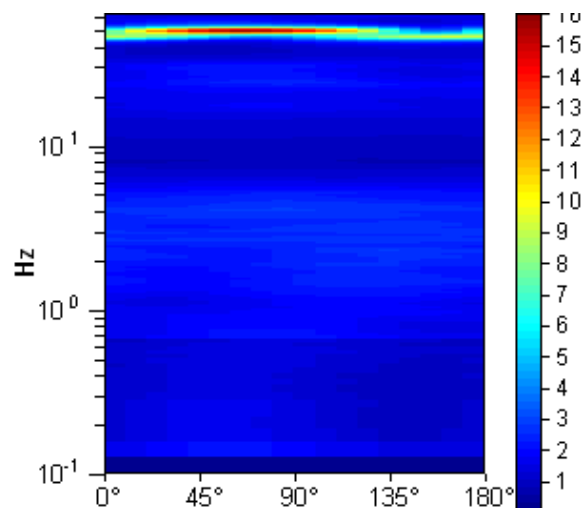
Max. H/V at  $3.97 \pm 0.19$  Hz. (In the range 0.0 - 35.0 Hz).



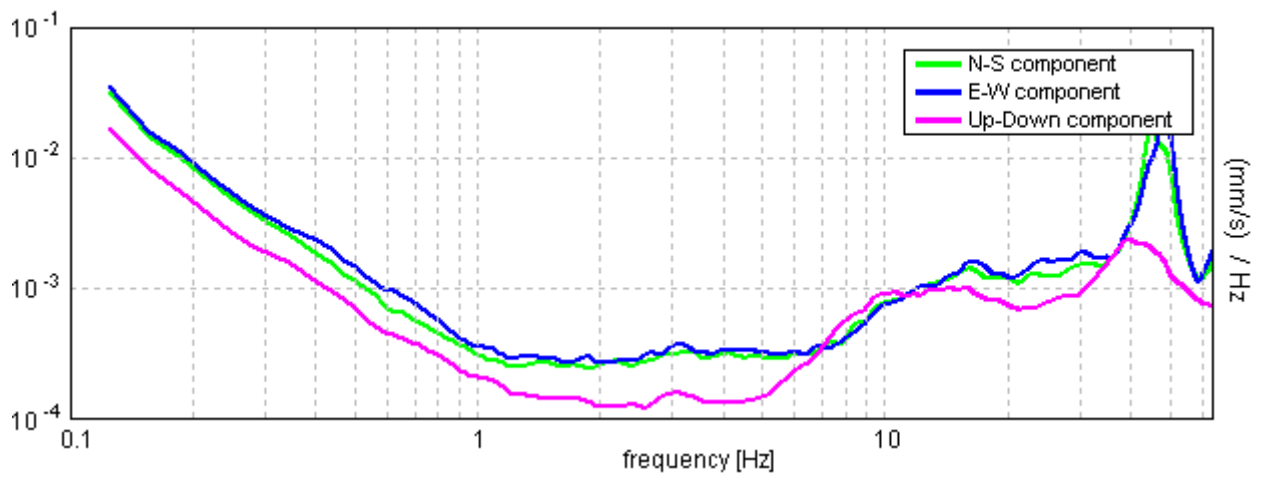
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $3.97 \pm 0.19$  Hz. (in the range 0.0 - 35.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$3.97 > 0.50$	OK	
$n_c(f_0) > 200$	$5953.1 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 192 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	6.156 Hz	OK	
$A_0 > 2$	$2.66 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02334  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.09261 < 0.19844$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.161 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0054			
<b>Coordinate</b>	UTM	4225487.60	N	352437.62	E
	Gauss Boaga	4225486.168	N	2372432.626	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		29/04/2014, 14:04			
<b>Nome file</b>		0054			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>		<b>Vento</b>	No		
		<b>Pioggia</b>	No		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	Si		
		<b>Pedoni</b>	No		
		<b>Altro</b>	No		

**Documentazione fotografica**



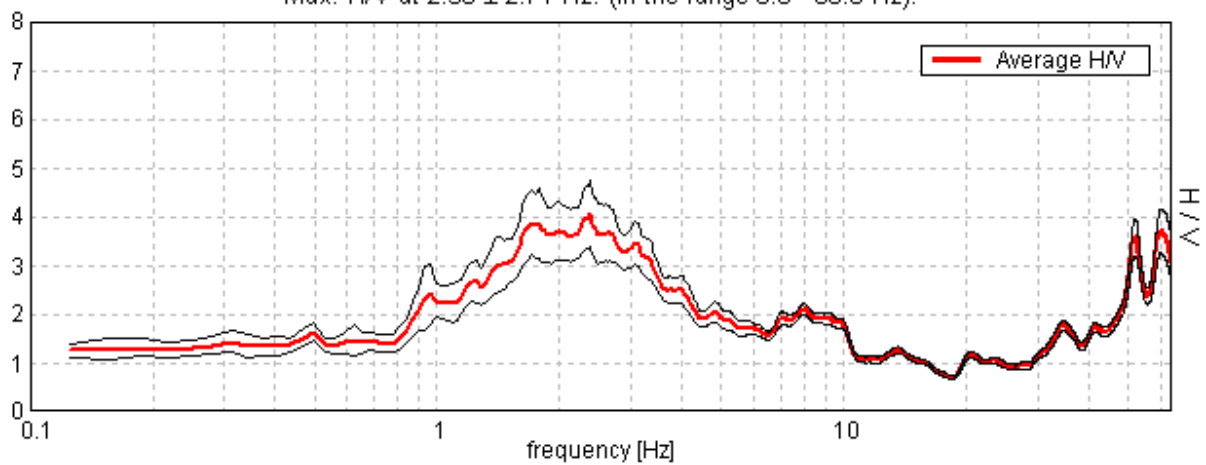
## TRIVELSICILIA PALERMO, PALERMO 0054

Start recording: 29/04/14 14:04:03      End recording: 29/04/14 14:34:04  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

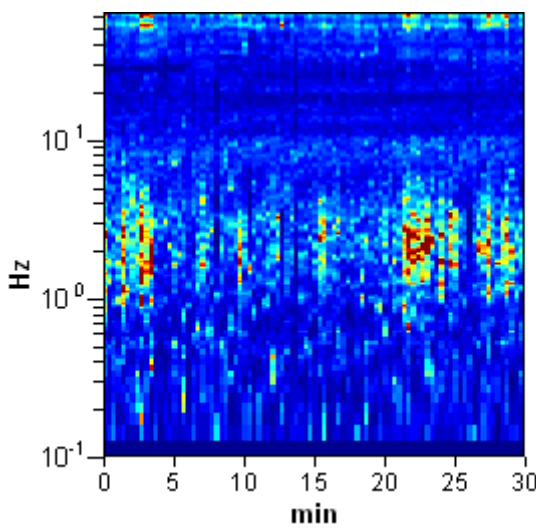
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

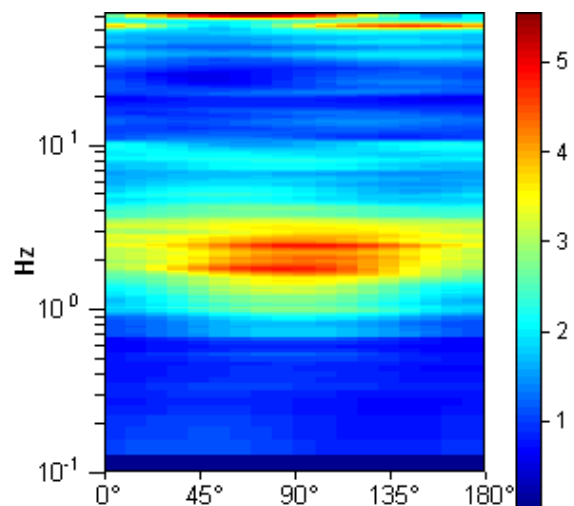
Max. H/V at  $2.38 \pm 2.71$  Hz. (In the range 0.0 - 60.0 Hz).



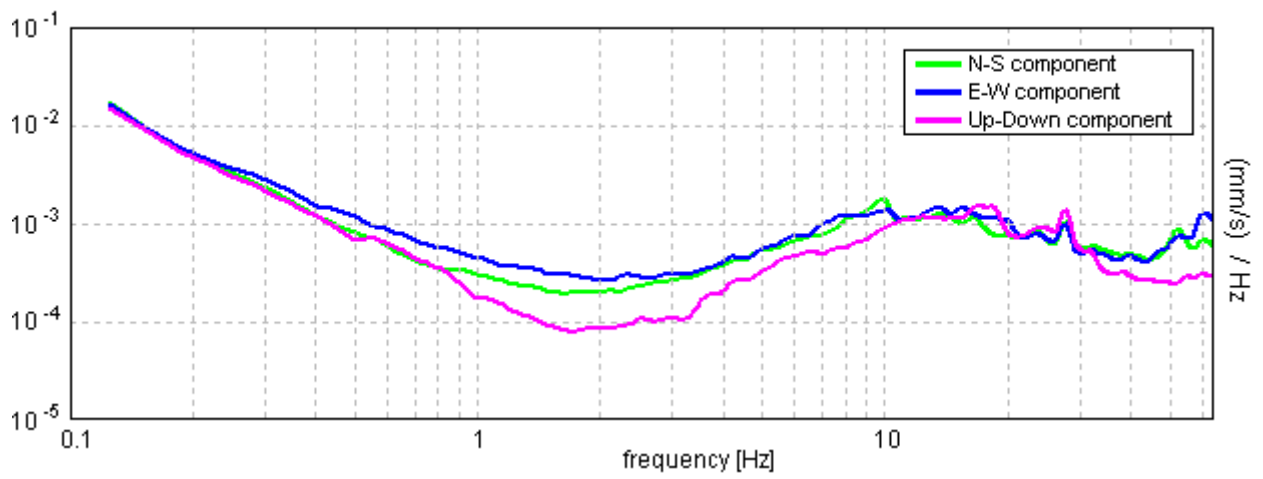
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 2.38 ± 2.71 Hz. (in the range 0.0 - 60.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.38 > 0.50	OK	
$n_c(f_0) > 200$	4275.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 115 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.875 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	4.344 Hz	OK	
$A_0 > 2$	4.05 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.57009  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	1.35398 < 0.11875		NO
$\sigma_A(f_0) < \theta(f_0)$	0.3427 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0055				
<b>Coordinate</b>	<i>UTM</i>	4224951.86	N	352905.06	E
	<i>Gauss Boaga</i>	4224950.411	N	2372900.069	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	02/05/2014, 10:21				
<b>Nome file</b>	0055				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	MarciapiEDE				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

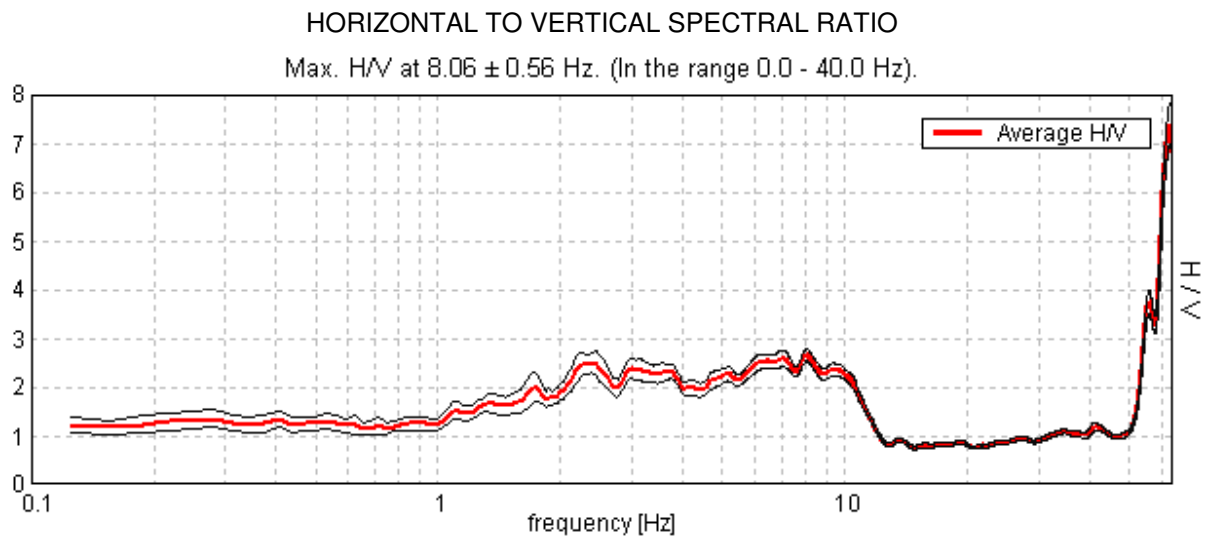
**Documentazione fotografica**



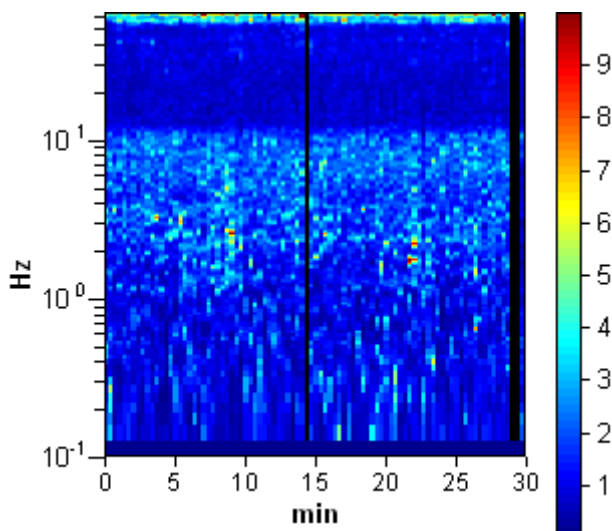
## TRIVELSICILIA PALERMO, PALERMO 0055

Start recording: 02/05/14 10:21:10      End recording: 02/05/14 10:51:11  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

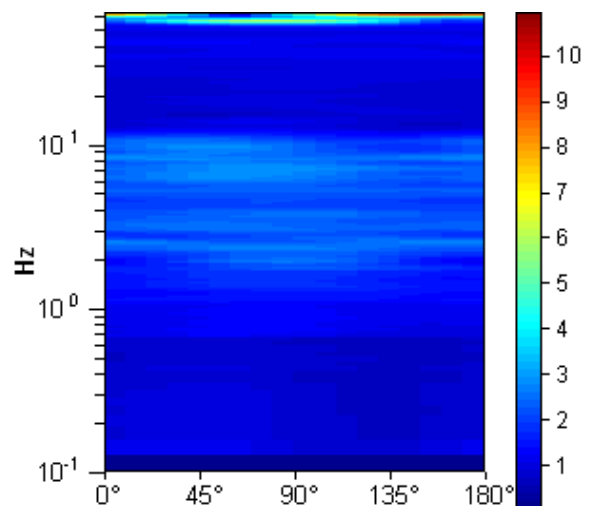
Trace length: 0h30'00".      Analyzed 97% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



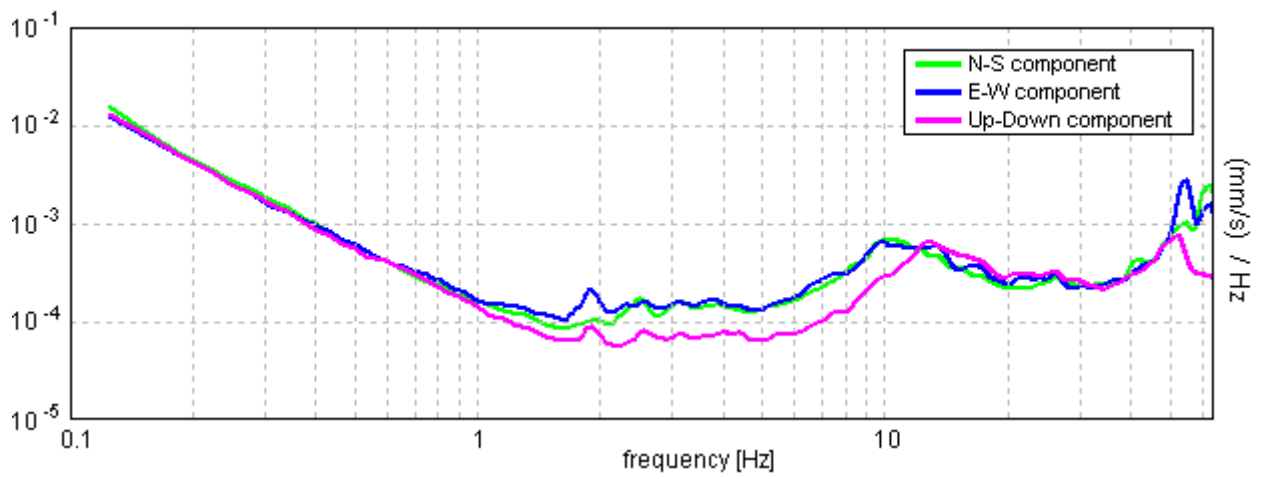
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 8.06 ± 0.56 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	8.06 > 0.50	OK	
$n_c(f_0) > 200$	14028.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 388 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	11.625 Hz	OK	
$A_0 > 2$	2.65 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03494  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.28168 < 0.40313	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.0645 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0056				
<b>Coordinate</b>	<i>UTM</i>	4225085.24	N	353202.05	E
	<i>Gauss Boaga</i>	4225083.800	N	2373197.078	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	02/05/2014, 09:03				
<b>Nome file</b>	0056				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Terreno				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



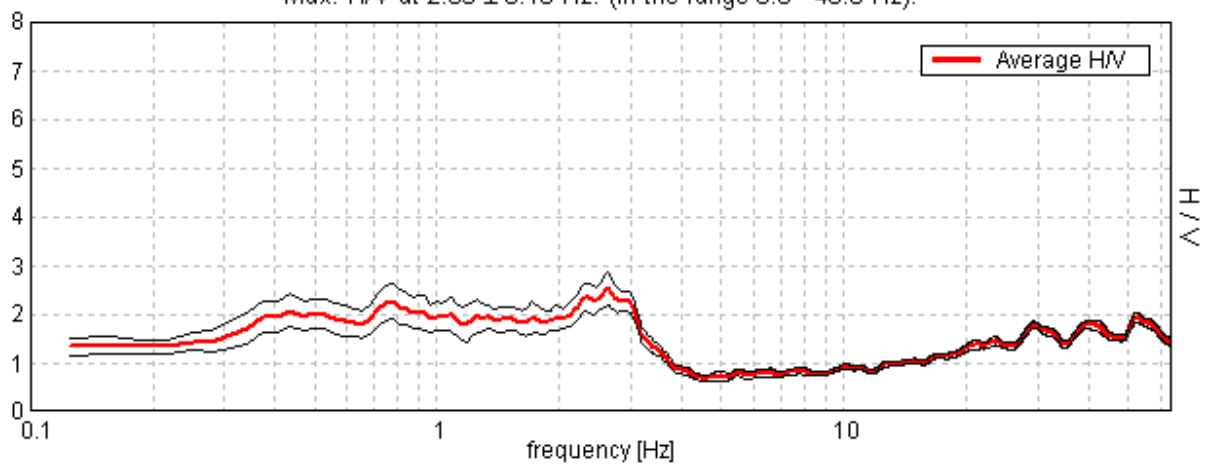
## TRIVELSICILIA PALERMO, PALERMO 0056

Start recording: 02/05/14 09:02:44      End recording: 02/05/14 09:32:45  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

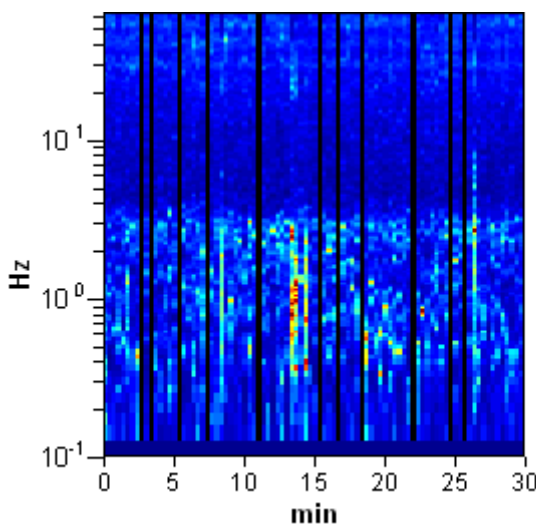
Trace length: 0h30'00".      Analyzed 88% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

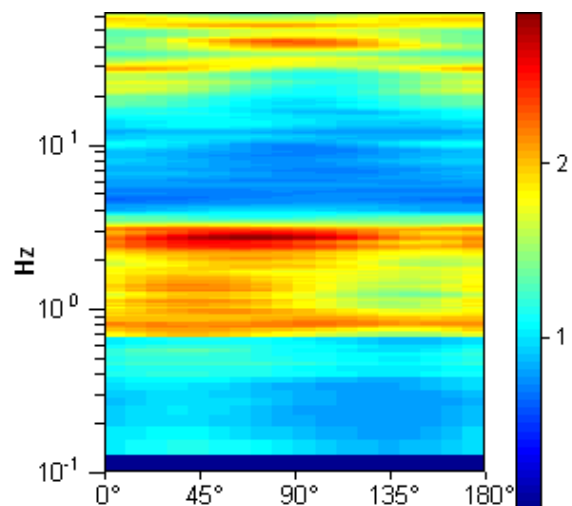
Max. H/V at  $2.63 \pm 0.18$  Hz. (In the range 0.0 - 40.0 Hz).



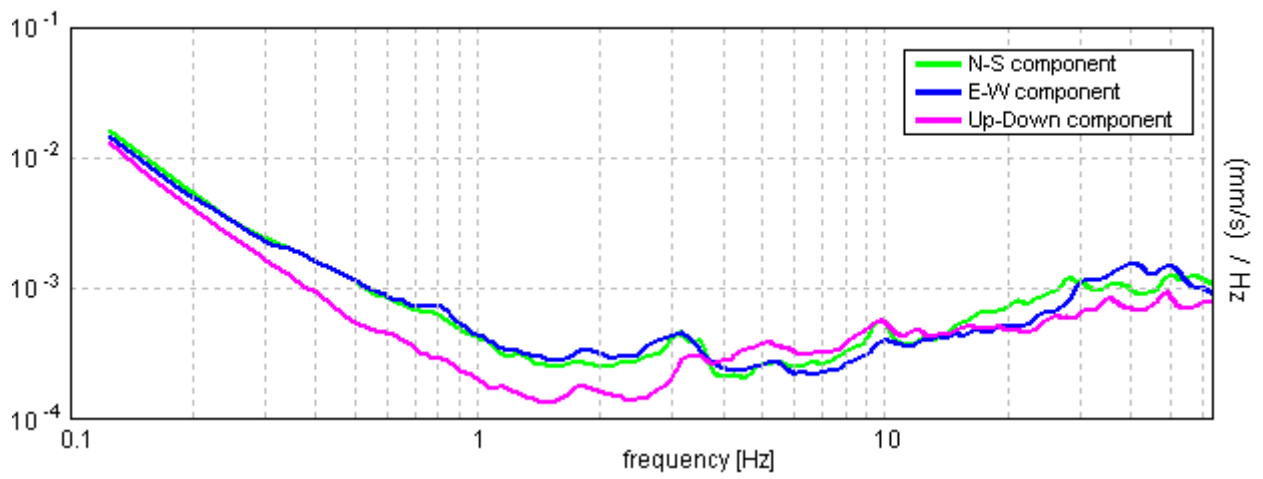
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 2.63 ± 0.18 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.63 > 0.50	OK	
$n_c(f_0) > 200$	4147.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 127 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	3.531 Hz	OK	
$A_0 > 2$	2.52 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.0347  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.0911 < 0.13125	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1726 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0057			
<b>Coordinate</b>	UTM	4225050.46	N	353590.94	E
	Gauss Boaga	4225049.024	N	2373585.985	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		02/05/2014, 08:23			
<b>Nome file</b>		0057			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

**Documentazione fotografica**



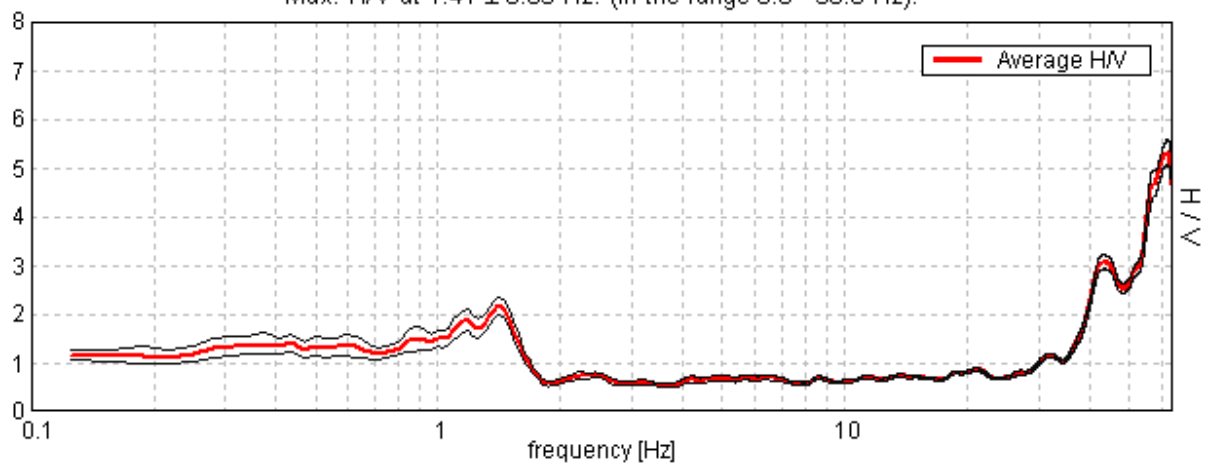
## TRIVELSICILIA PALERMO, PALERMO 0057

Start recording: 02/05/14 08:24:46      End recording: 02/05/14 08:54:47  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

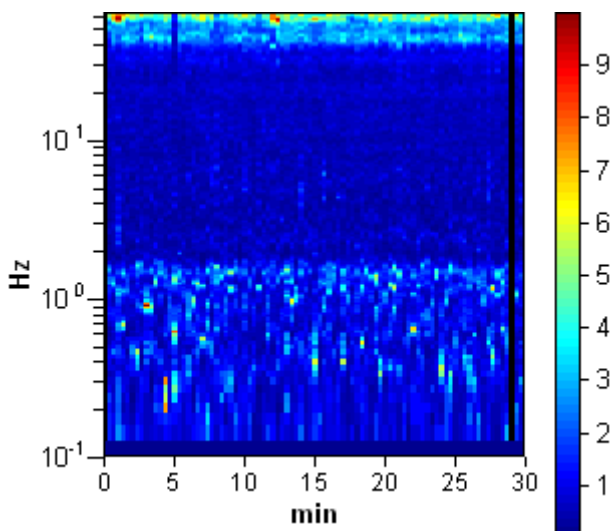
Trace length: 0h30'00".      Analyzed 98% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

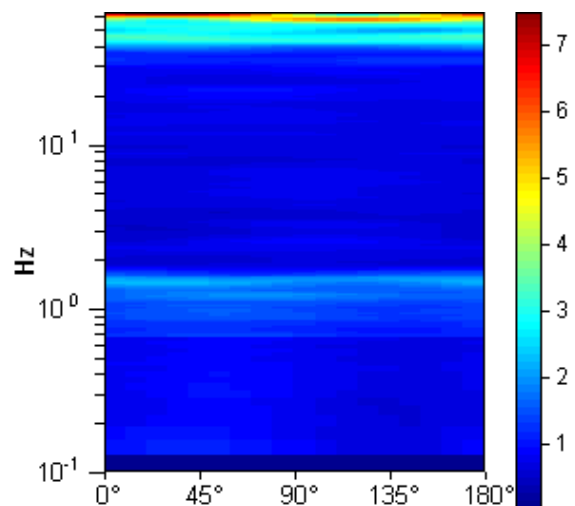
Max. H/V at  $1.41 \pm 0.05$  Hz. (In the range 0.0 - 30.0 Hz).



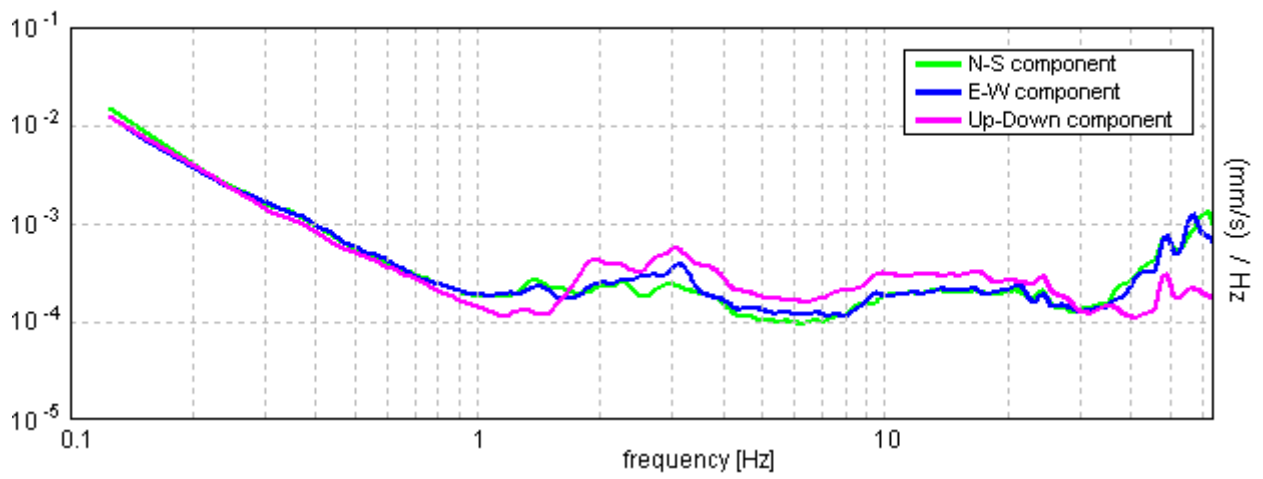
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.41 ± 0.05 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.41 > 0.50	OK	
$n_c(f_0) > 200$	2475.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 68 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.656 Hz	OK	
$A_0 > 2$	2.17 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01666  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02343 < 0.14063$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.0945 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0058				
<b>Coordinate</b>	<i>UTM</i>	4225138.92	N	353986.92	E
	<i>Gauss Boaga</i>	4225137.493	N	2373981.986	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	02/05/2014, 07:46				
<b>Nome file</b>	0058				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Terreno				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

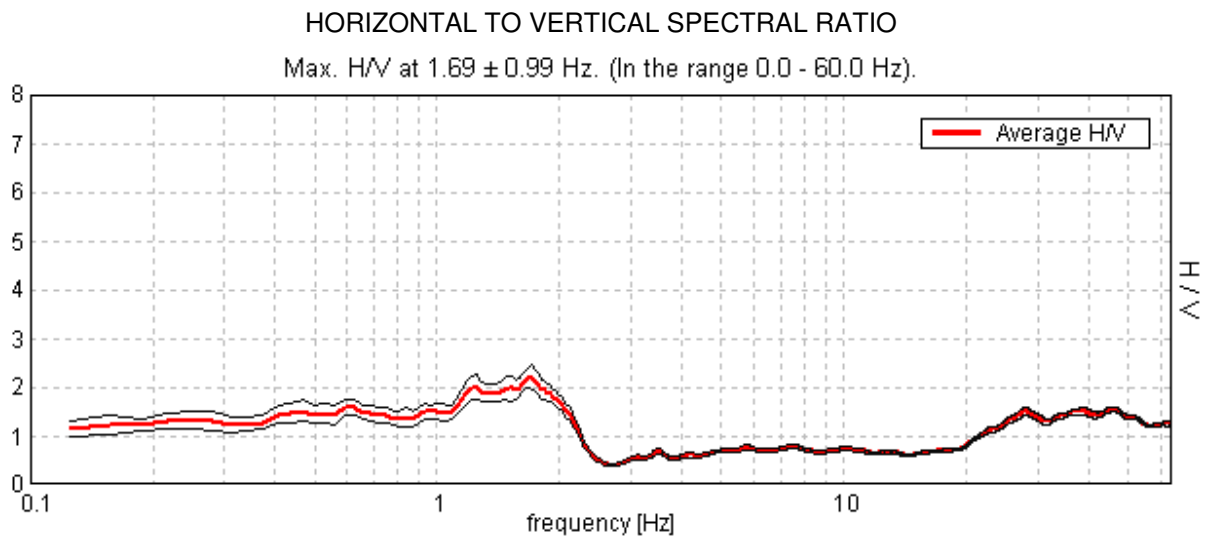
**Documentazione fotografica**



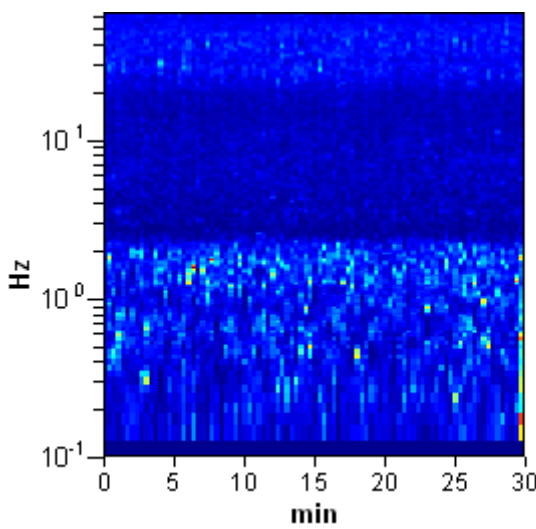
## TRIVELSICILIA PALERMO, PALERMO 0058

Start recording: 02/05/14 07:47:30      End recording: 02/05/14 08:17:31  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

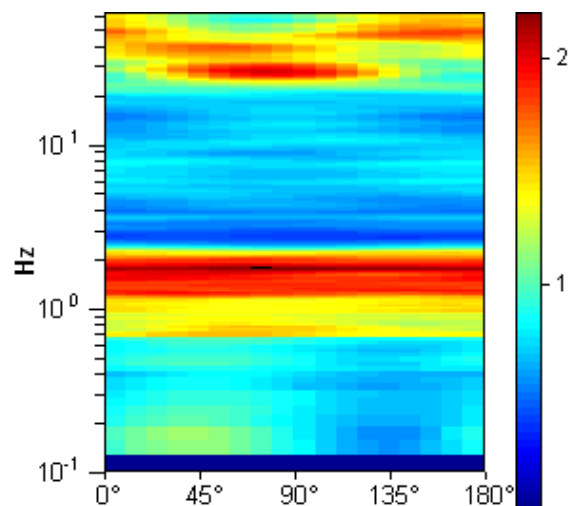
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



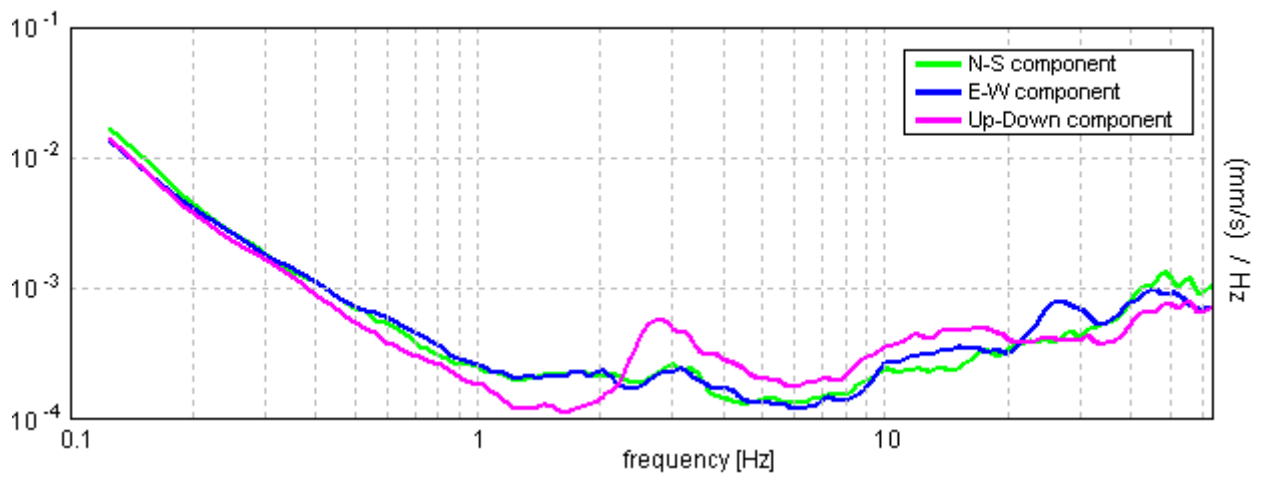
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.69 ± 0.99 Hz. (in the range 0.0 - 60.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.69 > 0.50	OK	
$n_c(f_0) > 200$	3037.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 82 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.25 Hz	OK	
<b><math>A_0 &gt; 2</math></b>	2.22 > 2	OK	
<b><math>f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%</math></b>	$ 0.29503  < 0.05$		<b>NO</b>
<b><math>\sigma_f &lt; \varepsilon(f_0)</math></b>	$0.49787 < 0.16875$		<b>NO</b>
<b><math>\sigma_A(f_0) &lt; \theta(f_0)</math></b>	$0.1105 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0059			
<b>Coordinate</b>	UTM	4224822.57	N	353917.93	E
	Gauss Boaga	4224821.128	N	2373912.982	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		02/05/2014, 13:21			
<b>Nome file</b>		0059			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			

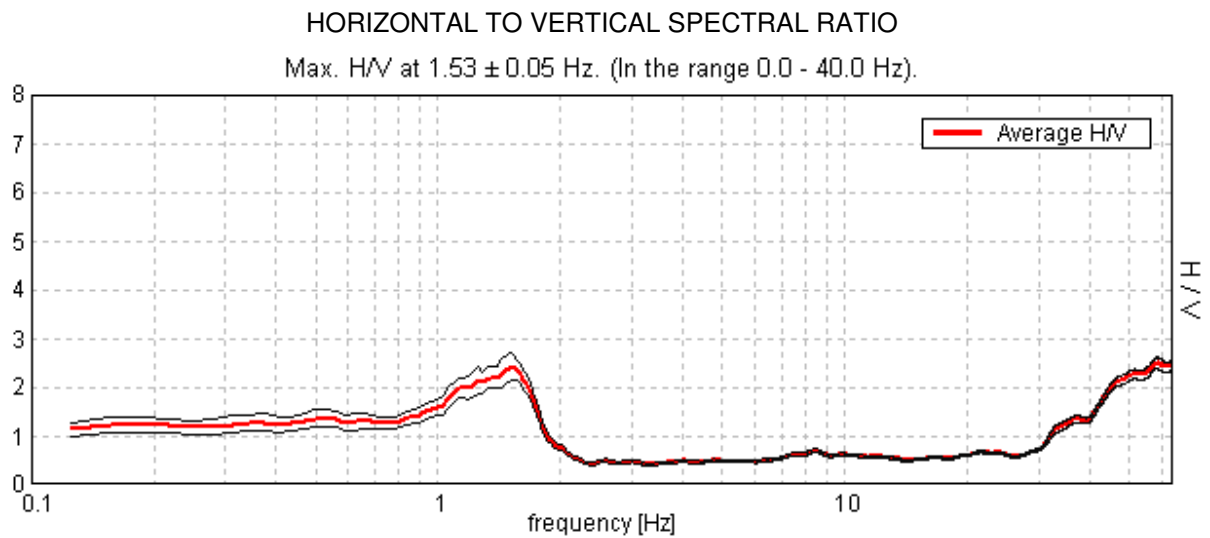
**Documentazione fotografica**



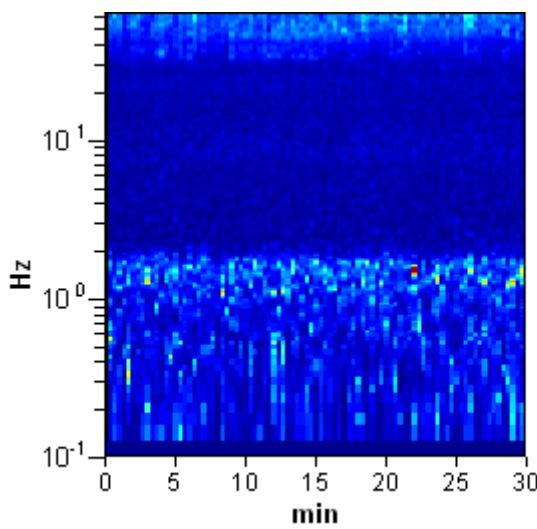
## TRIVELSICILIA PALERMO, PALERMO 0059

Start recording: 02/05/14 13:21:35      End recording: 02/05/14 13:51:36  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

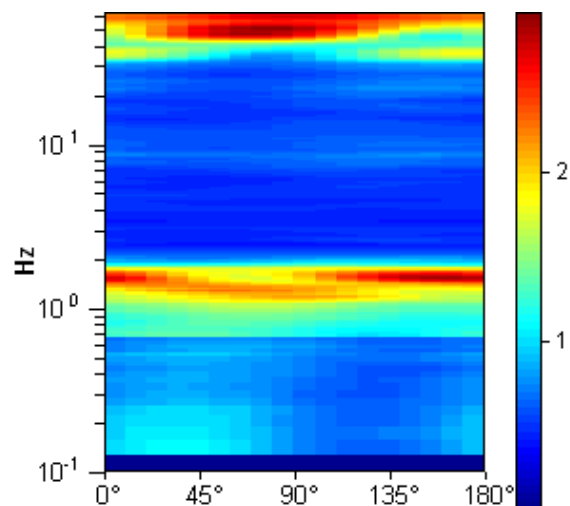
Trace length: 0h30'00".      Analyzed 99% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



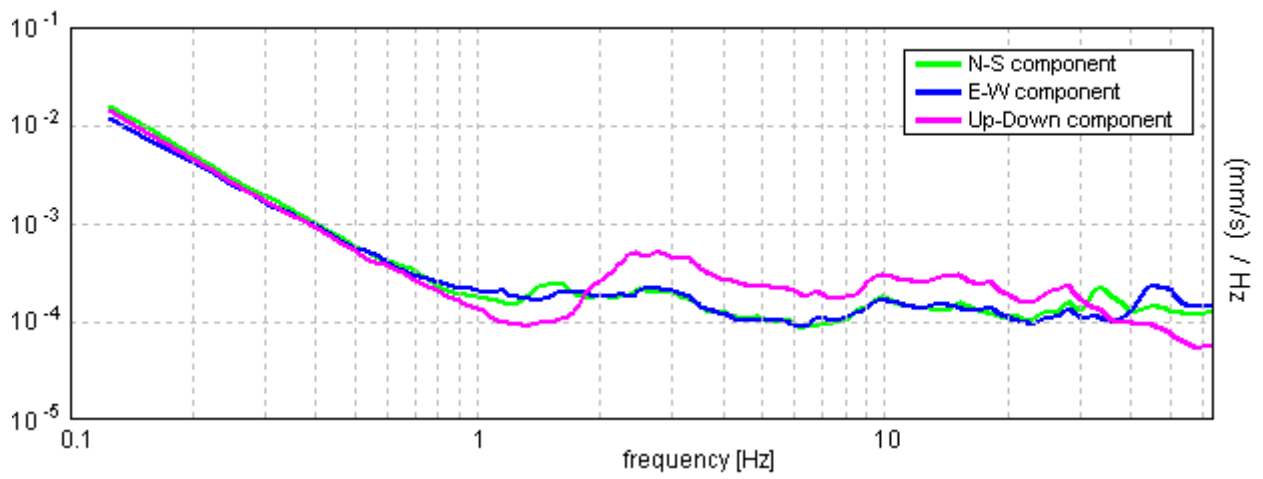
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.53 ± 0.05 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.53 > 0.50	OK	
$n_c(f_0) > 200$	2725.6 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 74 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.813 Hz	OK	
$A_0 > 2$	2.41 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01592  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02438 < 0.15313$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1245 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

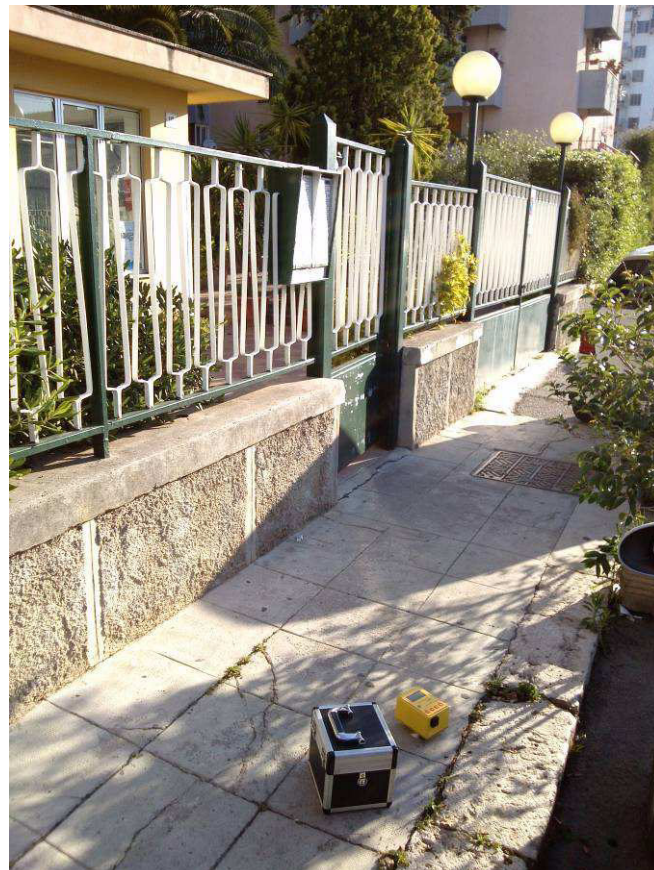


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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0060			
<b>Coordinate</b>	UTM	4224714.44	N	353587.32	E
	Gauss Boaga	4224712.990	N	2373582.353	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		06/05/2014, 07:34			
<b>Nome file</b>		0060			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>Si</b>		
		<b>Altro</b>	<b>No</b>		

**Documentazione fotografica**



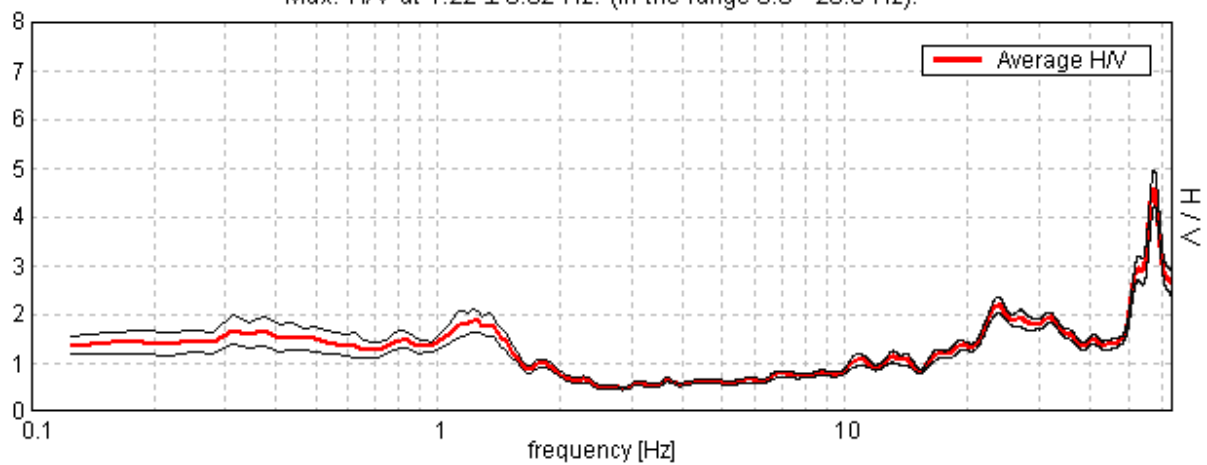
## TRIVELSICILIA PALERMO, PALERMO 0060

Start recording: 06/05/14 07:35:29      End recording: 06/05/14 08:05:30  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

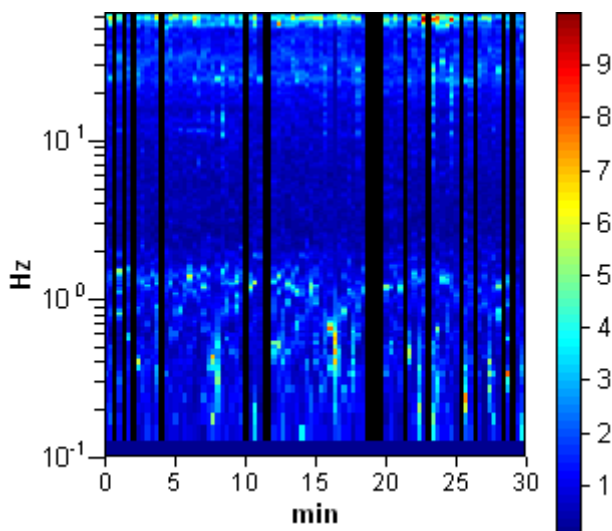
Trace length: 0h30'00".      Analyzed 81% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

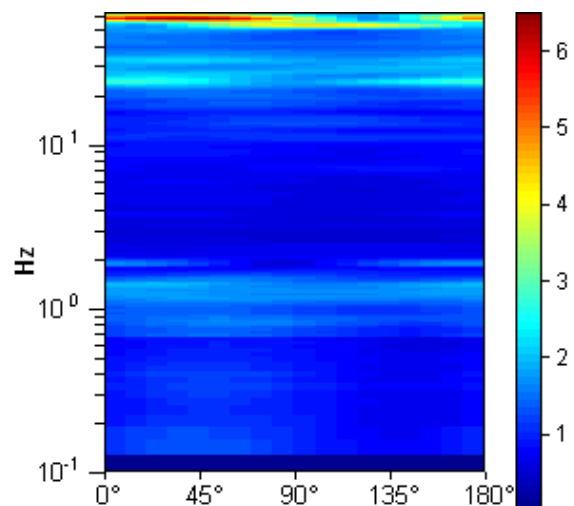
Max. H/V at  $1.22 \pm 0.02$  Hz. (In the range 0.0 - 20.0 Hz).



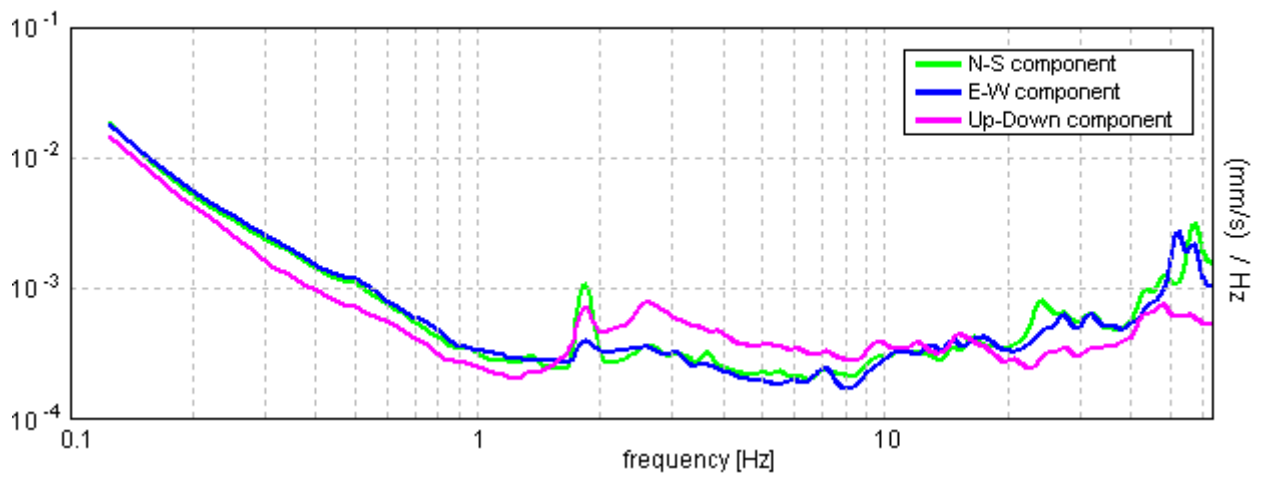
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.22 ± 0.02 Hz. (in the range 0.0 - 20.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.22 > 0.50	OK	
$n_c(f_0) > 200$	1779.4 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 60 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.656 Hz	OK	
<b><math>A_0 &gt; 2</math></b>	1.86 > 2		<b>NO</b>
<b><math>f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%</math></b>	$ 0.0101  < 0.05$	OK	
<b><math>\sigma_f &lt; \varepsilon(f_0)</math></b>	$0.01231 < 0.12188$	OK	
<b><math>\sigma_A(f_0) &lt; \theta(f_0)</math></b>	$0.1192 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>				
<b>Nome base sismica</b>	0061				
<b>Coordinate</b>	<i>UTM</i>	4224645.38	N	353142.97	E
	<i>Gauss Boaga</i>	4224643.921	N	2373137.980	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	06/05/2014, 08:17				
<b>Nome file</b>	0061				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	MarciapiEDE				
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

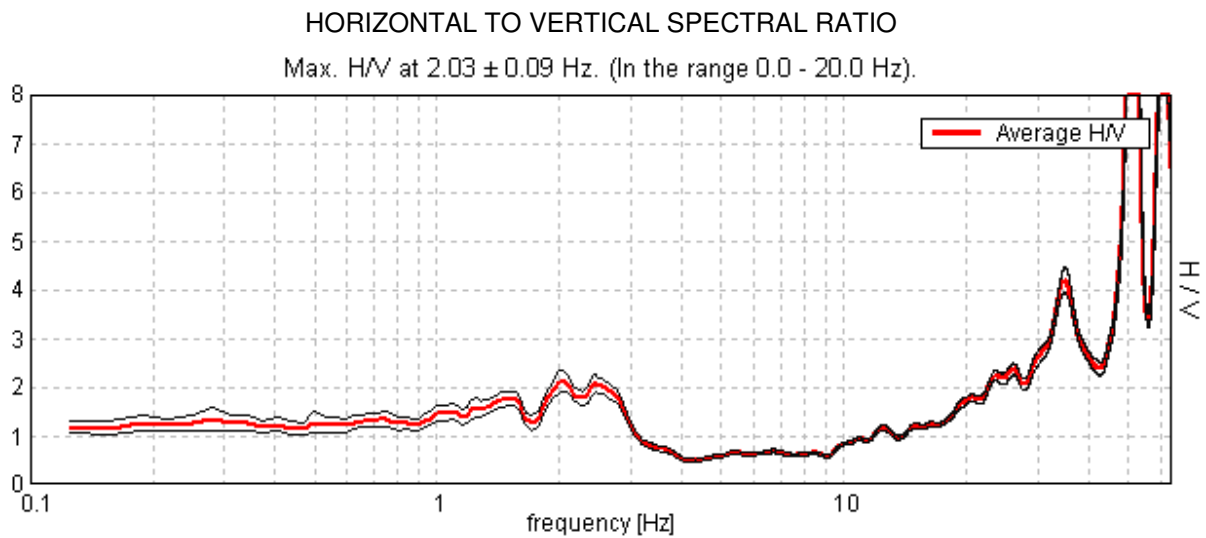
**Documentazione fotografica**



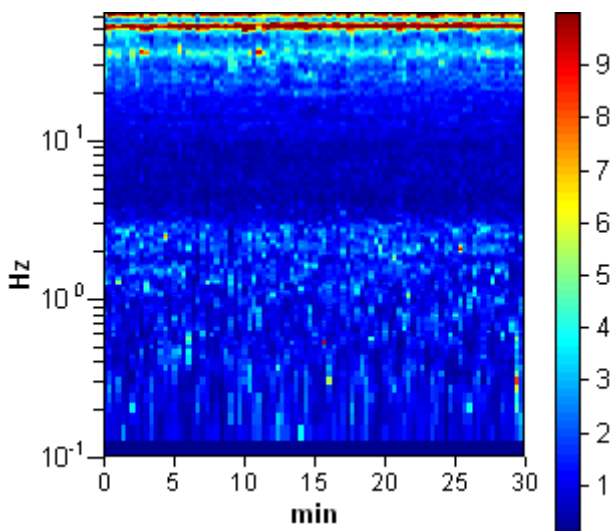
## TRIVELSICILIA PALERMO, PALERMO 0061

Start recording: 06/05/14 08:18:06      End recording: 06/05/14 08:48:07  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

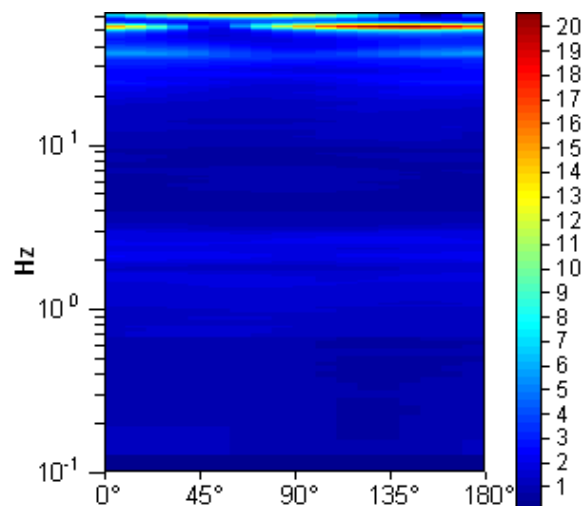
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



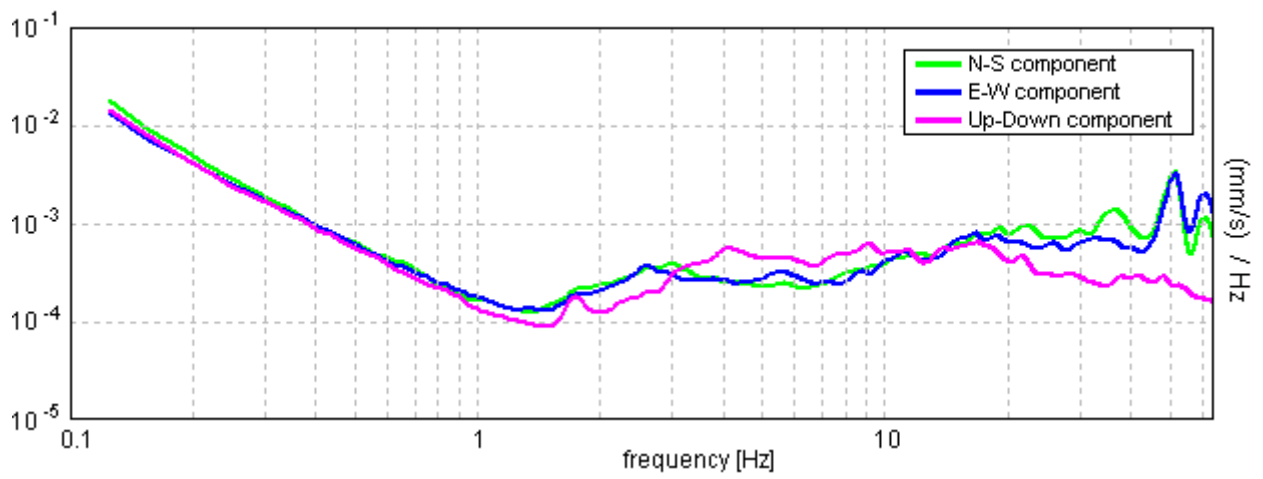
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 2.03 ± 0.09 Hz. (in the range 0.0 - 20.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.03 > 0.50	OK	
$n_c(f_0) > 200$	3656.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 98 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	3.094 Hz	OK	
$A_0 > 2$	2.11 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02321  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.04715 < 0.10156	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1153 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0062			
<b>Coordinate</b>	UTM	4224303.02	N	353540.94	E
	Gauss Boaga	4224301.552	N	2373535.957	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		06/05/2014, 08:55			
<b>Nome file</b>		0062			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

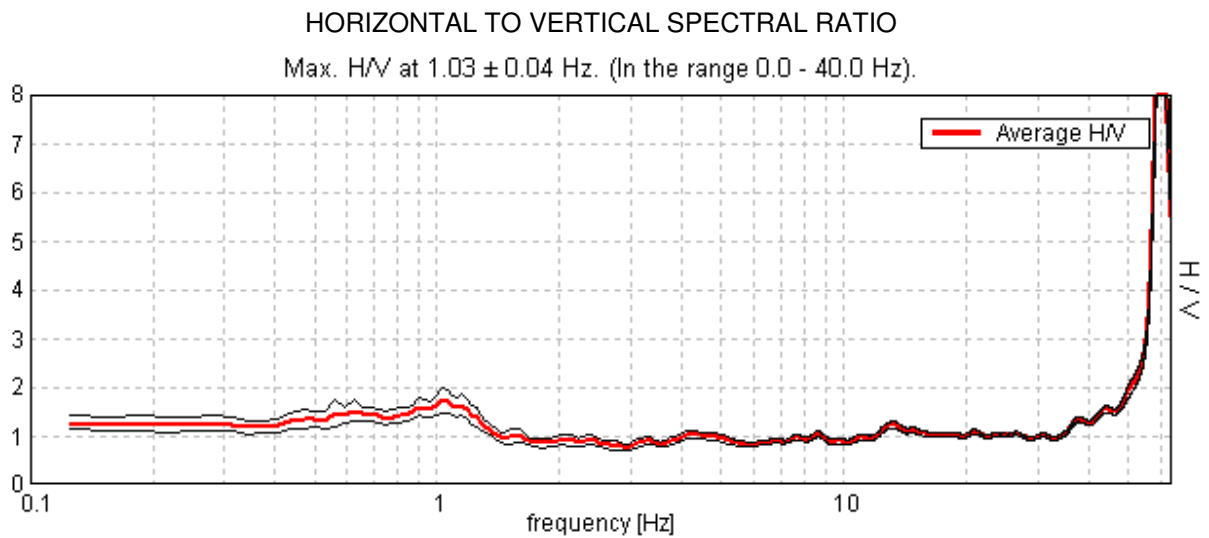
**Documentazione fotografica**



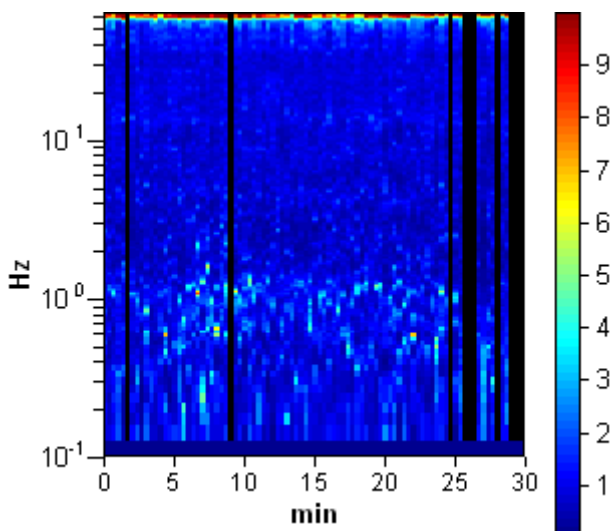
## TRIVELSICILIA PALERMO, PALERMO 0062

Start recording: 06/05/14 08:55:57      End recording: 06/05/14 09:25:58  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

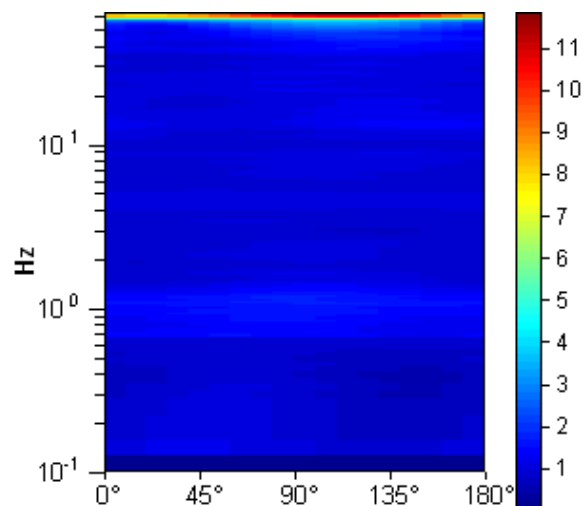
Trace length: 0h30'00".      Analyzed 89% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



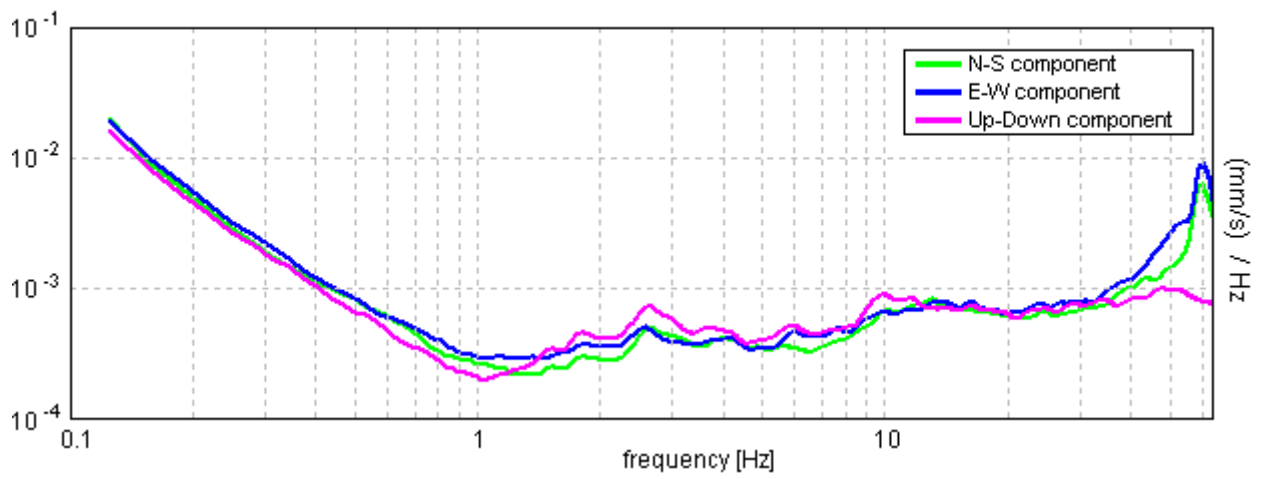
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.03 ± 0.04 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.03 > 0.50	OK	
$n_c(f_0) > 200$	1650.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 50 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	1.719 Hz	OK	
$A_0 > 2$	1.72 > 2		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01934  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01994 < 0.10313$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1242 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0063				
<b>Coordinate</b>	<i>UTM</i>	4224279.72	N	353927.65	E
	<i>Gauss Boaga</i>	4224278.256	N	2373922.684	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	06/05/2014, 09:38				
<b>Nome file</b>	0063				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

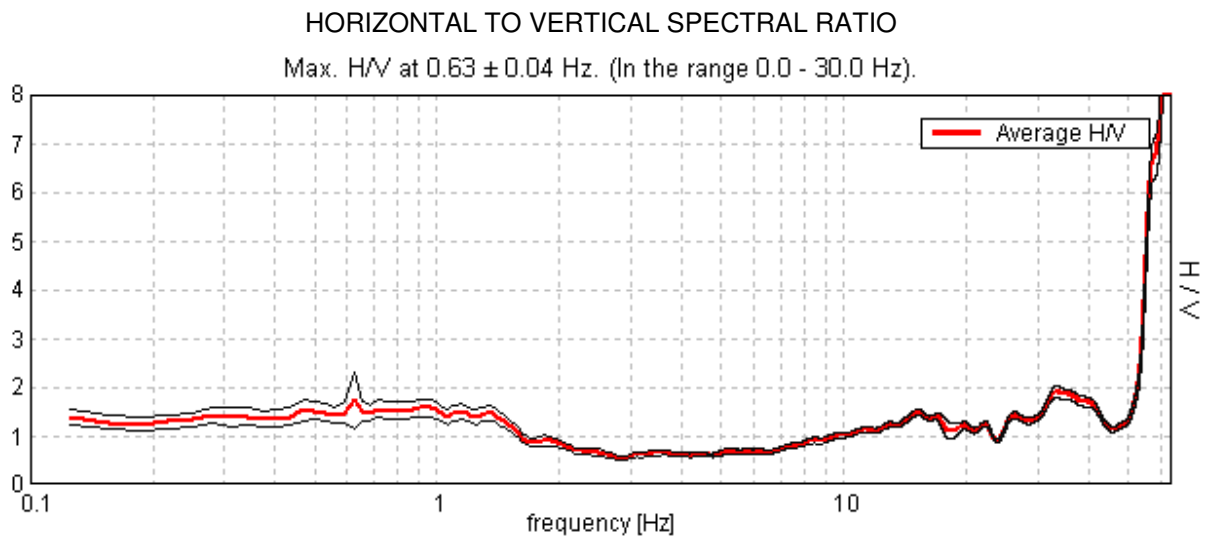
**Documentazione fotografica**



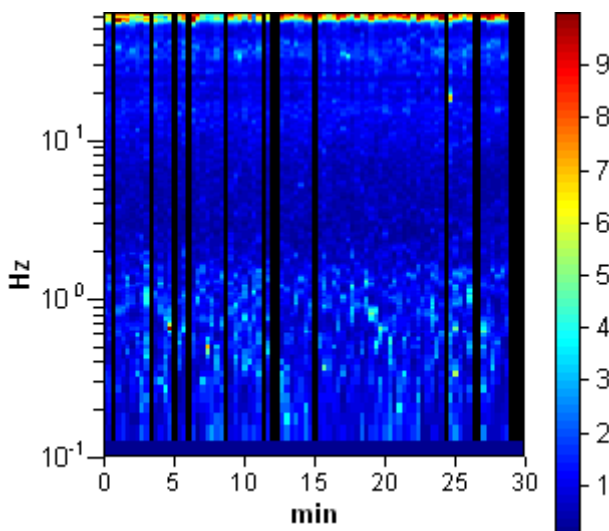
### TRIVELSICILIA PALERMO, PALERMO 0063

Start recording: 06/05/14 09:39:01      End recording: 06/05/14 10:09:02  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

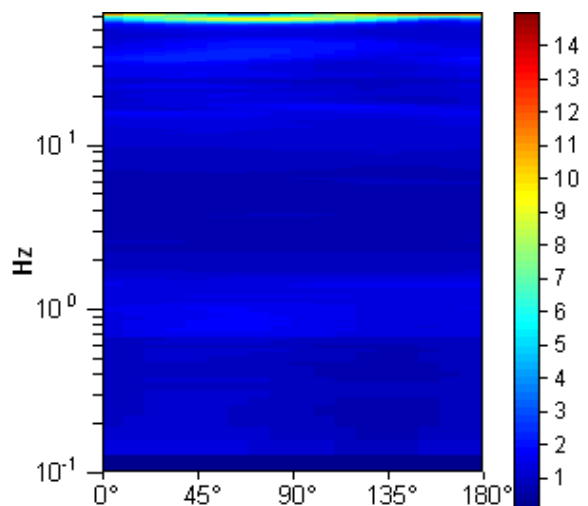
Trace length: 0h30'00".      Analyzed 83% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



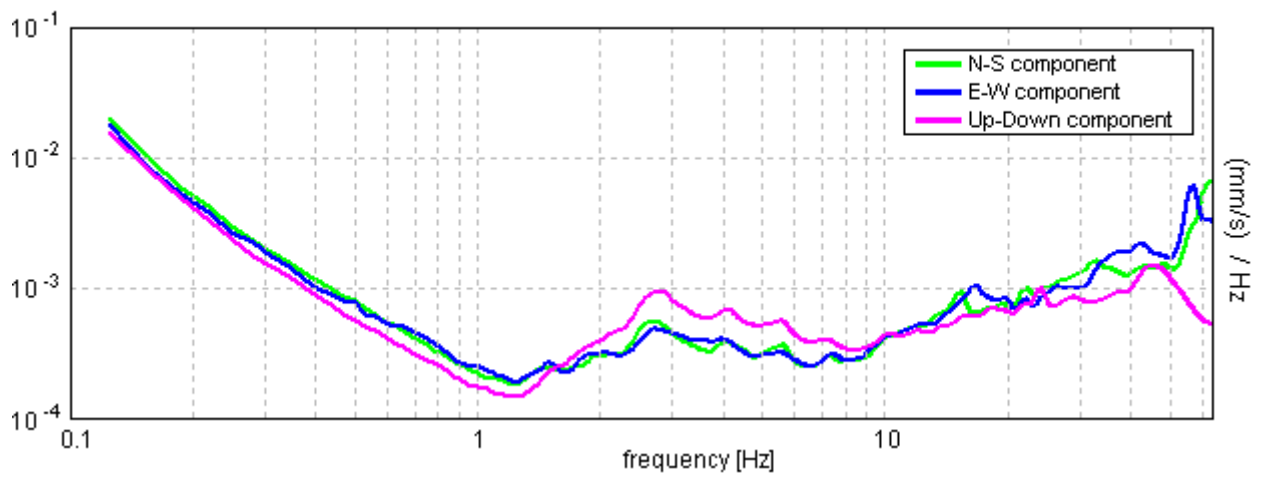
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $0.63 \pm 0.04$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.63 > 0.50$	OK	
$n_c(f_0) > 200$	$937.5 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 31 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	1.719 Hz	OK	
$A_0 > 2$	$1.73 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03219  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02012 < 0.09375$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2942 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0064			
<b>Coordinate</b>	UTM	4224275.07	N	354358.51	E
	Gauss Boaga	4224273.611	N	2374353.564	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		06/05/2014, 10:15			
<b>Nome file</b>		0064			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

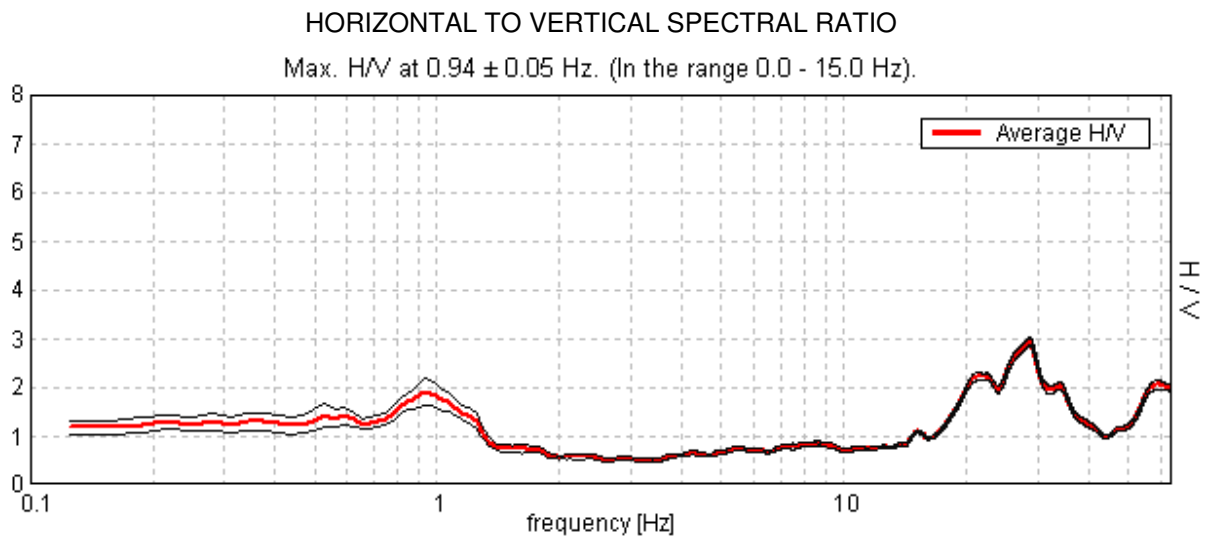
**Documentazione fotografica**



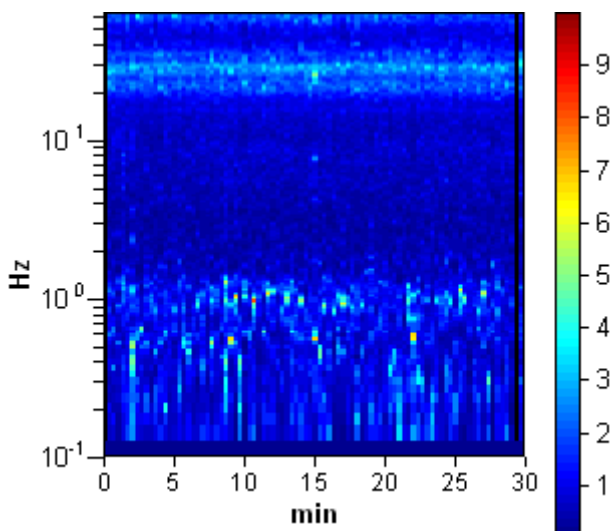
## TRIVELSICILIA PALERMO, PALERMO 0064

Start recording: 06/05/14 10:16:33      End recording: 06/05/14 10:46:34  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

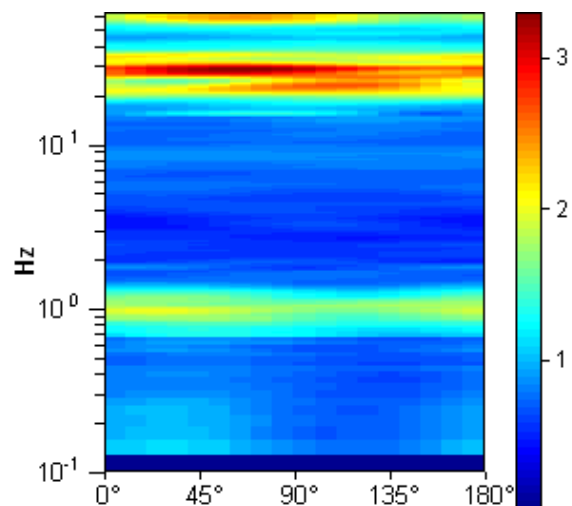
Trace length: 0h30'00".      Analyzed 98% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



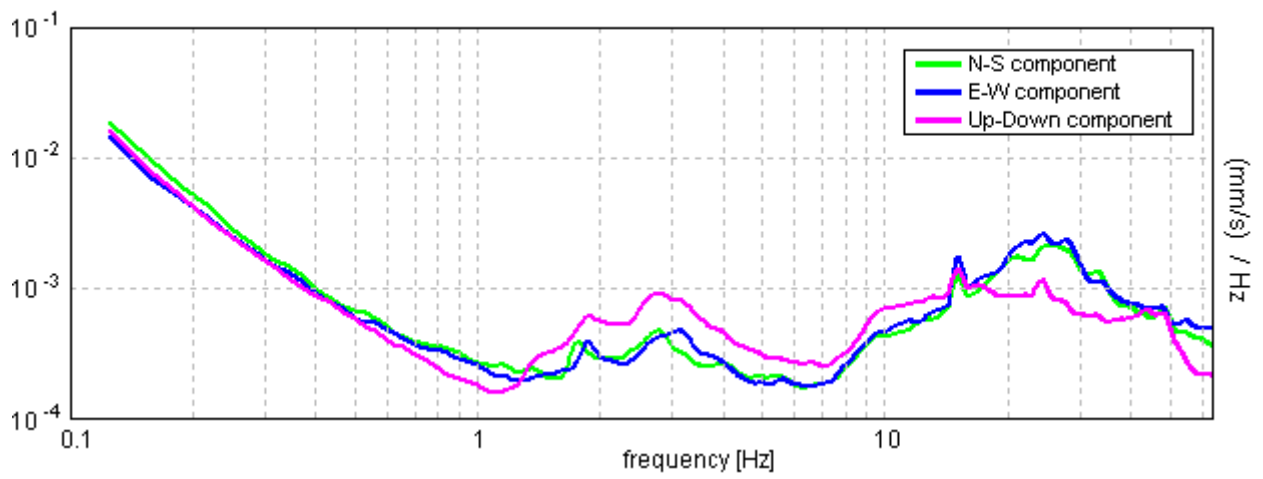
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 0.94 ± 0.05 Hz. (in the range 0.0 - 15.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.94 > 0.50	OK	
$n_c(f_0) > 200$	1650.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 46 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.344 Hz	OK	
<b><math>A_0 &gt; 2</math></b>	1.90 > 2		<b>NO</b>
<b><math>f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%</math></b>	$ 0.02463  < 0.05$	OK	
<b><math>\sigma_f &lt; \varepsilon(f_0)</math></b>	0.02309 < 0.14063	OK	
<b><math>\sigma_A(f_0) &lt; \theta(f_0)</math></b>	0.1348 < 2.0	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

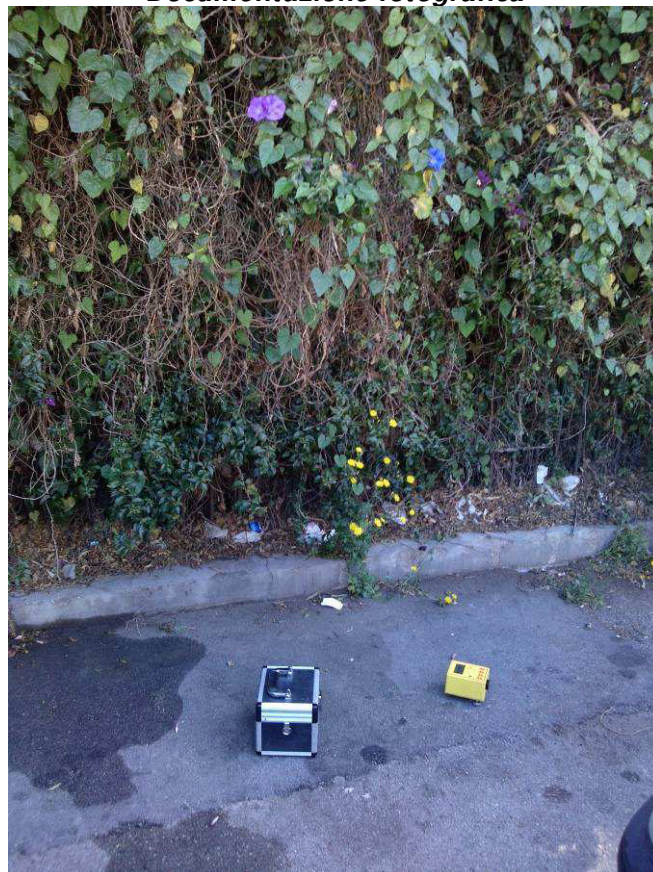


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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0065			
<b>Coordinate</b>	UTM	4223848.02	N	354789.12	E
	Gauss Boaga	4223846.549	N	2374784.179	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		06/05/2014, 10:52			
<b>Nome file</b>		0065			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

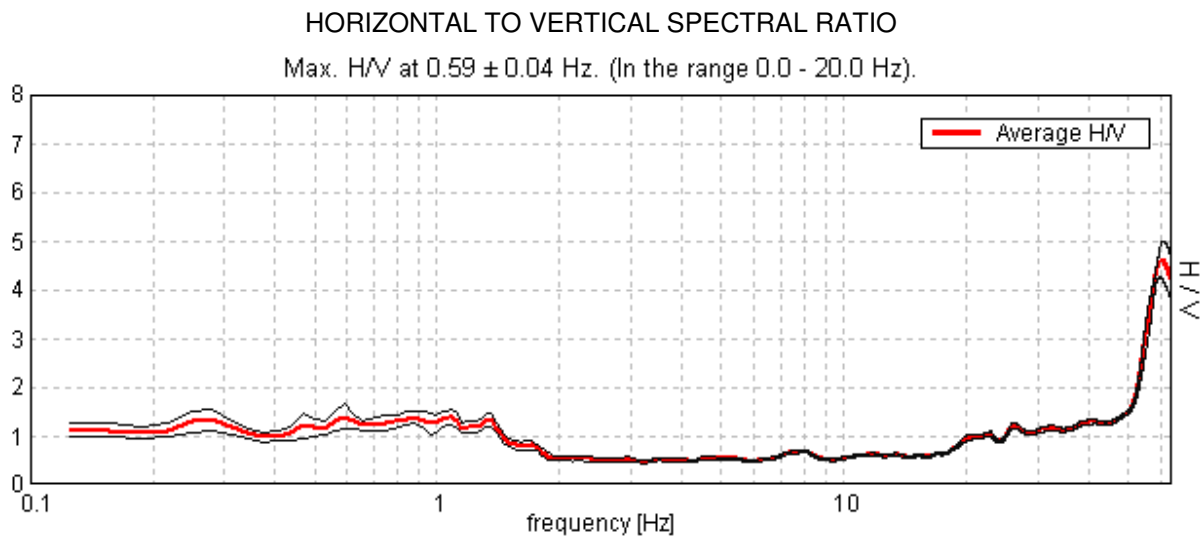
**Documentazione fotografica**



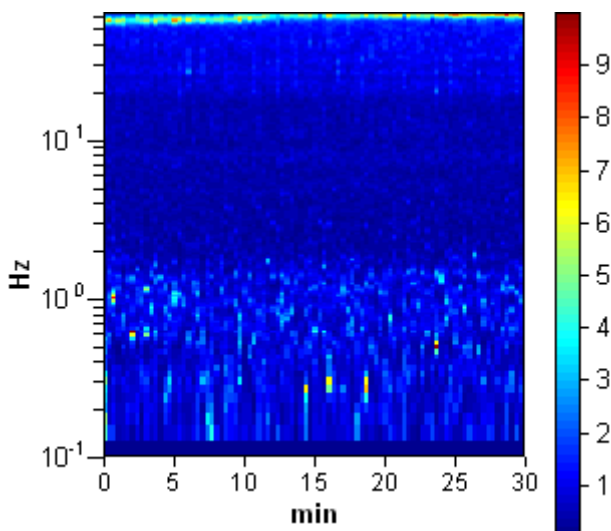
## TRIVELSICILIA PALERMO, PALERMO 0065

Start recording: 06/05/14 10:52:11      End recording: 06/05/14 11:22:12  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

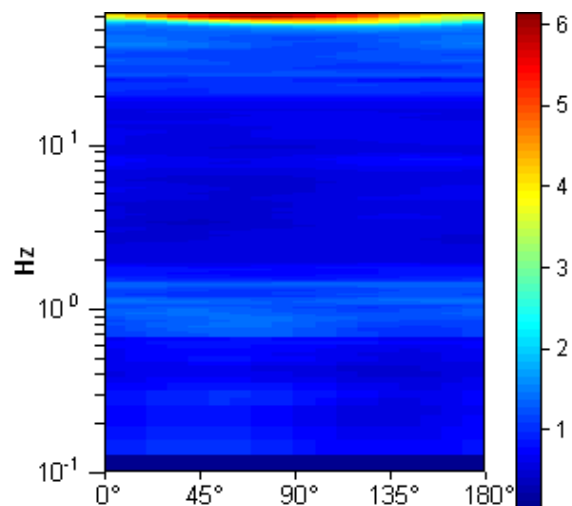
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



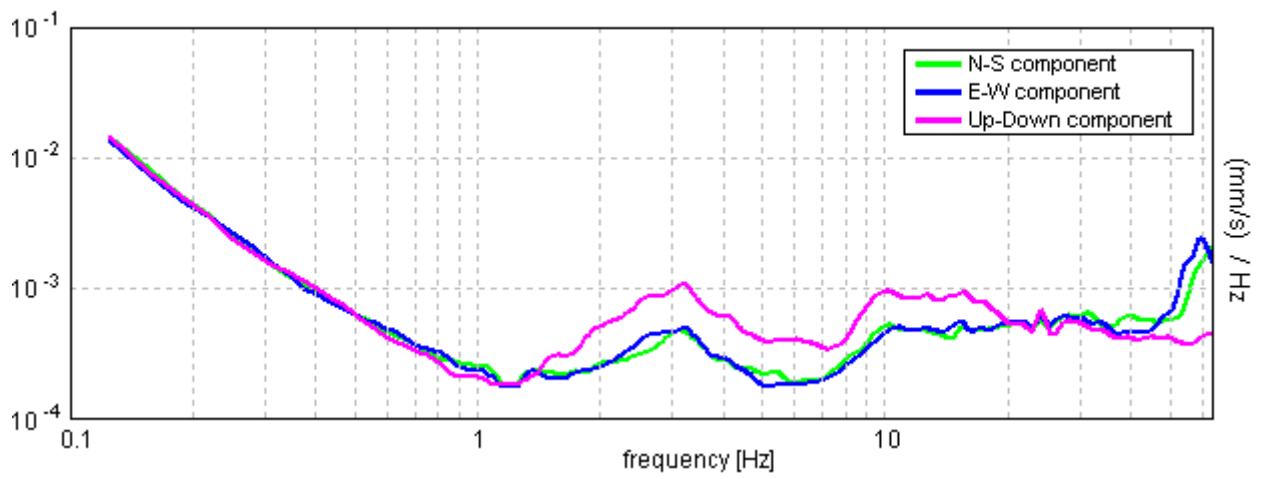
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $0.59 \pm 0.04$  Hz. (in the range 0.0 - 20.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.59 > 0.50$	OK	
$n_c(f_0) > 200$	$1068.8 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 30 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	1.813 Hz	OK	
$A_0 > 2$	$1.40 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03238  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01922 < 0.08906$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1252 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0066			
<b>Coordinate</b>	<i>UTM</i>	4223889.11	N	354388.11	E
	<i>Gauss Boaga</i>	4223887.635	N	2374383.152	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		06/05/2014, 11:33			
<b>Nome file</b>		0066			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

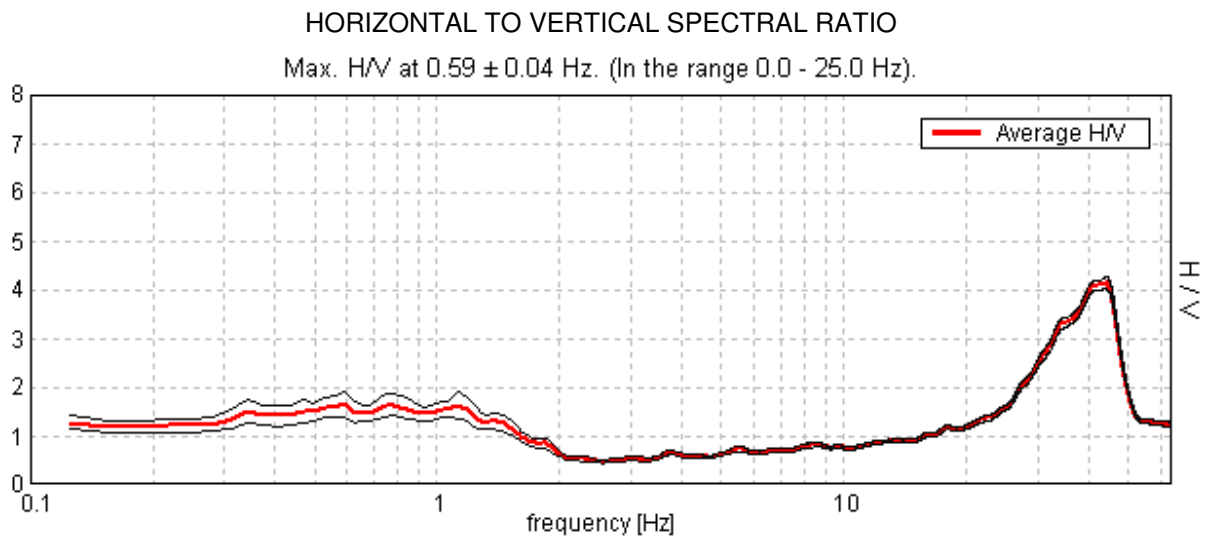
**Documentazione fotografica**



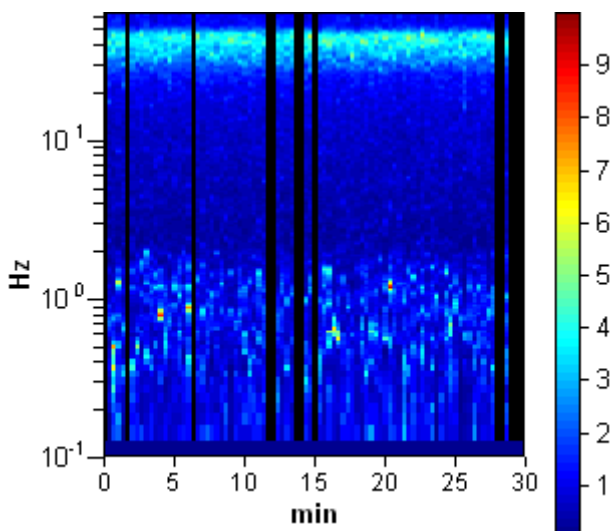
## TRIVELSICILIA PALERMO, PALERMO 0066

Start recording: 06/05/14 11:34:55      End recording: 06/05/14 12:04:56  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

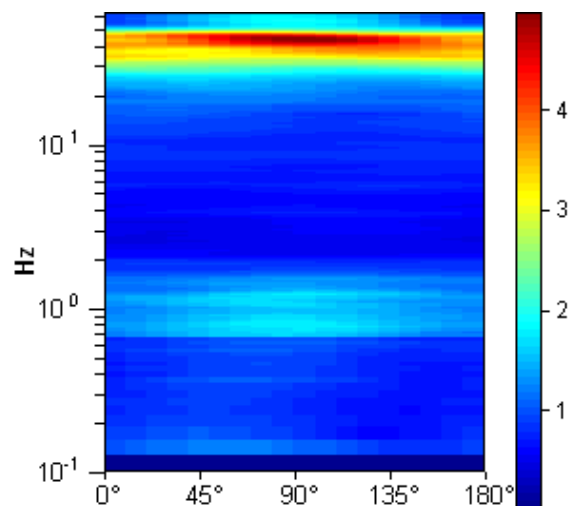
Trace length: 0h30'00".      Analyzed 86% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



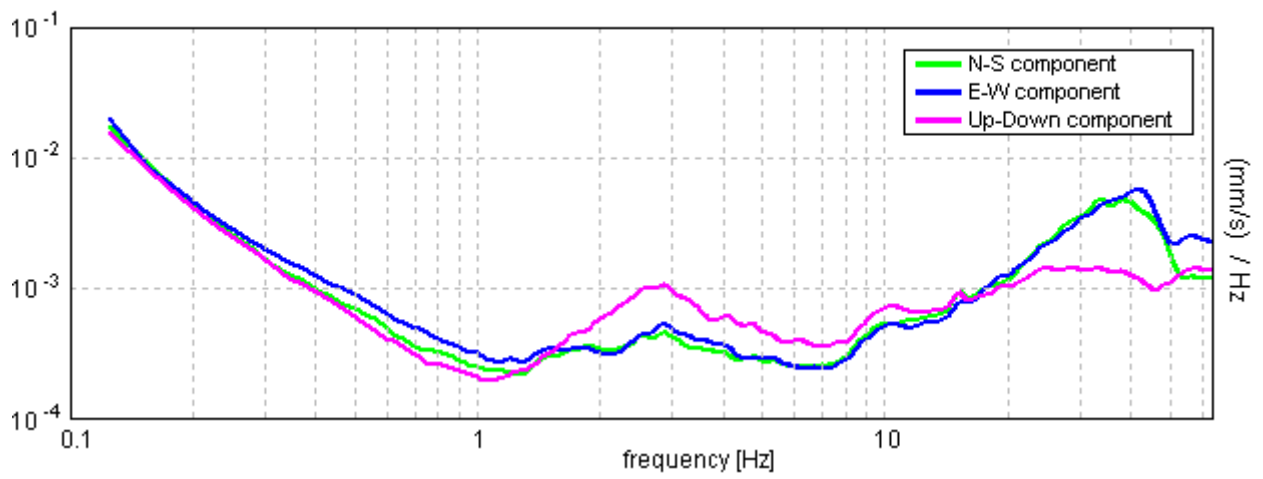
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 0.59 ± 0.04 Hz. (in the range 0.0 - 25.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.59 > 0.50	OK	
$n_c(f_0) > 200$	914.4 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 30 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.906 Hz	OK	
$A_0 > 2$	1.64 > 2		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03102  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.01842 < 0.08906	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1229 < 2.0	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0067			
<b>Coordinate</b>	UTM	4223868.67	N	353981.13	E
	Gauss Boaga	4223867.190	N	2373976.152	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		06/05/2014, 12:18			
<b>Nome file</b>		0067			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	
<b>Nota</b>		Base sismica ripetuta per l'inattendibilità del segnale			

**Documentazione fotografica**



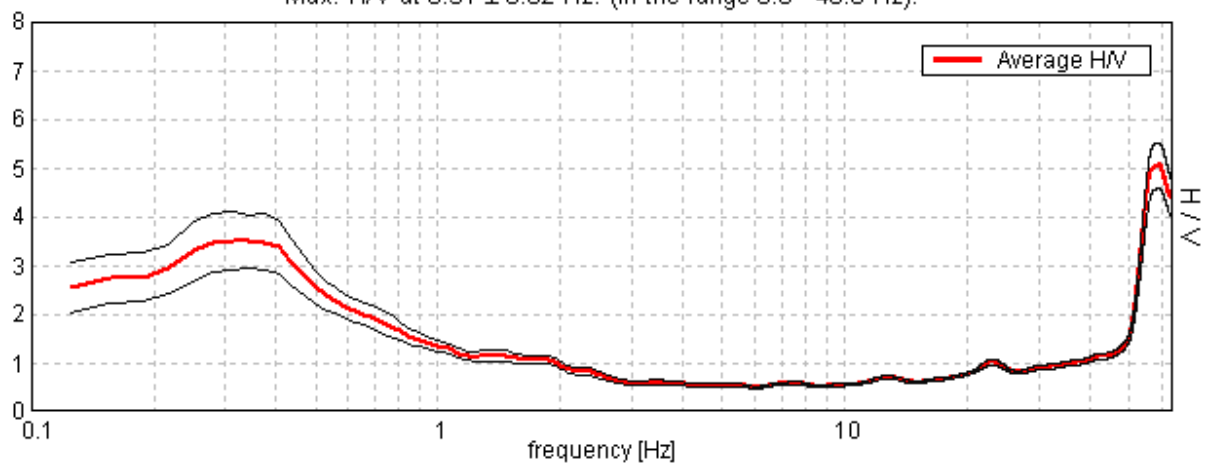
## TRIVELSICILIA PALERMO, PALERMO 0067

Start recording: 06/05/14 12:19:32      End recording: 06/05/14 12:49:33  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

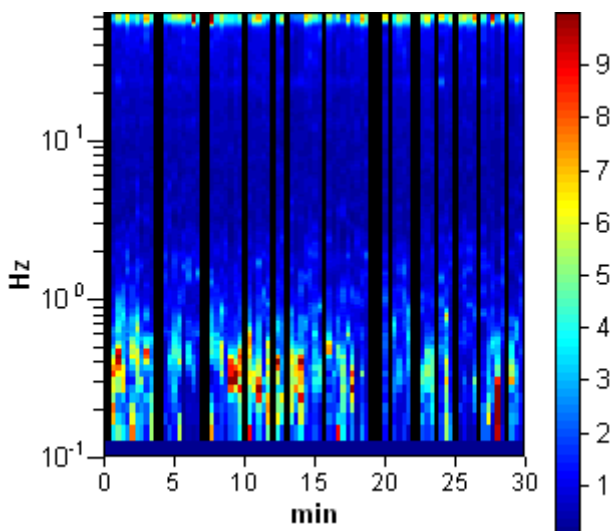
Trace length: 0h30'00".      Analyzed 78% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 10%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

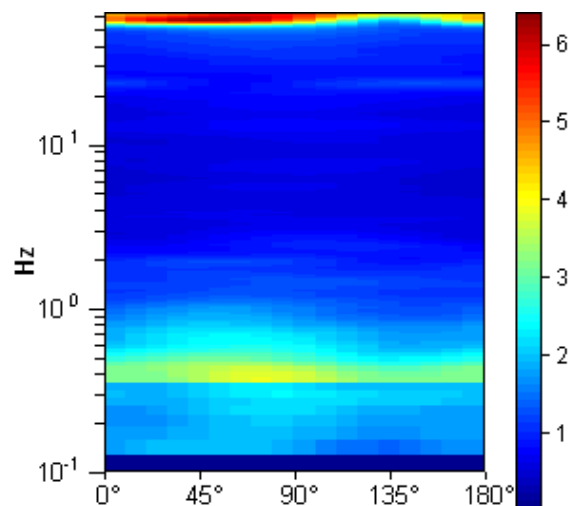
Max. H/V at  $0.31 \pm 0.02$  Hz. (In the range 0.0 - 40.0 Hz).



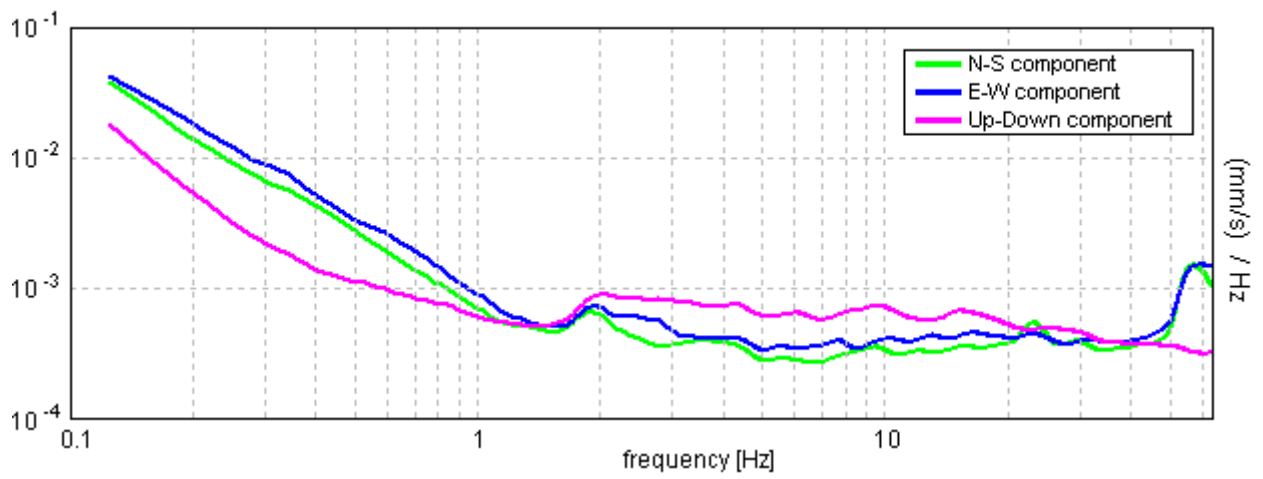
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 0.31 ± 0.02 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.31 > 0.50		<b>NO</b>
$n_c(f_0) > 200$	437.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 16 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.094 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	0.781 Hz	OK	
$A_0 > 2$	3.51 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02661  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.00832 < 0.0625	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.295 < 2.5	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

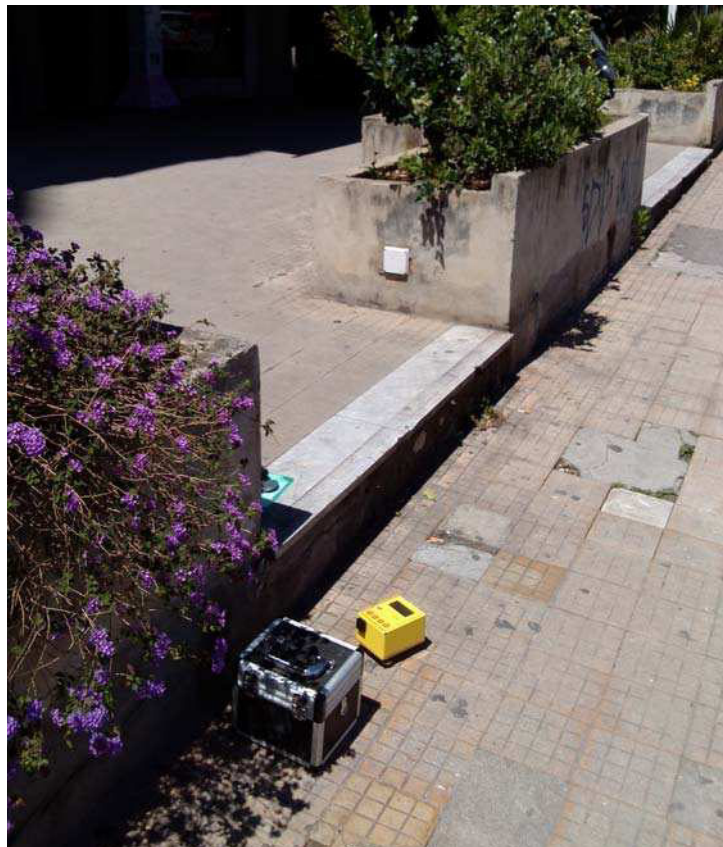


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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0067 bis			
<b>Coordinate</b>	<i>UTM</i>	4223893.59	N	353966.96	E
	<i>Gauss Boaga</i>	4223892.110	N	2373961.982	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		16/06/2014, 13:23			
<b>Nome file</b>		0067 bis			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



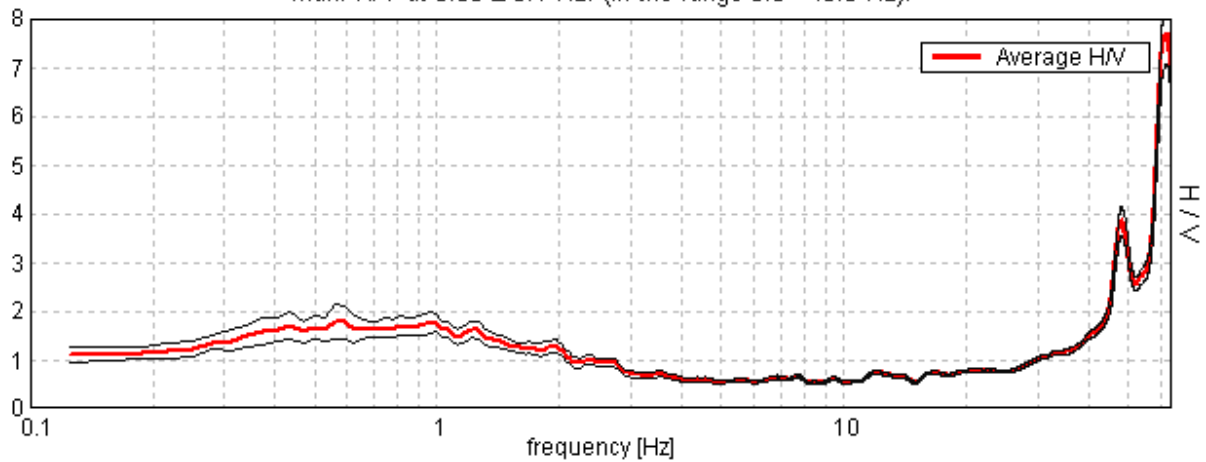
## TRIVEL SICILIA PALERMO, PALERMO 0067 BIS

Start recording: 16/06/14 13:27:22      End recording: 16/06/14 13:57:23  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

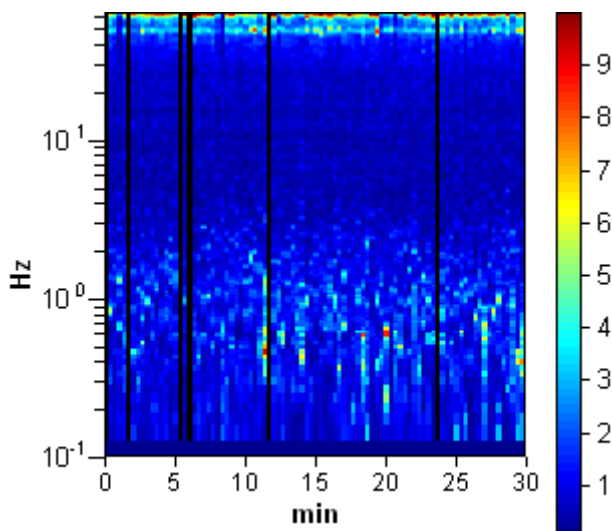
Trace length: 0h30'00".      Analyzed 93% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

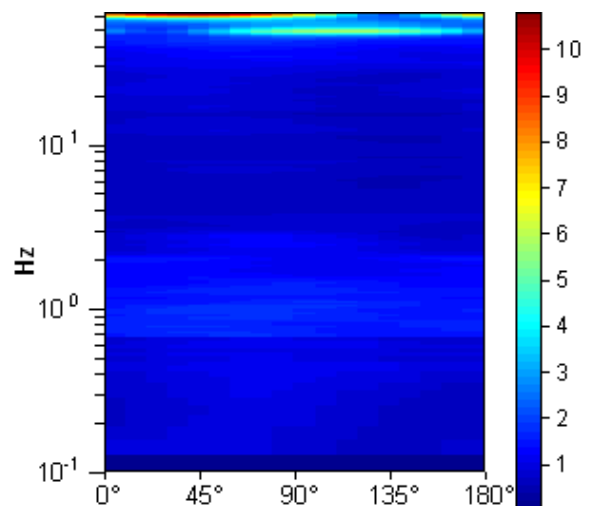
Max. H/V at  $0.56 \pm 0.1$  Hz. (In the range 0.0 - 40.0 Hz).



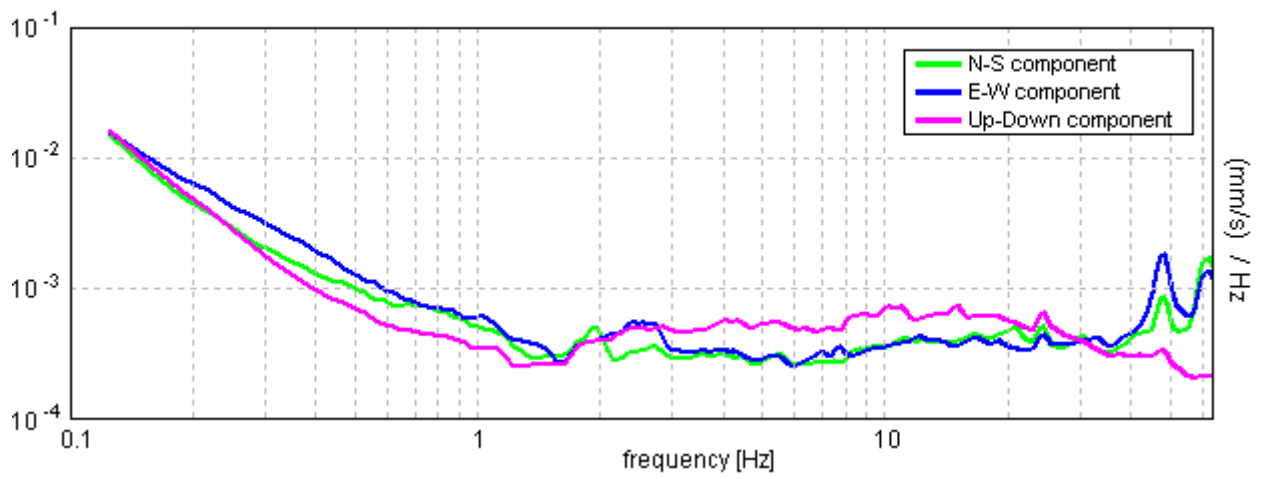
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $0.56 \pm 0.1$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.56 > 0.50$	OK	
$n_c(f_0) > 200$	$945.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 28 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$1.78 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.08811  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.04956 < 0.08438$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1723 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

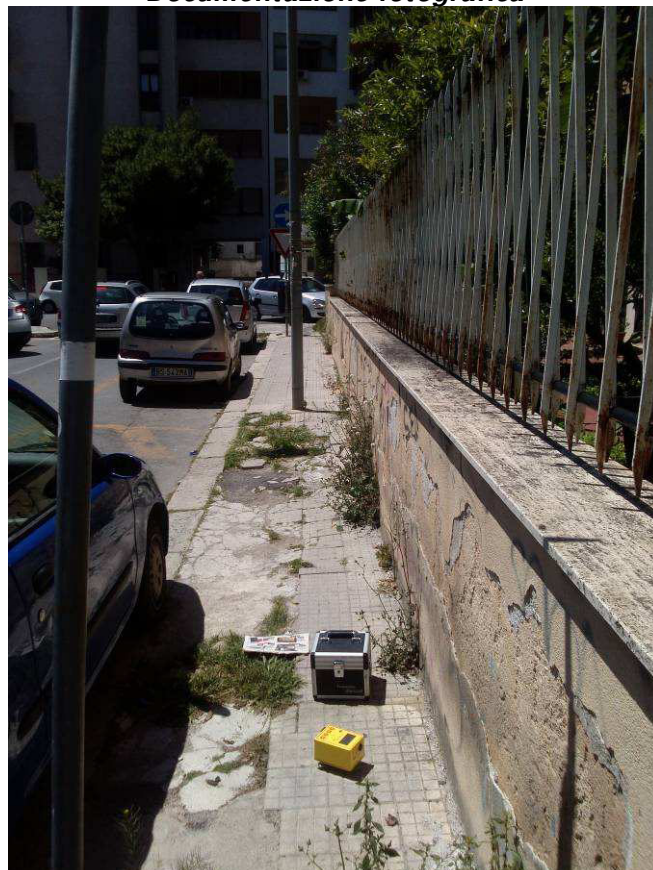


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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>				
<b>Nome base sismica</b>	0068				
<b>Coordinate</b>	<i>UTM</i>	4223458.84	N	354309.78	E
	<i>Gauss Boaga</i>	4223457.347	N	2374304.803	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	06/05/2014, 13:01				
<b>Nome file</b>	0068				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	MarciapiEDE				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



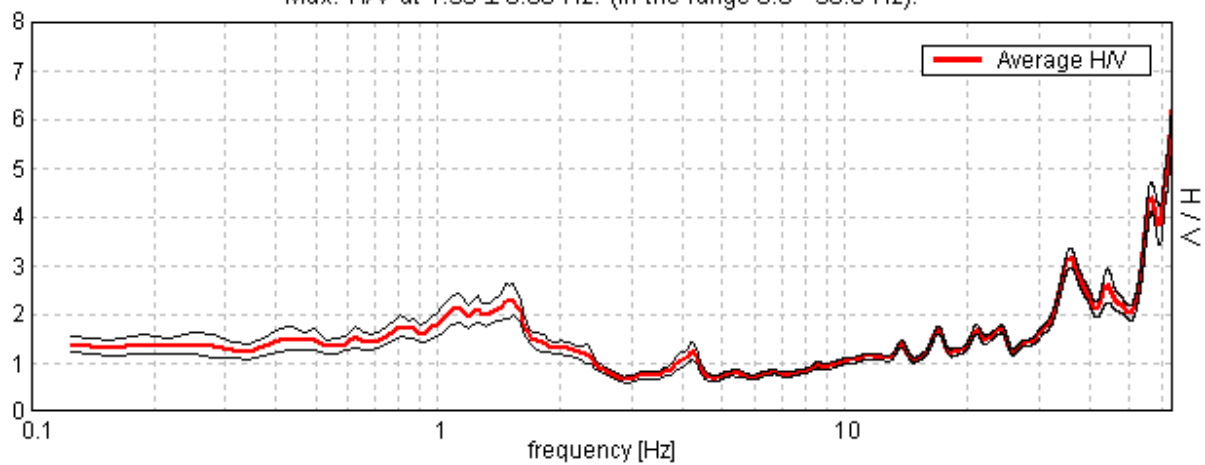
## TRIVELSICILIA PALERMO, PALERMO 0068

Start recording: 06/05/14 13:02:27      End recording: 06/05/14 13:32:28  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

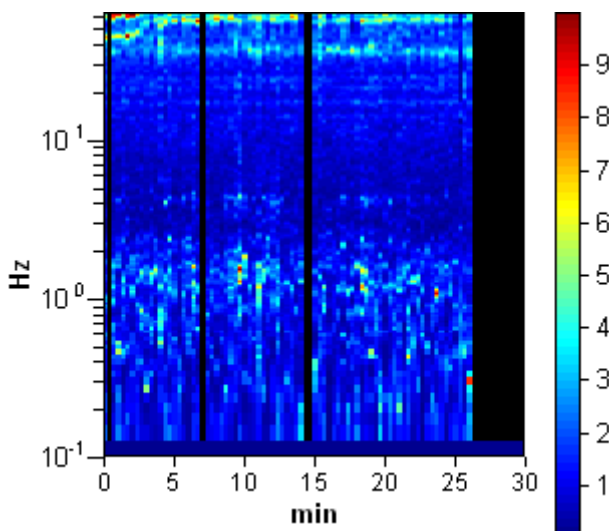
Trace length: 0h30'00".      Analyzed 83% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

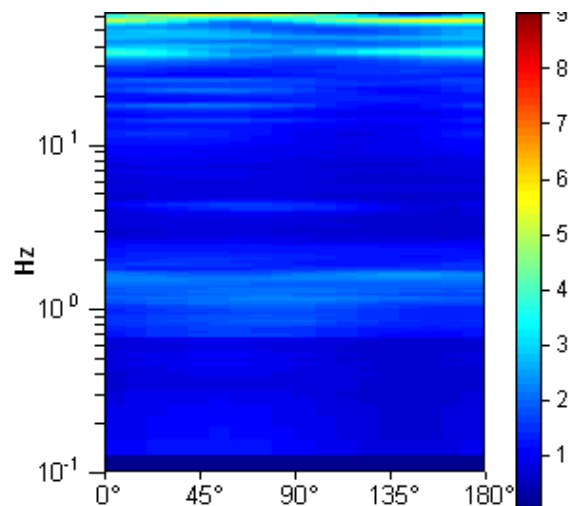
Max. H/V at  $1.53 \pm 0.08$  Hz. (In the range 0.0 - 30.0 Hz).



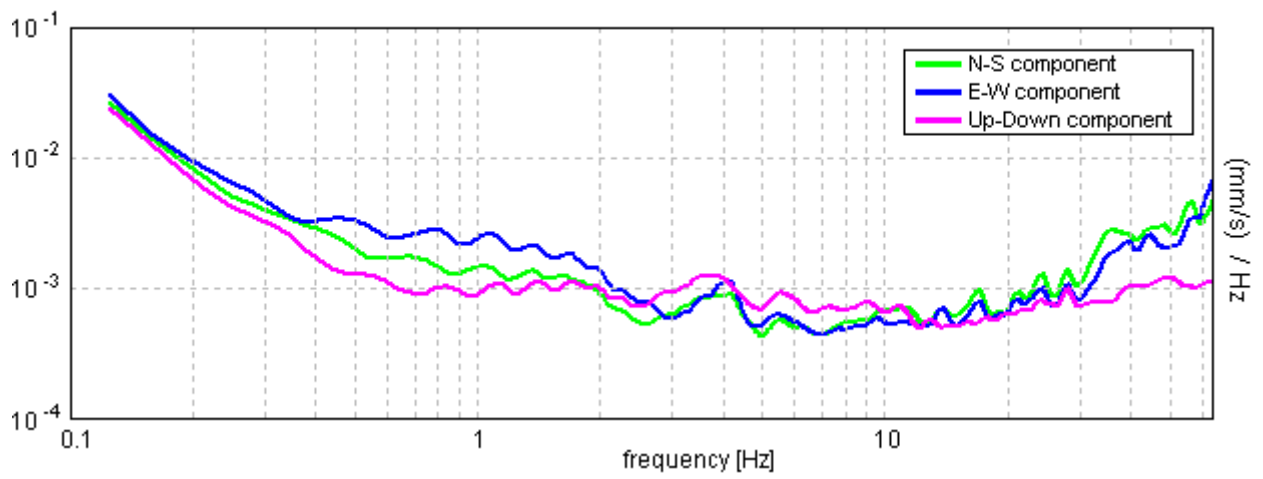
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.53 ± 0.08 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.53 > 0.50	OK	
$n_c(f_0) > 200$	2296.9 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 74 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.375 Hz	OK	
$A_0 > 2$	2.29 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02487  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.03809 < 0.15313$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1556 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0069				
<b>Coordinate</b>	<i>UTM</i>	4223400.64	N	354805.48	E
	<i>Gauss Boaga</i>	4223399.150	N	2374800.524	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	06/05/2014, 14:04				
<b>Nome file</b>	0069				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



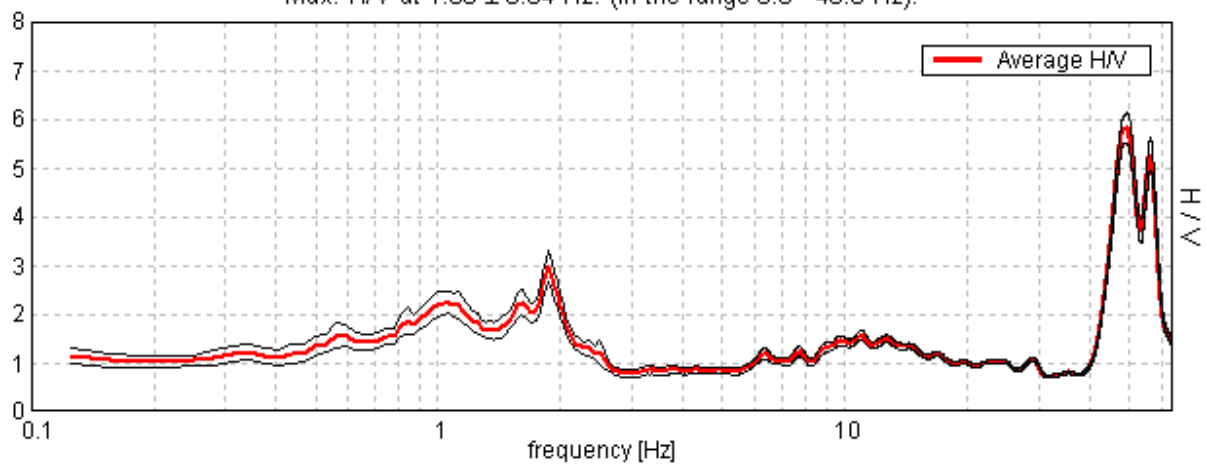
## TRIVELSICILIA PALERMO, PALERMO 0069

Start recording: 06/05/14 14:03:05      End recording: 06/05/14 14:33:06  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

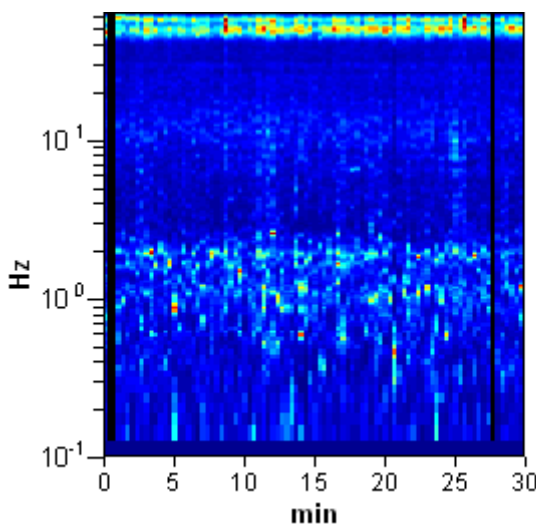
Trace length: 0h30'00".      Analyzed 97% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

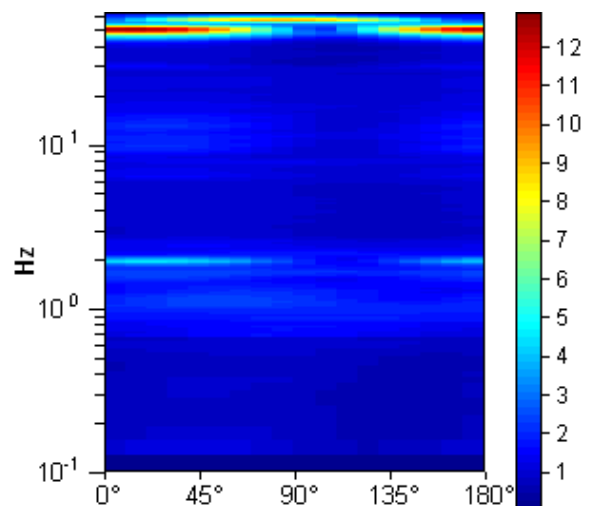
Max. H/V at  $1.88 \pm 0.04$  Hz. (In the range 0.0 - 40.0 Hz).



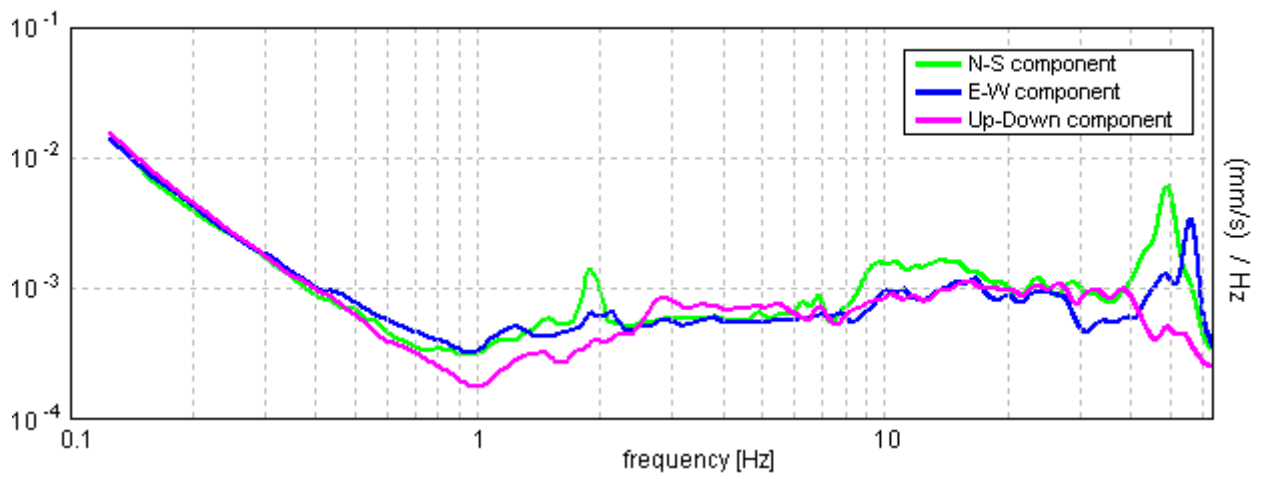
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $1.88 \pm 0.04$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.88 > 0.50$	OK	
$n_c(f_0) > 200$	$3262.5 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 91 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.719 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.156 Hz	OK	
$A_0 > 2$	$2.99 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01132  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02122 < 0.1875$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1615 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

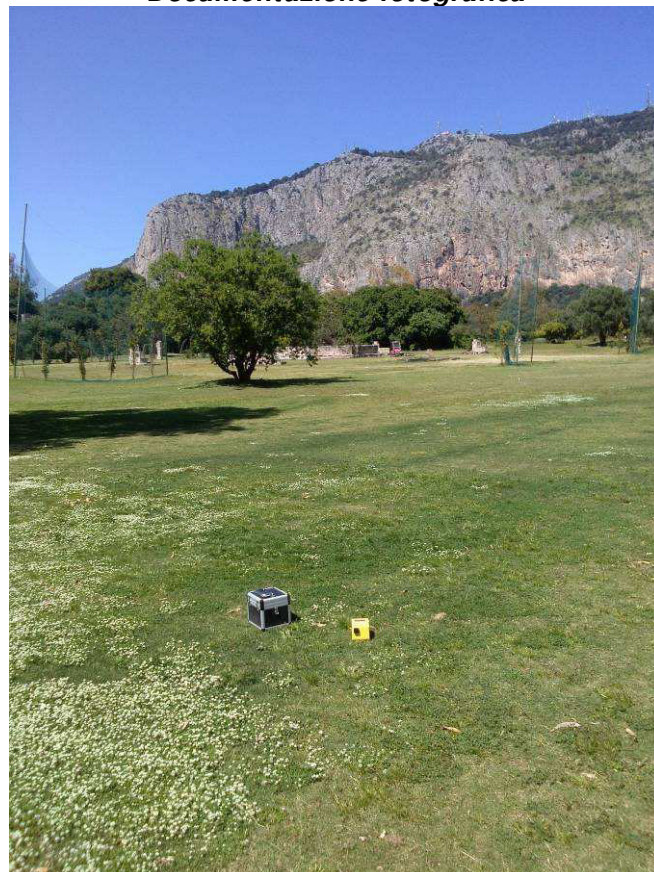


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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0070				
<b>Coordinate</b>	<i>UTM</i>	4223459.29	N	355147.42	E
	<i>Gauss Boaga</i>	4223457.807	N	2375142.482	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	06/05/2014, 14:48				
<b>Nome file</b>	0070				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>No</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



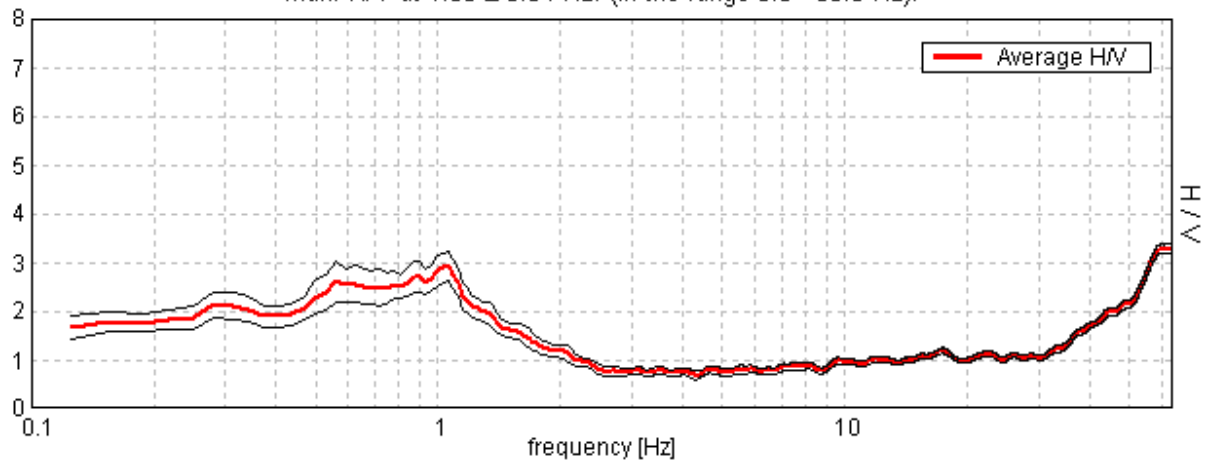
## TRIVELSICILIA PALERMO, PALERMO 0070

Start recording: 06/05/14 14:48:13      End recording: 06/05/14 15:18:14  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

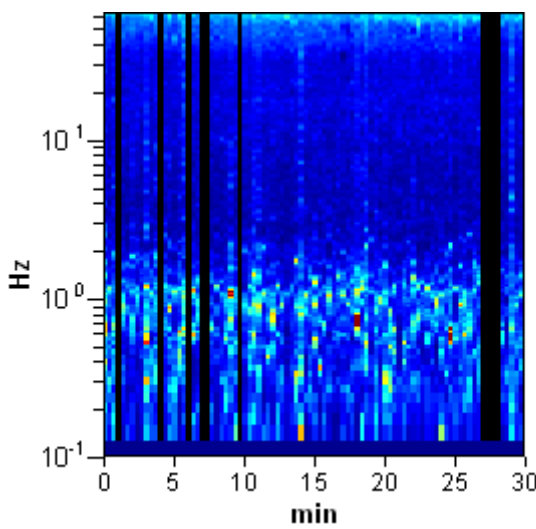
Trace length: 0h30'00".      Analyzed 89% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

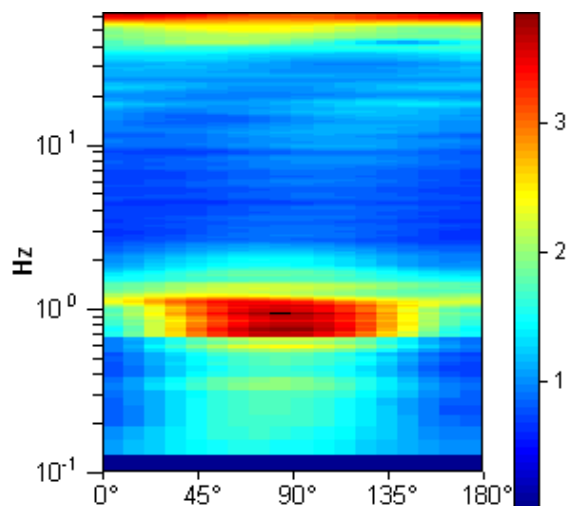
Max. H/V at  $1.06 \pm 0.04$  Hz. (In the range 0.0 - 50.0 Hz).



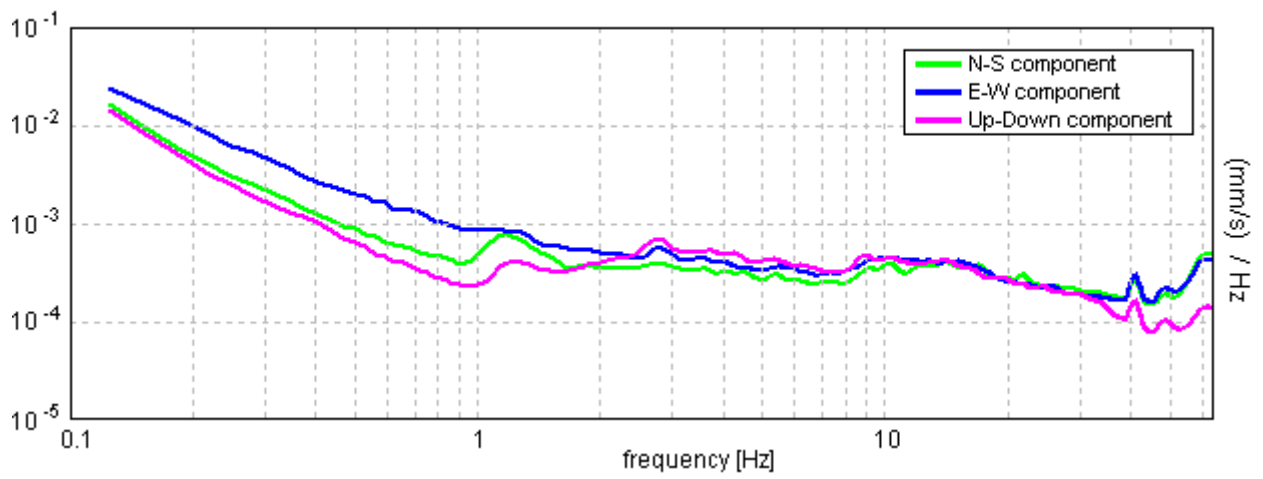
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.06 ± 0.04 Hz. (in the range 0.0 - 50.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.06 > 0.50	OK	
$n_c(f_0) > 200$	1700.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 52 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.656 Hz	OK	
$A_0 > 2$	2.92 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01761  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01871 < 0.10625$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1543 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0071			
<b>Coordinate</b>	UTM	4223088.79	N	356740.63	E
	Gauss Boaga	4223087.313	N	2376735.755	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		07/05/2014, 14:20			
<b>Nome file</b>		0071			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



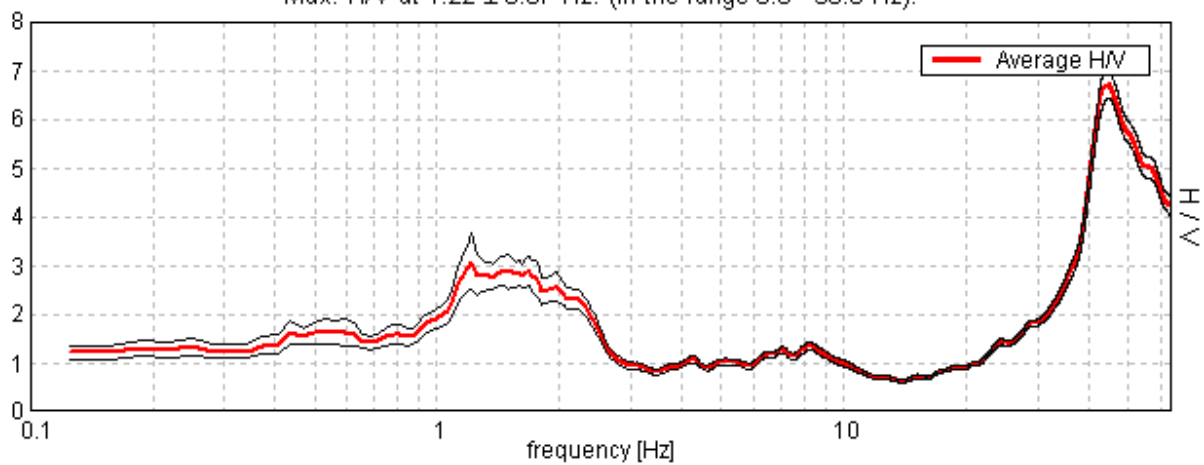
## TRIVELSICILIA PALERMO, PALERMO 0071

Start recording: 07/05/14 14:20:38      End recording: 07/05/14 14:50:39  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

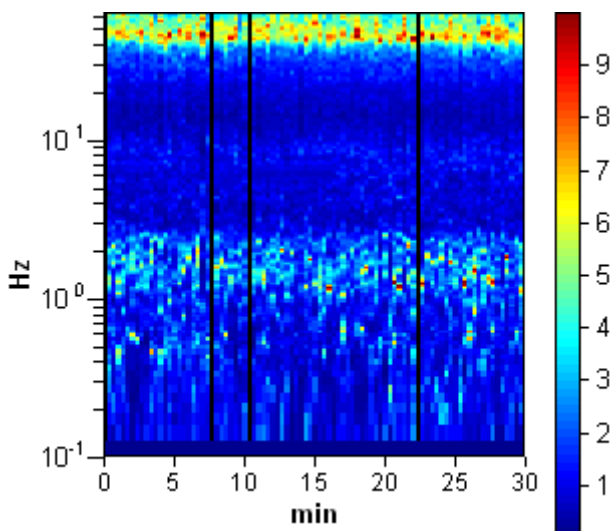
Trace length: 0h30'00".      Analyzed 96% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

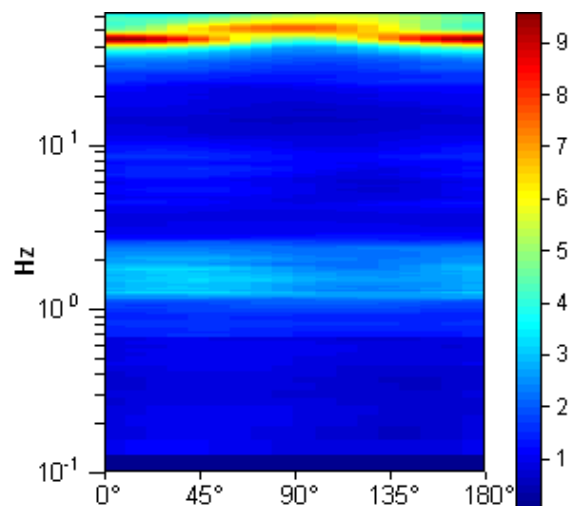
Max. H/V at  $1.22 \pm 0.07$  Hz. (In the range 0.0 - 30.0 Hz).



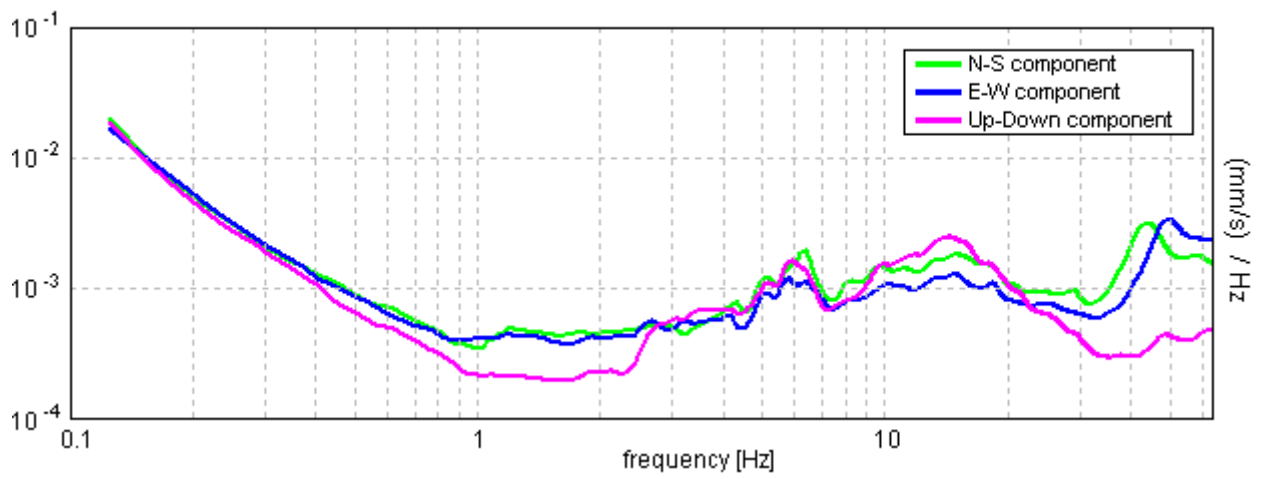
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $1.22 \pm 0.07$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.22 > 0.50$	OK	
$n_c(f_0) > 200$	$2096.3 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 60 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.844 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.563 Hz	OK	
$A_0 > 2$	$3.08 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02907  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.03543 < 0.12188$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2837 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0072			
<b>Coordinate</b>	UTM	4223094.28	N	355559.74	E
	Gauss Boaga	4223092.787	N	2375554.809	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		07/05/2014, 11:25			
<b>Nome file</b>		0072			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>No</b>		
		<b>Altro</b>	<b>No</b>		

**Documentazione fotografica**



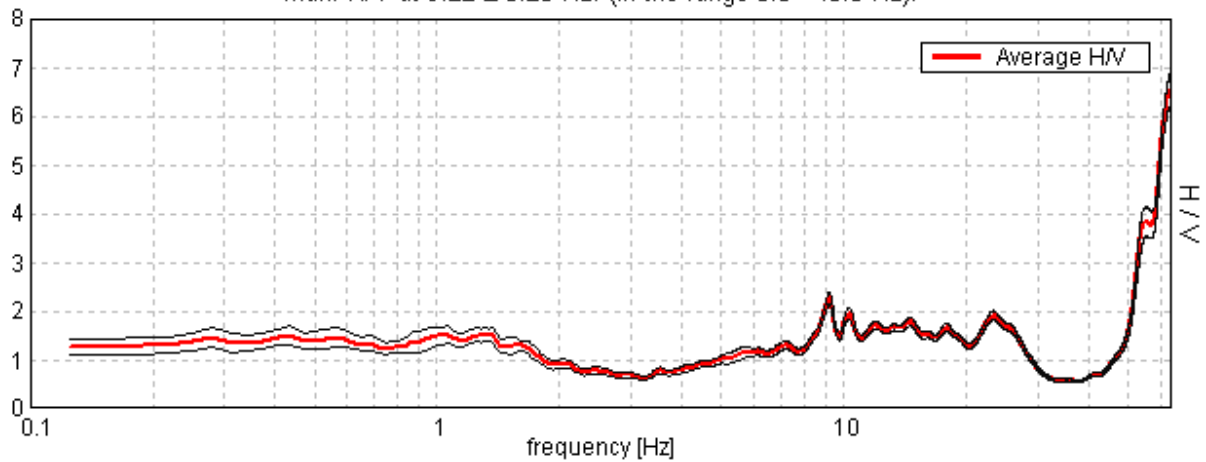
## TRIVELSICILIA PALERMO, PALERMO 0072

Start recording: 07/05/14 11:26:36      End recording: 07/05/14 11:56:37  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

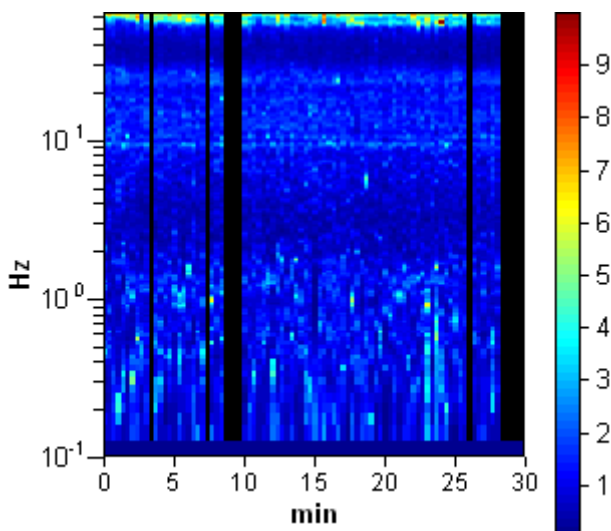
Trace length: 0h30'00".      Analyzed 87% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

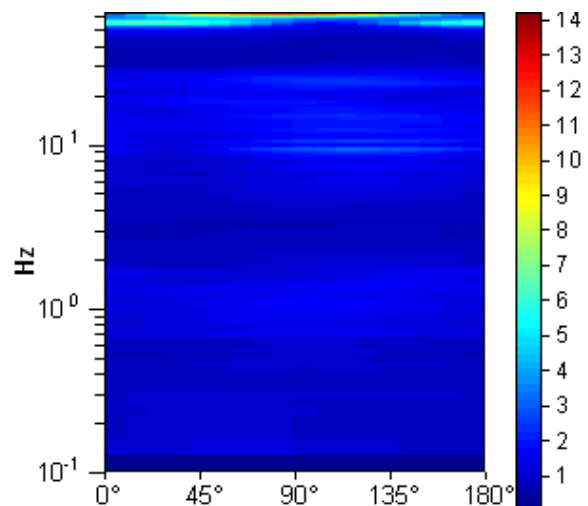
Max. H/V at  $9.22 \pm 0.23$  Hz. (In the range 0.0 - 40.0 Hz).



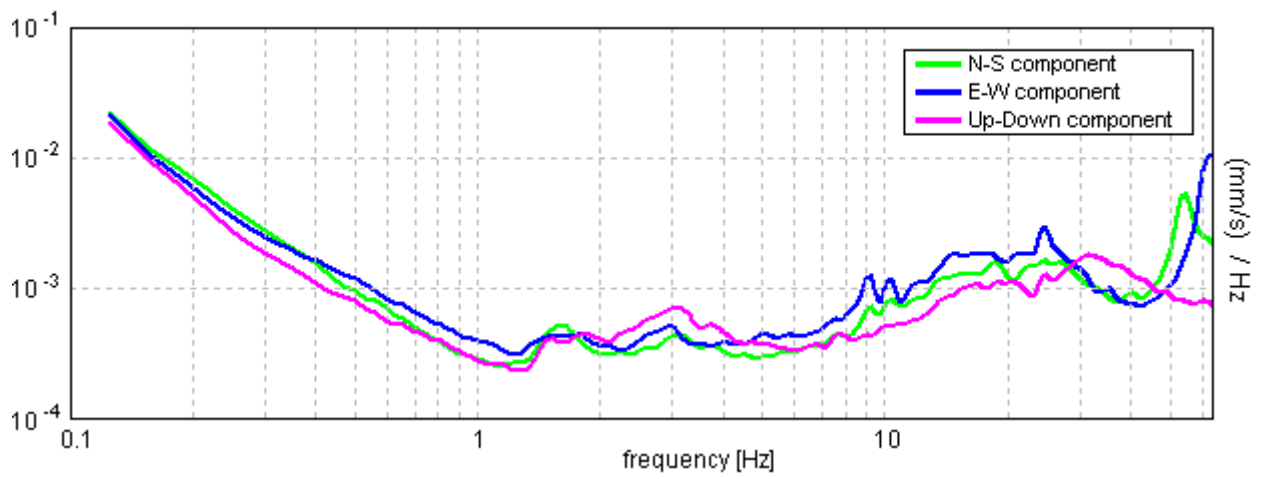
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 9.22 ± 0.23 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	9.22 > 0.50	OK	
$n_c(f_0) > 200$	14381.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 444 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	6.563 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	28.188 Hz	OK	
$A_0 > 2$	2.26 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01222  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.11261 < 0.46094	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.0666 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

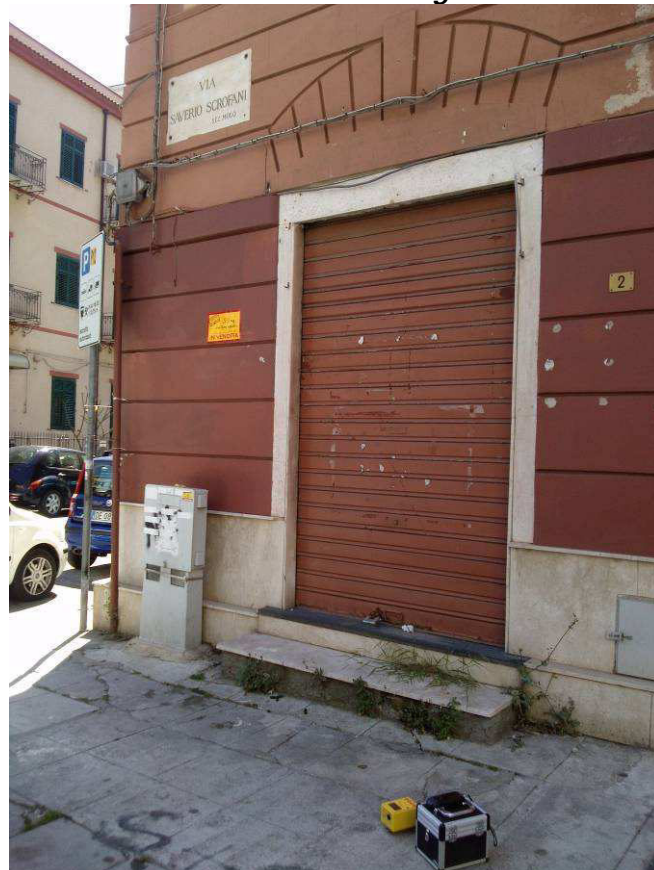


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n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0073				
<b>Coordinate</b>	<i>UTM</i>	4223095.09	N	355167.71	E
	<i>Gauss Boaga</i>	4223093.592	N	2375162.761	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	07/05/2014, 10:51				
<b>Nome file</b>	0073				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

**Documentazione fotografica**



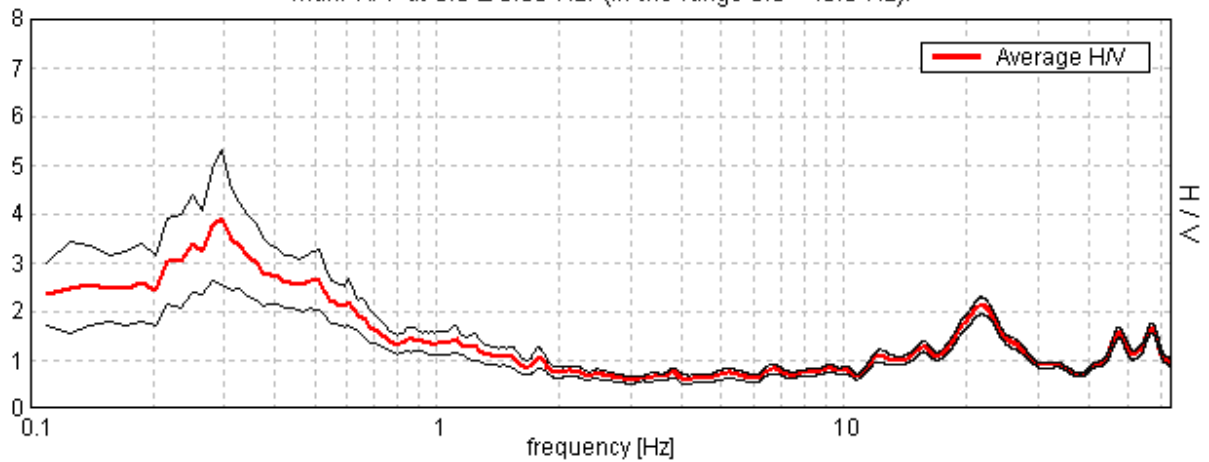
### TRIVELSICILIA PALERMO, PALERMO 0073

Start recording: 07/05/14 10:52:29      End recording: 07/05/14 11:22:30  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

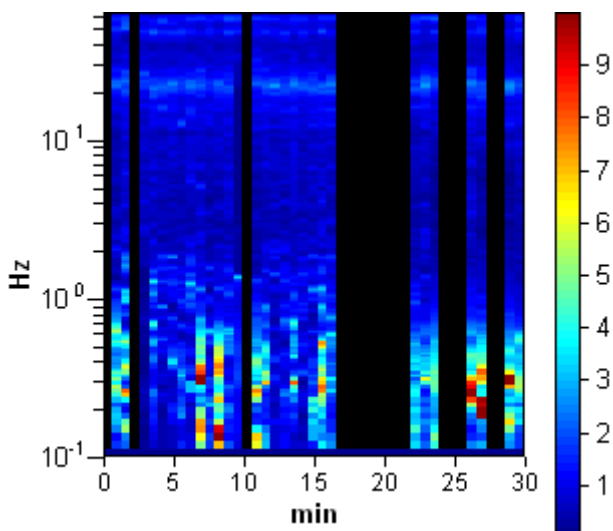
Trace length: 0h30'00".      Analyzed 64% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 40 s  
Smoothing window: Triangular window  
Smoothing: 5%

#### HORIZONTAL TO VERTICAL SPECTRAL RATIO

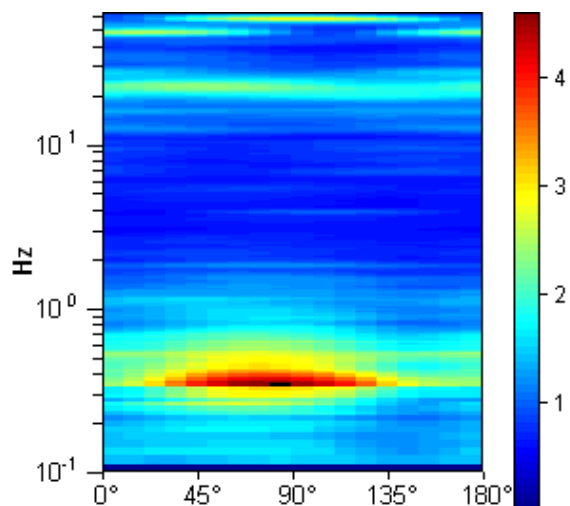
Max. H/V at  $0.3 \pm 0.03$  Hz. (In the range 0.0 - 40.0 Hz).



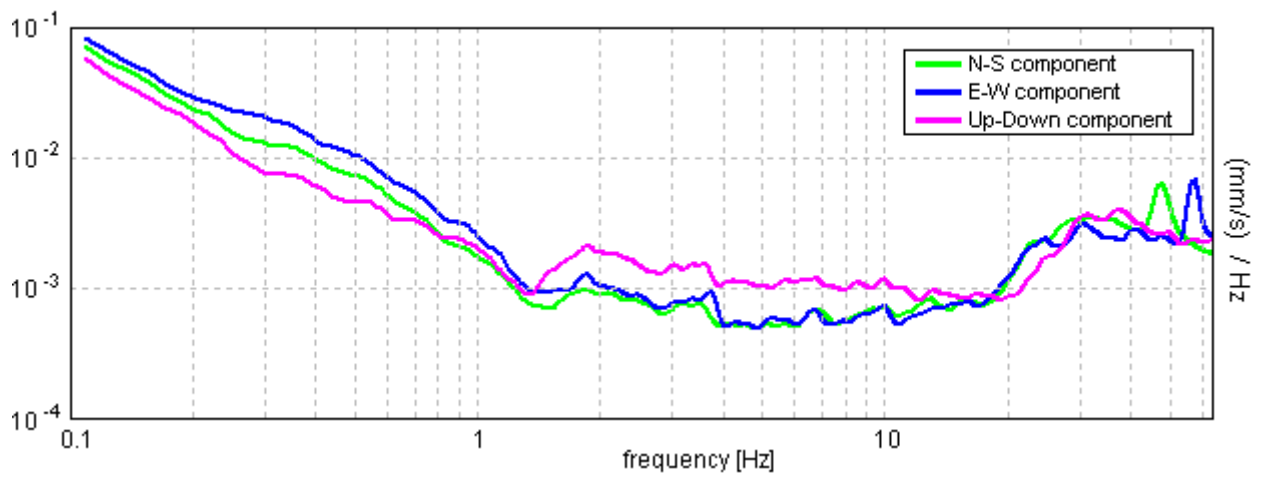
#### H/V TIME HISTORY



#### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $0.3 \pm 0.03$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.30 > 0.25$	OK	
$n_c(f_0) > 200$	$344.4 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 30 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.094 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	0.641 Hz	OK	
$A_0 > 2$	$3.91 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.04091  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01214 < 0.05938$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.6612 < 2.5$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

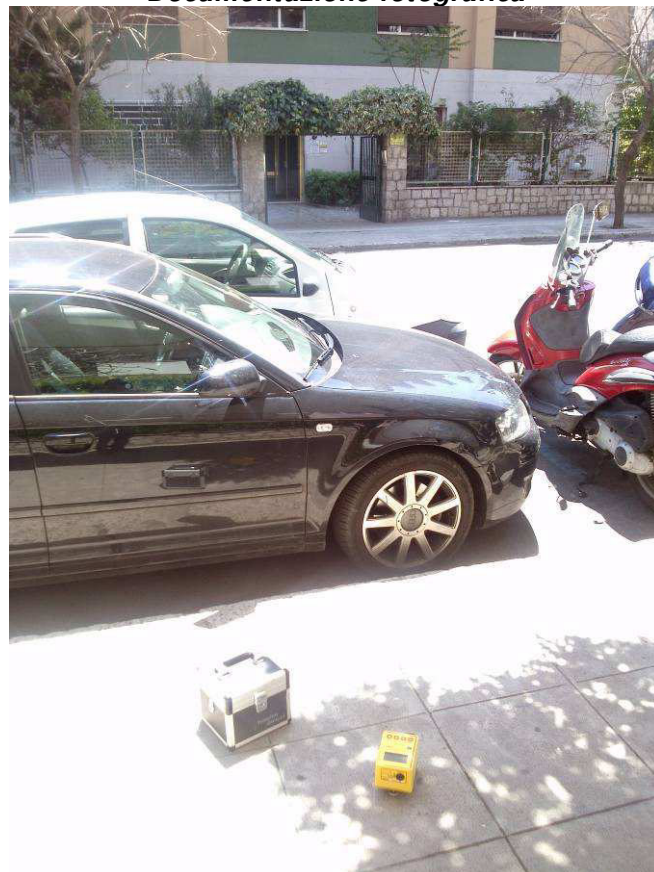


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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0074			
<b>Coordinate</b>	UTM	4223072.00	N	354760.00	E
	Gauss Boaga	4223070.496	N	2374755.031	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		08/05/2014, 12:59			
<b>Nome file</b>		0074			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>Si</b>		
		<b>Altro</b>	<b>No</b>		

**Documentazione fotografica**



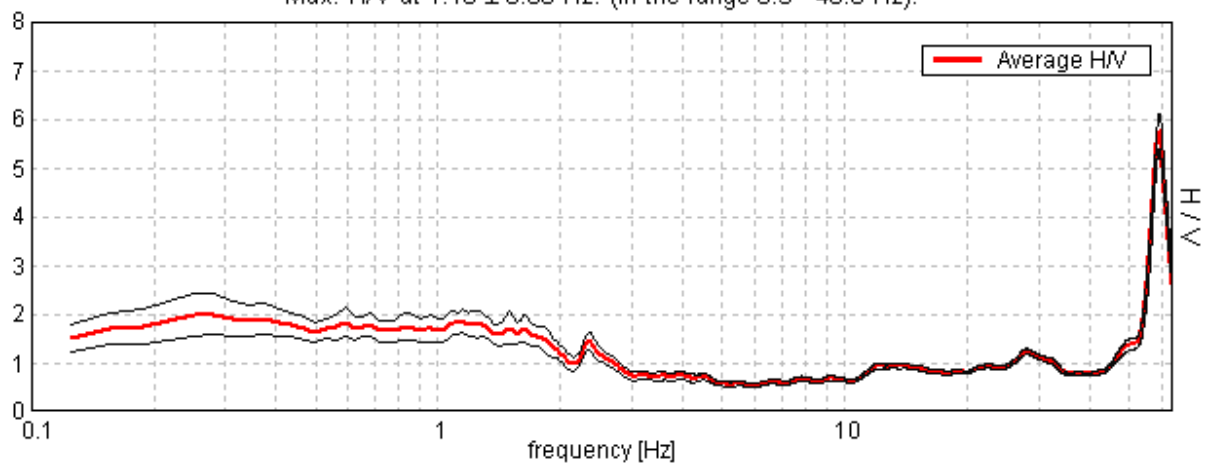
## TRIVELSICILIA PALERMO, PALERMO 0074

Start recording: 08/05/14 12:59:14      End recording: 08/05/14 13:29:15  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

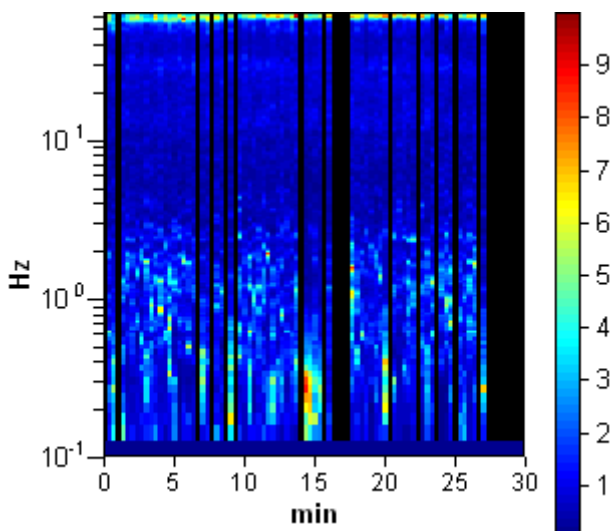
Trace length: 0h30'00".      Analyzed 72% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

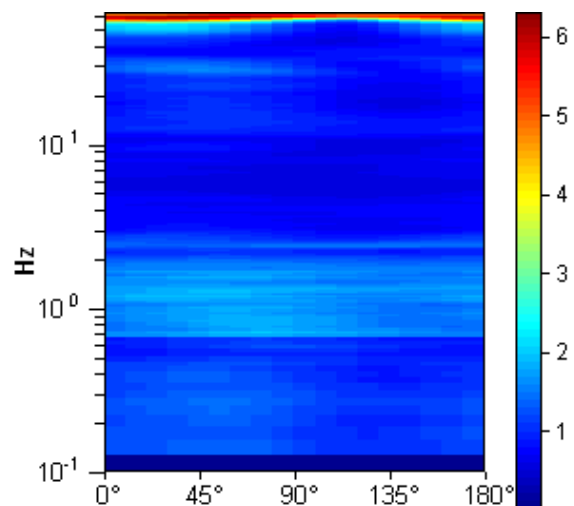
Max. H/V at  $1.16 \pm 0.08$  Hz. (In the range 0.5 - 40.0 Hz).



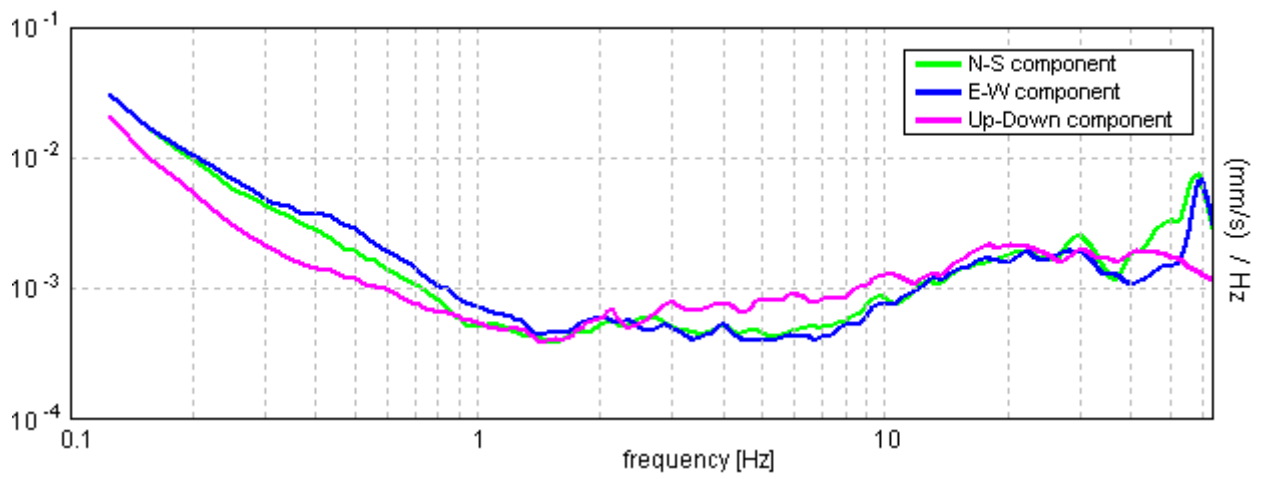
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.16 ± 0.08 Hz. (in the range 0.5 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.16 > 0.50	OK	
$n_c(f_0) > 200$	1503.1 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 56 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.781 Hz	OK	
$A_0 > 2$	1.87 > 2		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03422  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.03957 < 0.11563$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1194 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

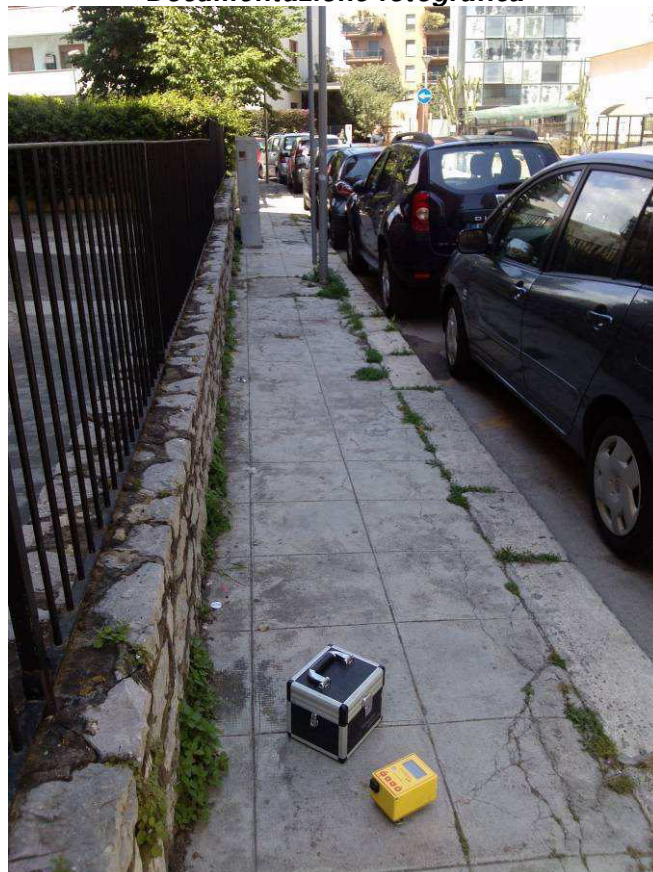


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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0075			
<b>Coordinate</b>	UTM	4223074.00	N	354360.00	E
	Gauss Boaga	4223072.491	N	2374355.012	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		08/05/2014, 13:35			
<b>Nome file</b>		0075			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>Si</b>		
		<b>Altro</b>	<b>No</b>		

**Documentazione fotografica**



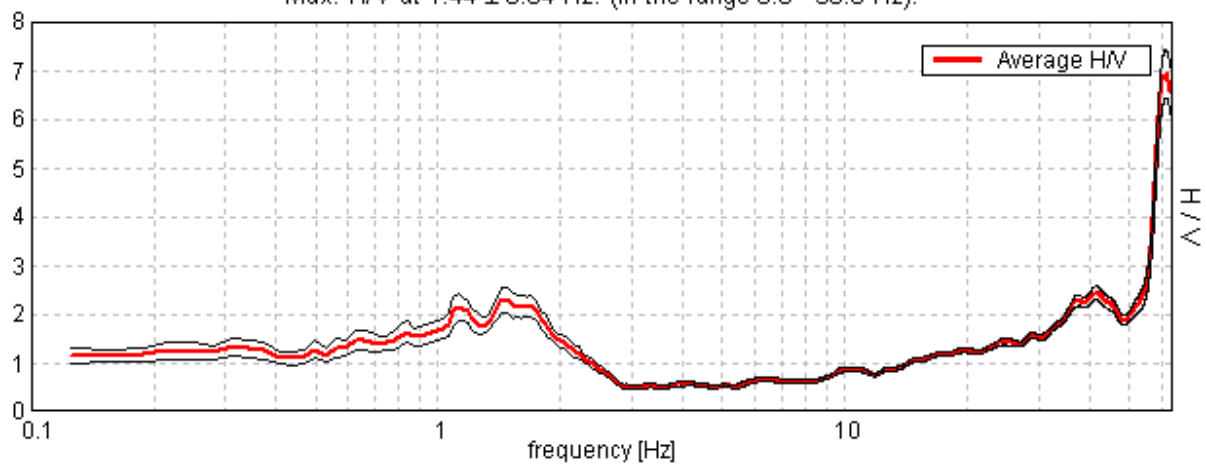
## TRIVELSICILIA PALERMO, PALERMO 0075

Start recording: 08/05/14 13:36:32      End recording: 08/05/14 14:06:33  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

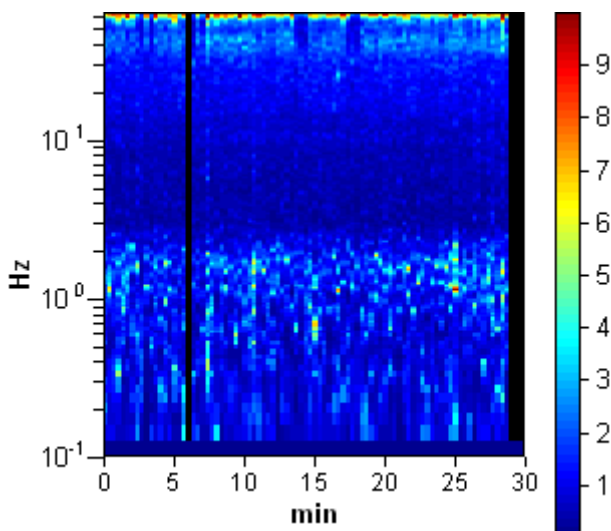
Trace length: 0h30'00".      Analyzed 96% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

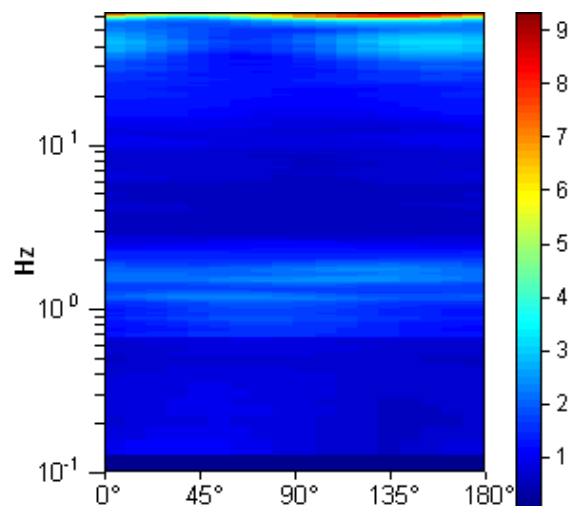
Max. H/V at  $1.44 \pm 0.04$  Hz. (In the range 0.0 - 30.0 Hz).



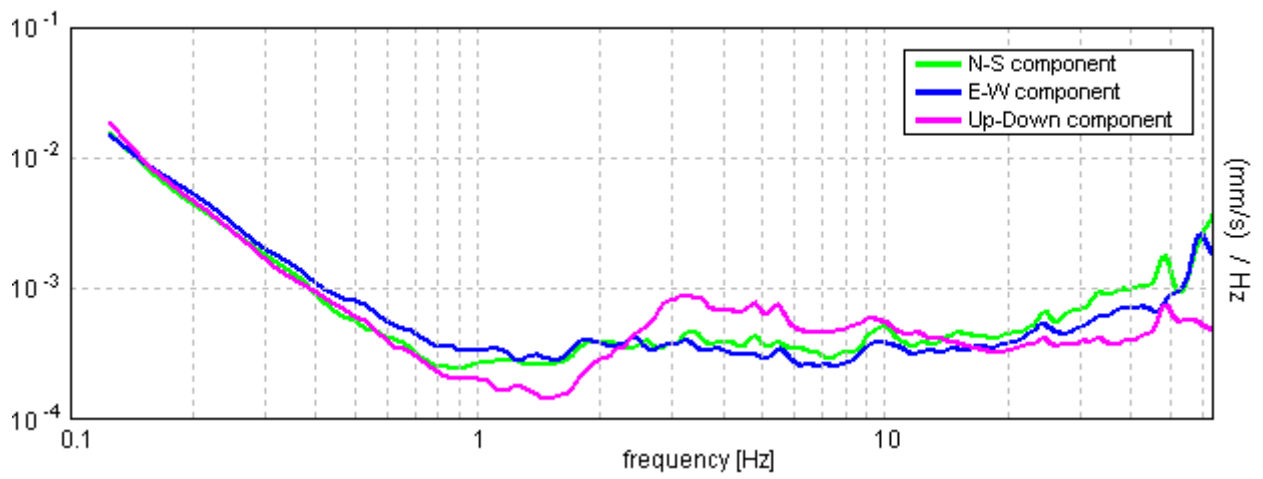
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.44 ± 0.04 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.44 > 0.50	OK	
$n_c(f_0) > 200$	2472.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 70 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.469 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.281 Hz	OK	
$A_0 > 2$	2.29 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01397  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.02008 < 0.14375	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1281 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

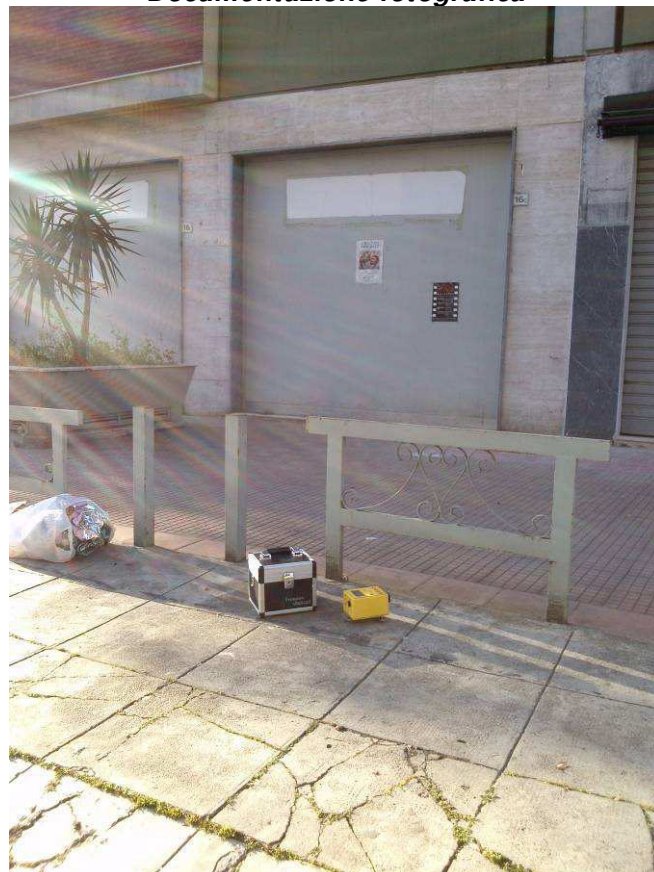


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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0076			
<b>Coordinate</b>	<i>UTM</i>	4222670.00	N	354360.00	E
	<i>Gauss Boaga</i>	4222668.474	N	2374354.998	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		08/05/2014, 07:35			
<b>Nome file</b>		0076			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

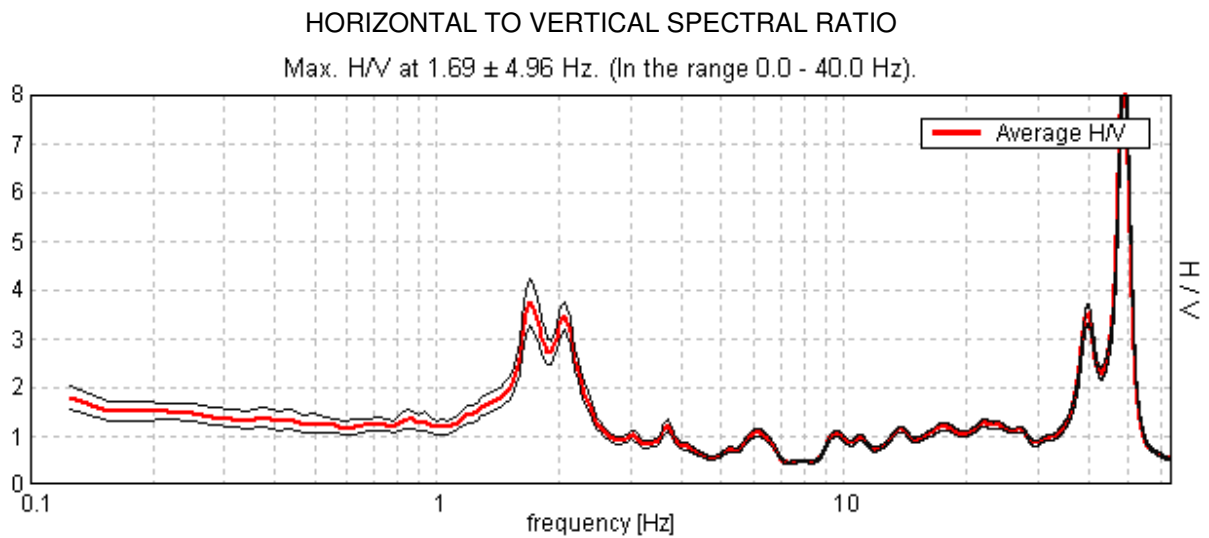
**Documentazione fotografica**



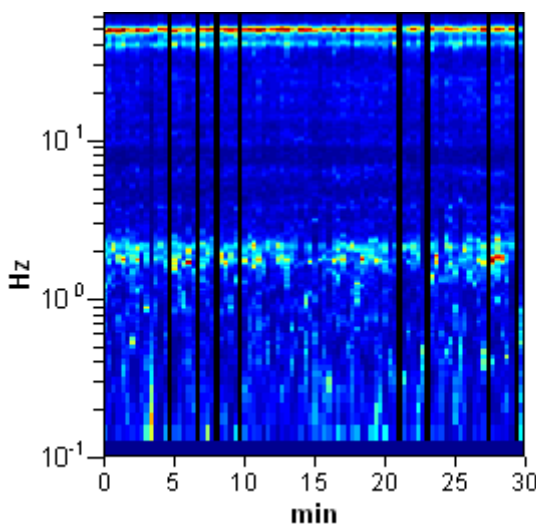
## TRIVELSICILIA PALERMO, PALERMO 0076

Start recording: 08/05/14 07:36:05      End recording: 08/05/14 08:06:06  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

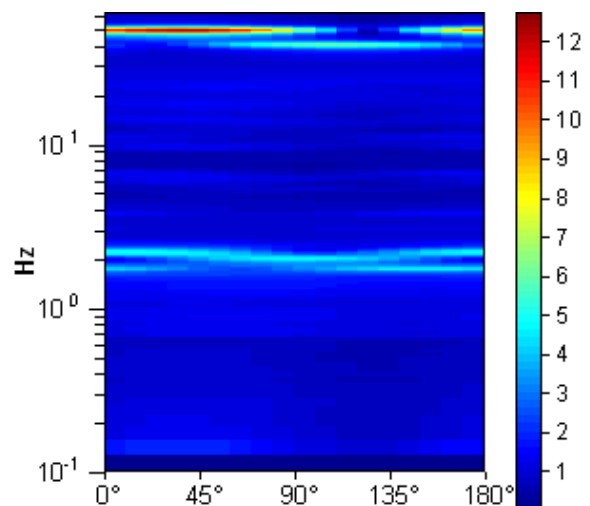
Trace length: 0h30'00".      Analyzed 91% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



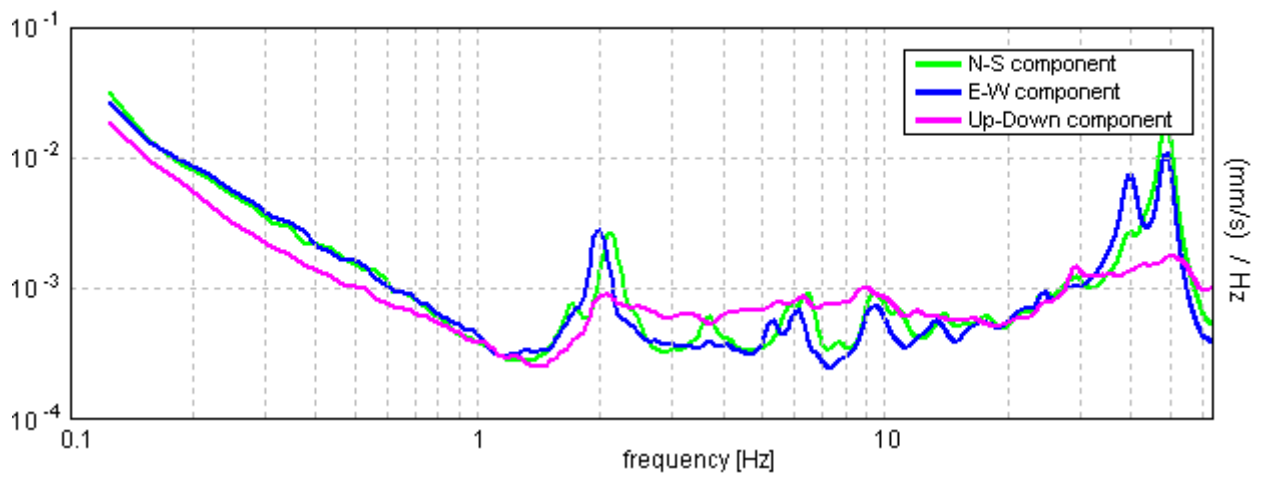
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.69 ± 4.96 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.69 > 0.50	OK	
$n_c(f_0) > 200$	2767.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 82 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	1.469 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.313 Hz	OK	
$A_0 > 2$	3.75 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 1.46688  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	2.47536 < 0.16875		NO
$\sigma_A(f_0) < \theta(f_0)$	0.2337 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0077				
<b>Coordinate</b>	<i>UTM</i>	4222671.00	N	354761.00	E
	<i>Gauss Boaga</i>	4222668.479	N	2374756.017	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	08/05/2014, 08:15				
<b>Nome file</b>	0077				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



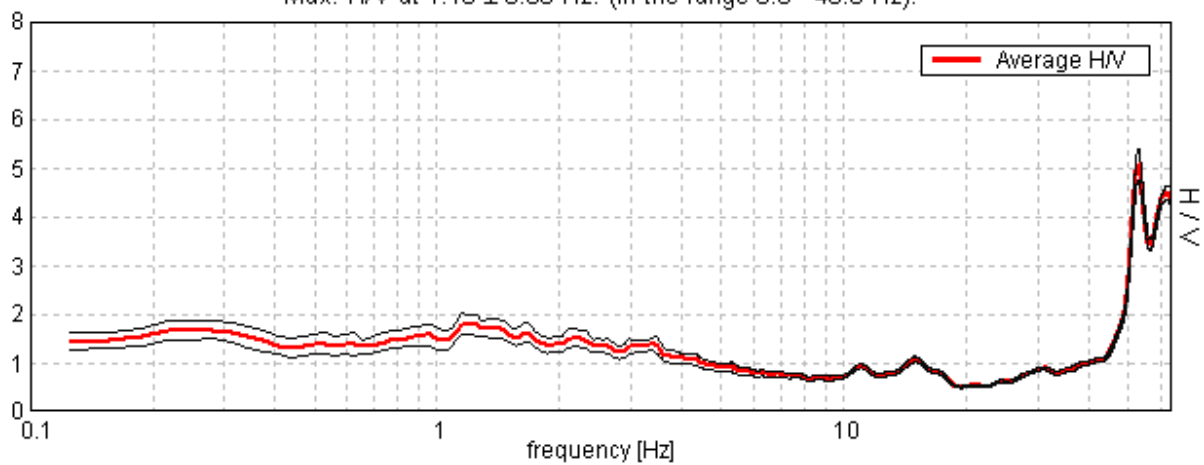
## TRIVELSICILIA PALERMO, PALERMO 0077

Start recording: 08/05/14 08:16:25      End recording: 08/05/14 08:46:26  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

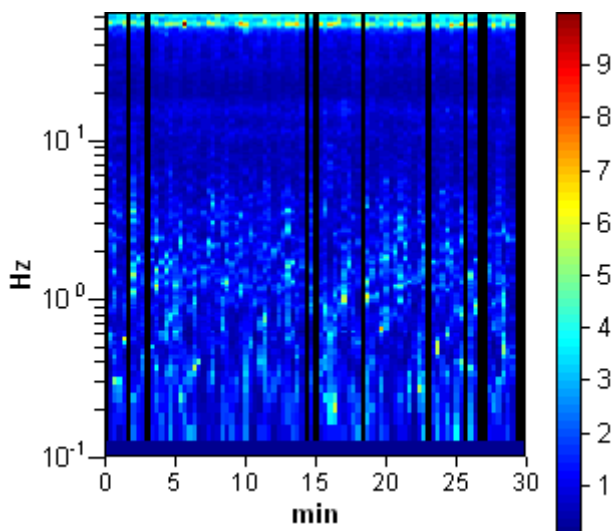
Trace length: 0h30'00".      Analyzed 87% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

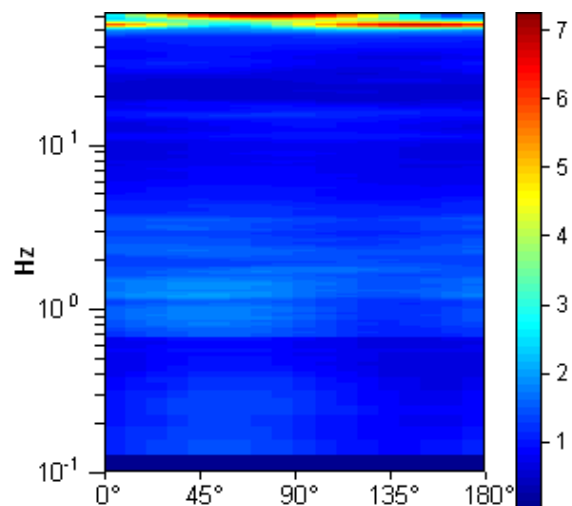
Max. H/V at  $1.16 \pm 0.06$  Hz. (In the range 0.0 - 40.0 Hz).



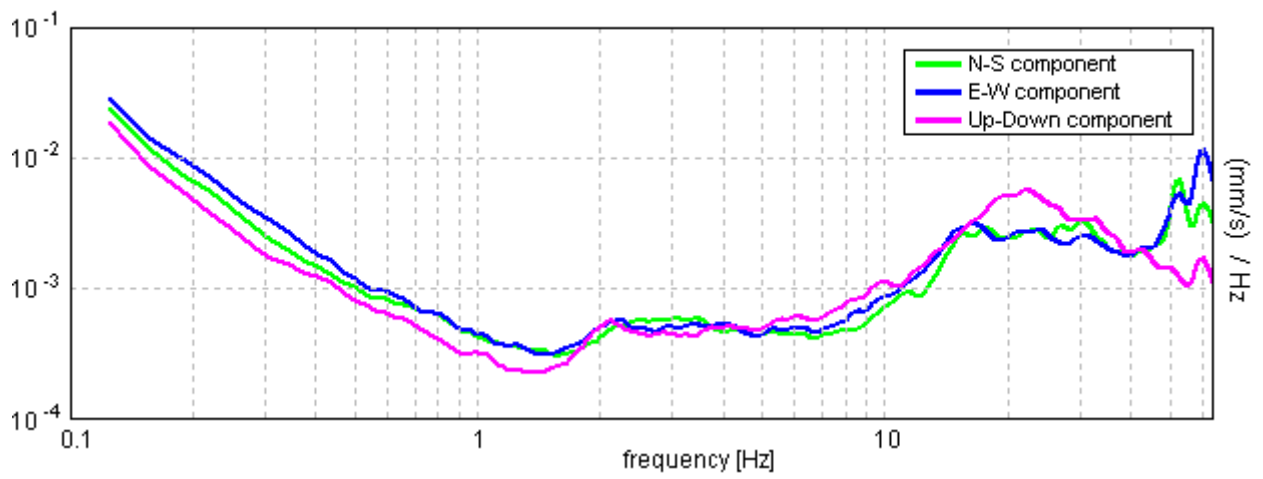
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $1.16 \pm 0.06$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.16 > 0.50$	OK	
$n_c(f_0) > 200$	$1803.8 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 56 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$1.80 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02688  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.03108 < 0.11563$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1124 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

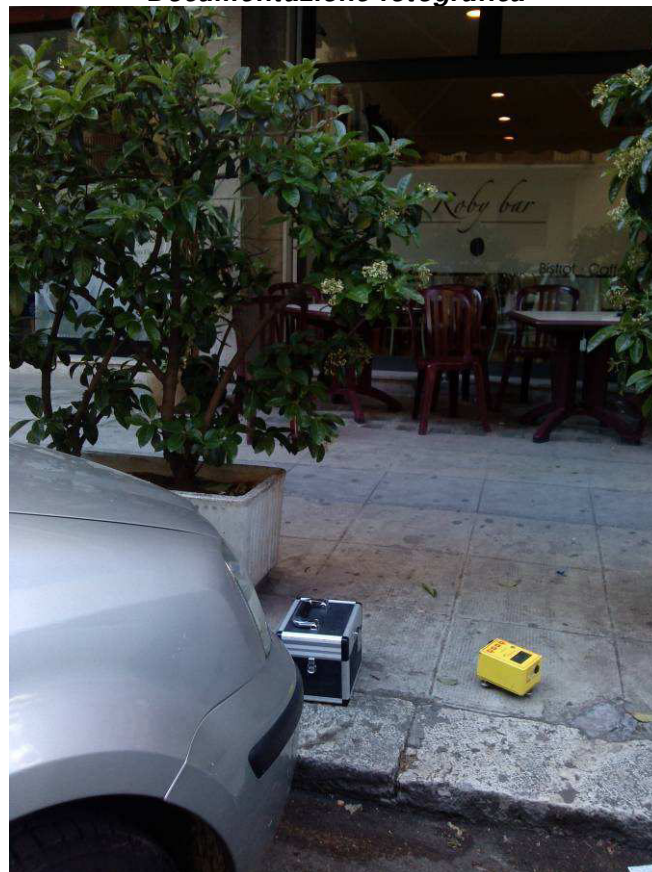


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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0078			
<b>Coordinate</b>	UTM	4222672.00	N	355161.00	E
	Gauss Boaga	4222670.484	N	2375156.036	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		08/05/2014, 08:50			
<b>Nome file</b>		0078			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



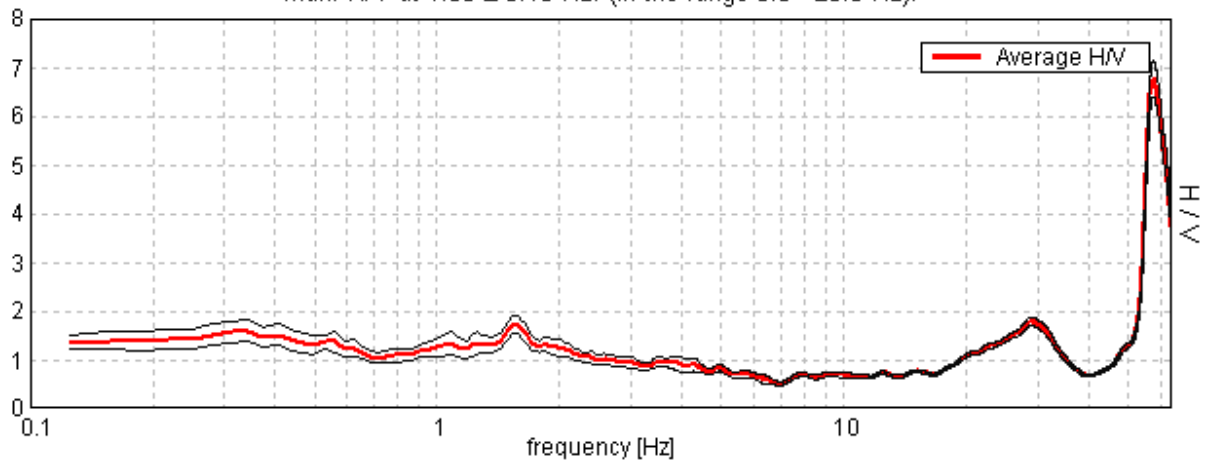
## TRIVELSICILIA PALERMO, PALERMO 0078

Start recording: 08/05/14 08:51:39      End recording: 08/05/14 09:21:40  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

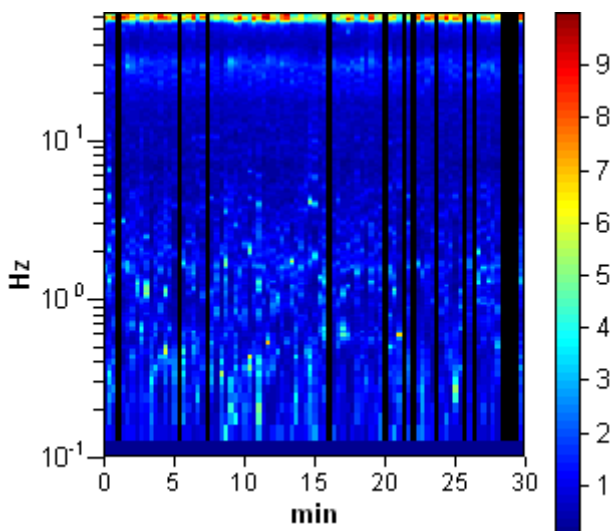
Trace length: 0h30'00".      Analyzed 84% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

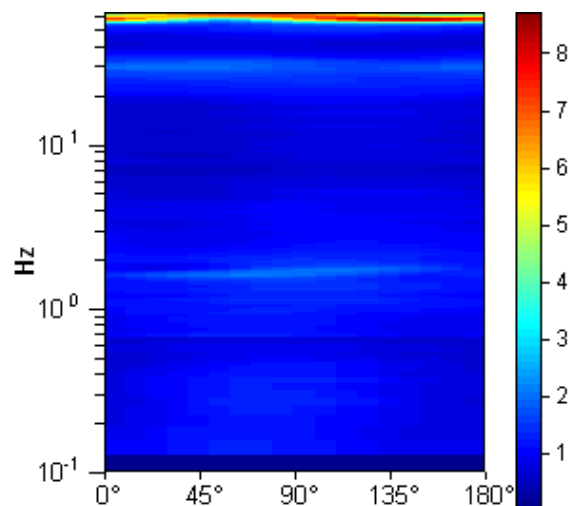
Max. H/V at  $1.56 \pm 0.18$  Hz. (In the range 0.0 - 20.0 Hz).



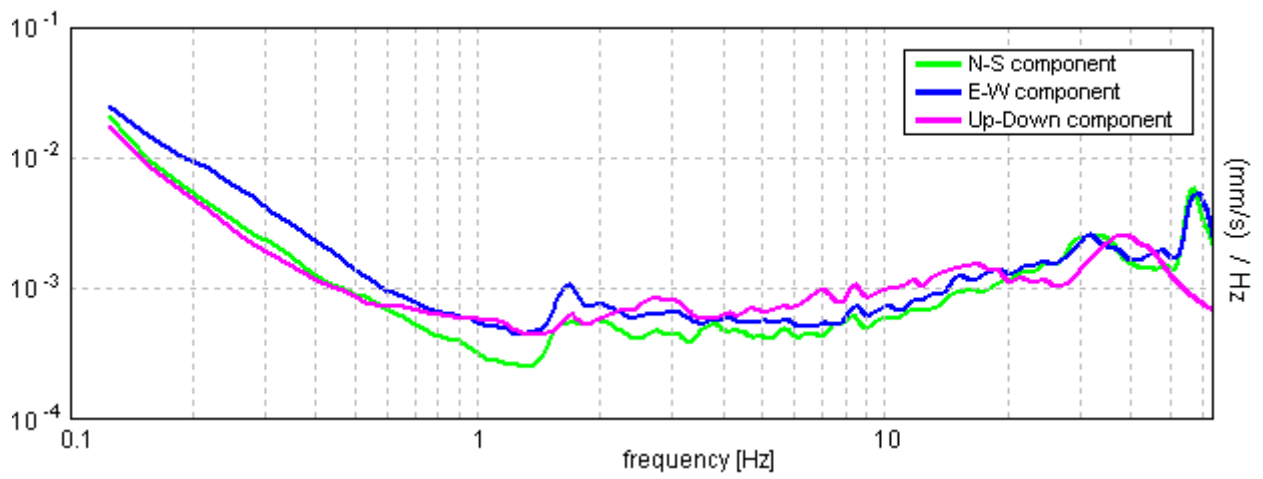
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.56 ± 0.18 Hz. (in the range 0.0 - 20.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.56 > 0.50	OK	
$n_c(f_0) > 200$	2375.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 76 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	3.188 Hz	OK	
$A_0 > 2$	1.72 > 2		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.05802  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	0.09066 < 0.15625	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.0892 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>				
<b>Nome base sismica</b>	0079				
<b>Coordinate</b>	<i>UTM</i>	4222669.34	<i>N</i>	355527.83	<i>E</i>
	<i>Gauss Boaga</i>	4222667.829	<i>N</i>	2375522.883	<i>E</i>
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	08/05/2014, 09:34				
<b>Nome file</b>	0079				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



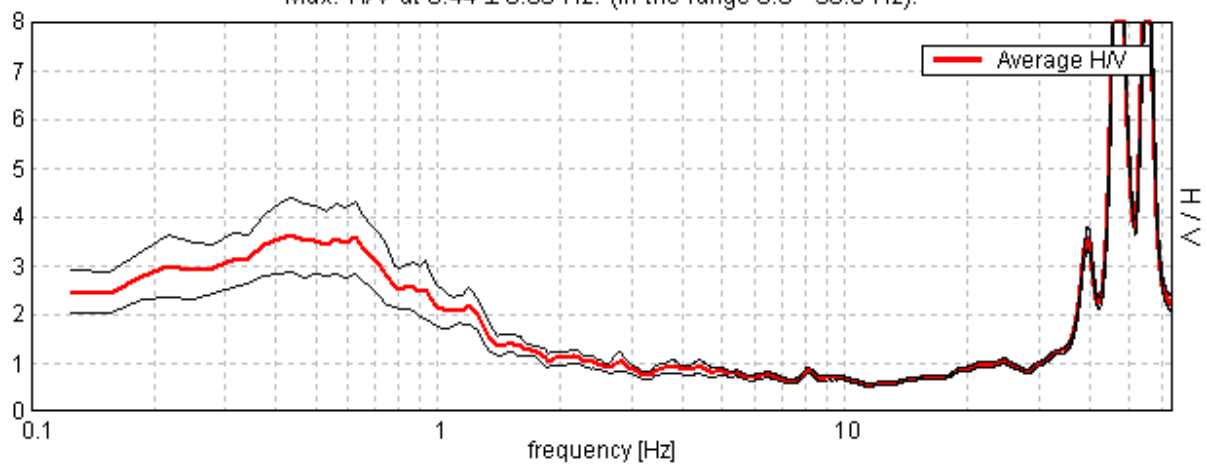
## TRIVELSICILIA PALERMO, PALERMO 0079

Start recording: 08/05/14 09:35:36      End recording: 08/05/14 10:05:37  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

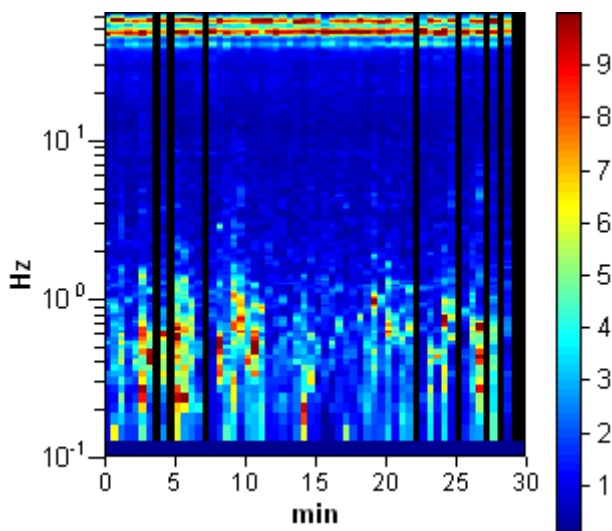
Trace length: 0h30'00".      Analyzed 85% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 30 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

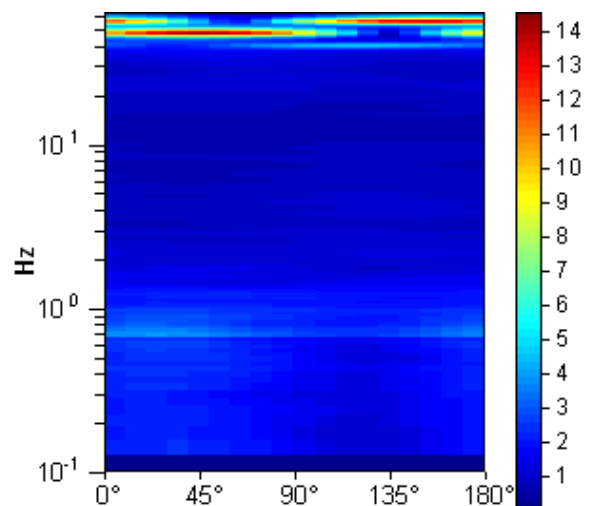
Max. H/V at  $0.44 \pm 0.03$  Hz. (In the range 0.0 - 30.0 Hz).



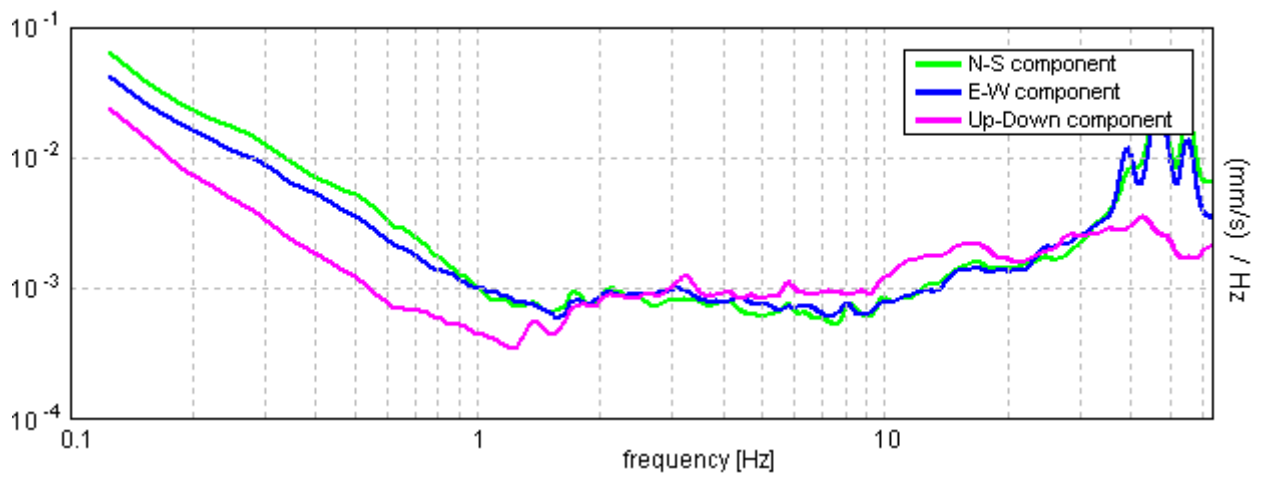
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 0.44 ± 0.03 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.44 > 0.33	OK	
$n_c(f_0) > 200$	669.4 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 22 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.313 Hz	OK	
$A_0 > 2$	3.62 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03178  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.01391 < 0.0875	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.382 < 2.5	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0080			
<b>Coordinate</b>	UTM	4222677.32	N	355946.82	E
	Gauss Boaga	4222675.815	N	2375941.893	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		07/05/2014, 12:03			
<b>Nome file</b>		0080			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



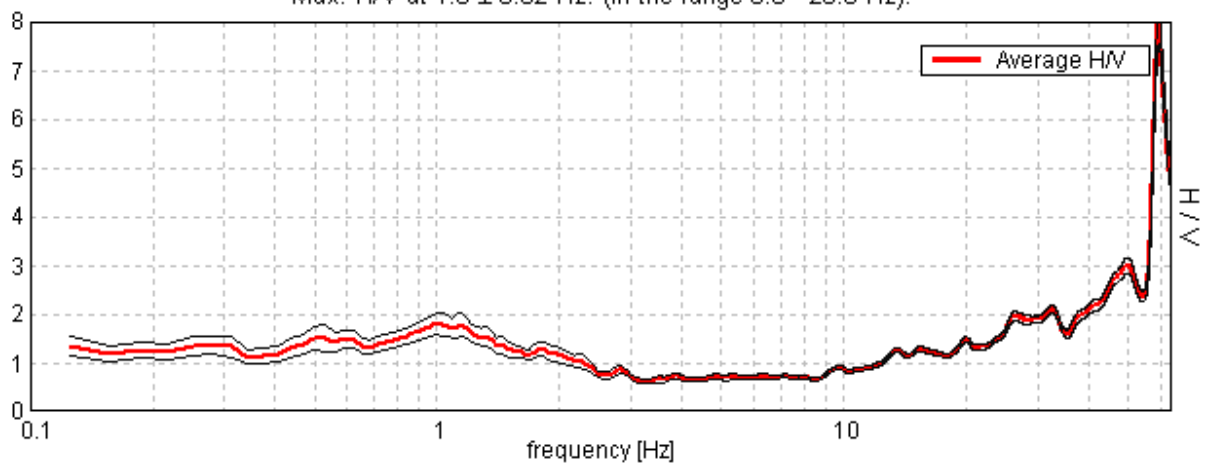
## TRIVELSICILIA PALERMO, PALERMO 0080

Start recording: 07/05/14 12:03:49      End recording: 07/05/14 12:33:50  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

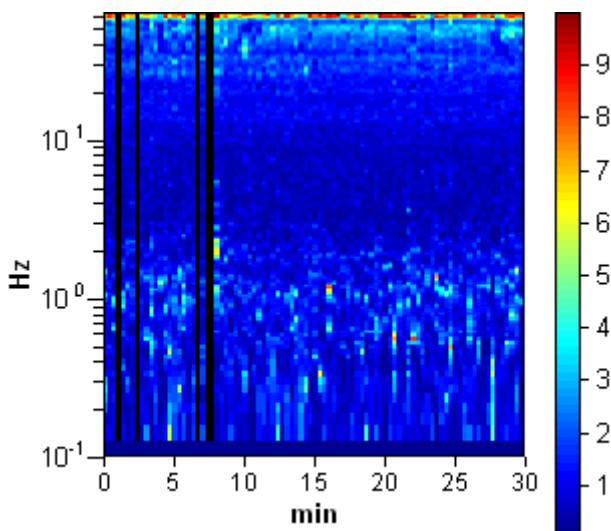
Trace length: 0h30'00".      Analyzed 94% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

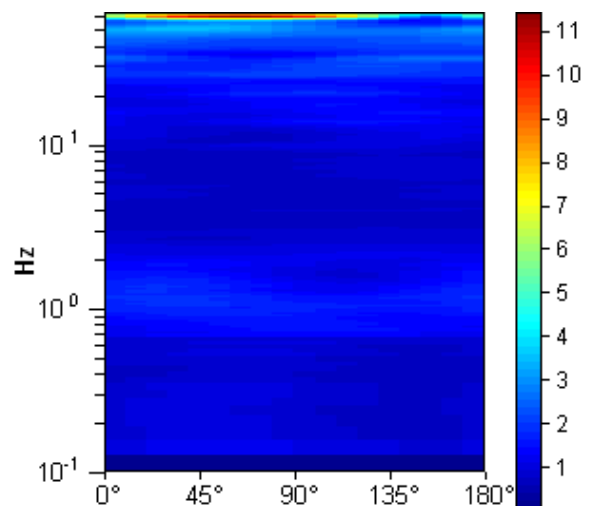
Max. H/V at  $1.0 \pm 0.02$  Hz. (In the range 0.0 - 20.0 Hz).



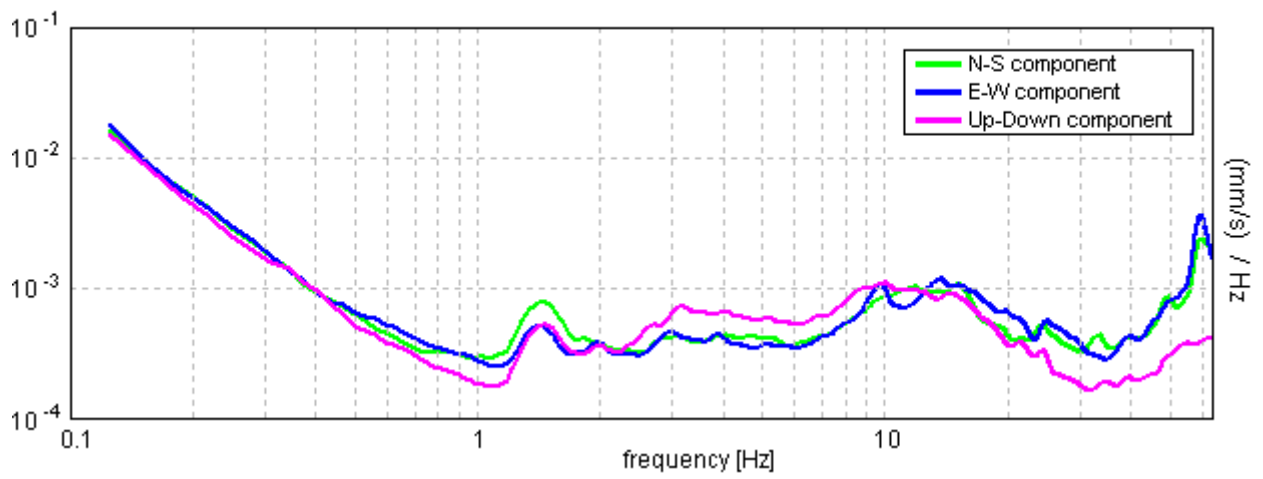
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.0 ± 0.02 Hz. (in the range 0.0 - 20.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.00 > 0.50	OK	
$n_c(f_0) > 200$	1700.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 49 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.406 Hz	OK	
<b><math>A_0 &gt; 2</math></b>	1.80 > 2		<b>NO</b>
<b><math>f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%</math></b>	$ 0.01175  < 0.05$	OK	
<b><math>\sigma_f &lt; \varepsilon(f_0)</math></b>	$0.01175 < 0.1$	OK	
<b><math>\sigma_A(f_0) &lt; \theta(f_0)</math></b>	$0.1026 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0081				
<b>Coordinate</b>	<i>UTM</i>	4222691.74	N	356351.31	E
	<i>Gauss Boaga</i>	4222690.240	N	2376346.402	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	07/05/2014, 12:44				
<b>Nome file</b>	0081				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



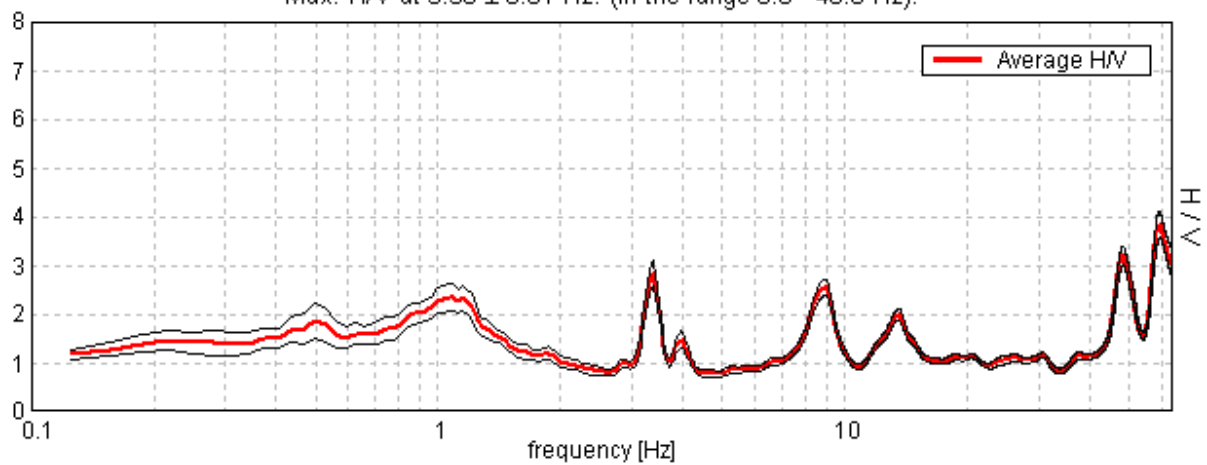
## TRIVELSICILIA PALERMO, PALERMO 0081

Start recording: 07/05/14 12:45:07      End recording: 07/05/14 13:15:08  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

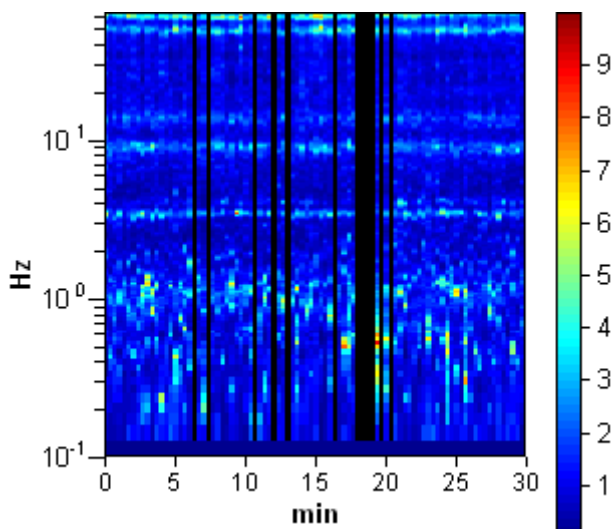
Trace length: 0h30'00".      Analyzed 87% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

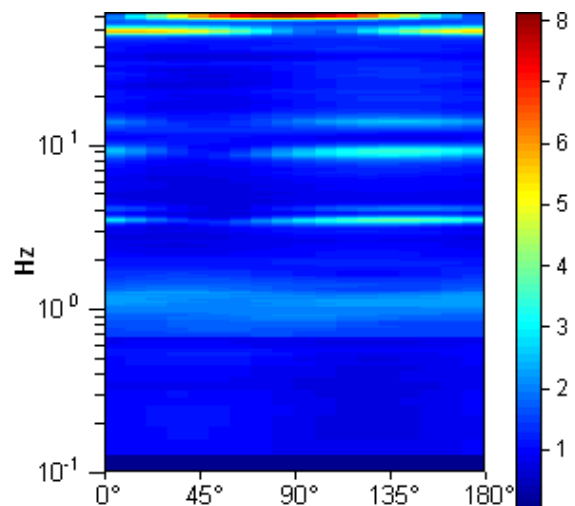
Max. H/V at  $3.38 \pm 0.01$  Hz. (In the range 0.0 - 40.0 Hz).



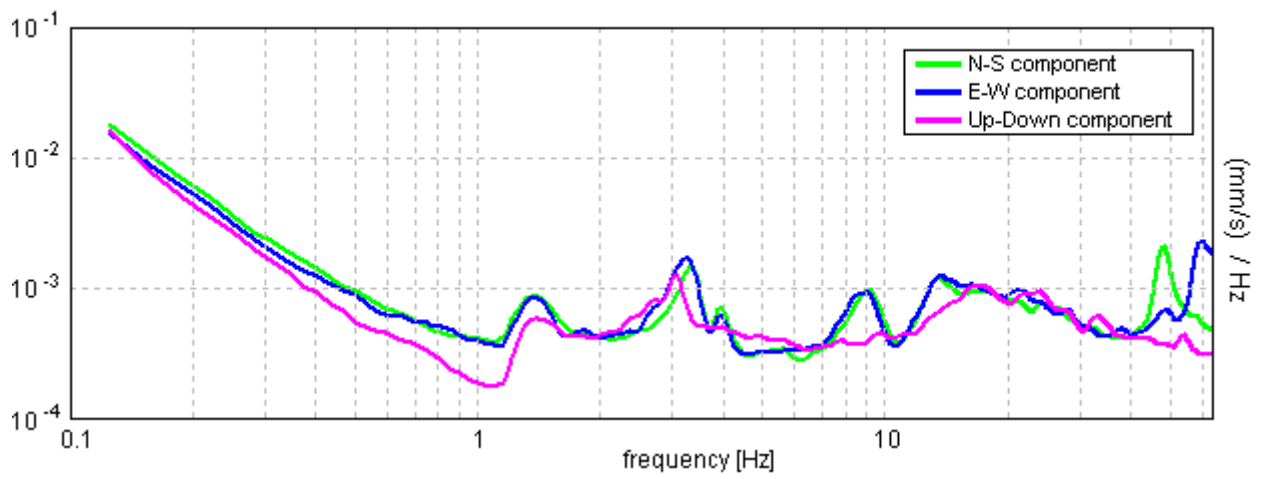
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 3.38 ± 0.01 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	3.38 > 0.50	OK	
$n_c(f_0) > 200$	5265.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 163 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	3.125 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	3.594 Hz	OK	
$A_0 > 2$	2.84 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00083  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.0028 < 0.16875$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1278 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

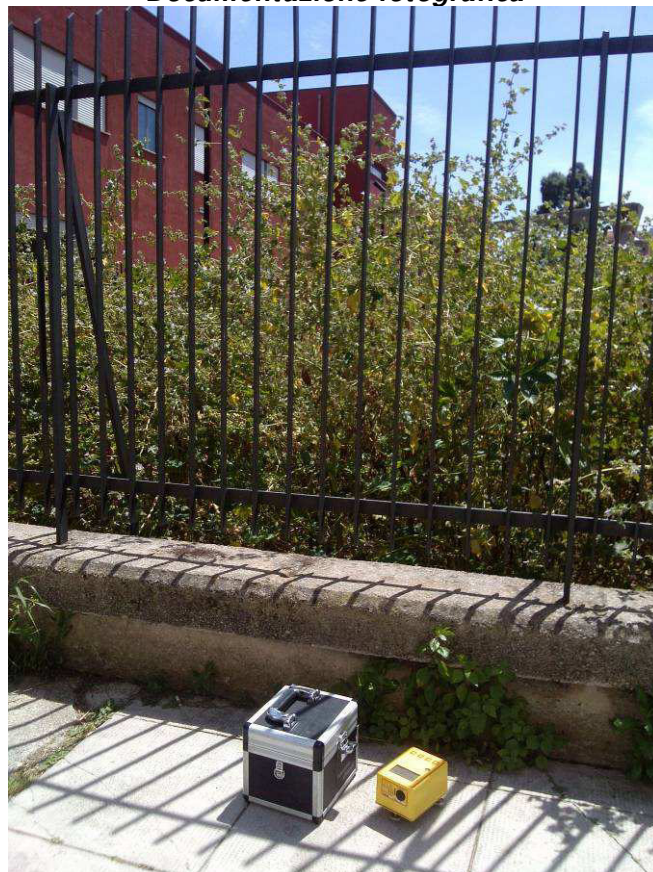


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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0082			
<b>Coordinate</b>	UTM	4222645.96	N	356674.38	E
	Gauss Boaga	4222644.463	N	2376669.486	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		07/05/2014, 13:22			
<b>Nome file</b>		0082			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



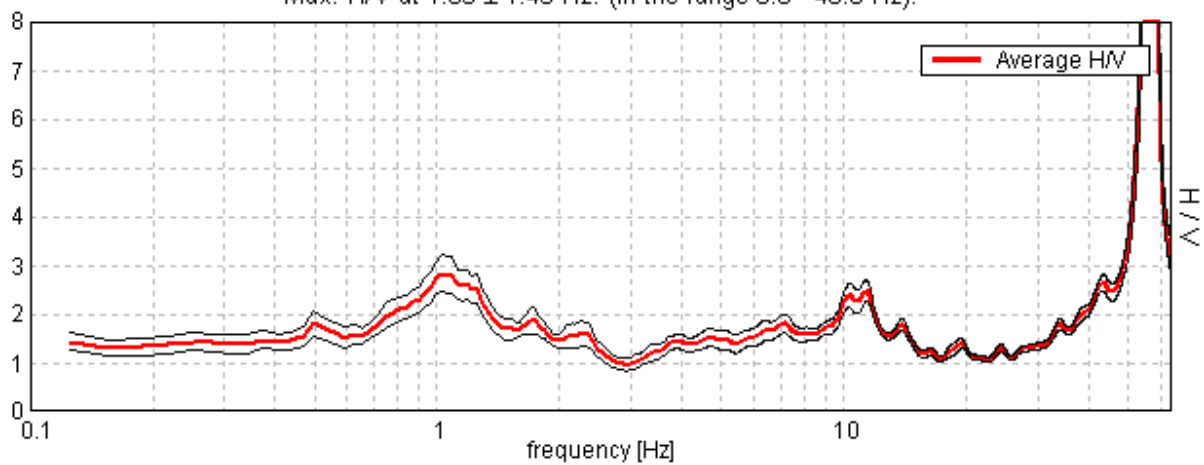
## TRIVELSICILIA PALERMO, PALERMO 0082

Start recording: 07/05/14 13:22:29      End recording: 07/05/14 13:52:30  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

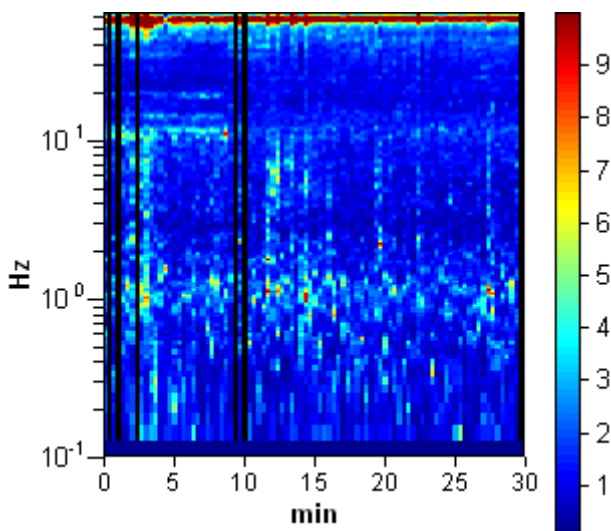
Trace length: 0h30'00".      Analyzed 93% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

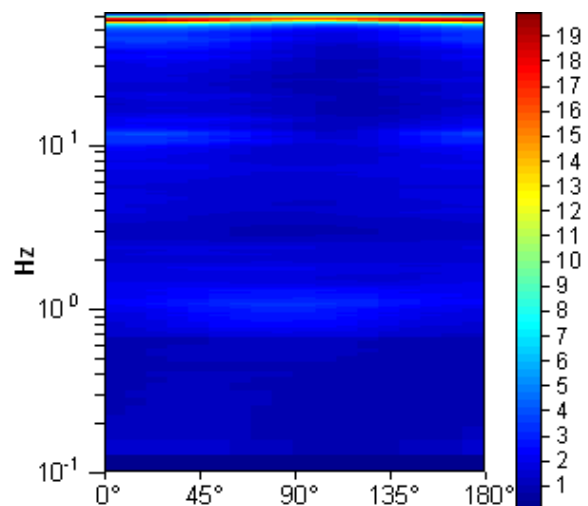
Max. H/V at  $1.03 \pm 1.43$  Hz. (In the range 0.0 - 40.0 Hz).



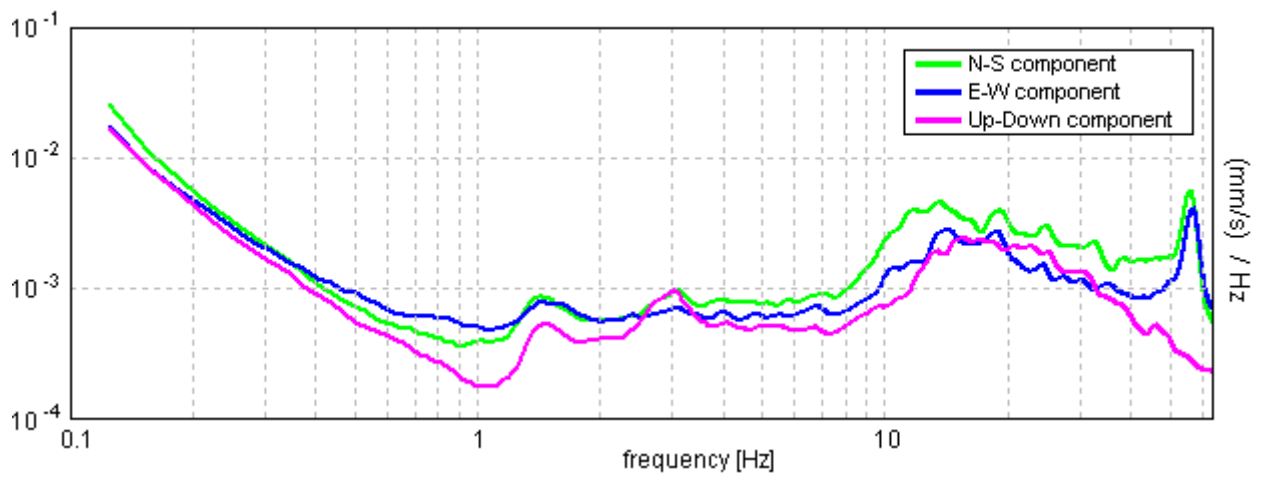
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.03 ± 1.43 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.03 > 0.50	OK	
$n_c(f_0) > 200$	1732.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 50 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.406 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.438 Hz	OK	
$A_0 > 2$	2.84 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.69473  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.71644 < 0.10313$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.1865 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0083			
<b>Coordinate</b>	UTM	4222264.00	N	356761.00	E
	Gauss Boaga	4222262.488	N	2376756.097	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		08/05/2014, 10:44			
<b>Nome file</b>		0083			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



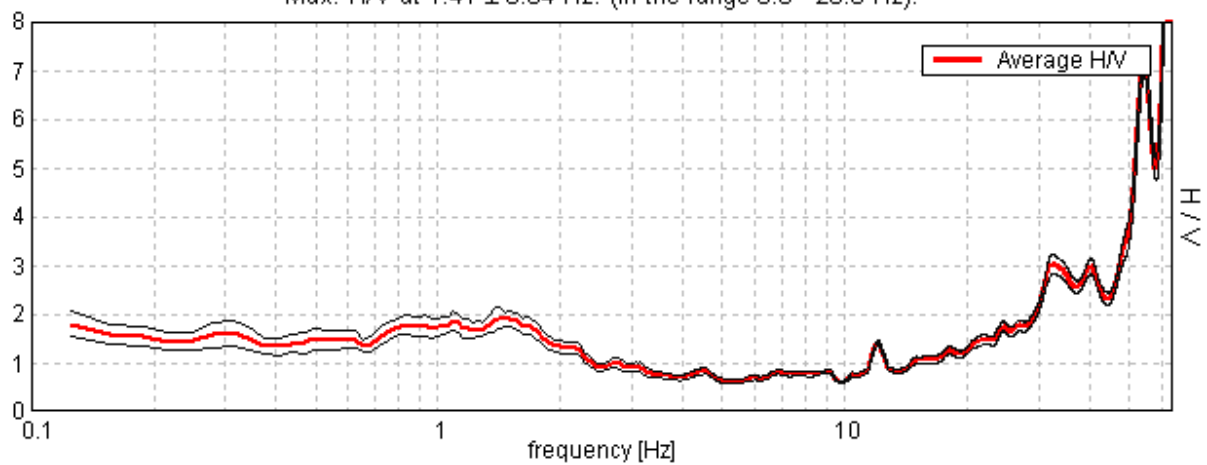
### TRIVELSICILIA PALERMO, PALERMO 0083

Start recording: 08/05/14 10:15:27      End recording: 08/05/14 10:45:28  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

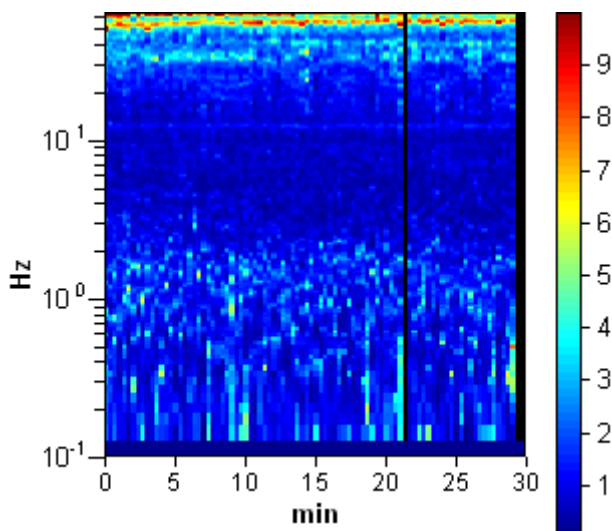
Trace length: 0h30'00".      Analyzed 97% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

#### HORIZONTAL TO VERTICAL SPECTRAL RATIO

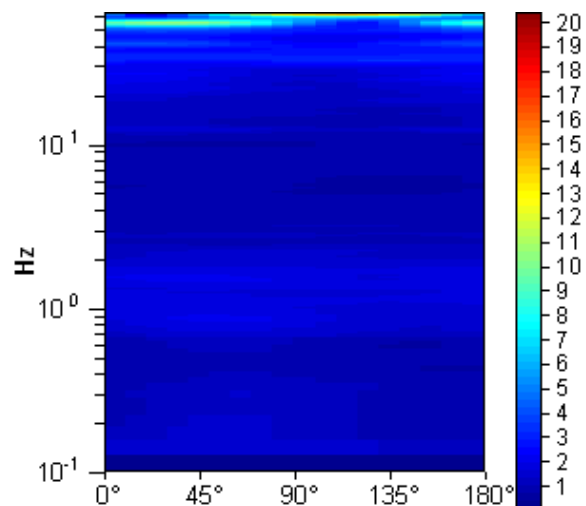
Max. H/V at  $1.41 \pm 0.04$  Hz. (In the range 0.0 - 20.0 Hz).



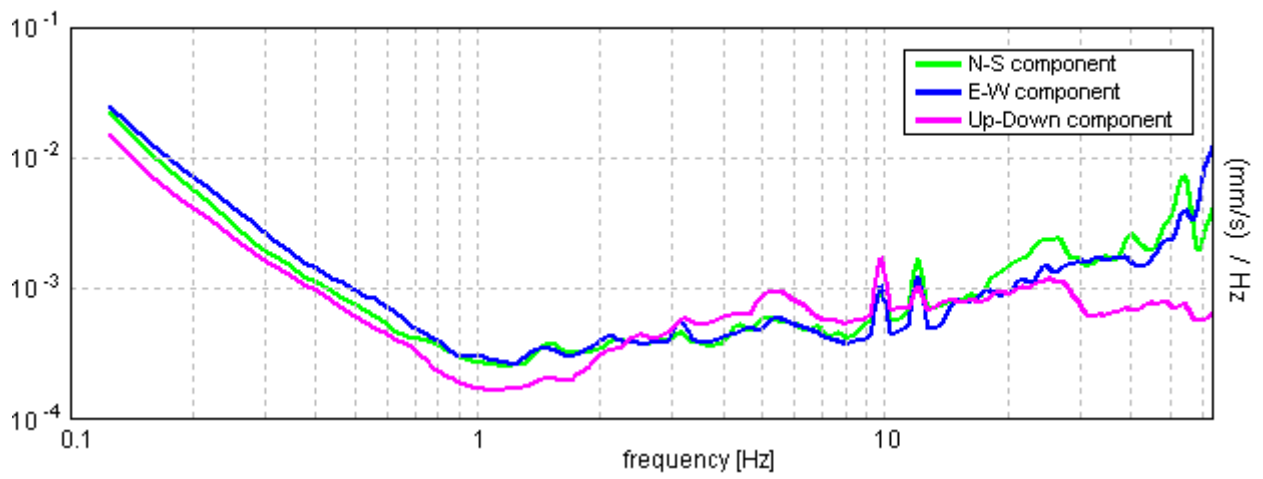
#### H/V TIME HISTORY



#### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.41 ± 0.04 Hz. (in the range 0.0 - 20.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.41 > 0.50	OK	
$n_c(f_0) > 200$	2446.9 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 68 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.438 Hz	OK	
<b><math>A_0 &gt; 2</math></b>	1.91 > 2		<b>NO</b>
<b><math>f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%</math></b>	$ 0.01461  < 0.05$	OK	
<b><math>\sigma_f &lt; \varepsilon(f_0)</math></b>	$0.02055 < 0.14063$	OK	
<b><math>\sigma_A(f_0) &lt; \theta(f_0)</math></b>	$0.1073 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

**Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$**

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0084				
<b>Coordinate</b>	<i>UTM</i>	4222269.16	N	356360.89	E
	<i>Gauss Boaga</i>	4222267.643	N	2376355.968	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	07/05/2014, 15:12				
<b>Nome file</b>	0084				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



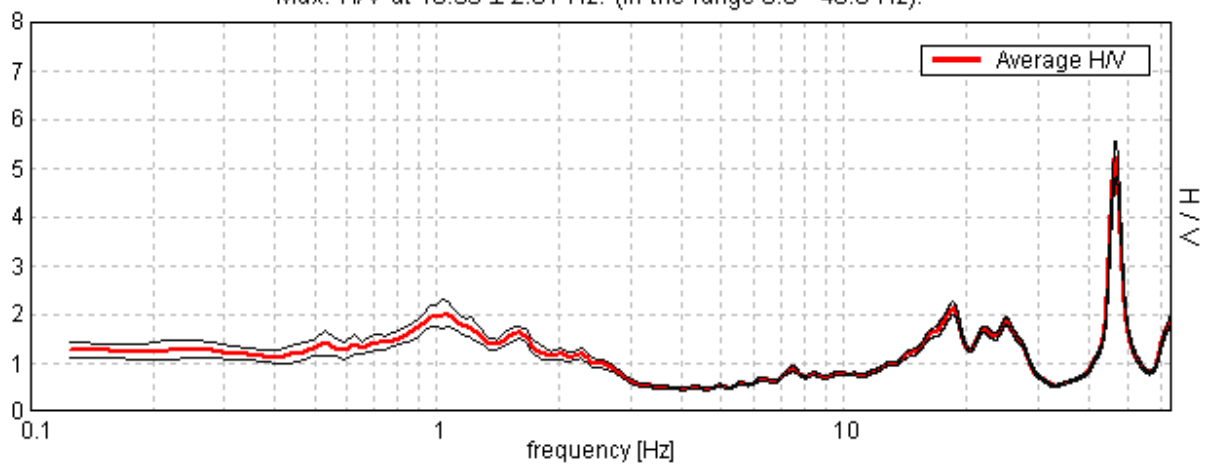
## TRIVELSICILIA PALERMO, PALERMO 0084

Start recording: 07/05/14 15:13:16      End recording: 07/05/14 15:43:17  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

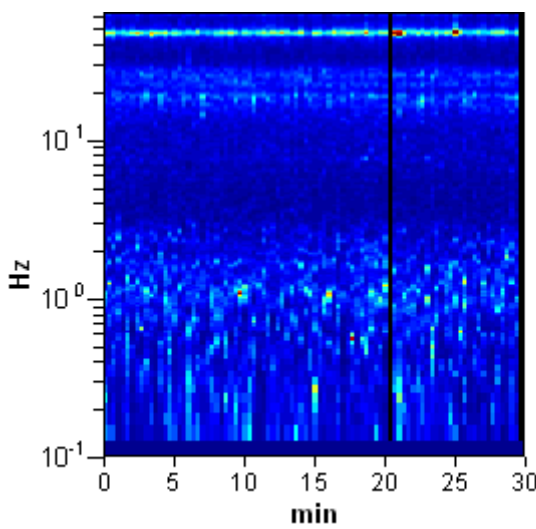
Trace length: 0h30'00".      Analyzed 98% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

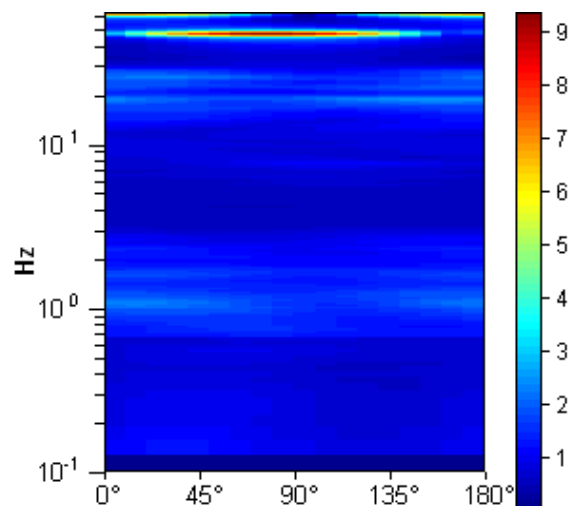
Max. H/V at  $18.53 \pm 2.81$  Hz. (In the range 0.0 - 40.0 Hz).



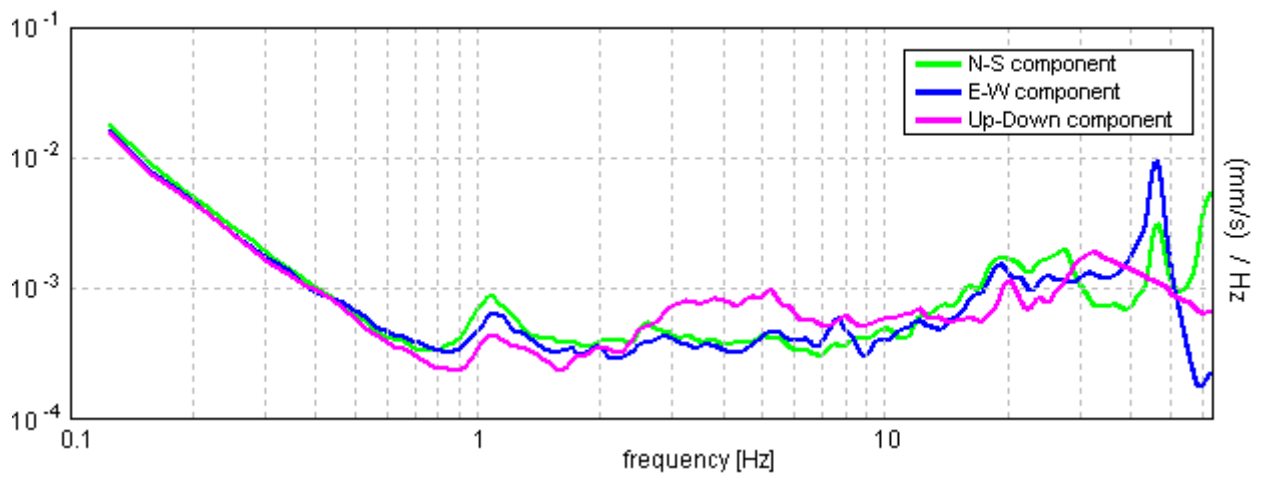
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 18.53 ± 2.81 Hz. (in the range 0.0 - 40.0 Hz).**

<b>Criteria for a reliable HVSR curve</b> [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	18.53 > 0.50	<b>OK</b>	
$n_c(f_0) > 200$	32615.0 > 200	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 890 times	<b>OK</b>	
<b>Criteria for a clear HVSR peak</b> [At least 5 out of 6 should be fulfilled]			
<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	13.813 Hz	<b>OK</b>	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	28.563 Hz	<b>OK</b>	
$A_0 > 2$	2.12 > 2	<b>OK</b>	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.07585  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	1.40562 < 0.92656		<b>NO</b>
$\sigma_A(f_0) < \theta(f_0)$	0.066 < 1.58	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for $\sigma_f$ and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0085			
<b>Coordinate</b>	<i>UTM</i>	4222266.54	N	355985.81	E
	<i>Gauss Boaga</i>	4222265.018	N	2375980.870	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		08/05/2014, 10:53			
<b>Nome file</b>		0085			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>No</b>	
	<b>Pedoni</b>			<b>No</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



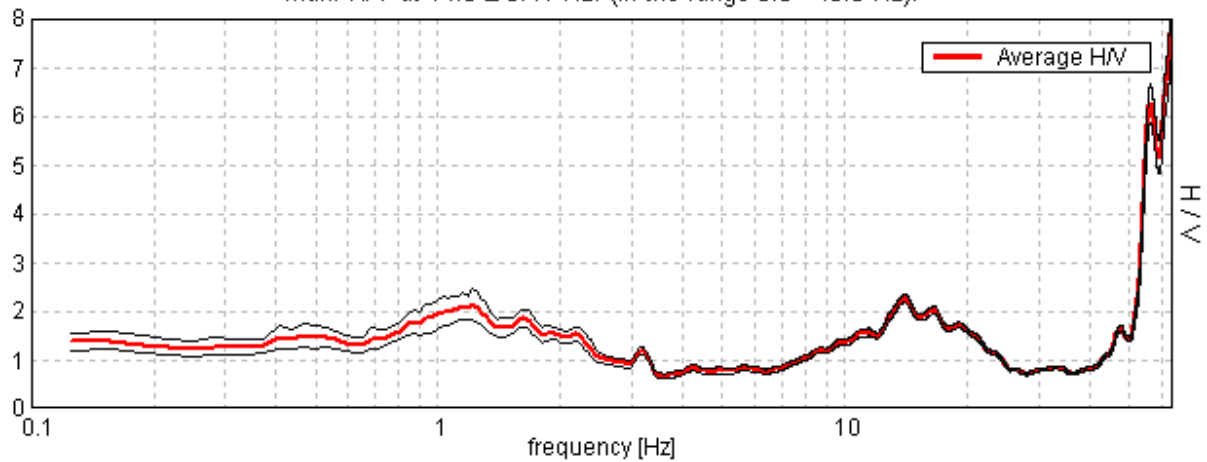
## TRIVELSICILIA PALERMO, PALERMO 0085

Start recording: 08/05/14 10:53:51      End recording: 08/05/14 11:23:52  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

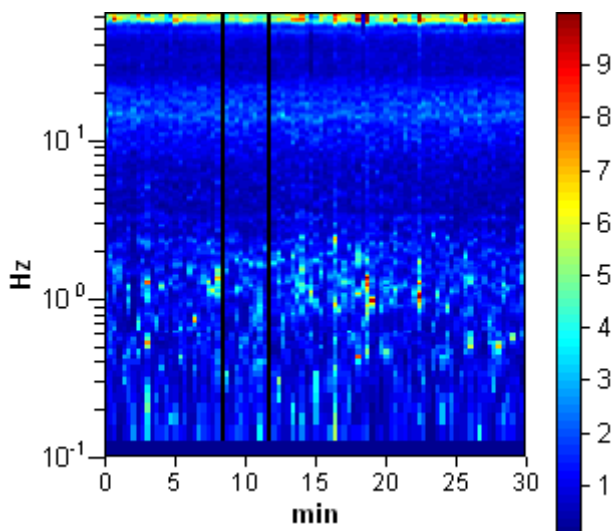
Trace length: 0h30'00".      Analyzed 98% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

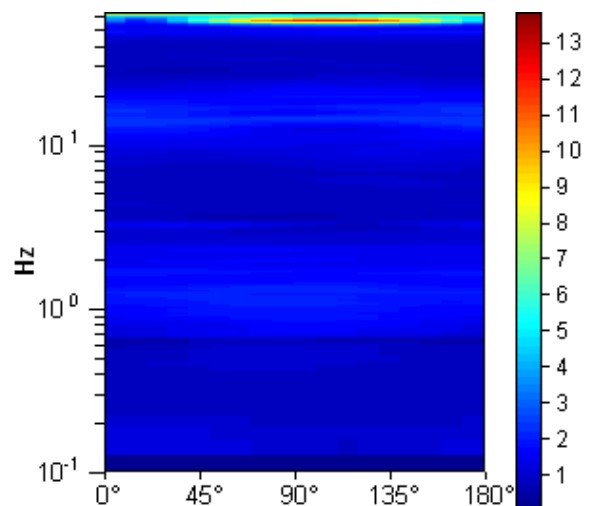
Max. H/V at  $14.0 \pm 0.41$  Hz. (In the range 0.0 - 40.0 Hz).



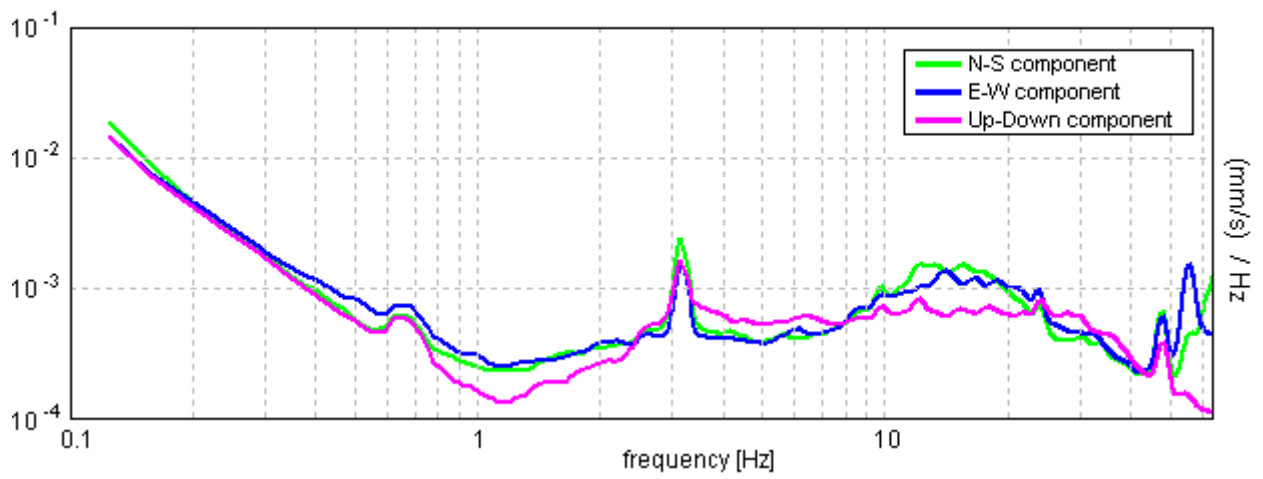
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 14.0 ± 0.41 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	14.00 > 0.50	OK	
$n_c(f_0) > 200$	24640.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 673 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	8.344 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	23.375 Hz	OK	
$A_0 > 2$	2.26 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01475  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.2065 < 0.7	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.0418 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0086			
<b>Coordinate</b>	UTM	4222264.73	N	355566.91	E
	Gauss Boaga	4222263.203	N	2375561.951	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		09/05/2014, 14:11			
<b>Nome file</b>		0086			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



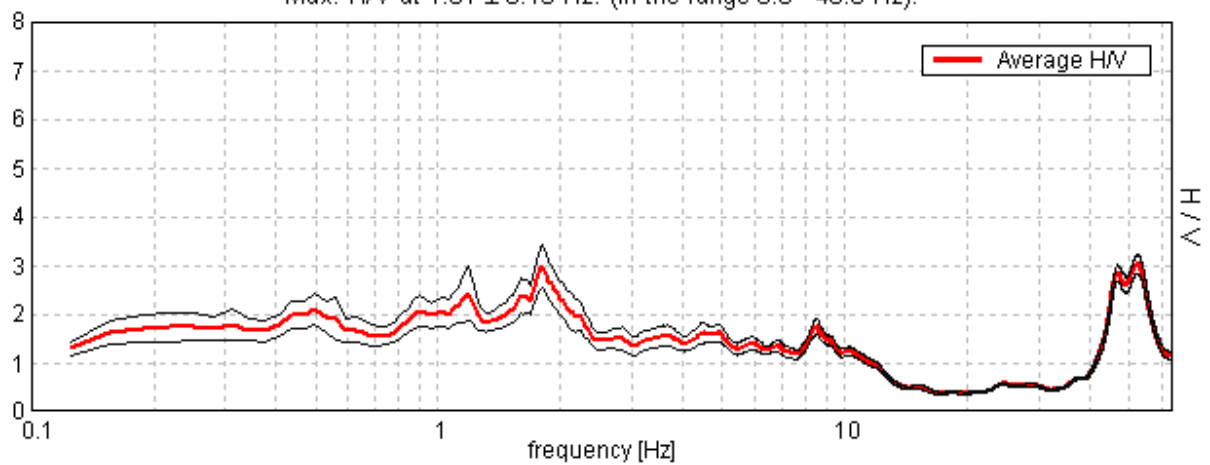
## TRIVELSICILIA PALERMO, PALERMO 0086

Start recording: 09/05/14 14:11:59      End recording: 09/05/14 14:42:00  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

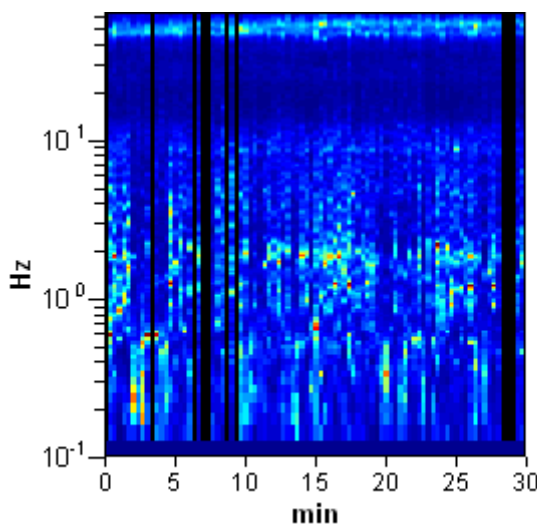
Trace length: 0h30'00".      Analyzed 89% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

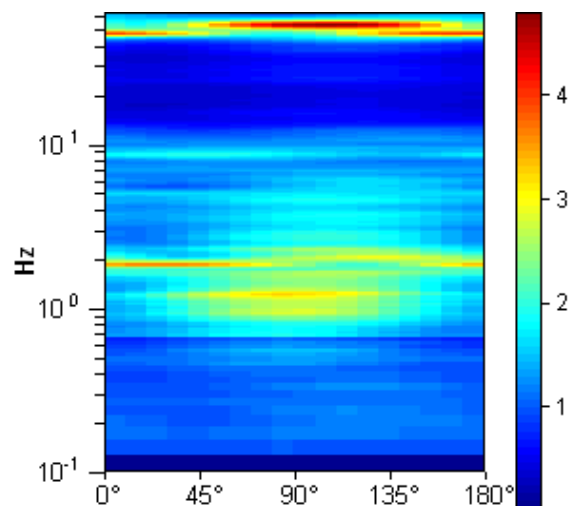
Max. H/V at  $1.81 \pm 0.13$  Hz. (In the range 0.0 - 40.0 Hz).



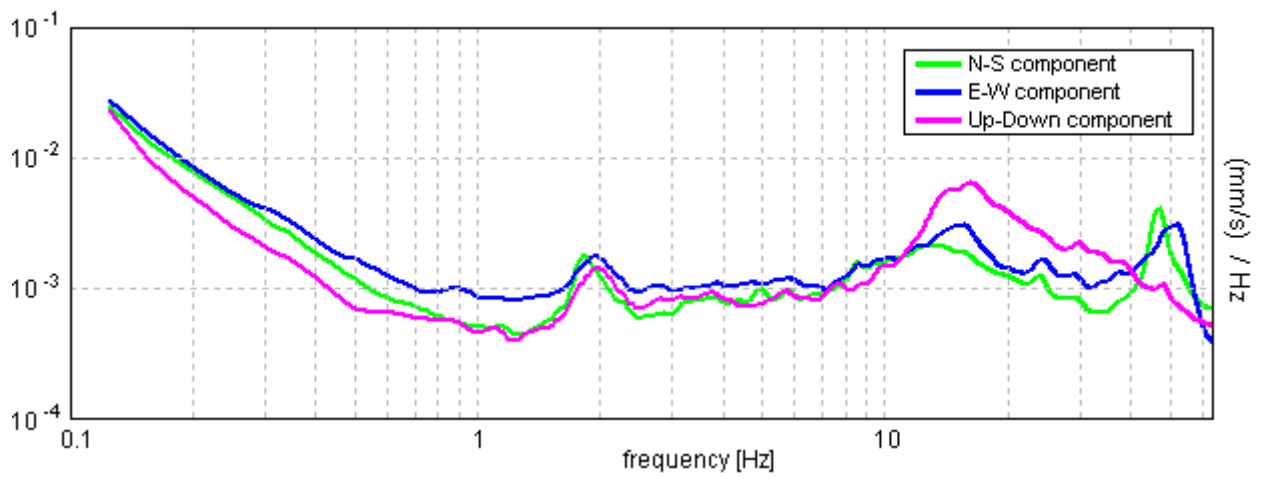
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.81 ± 0.13 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.81 > 0.50	OK	
$n_c(f_0) > 200$	2900.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 88 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.438 Hz	OK	
$A_0 > 2$	2.98 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03658  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.0663 < 0.18125$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2232 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0087				
<b>Coordinate</b>	<i>UTM</i>	4222412.68	N	355140.56	E
	<i>Gauss Boaga</i>	4222411.153	N	2375135.586	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	09/05/2014, 09:53				
<b>Nome file</b>	0087				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

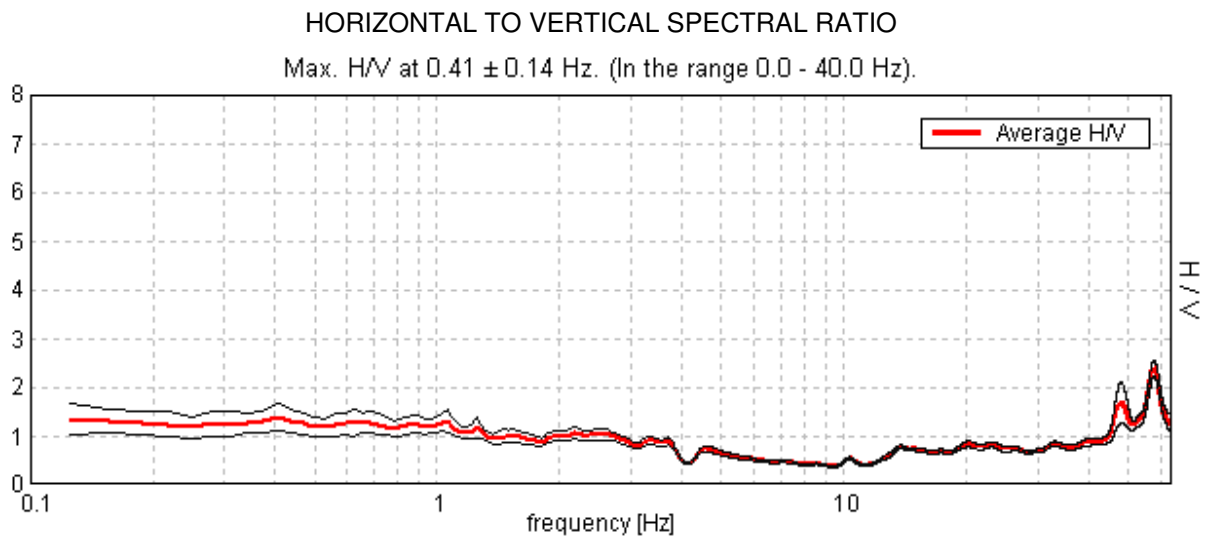
**Documentazione fotografica**



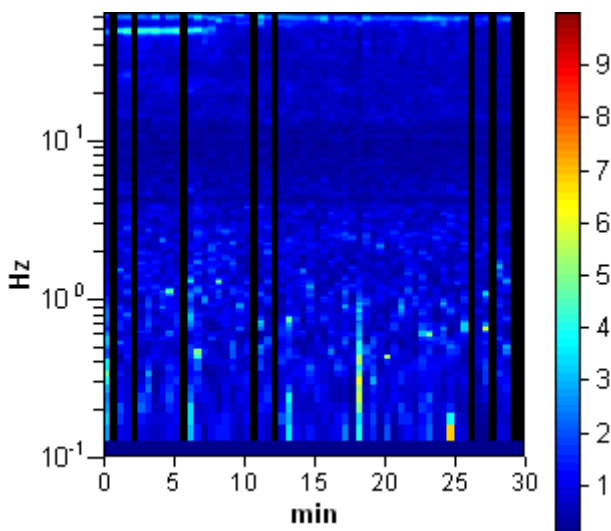
## TRIVELSICILIA PALERMO, PALERMO 0087

Start recording: 09/05/14 09:55:58      End recording: 09/05/14 10:25:59  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

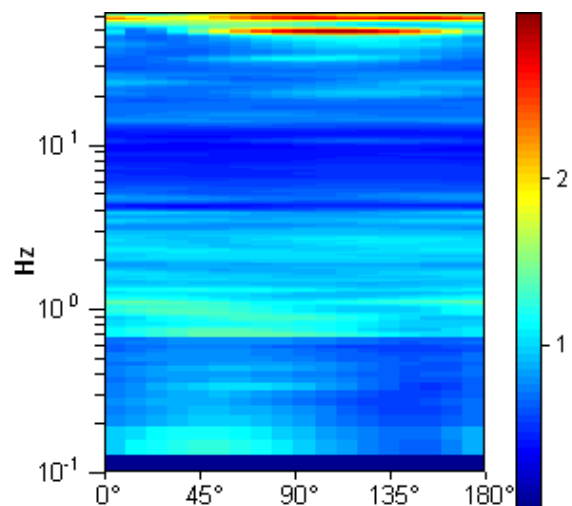
Trace length: 0h30'00".      Analyzed 85% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 30 s  
Smoothing window: Triangular window  
Smoothing: 5%



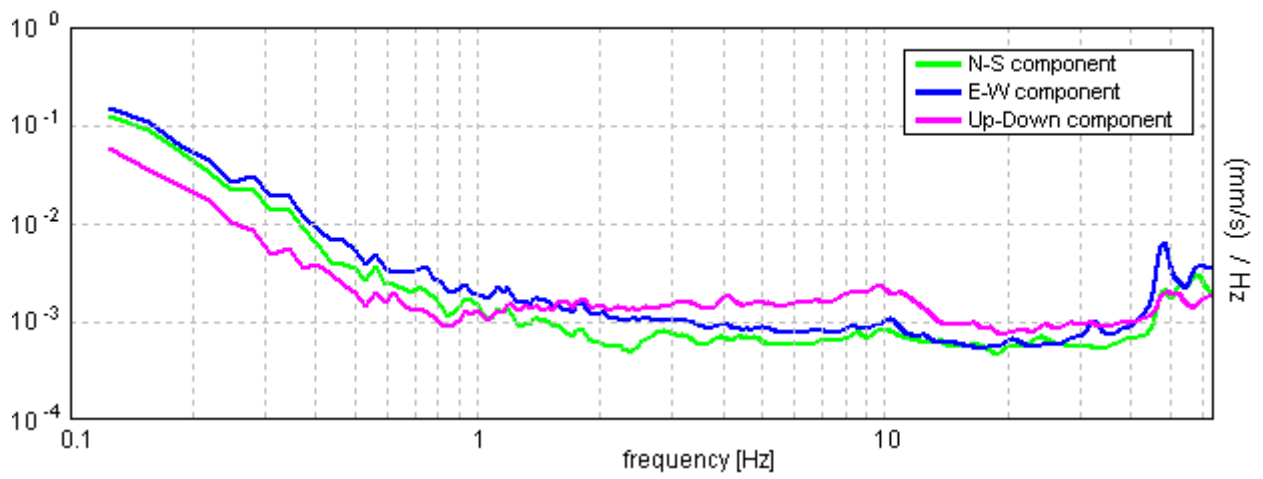
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $0.41 \pm 0.14$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.41 > 0.33$	OK	
$n_c(f_0) > 200$	$621.6 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 20 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.094 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$1.38 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.1683  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.06837 < 0.08125$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1427 < 2.5$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

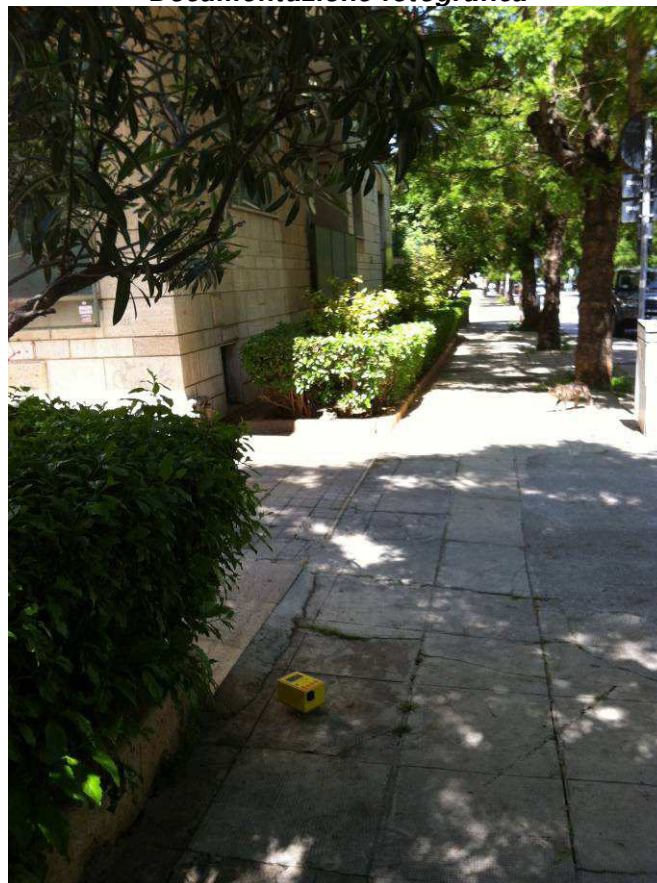


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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>	<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>			
<b>Nome base sismica</b>	0088			
<b>Coordinate</b>	<i>UTM</i>	4222297.62	<i>N</i>	354758.98 <i>E</i>
	<i>Gauss Boaga</i>	4222296.084	<i>N</i>	2374753.984 <i>E</i>
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®			
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>	09/05/2014, 14:54			
<b>Nome file</b>	0088			
<b>Durata</b>	30 min			
<b>Frequenza campionamento</b>	128 Hz			
<b>Accoppiamento strumento-suolo</b>	Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>		
	<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>		
	<b>Pedoni</b>	<b>Si</b>		
	<b>Altro</b>	<b>No</b>		

**Documentazione fotografica**



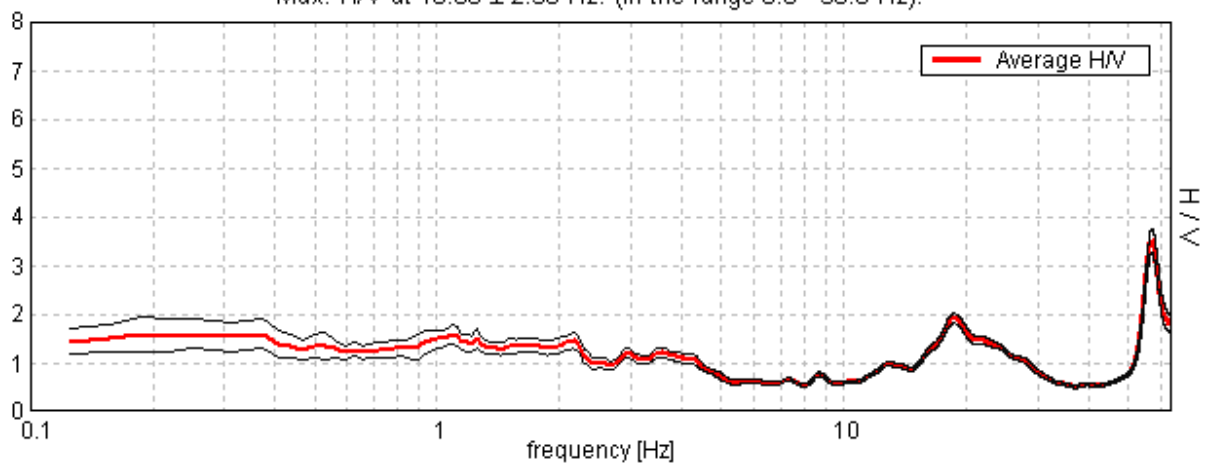
## TRIVELSICILIA PALERMO, PALERMO 0088

Start recording: 09/05/14 14:54:30      End recording: 09/05/14 15:24:31  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

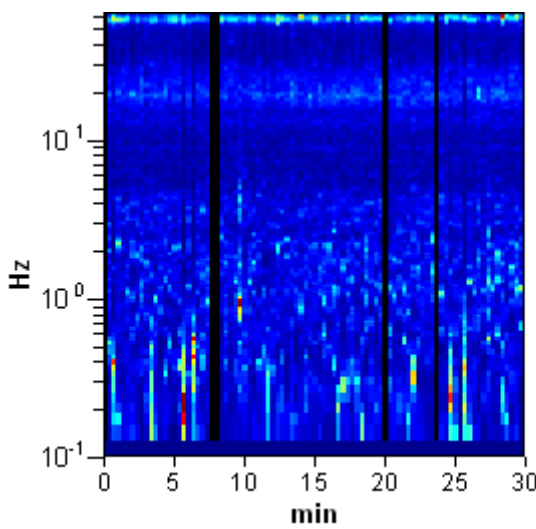
Trace length: 0h30'00".      Analyzed 94% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

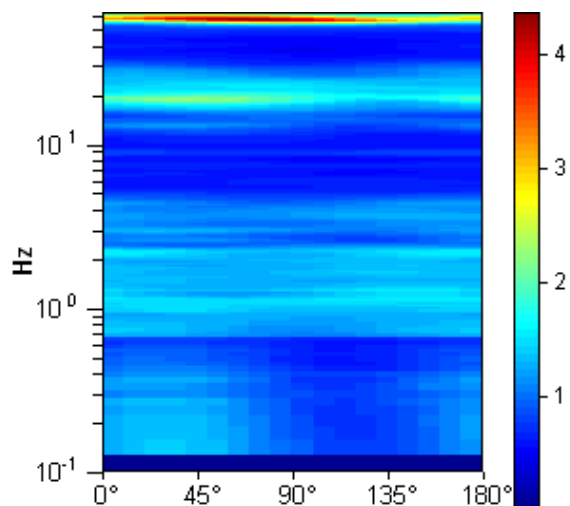
Max. H/V at  $18.66 \pm 2.58$  Hz. (In the range 0.0 - 30.0 Hz).



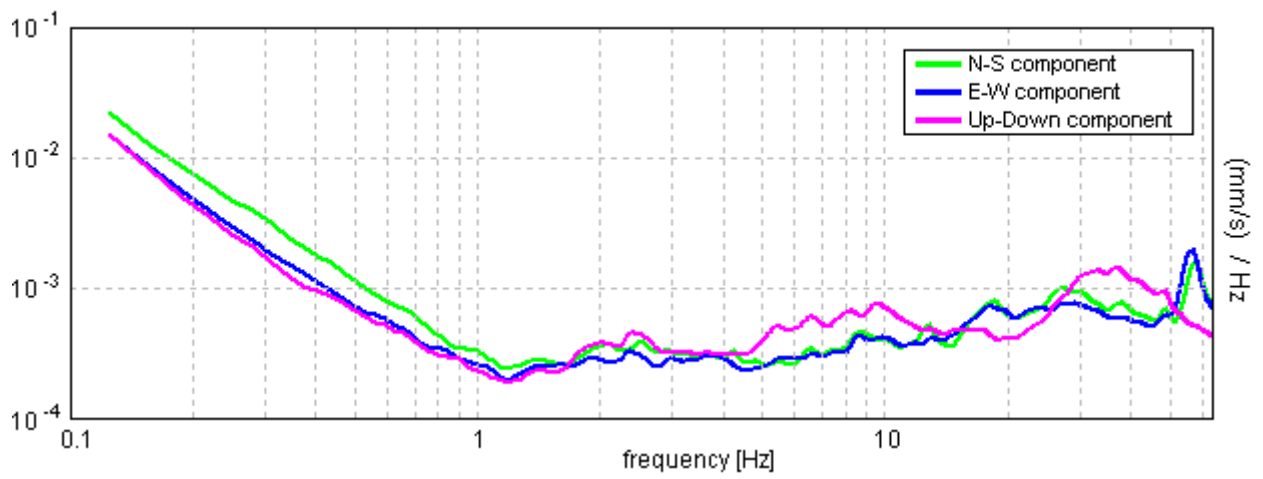
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 18.66 ± 2.58 Hz. (in the range 0.0 - 30.0 Hz).**

<b>Criteria for a reliable HVSR curve</b> [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	18.66 > 0.50	<b>OK</b>	
$n_c(f_0) > 200$	31715.6 > 200	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 896 times	<b>OK</b>	
<b>Criteria for a clear HVSR peak</b> [At least 5 out of 6 should be fulfilled]			
<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	15.188 Hz	<b>OK</b>	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	28.75 Hz	<b>OK</b>	
$A_0 > 2$	1.91 > 2		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.0692  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	1.29098 < 0.93281		<b>NO</b>
$\sigma_A(f_0) < \theta(f_0)$	0.0519 < 1.58	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for $\sigma_f$ and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

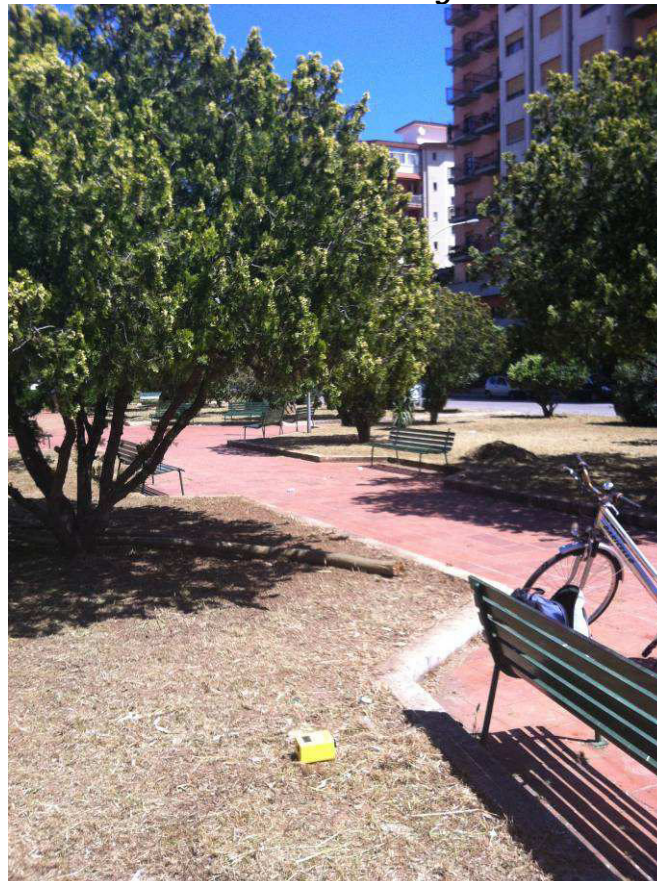


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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0089				
<b>Coordinate</b>	<i>UTM</i>	4222129.20	N	354349.27	E
	<i>Gauss Boaga</i>	4222296.079	N	2374344.255	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	05/05/2014, 14:10				
<b>Nome file</b>	0089				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Terreno				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



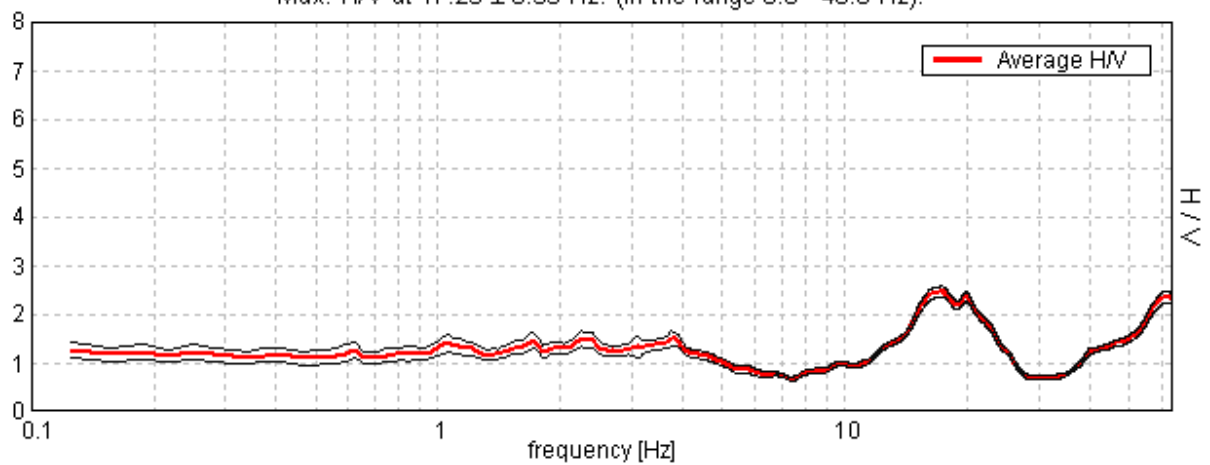
## TRIVEL SICILIA PALERMO, PALERMO 0089

Start recording: 05/05/14 14:10:57      End recording: 05/05/14 14:40:58  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

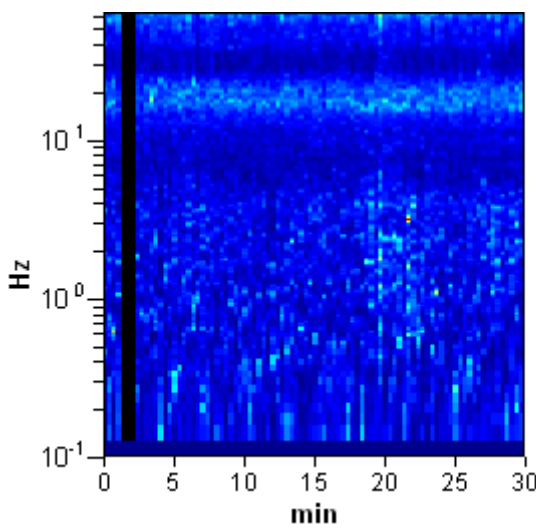
Trace length: 0h30'00".      Analyzed 97% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

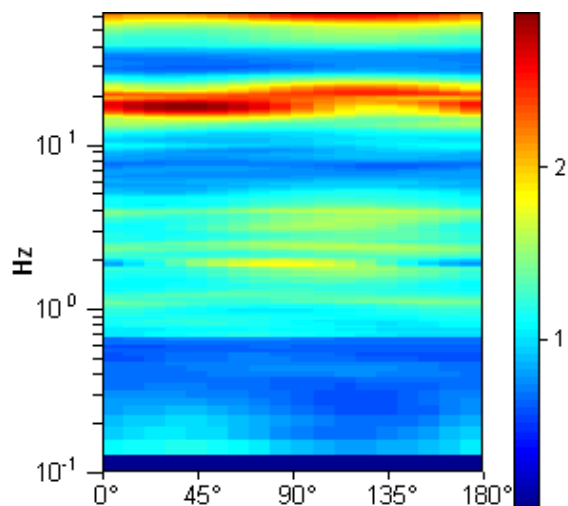
Max. H/V at  $17.25 \pm 0.55$  Hz. (In the range 0.0 - 40.0 Hz).



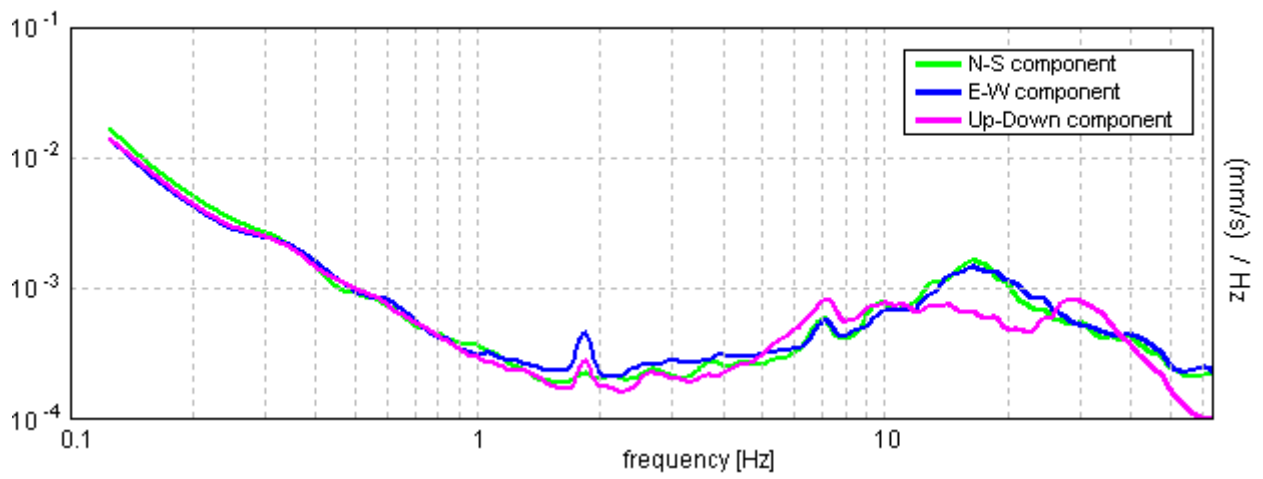
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 17.25 ± 0.55 Hz. (in the range 0.0 - 40.0 Hz).**

<b>Criteria for a reliable HVSR curve</b> [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	17.25 > 0.50	<b>OK</b>	
$n_c(f_0) > 200$	30015.0 > 200	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 829 times	<b>OK</b>	
<b>Criteria for a clear HVSR peak</b> [At least 5 out of 6 should be fulfilled]			
<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	12.156 Hz	<b>OK</b>	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	25.031 Hz	<b>OK</b>	
$A_0 > 2$	2.46 > 2	<b>OK</b>	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01582  < 0.05$	<b>OK</b>	
$\sigma_f < \varepsilon(f_0)$	0.27288 < 0.8625	<b>OK</b>	
$\sigma_A(f_0) < \theta(f_0)$	0.0545 < 1.58	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for $\sigma_f$ and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0090				
<b>Coordinate</b>	<i>UTM</i>	4221881.30	N	354417.89	E
	<i>Gauss Boaga</i>	4221879.742	N	2374412.864	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	05/05/2014, 14:45				
<b>Nome file</b>	0090				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



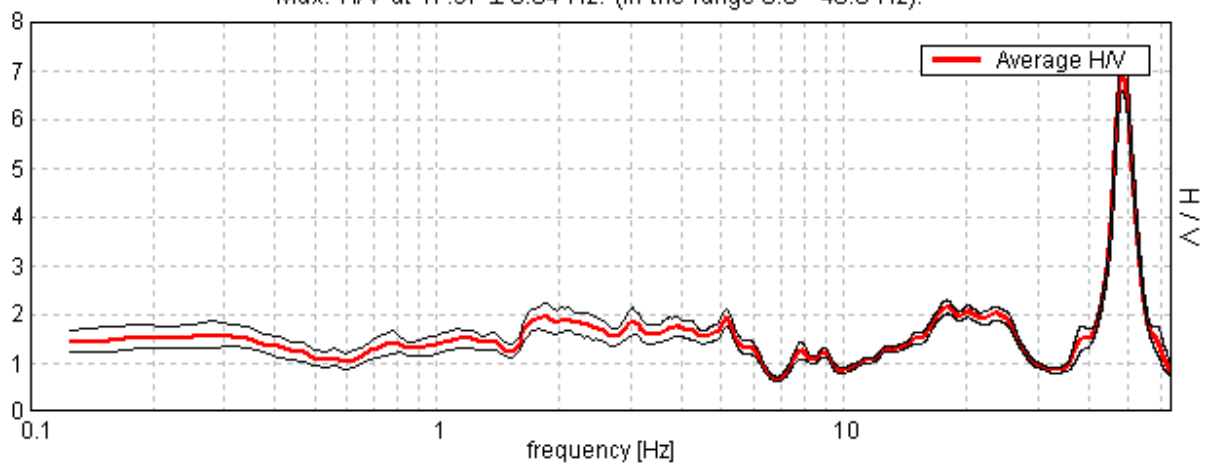
## TRIVEL SICILIA PALERMO, PALERMO 0090

Start recording: 05/05/14 14:47:22      End recording: 05/05/14 15:17:23  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

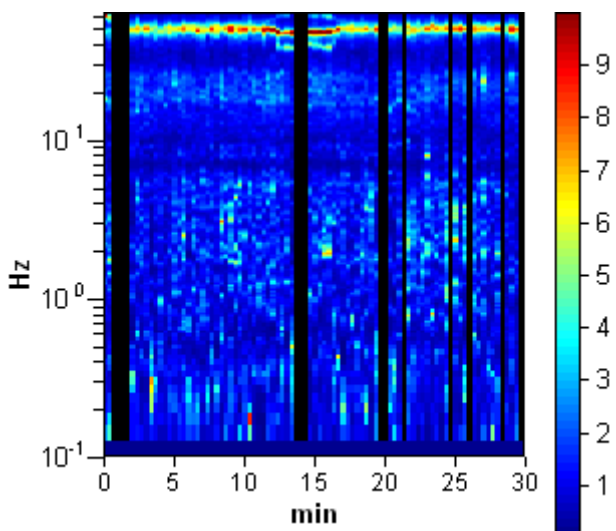
Trace length: 0h30'00".      Analyzed 84% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

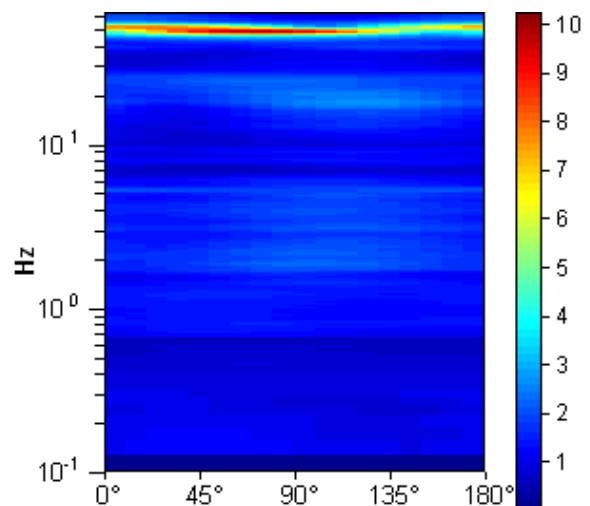
Max. H/V at  $17.97 \pm 0.04$  Hz. (In the range 0.0 - 40.0 Hz).



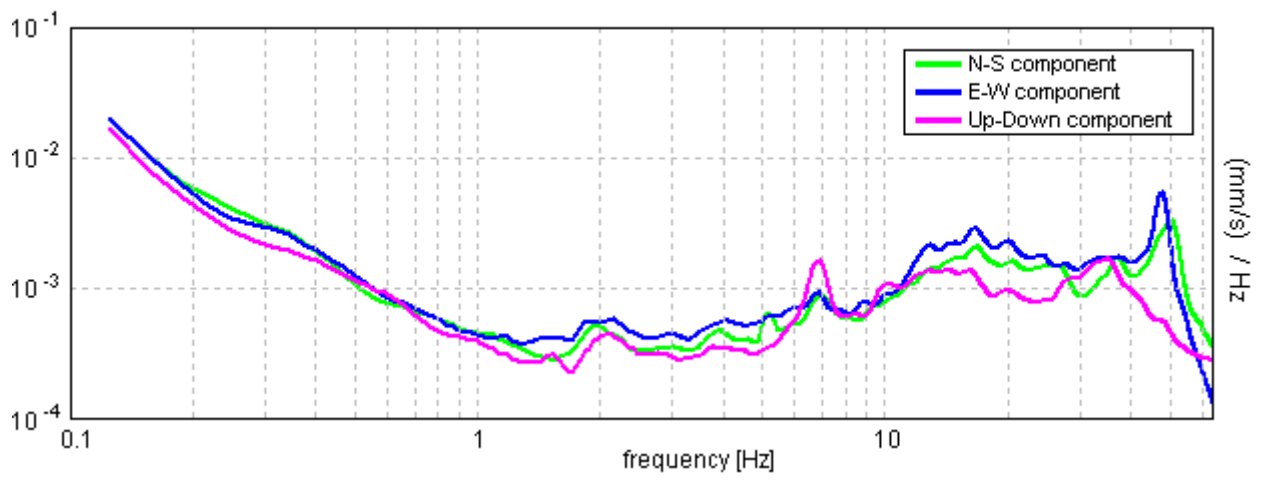
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 17.97 ± 0.04 Hz. (in the range 0.0 - 40.0 Hz).**

<b>Criteria for a reliable HVSR curve</b> [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	17.97 > 0.50	<b>OK</b>	
$n_c(f_0) > 200$	27312.5 > 200	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 864 times	<b>OK</b>	
<b>Criteria for a clear HVSR peak</b> [At least 5 out of 6 should be fulfilled]			
<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	11.938 Hz	<b>OK</b>	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	28.719 Hz	<b>OK</b>	
$A_0 > 2$	2.14 > 2	<b>OK</b>	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00101  < 0.05$	<b>OK</b>	
$\sigma_f < \varepsilon(f_0)$	0.01816 < 0.89844	<b>OK</b>	
$\sigma_A(f_0) < \theta(f_0)$	0.069 < 1.58	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for $\sigma_f$ and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0091			
<b>Coordinate</b>	UTM	4221882.00	N	354755.03	E
	Gauss Boaga	4221880.446	N	2374750.020	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		05/05/2014, 13:06			
<b>Nome file</b>		0091			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

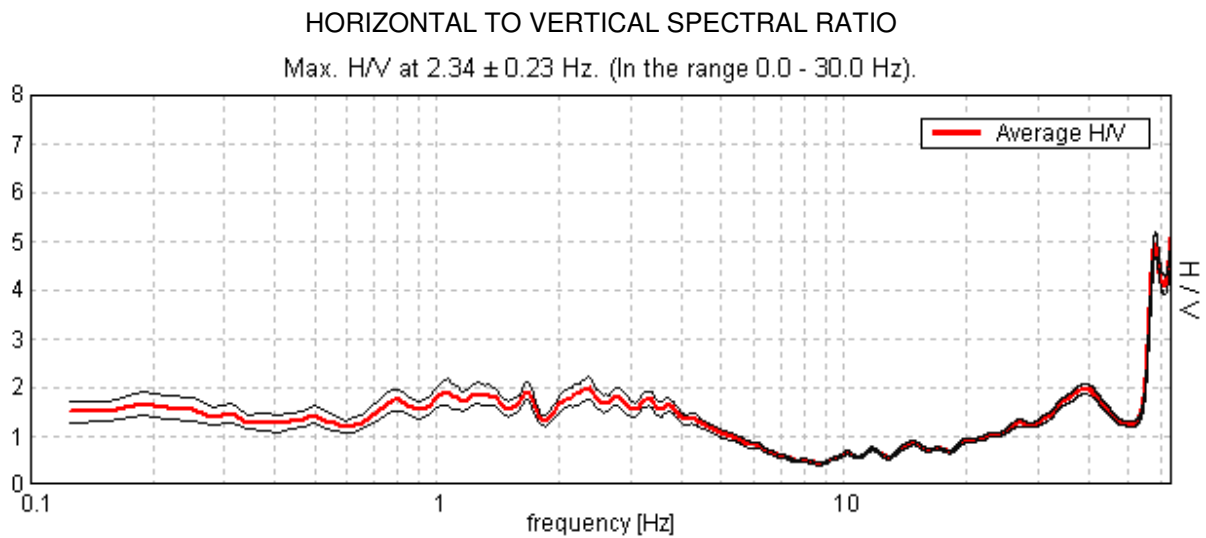
**Documentazione fotografica**



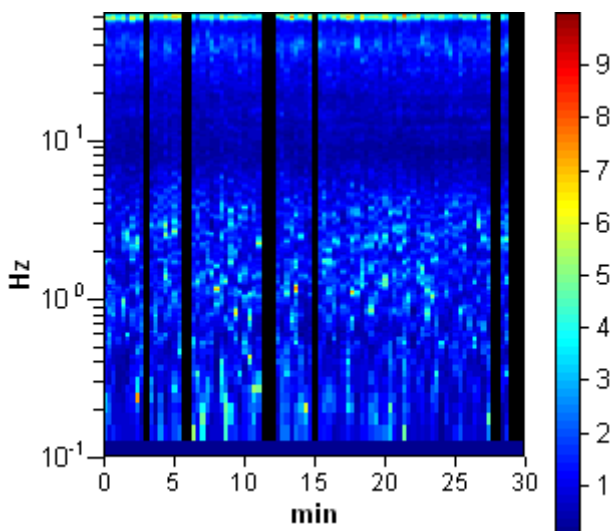
## TRIVEL SICILIA PALERMO, PALERMO 0091

Start recording: 05/05/14 13:07:59      End recording: 05/05/14 13:37:59  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

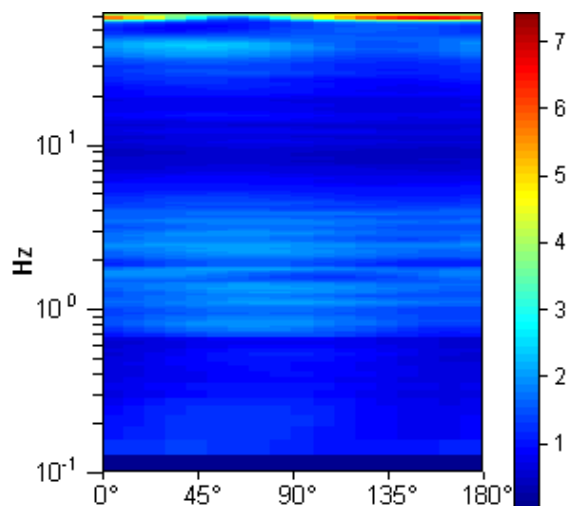
Trace length: 0h30'00".      Analyzed 87% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



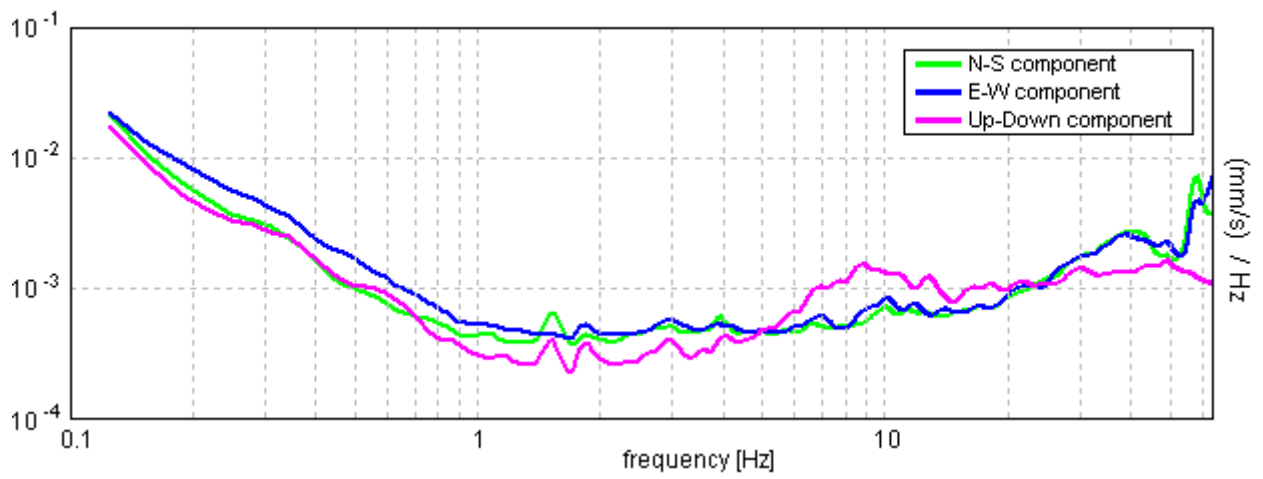
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 2.34 ± 0.23 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.34 > 0.50	OK	
$n_c(f_0) > 200$	3656.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 114 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	5.188 Hz	OK	
<b><math>A_0 &gt; 2</math></b>	1.99 > 2		<b>NO</b>
<b><math>f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%</math></b>	$ 0.04969  < 0.05$	OK	
<b><math>\sigma_f &lt; \varepsilon(f_0)</math></b>	$0.11646 < 0.11719$	OK	
<b><math>\sigma_A(f_0) &lt; \theta(f_0)</math></b>	$0.1187 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0092			
<b>Coordinate</b>	UTM	4221867.82	N	355172.63	E
	Gauss Boaga	4221866.271	N	2375167.639	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		05/05/2014, 09:42			
<b>Nome file</b>		0092			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



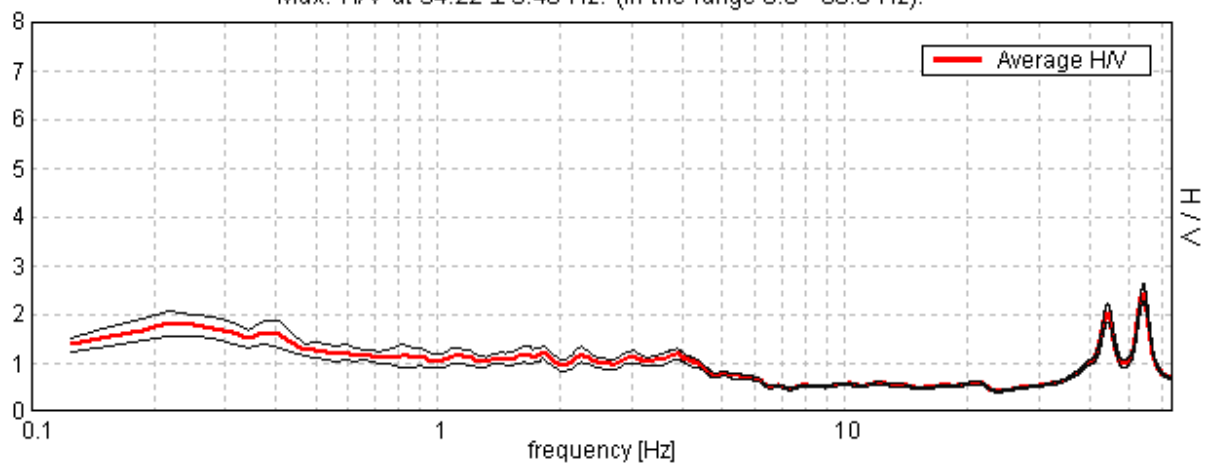
## TRIVEL SICILIA PALERMO, PALERMO 0092

Start recording: 05/05/14 09:43:36      End recording: 05/05/14 10:13:37  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

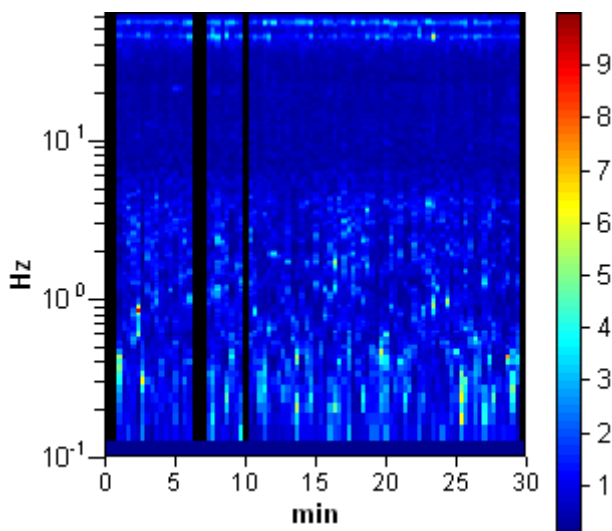
Trace length: 0h30'00".      Analyzed 91% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

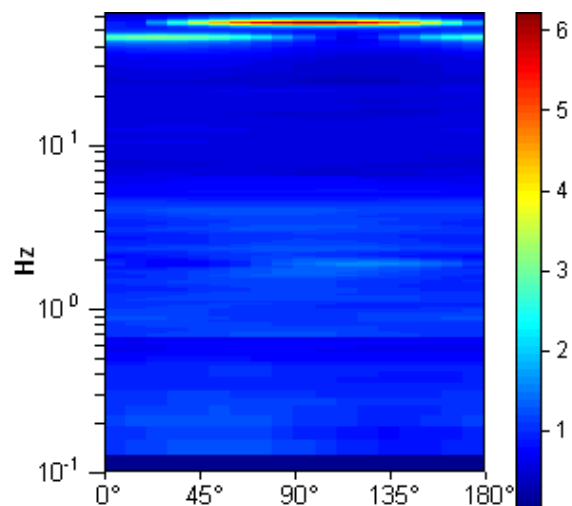
Max. H/V at  $54.22 \pm 3.48$  Hz. (In the range 0.0 - 60.0 Hz).



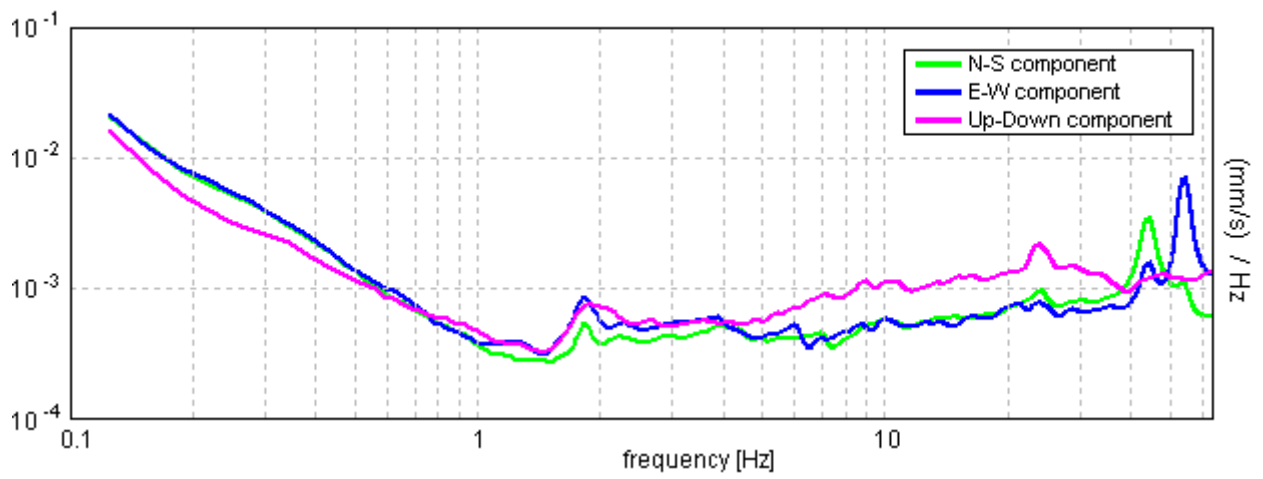
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 54.22 ± 3.48 Hz. (in the range 0.0 - 60.0 Hz).**

<b>Criteria for a reliable HVSR curve</b> [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	54.22 > 0.50	<b>OK</b>	
$n_c(f_0) > 200$	88918.8 > 200	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 1182 times	<b>OK</b>	
<b>Criteria for a clear HVSR peak</b> [At least 5 out of 6 should be fulfilled]			
<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	51.125 Hz	<b>OK</b>	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	57.25 Hz	<b>OK</b>	
$A_0 > 2$	2.44 > 2	<b>OK</b>	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03203  < 0.05$	<b>OK</b>	
$\sigma_f < \varepsilon(f_0)$	1.73673 < 2.71094	<b>OK</b>	
$\sigma_A(f_0) < \theta(f_0)$	0.0828 < 1.58	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for $\sigma_f$ and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0093				
<b>Coordinate</b>	<i>UTM</i>	4221892.15	N	355538.37	E
	<i>Gauss Boaga</i>	4221890.607	N	2375533.397	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	05/05/2014, 10:16				
<b>Nome file</b>	0093				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Terreno				
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

**Documentazione fotografica**



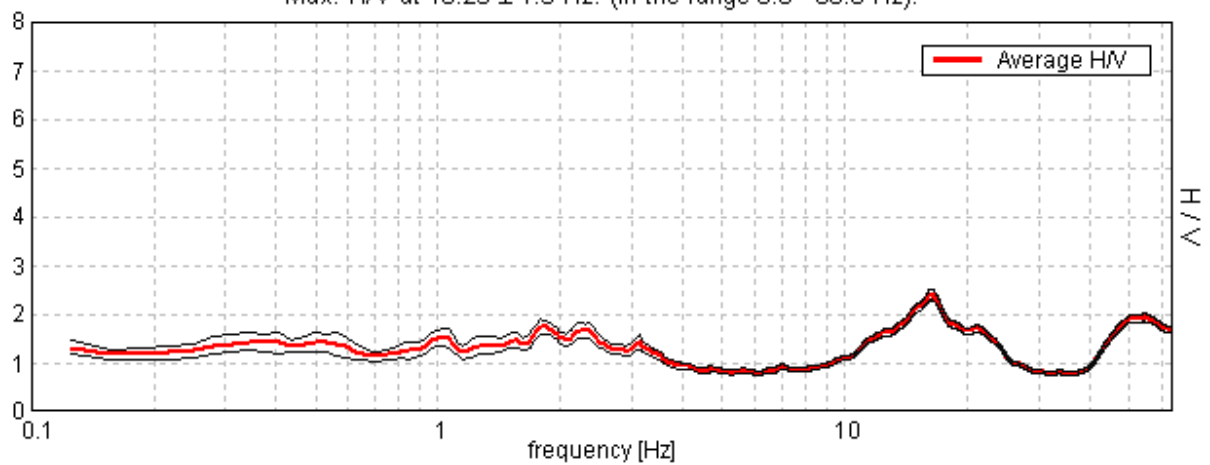
### TRIVEL SICILIA PALERMO, PALERMO 0093

Start recording: 05/05/14 10:18:12      End recording: 05/05/14 10:48:13  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

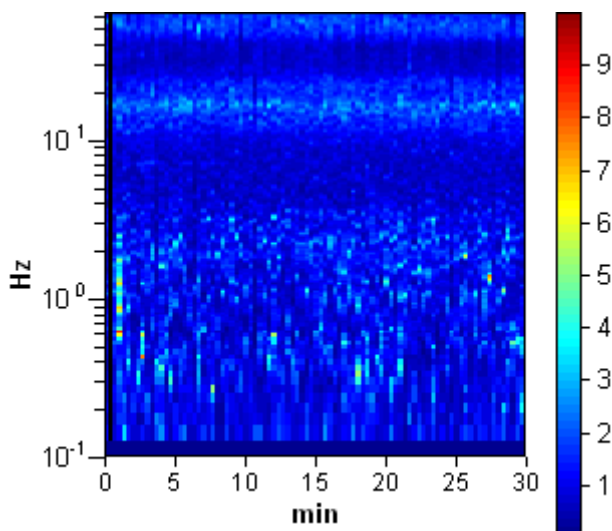
Trace length: 0h30'00".      Analyzed 99% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

#### HORIZONTAL TO VERTICAL SPECTRAL RATIO

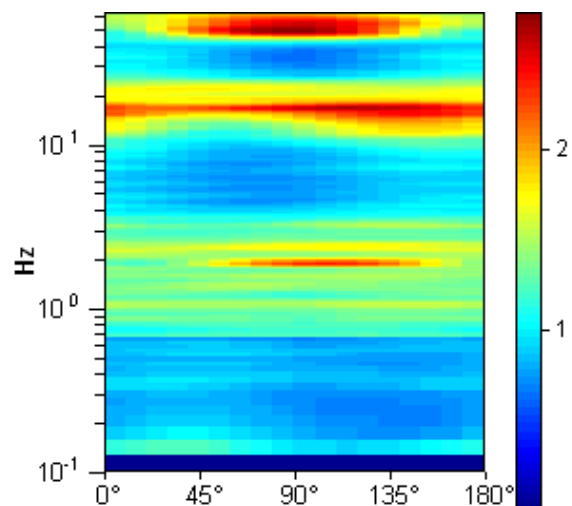
Max. H/V at  $16.25 \pm 1.5$  Hz. (In the range 0.0 - 60.0 Hz).



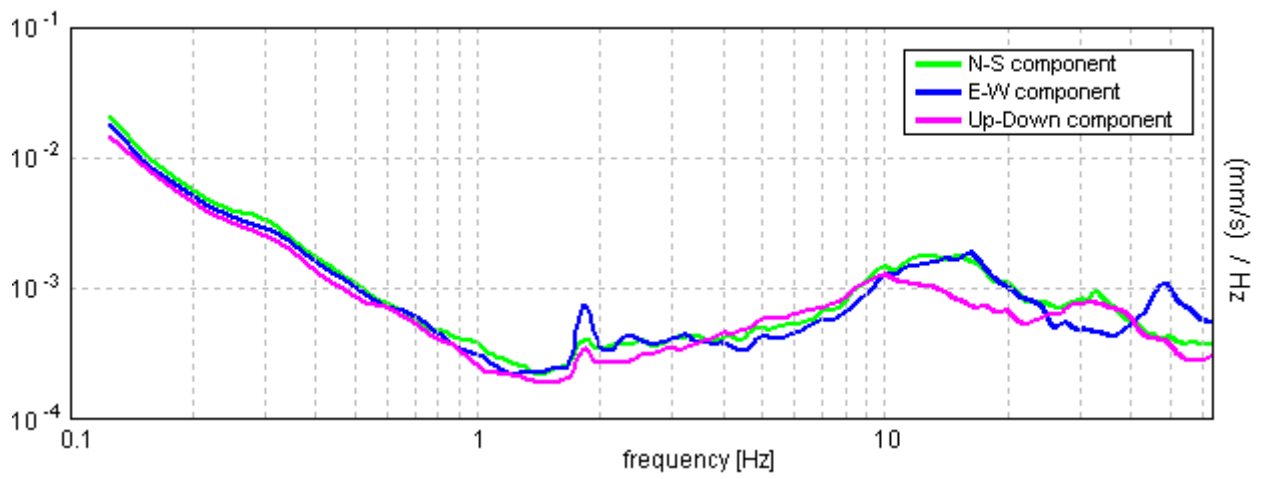
#### H/V TIME HISTORY



#### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 16.25 ± 1.5 Hz. (in the range 0.0 - 60.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	16.25 > 0.50	OK	
$n_c(f_0) > 200$	28925.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 781 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	10.656 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	24.688 Hz	OK	
$A_0 > 2$	2.40 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.04628  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.75212 < 0.8125	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.0569 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0094				
<b>Coordinate</b>	<i>UTM</i>	4221916.92	N	355879.77	E
	<i>Gauss Boaga</i>	4221915.382	N	2375874.813	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	05/05/2014, 16:15				
<b>Nome file</b>	0094				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



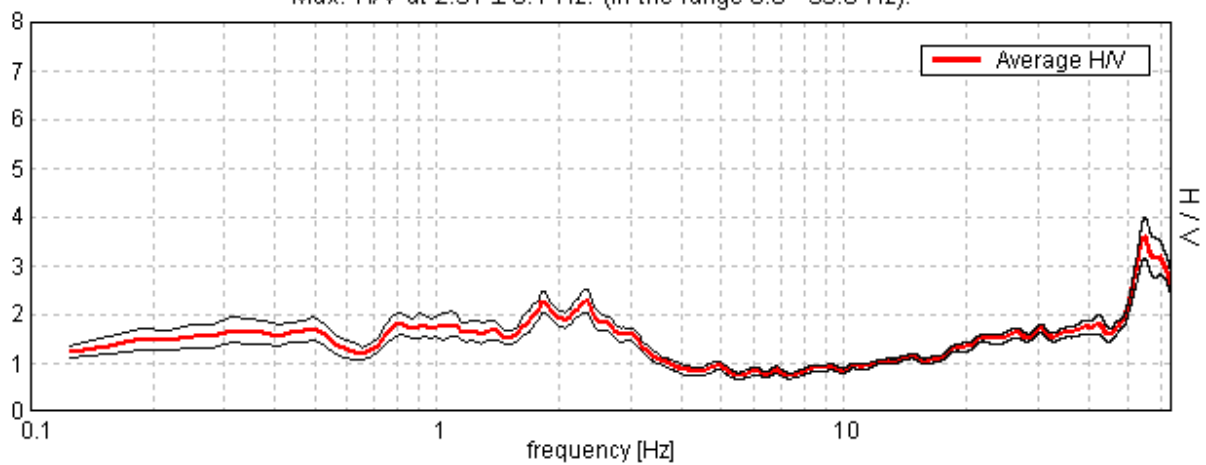
## TRIVELSICILIPALERMO, PALERMO 0094

Start recording: 05/05/14 16:16:47      End recording: 05/05/14 16:46:48  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

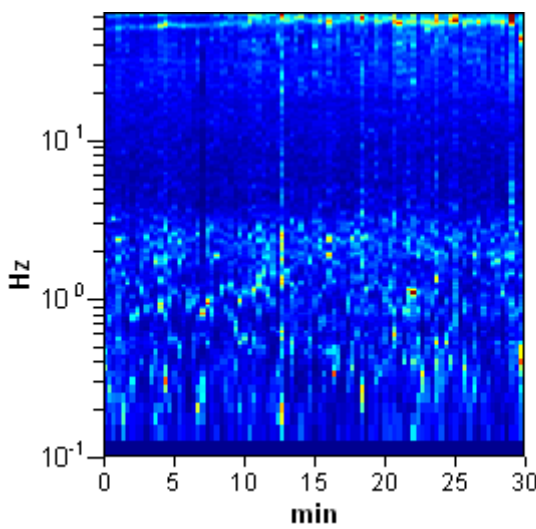
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

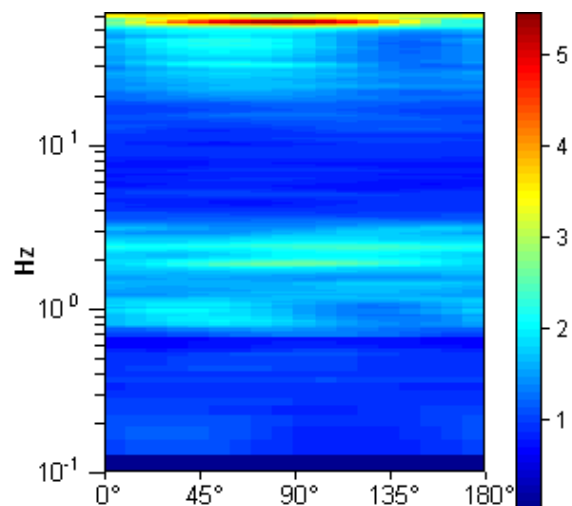
Max. H/V at  $2.31 \pm 0.1$  Hz. (In the range 0.0 - 35.0 Hz).



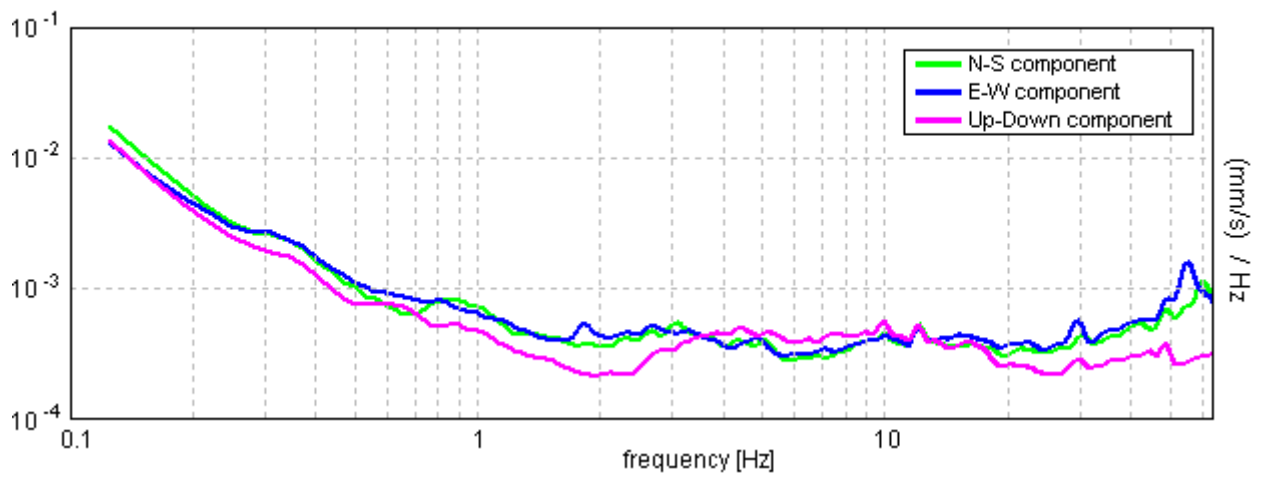
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 2.31 ± 0.1 Hz. (in the range 0.0 - 35.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.31 > 0.50	OK	
$n_c(f_0) > 200$	4162.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 112 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	3.438 Hz	OK	
$A_0 > 2$	2.27 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02267  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.05242 < 0.11563$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1205 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0095			
<b>Coordinate</b>	<i>UTM</i>	4221872.00	N	356362.00	E
	<i>Gauss Boaga</i>	4221870.466	N	2376357.064	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		16/05/2014, 09:28			
<b>Nome file</b>		0095			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



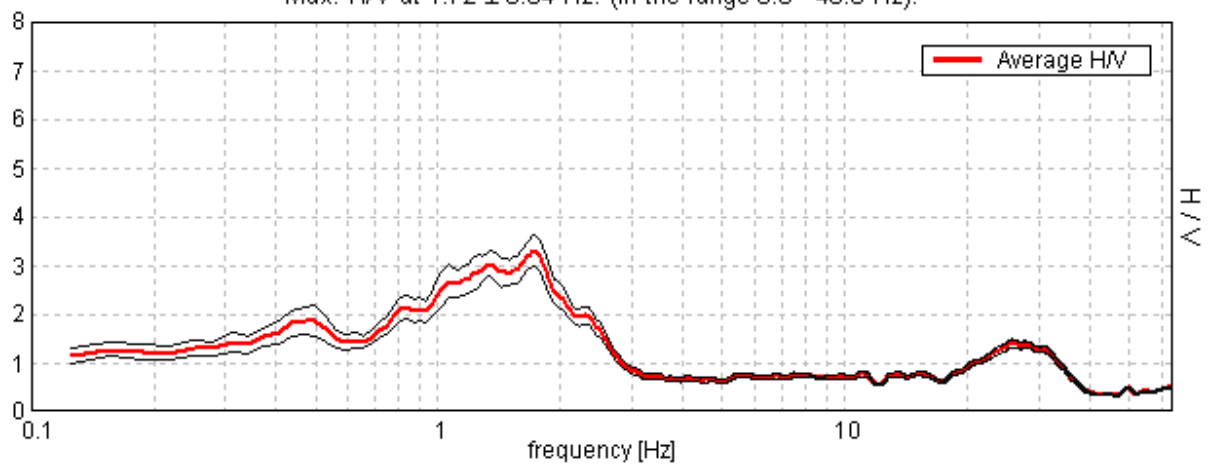
## TRIVELSICILIA PALERMO, PALERMO 0095

Start recording: 16/05/14 08:35:03      End recording: 16/05/14 09:05:04  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

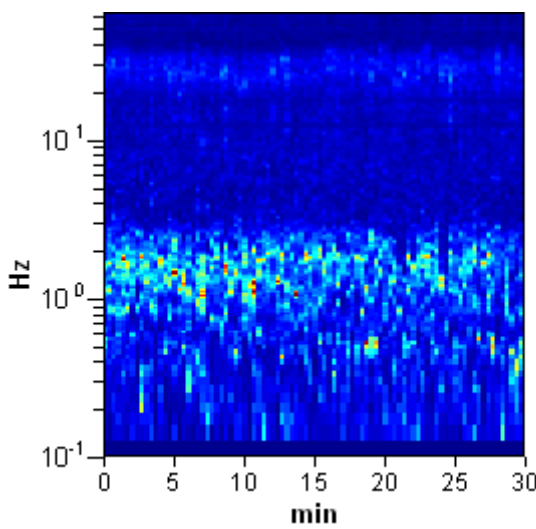
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

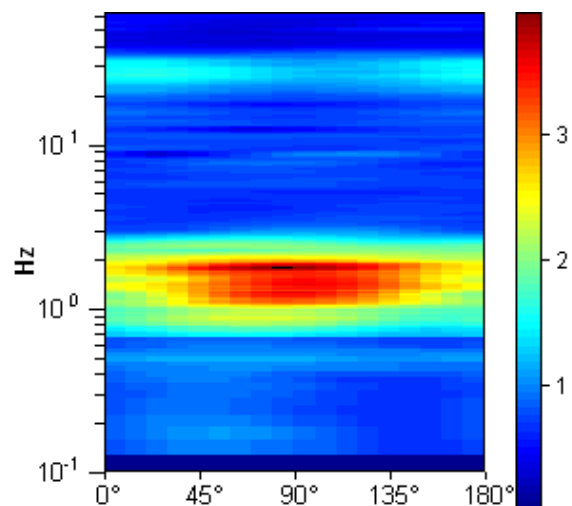
Max. H/V at  $1.72 \pm 0.04$  Hz. (In the range 0.0 - 40.0 Hz).



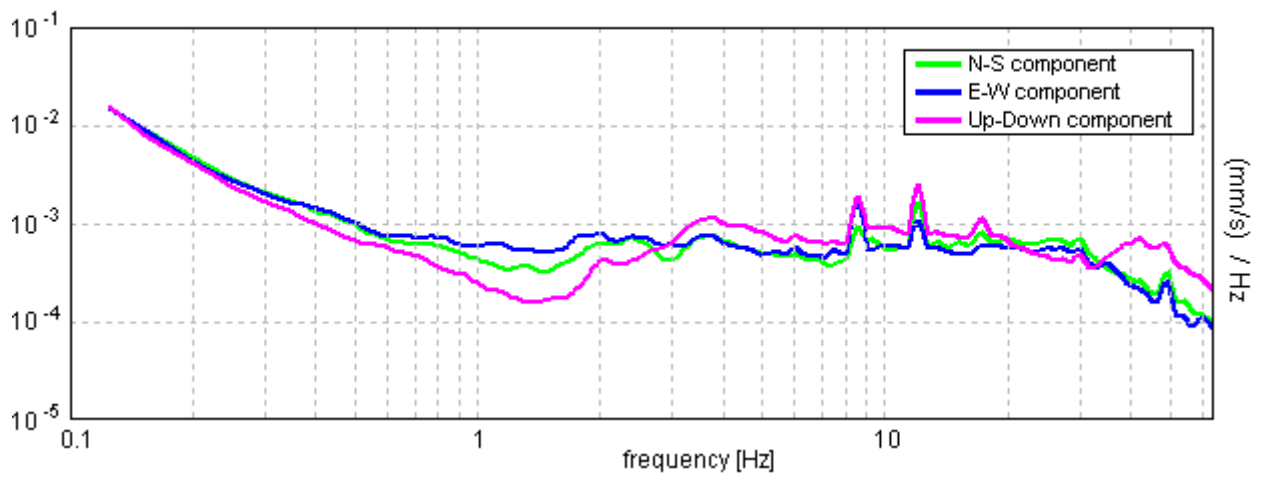
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $1.72 \pm 0.04$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.72 > 0.50$	OK	
$n_c(f_0) > 200$	$3093.8 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 84 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.688 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.531 Hz	OK	
$A_0 > 2$	$3.31 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.013  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02235 < 0.17188$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.165 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0096				
<b>Coordinate</b>	<i>UTM</i>	4221476.64	N	356366.37	E
	<i>Gauss Boaga</i>	4221475.090	N	2376361.421	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	08/05/2014, 11:30				
<b>Nome file</b>	0096				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

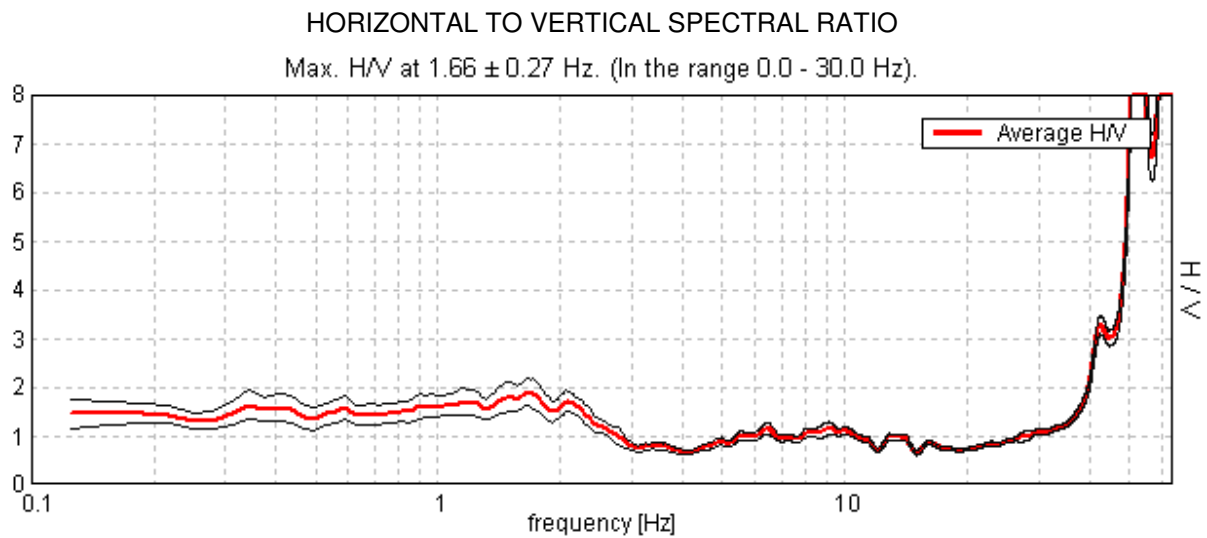
**Documentazione fotografica**



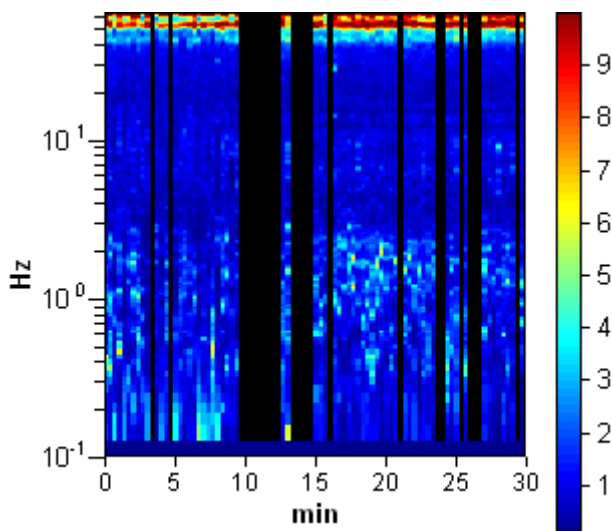
## TRIVELSICILIA PALERMO, PALERMO 0096

Start recording: 08/05/14 11:31:51      End recording: 08/05/14 12:01:52  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

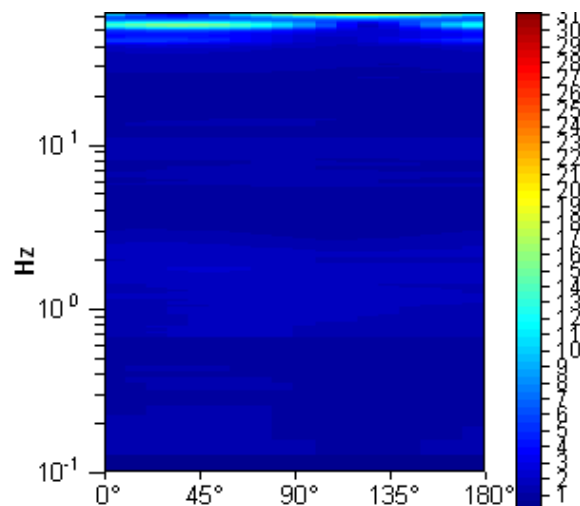
Trace length: 0h30'00".      Analyzed 72% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



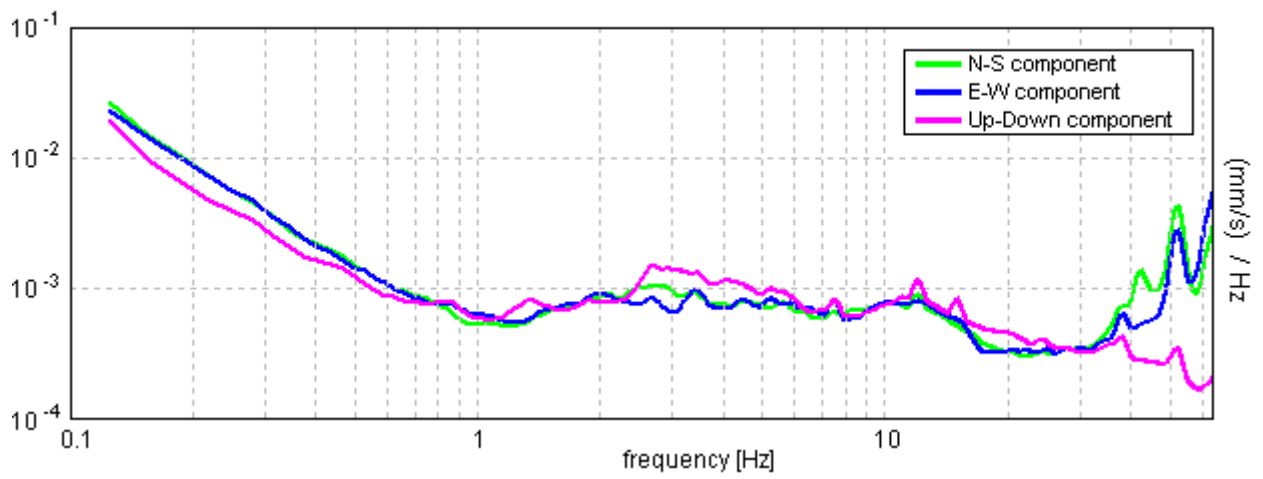
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.66 ± 0.27 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.66 > 0.50	OK	
$n_c(f_0) > 200$	2153.1 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 80 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.844 Hz	OK	
$A_0 > 2$	1.89 > 2		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.0806  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	0.13349 < 0.16563	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1402 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0097			
<b>Coordinate</b>	UTM	4221471.00	N	355961.00	E
	Gauss Boaga	4221469.444	N	2375956.032	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		08/05/2014, 12:03			
<b>Nome file</b>		0097			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



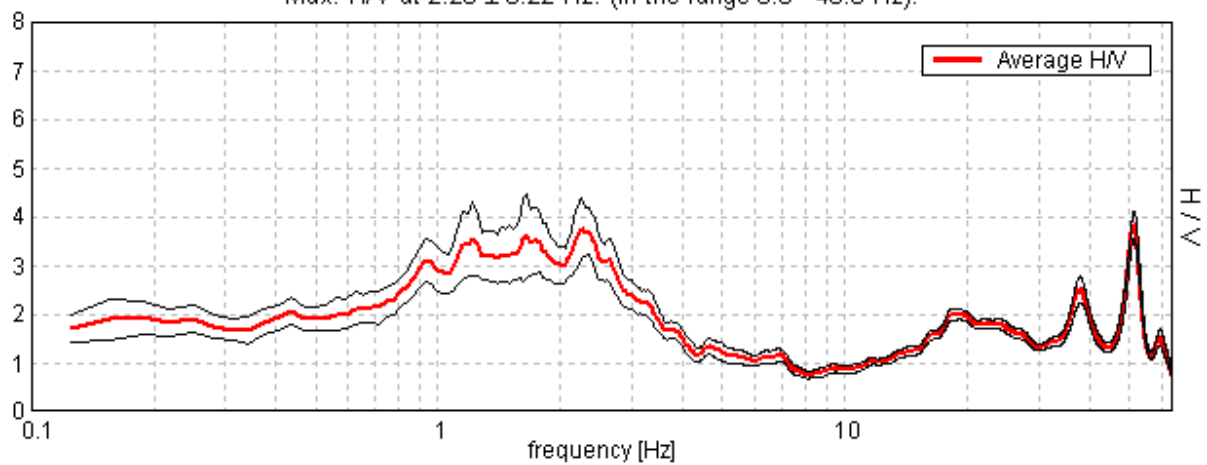
## TRIVELSICILIA PALERMO, PALERMO 0097

Start recording: 08/05/14 12:14:04      End recording: 08/05/14 12:44:05  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

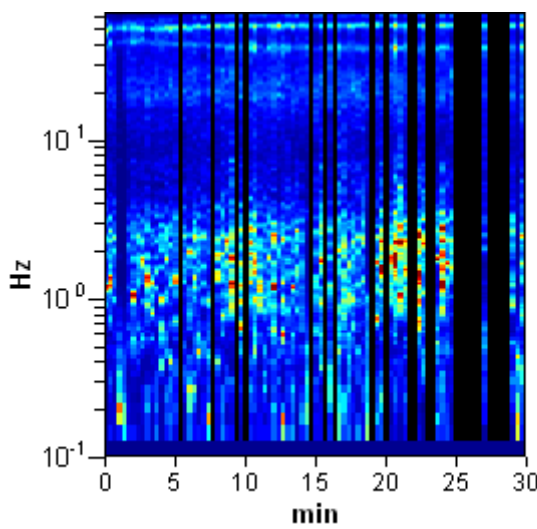
Trace length: 0h30'00".      Analyzed 73% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

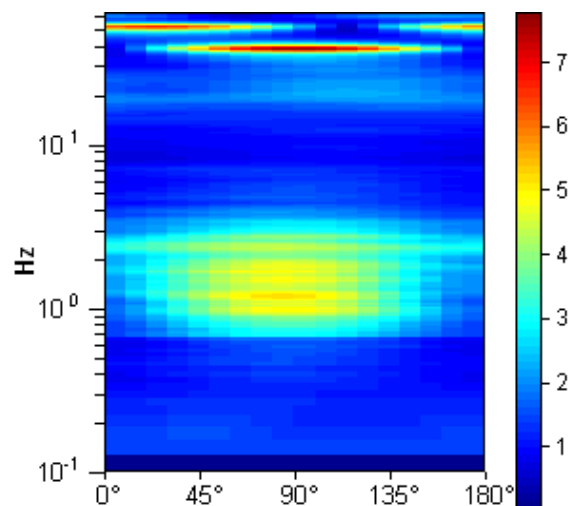
Max. H/V at  $2.28 \pm 0.22$  Hz. (In the range 0.0 - 40.0 Hz).



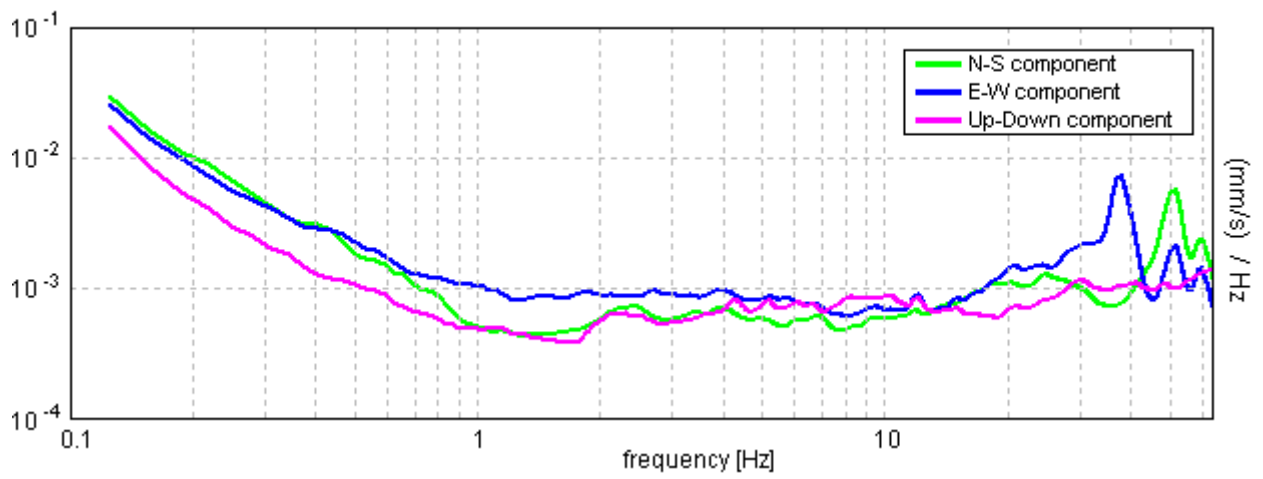
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 2.28 ± 0.22 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.28 > 0.50	OK	
$n_c(f_0) > 200$	3011.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 110 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	3.5 Hz	OK	
$A_0 > 2$	3.75 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.04878  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.11127 < 0.11406$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2794 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

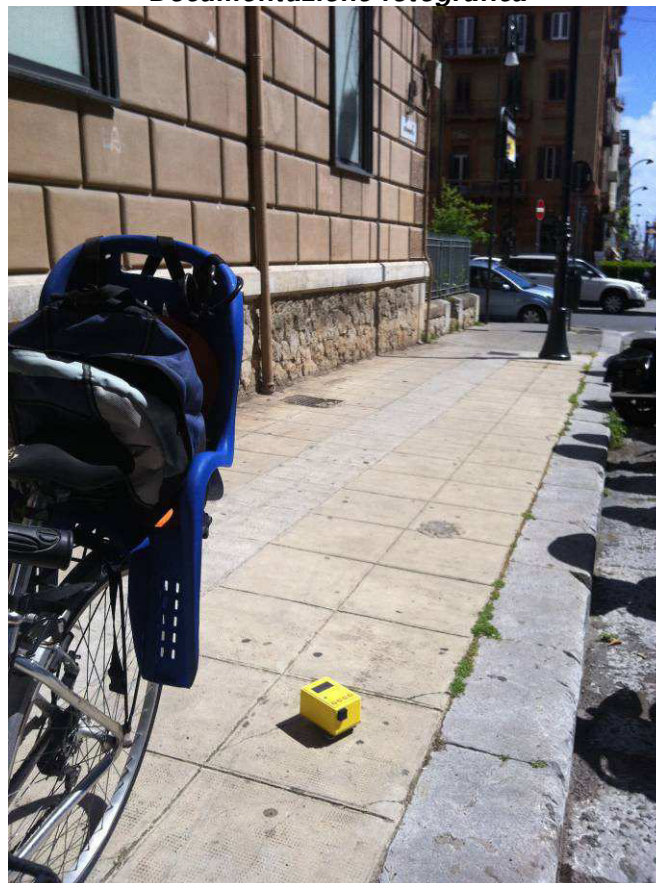


Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0098			
<b>Coordinate</b>	<i>UTM</i>	4221460.18	N	355555.05	E
	<i>Gauss Boaga</i>	4221458.619	N	2375550.063	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		05/05/2014, 10:42			
<b>Nome file</b>		0098			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

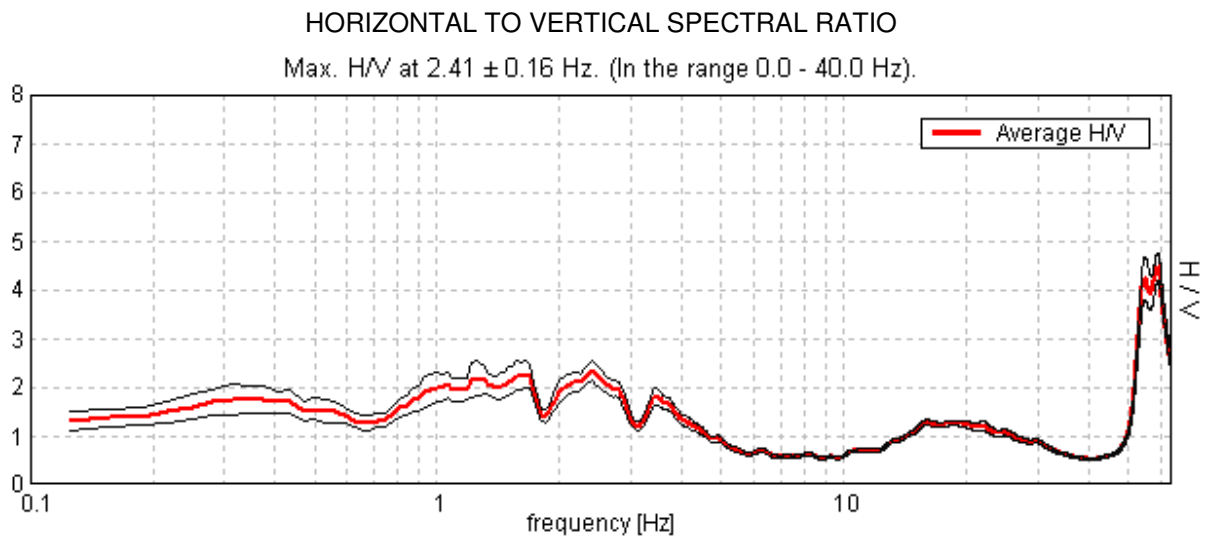
**Documentazione fotografica**



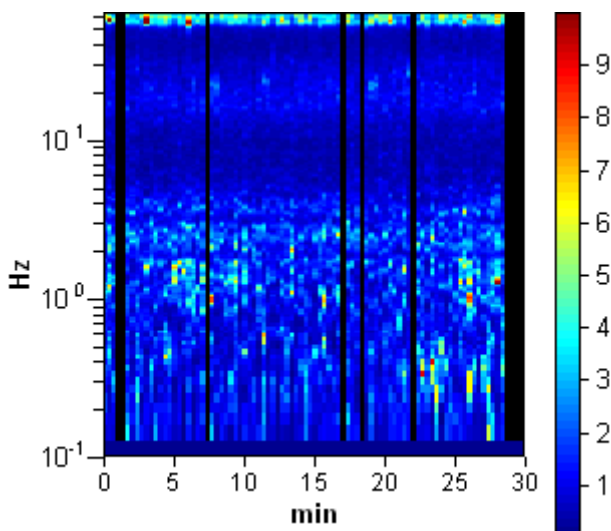
## TRIVEL SICILIA PALERMO, PALERMO 0098

Start recording: 05/05/14 10:54:34      End recording: 05/05/14 11:24:35  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

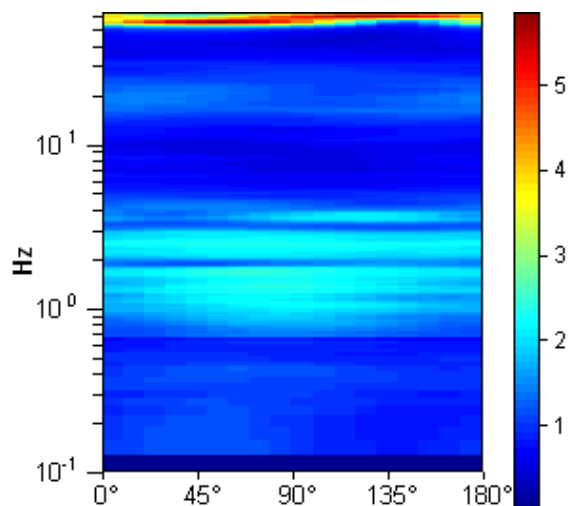
Trace length: 0h30'00".      Analyzed 89% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



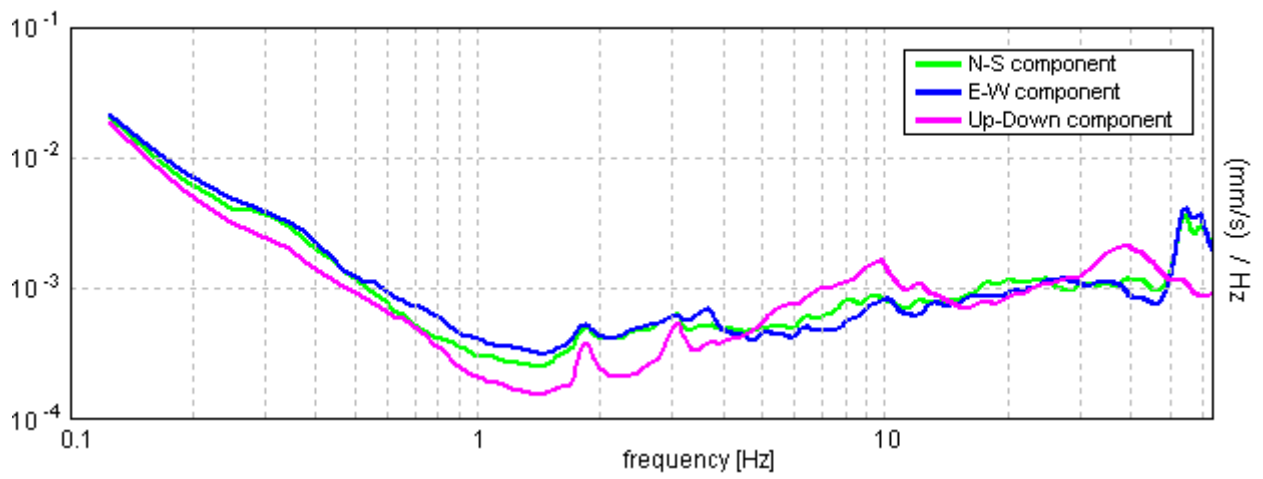
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 2.41 ± 0.16 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.41 > 0.50	OK	
$n_c(f_0) > 200$	3850.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 116 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	4.313 Hz	OK	
$A_0 > 2$	2.35 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.0337  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.0811 < 0.12031	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1028 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0099				
<b>Coordinate</b>	<i>UTM</i>	4221437.16	N	355116.25	E
	<i>Gauss Boaga</i>	4221435.592	N	2375111.241	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	05/05/2014, 11:29				
<b>Nome file</b>	0099				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Terreno				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



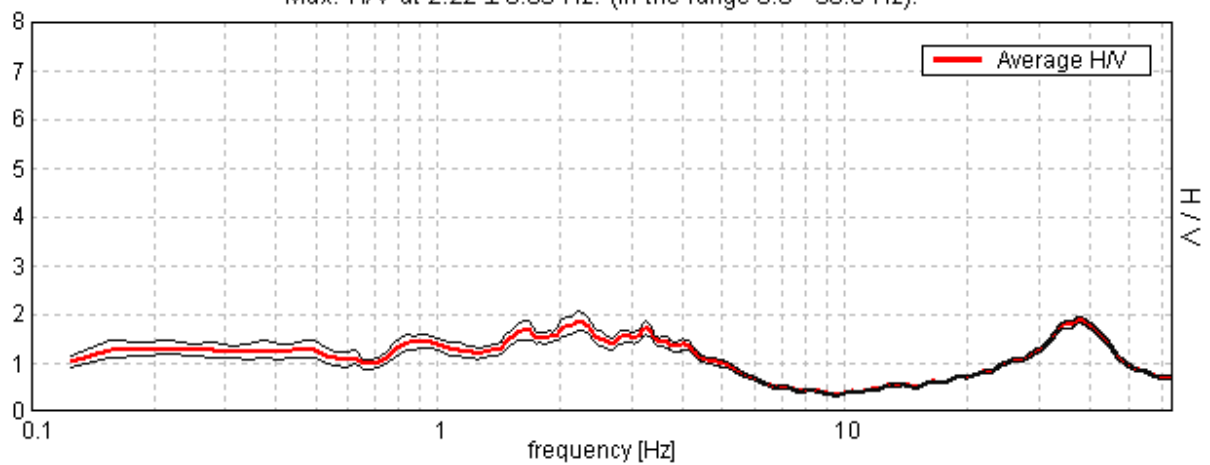
## TRIVEL SICILIA PALERMO, PALERMO 0099

Start recording: 05/05/14 11:31:17      End recording: 05/05/14 12:01:18  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

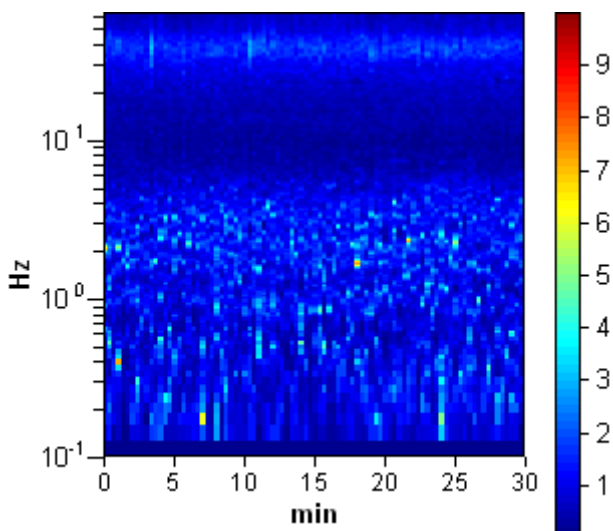
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

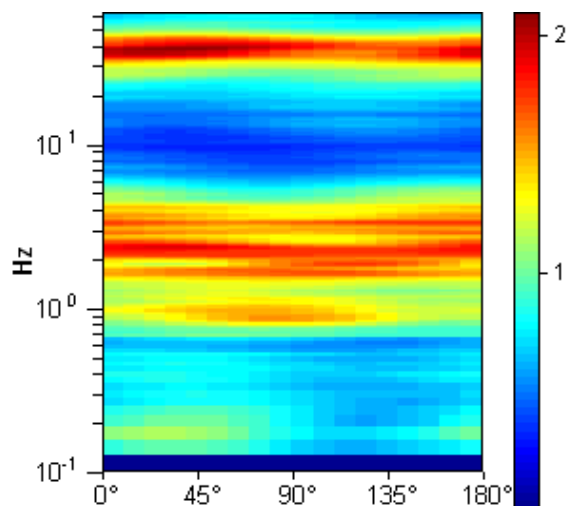
Max. H/V at  $2.22 \pm 0.03$  Hz. (In the range 0.0 - 30.0 Hz).



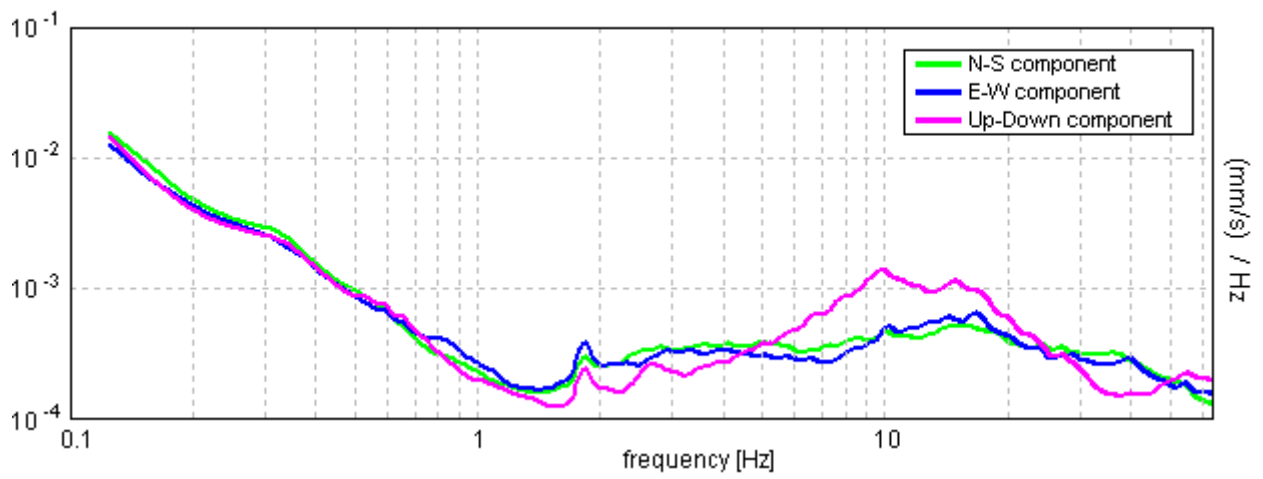
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 2.22 ± 0.03 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.22 > 0.50	OK	
$n_c(f_0) > 200$	3993.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 108 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	5.25 Hz	OK	
<b><math>A_0 &gt; 2</math></b>	1.85 > 2		<b>NO</b>
<b><math>f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%</math></b>	$ 0.00635  < 0.05$	OK	
<b><math>\sigma_f &lt; \varepsilon(f_0)</math></b>	$0.0141 < 0.11094$	OK	
<b><math>\sigma_A(f_0) &lt; \theta(f_0)</math></b>	$0.0971 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0100			
<b>Coordinate</b>	UTM	4221535.27	N	354801.38	E
	Gauss Boaga	4221533.703	N	2374796.360	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		05/05/2014, 12:10			
<b>Nome file</b>		0100			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



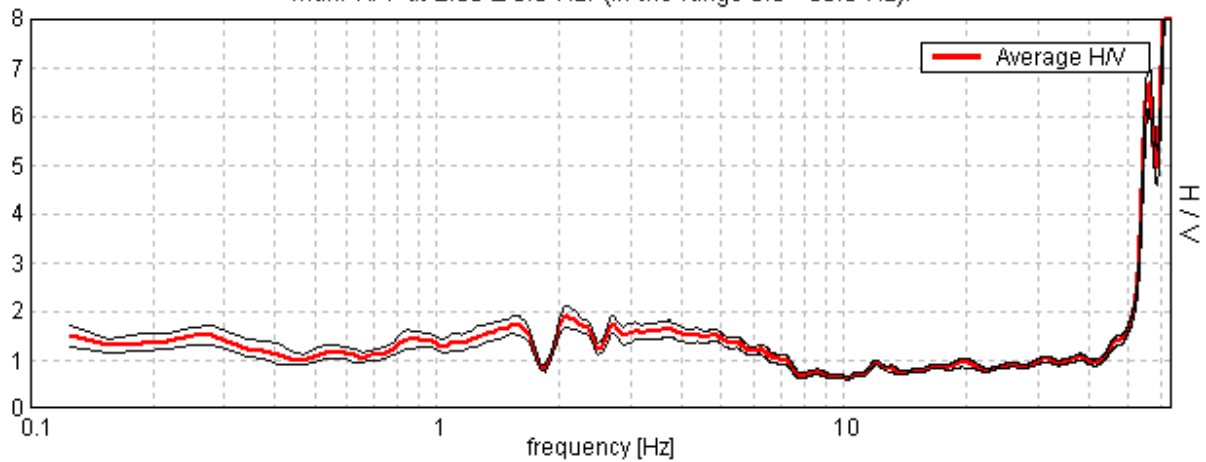
## TRIVEL SICILIA PALERMO, PALERMO 0100

Start recording: 05/05/14 12:12:17      End recording: 05/05/14 12:42:18  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

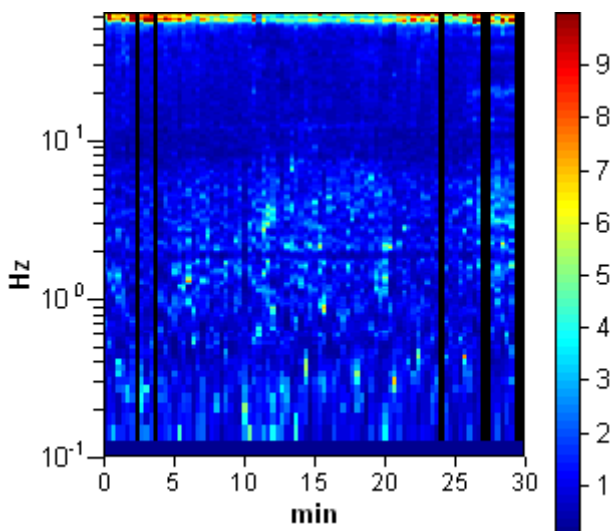
Trace length: 0h30'00".      Analyzed 92% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

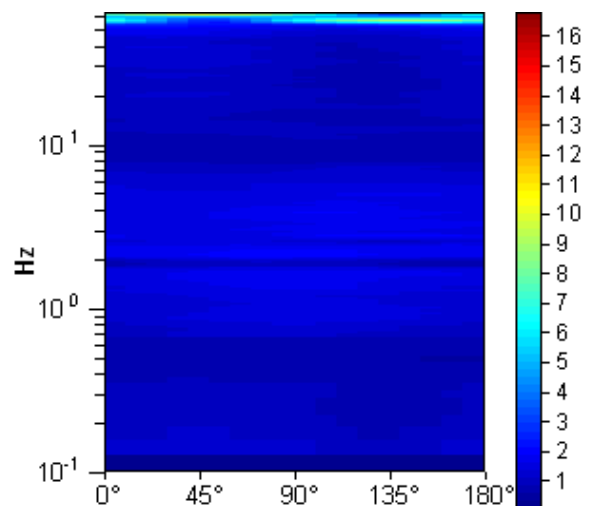
Max. H/V at  $2.06 \pm 5.3$  Hz. (In the range 0.0 - 50.0 Hz).



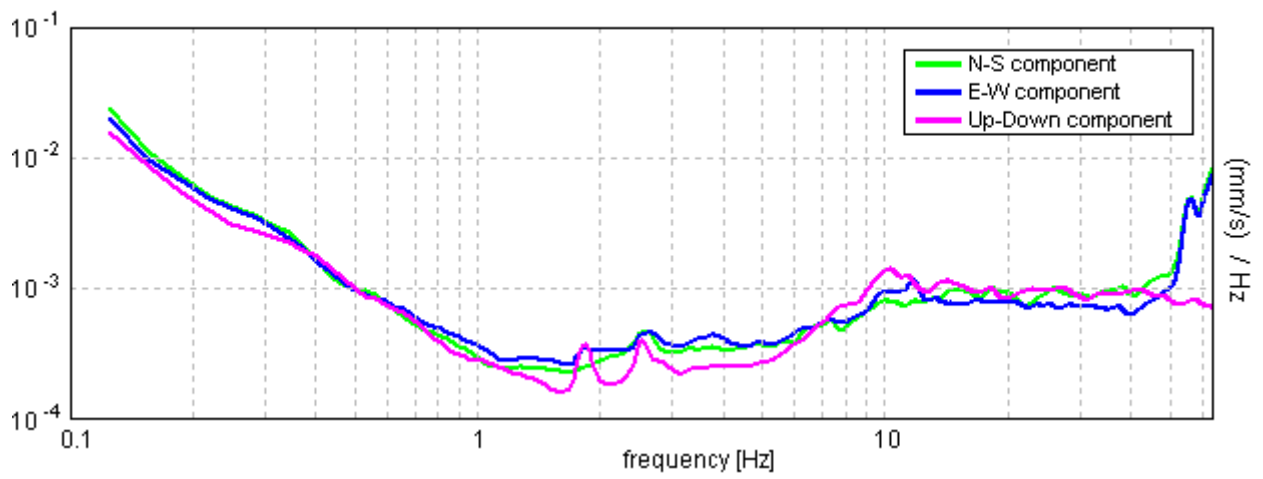
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 2.06 ± 5.3 Hz. (in the range 0.0 - 50.0 Hz).**

<b>Criteria for a reliable HVSR curve</b> [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	2.06 > 0.50	<b>OK</b>	
$n_c(f_0) > 200$	3423.8 > 200	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 100 times	<b>OK</b>	
<b>Criteria for a clear HVSR peak</b> [At least 5 out of 6 should be fulfilled]			
<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	1.875 Hz	<b>OK</b>	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	7.344 Hz	<b>OK</b>	
$A_0 > 2$	1.89 > 2		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 1.2839  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	2.64805 < 0.10313		<b>NO</b>
$\sigma_A(f_0) < \theta(f_0)$	0.11 < 1.58	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for $\sigma_f$ and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0101				
<b>Coordinate</b>	<i>UTM</i>	4221482.77	N	354288.97	E
	<i>Gauss Boaga</i>	4221481.194	N	2374283.924	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	05/05/2014, 15:20				
<b>Nome file</b>	0101				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Terreno				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



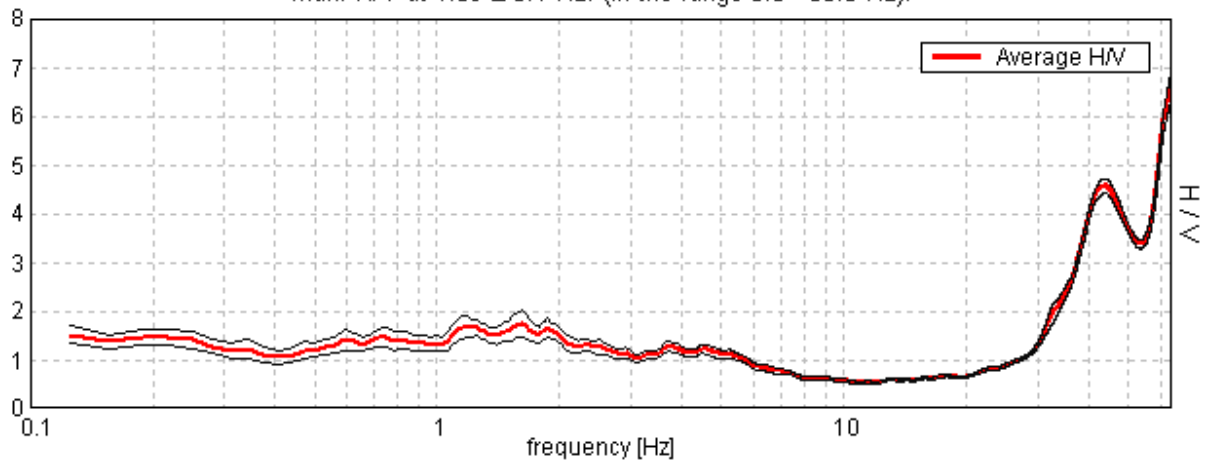
## TRIVEL SICILIA PALERMO, PALERMO 0101

Start recording: 05/05/14 15:22:06      End recording: 05/05/14 15:52:07  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

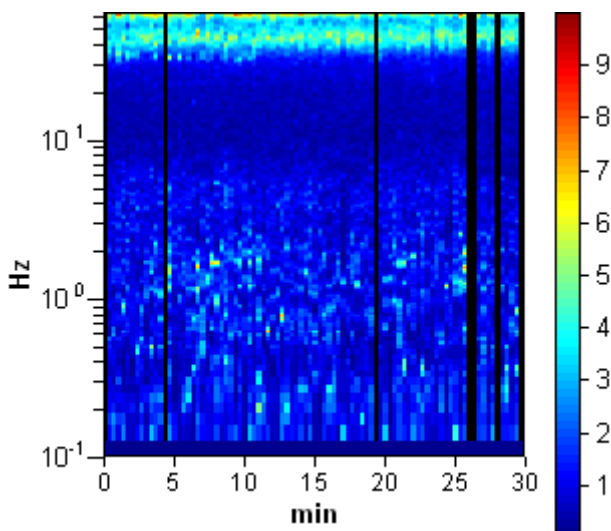
Trace length: 0h30'00".      Analyzed 92% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

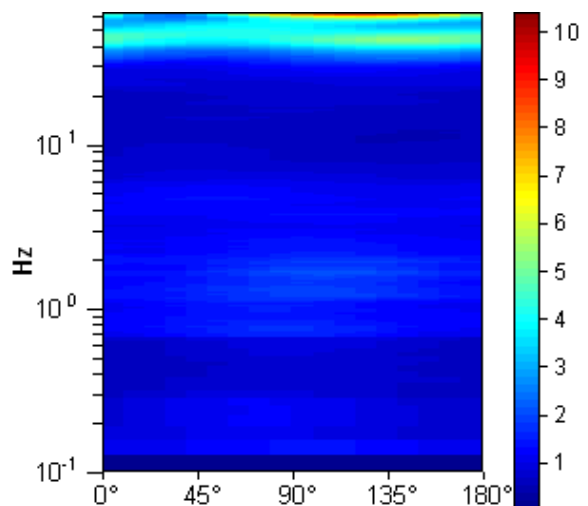
Max. H/V at  $1.59 \pm 0.1$  Hz. (In the range 0.0 - 30.0 Hz).



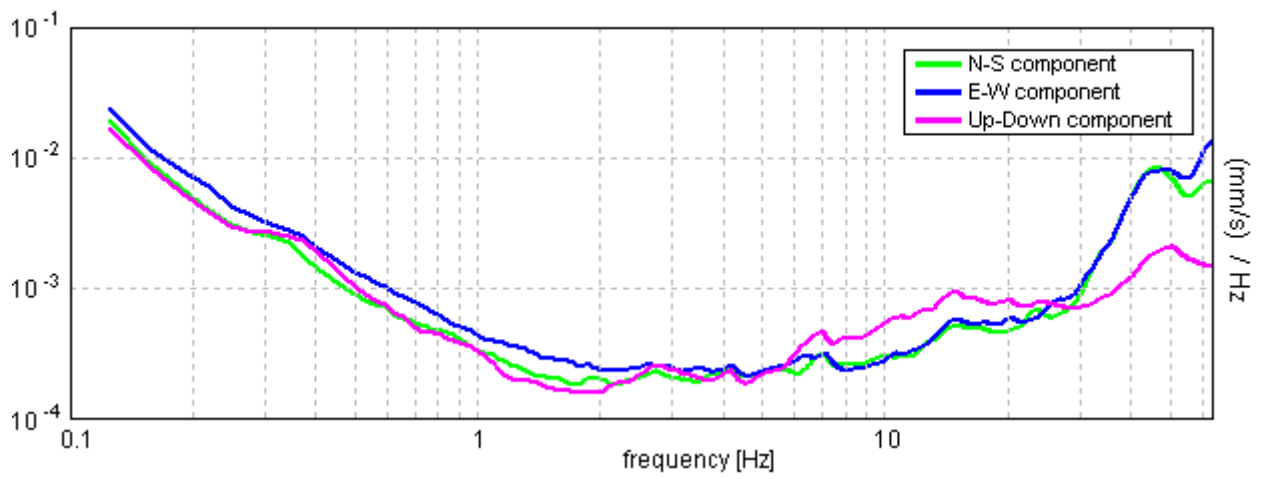
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.59 ± 0.1 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.59 > 0.50	OK	
$n_c(f_0) > 200$	2645.6 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 78 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	6.063 Hz	OK	
$A_0 > 2$	1.74 > 2		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03011  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.04799 < 0.15938$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1295 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0102				
<b>Coordinate</b>	<i>UTM</i>	4221043.42	N	354373.66	E
	<i>Gauss Boaga</i>	4221041.827	N	2374368.603	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	12/05/2014, 11:24				
<b>Nome file</b>	0102				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



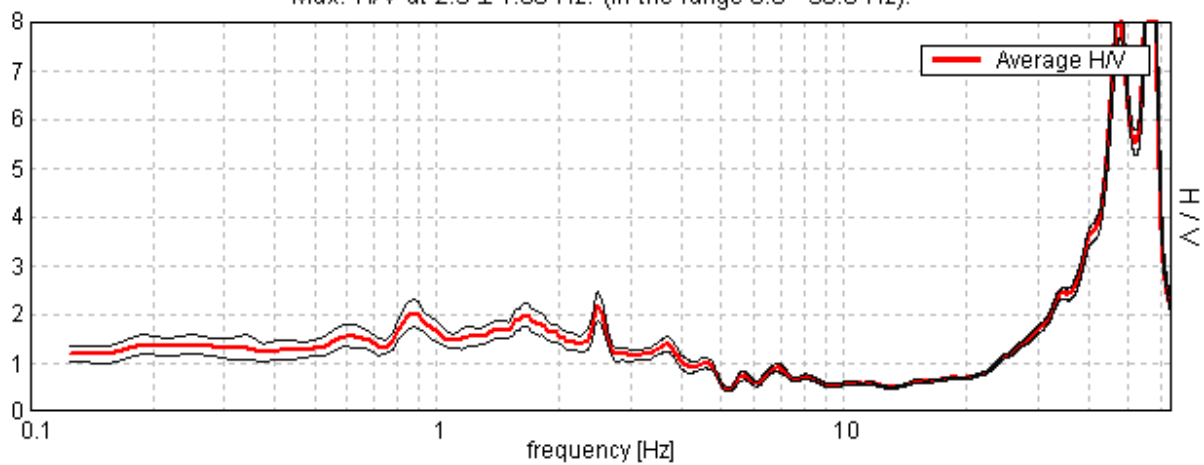
## TRIVELSICILIA PALERMO, PALERMO 0102

Start recording: 12/05/14 11:25:07      End recording: 12/05/14 11:55:08  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

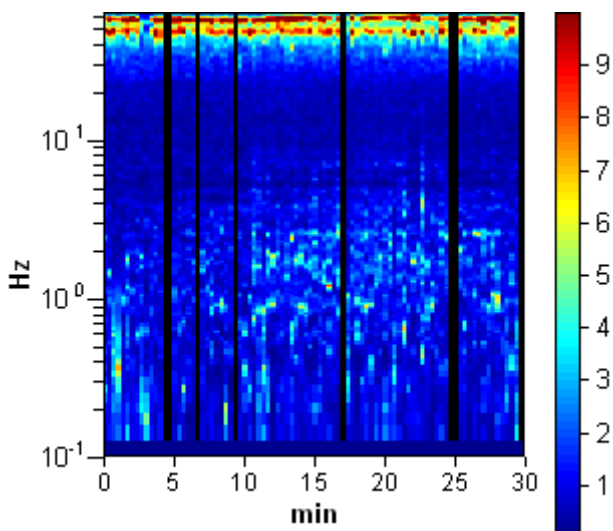
Trace length: 0h30'00".      Analyzed 91% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

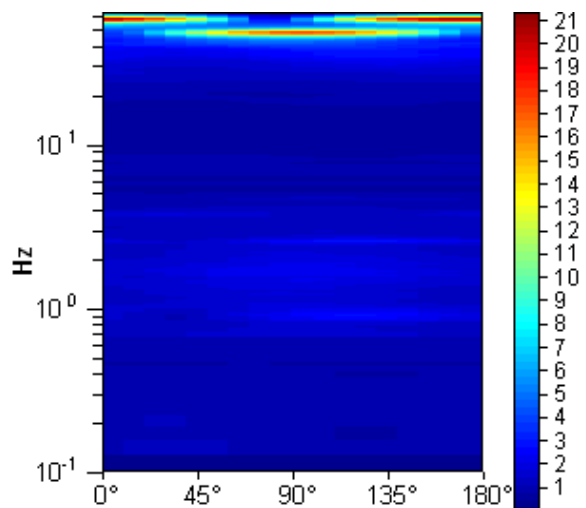
Max. H/V at  $2.5 \pm 1.68$  Hz. (In the range 0.0 - 30.0 Hz).



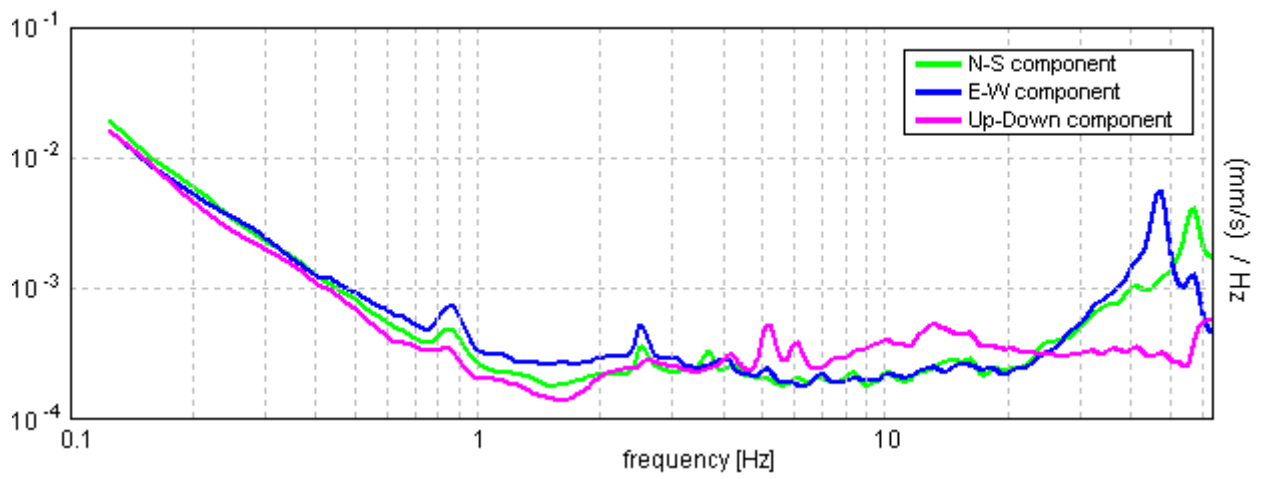
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $2.5 \pm 1.68$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$2.50 > 0.50$	OK	
$n_c(f_0) > 200$	$4100.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 121 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	3.969 Hz	OK	
$A_0 > 2$	$2.17 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.33511  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.83778 < 0.125$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.1477 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0103			
<b>Coordinate</b>	UTM	4221004.89	N	354804.08	E
	Gauss Boaga	4221003.300	N	2374799.042	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		12/05/2014, 10:46			
<b>Nome file</b>		0103			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	
<b>Nota</b>		Base sismica ripetuta per l'inattendibilità del segnale			

**Documentazione fotografica**



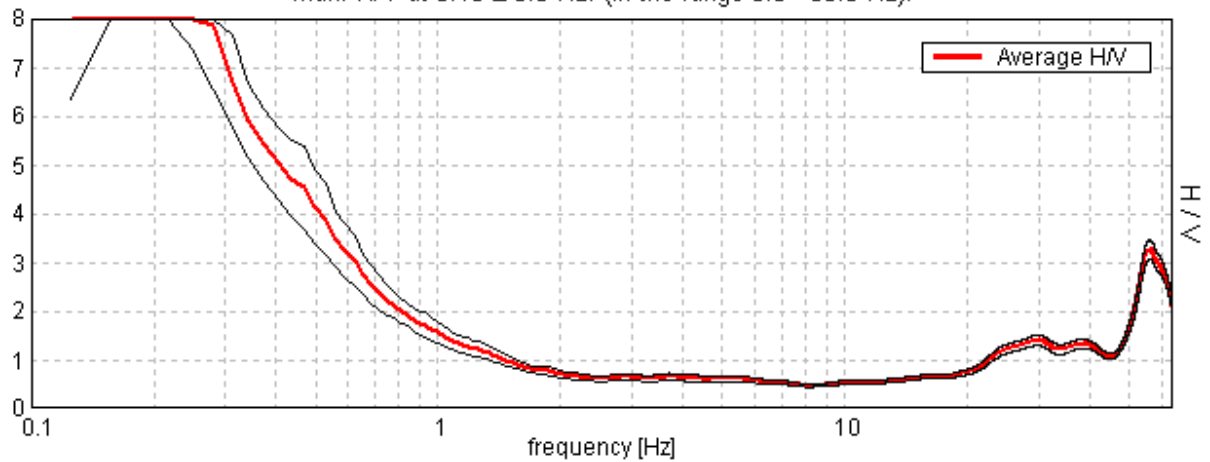
## TRIVELSICILIA PALERMO, PALERMO 0103

Start recording: 12/05/14 10:47:44      End recording: 12/05/14 11:17:45  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

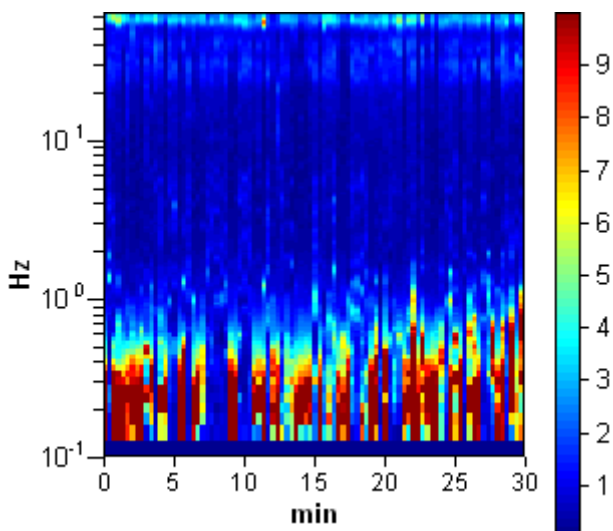
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 10%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

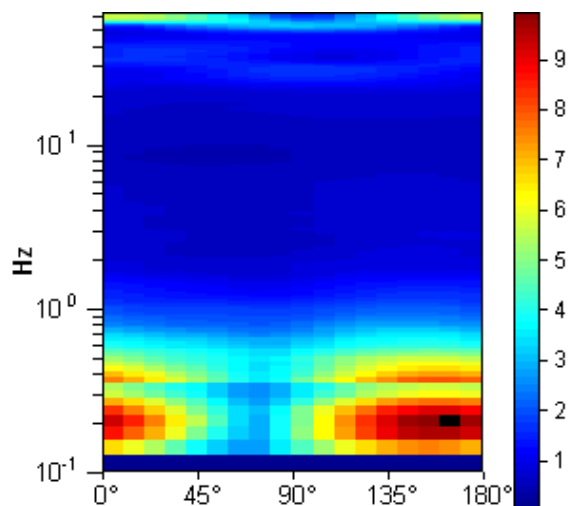
Max. H/V at  $0.16 \pm 0.0$  Hz. (In the range 0.0 - 30.0 Hz).



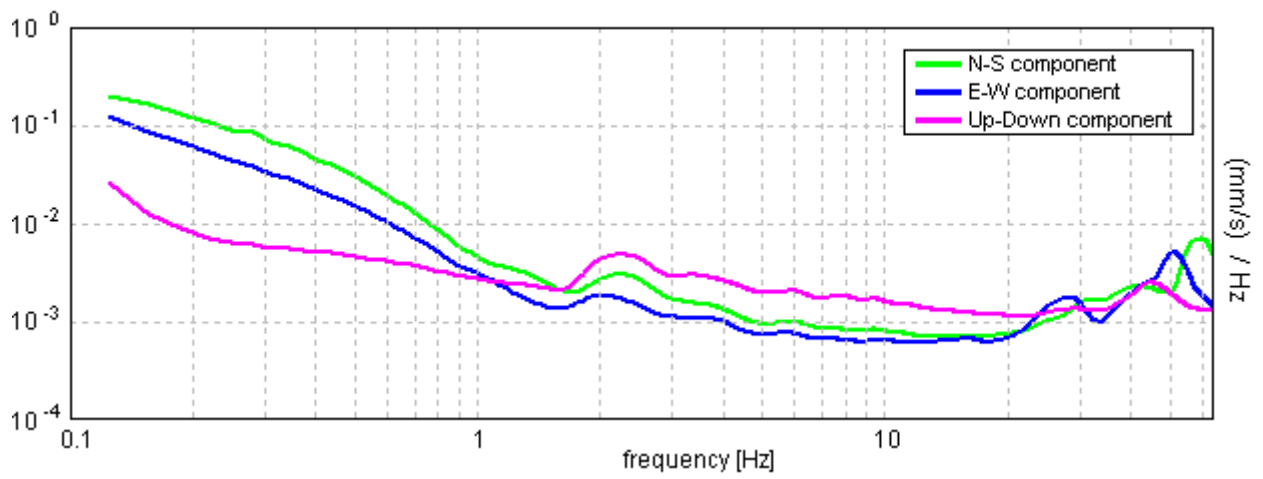
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 0.16 ± 0.0 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.16 > 0.50		<b>NO</b>
$n_c(f_0) > 200$	281.3 > 200	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 8 times	<b>OK</b>	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.094 Hz	<b>OK</b>	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	0.375 Hz	<b>OK</b>	
$A_0 > 2$	10.94 > 2	<b>OK</b>	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.0  < 0.05$	<b>OK</b>	
$\sigma_f < \varepsilon(f_0)$	0.0 < 0.03906	<b>OK</b>	
$\sigma_A(f_0) < \theta(f_0)$	1.2211 < 3.0	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0103 bis			
<b>Coordinate</b>	UTM	4221054.69	N	354553.37	E
	Gauss Boaga	4221053.099	N	2374548.322	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		16/06/2014, 12:20			
<b>Nome file</b>		0103 bis			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>Si</b>		
		<b>Altro</b>	<b>No</b>		

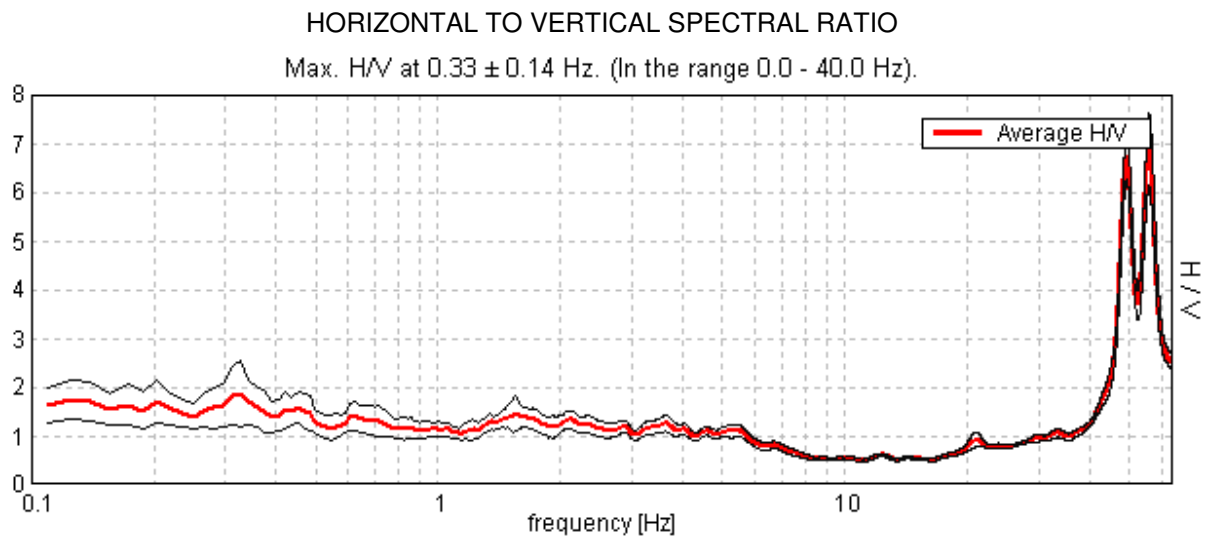
**Documentazione fotografica**



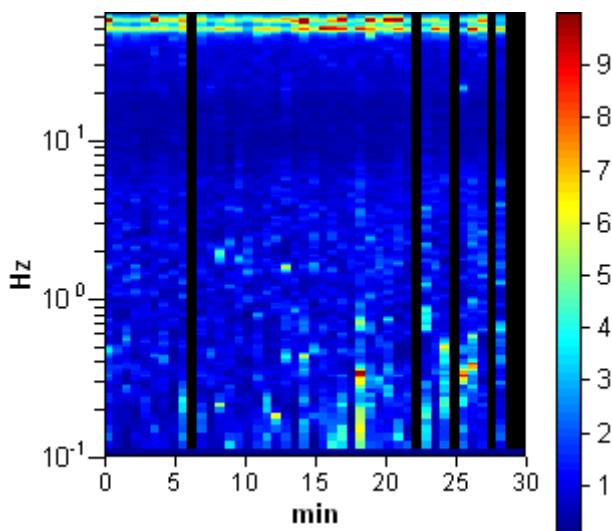
## TRIVEL SICILIA PALERMO, PALERMO 0103 BIS

Start recording: 16/06/14 12:24:21      End recording: 16/06/14 12:54:22  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

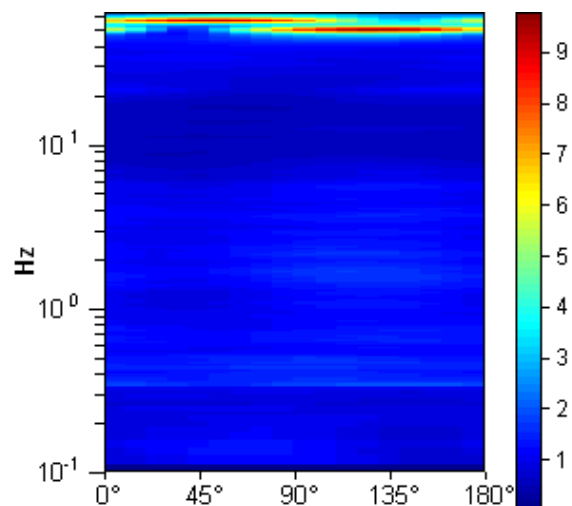
Trace length: 0h30'00".      Analyzed 87% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 40 s  
Smoothing window: Triangular window  
Smoothing: 5%



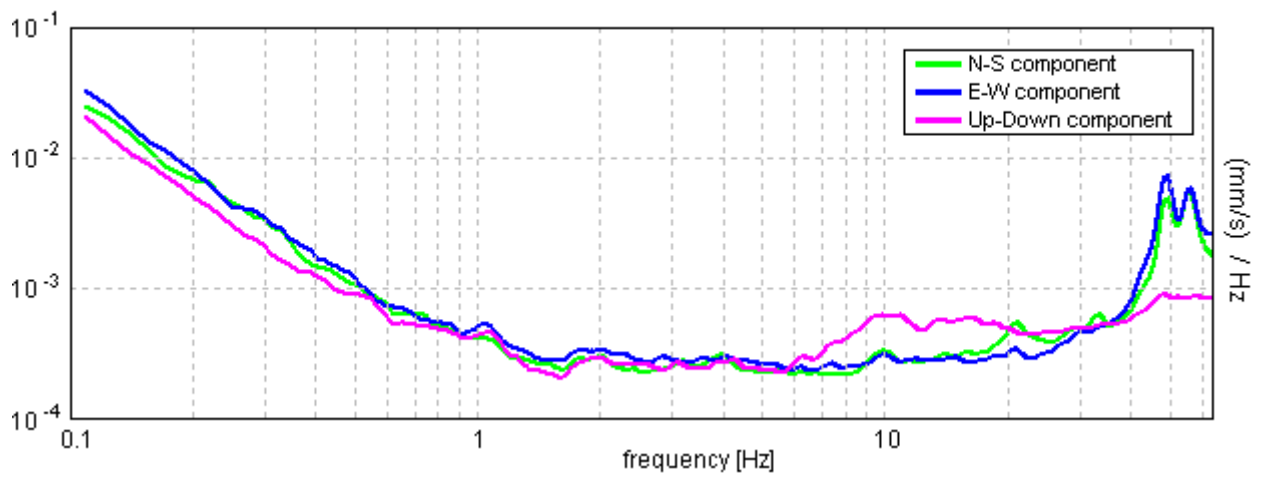
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $0.33 \pm 0.14$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.33 > 0.25$	OK	
$n_c(f_0) > 200$	$511.9 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 32 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.094 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$1.85 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.20412  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.06698 < 0.06563$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.3258 < 2.5$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0104			
<b>Coordinate</b>	UTM	4221045.09	N	355143.36	E
	Gauss Boaga	4221043.506	N	2375138.339	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		09/05/2014, 10:52			
<b>Nome file</b>		0104			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

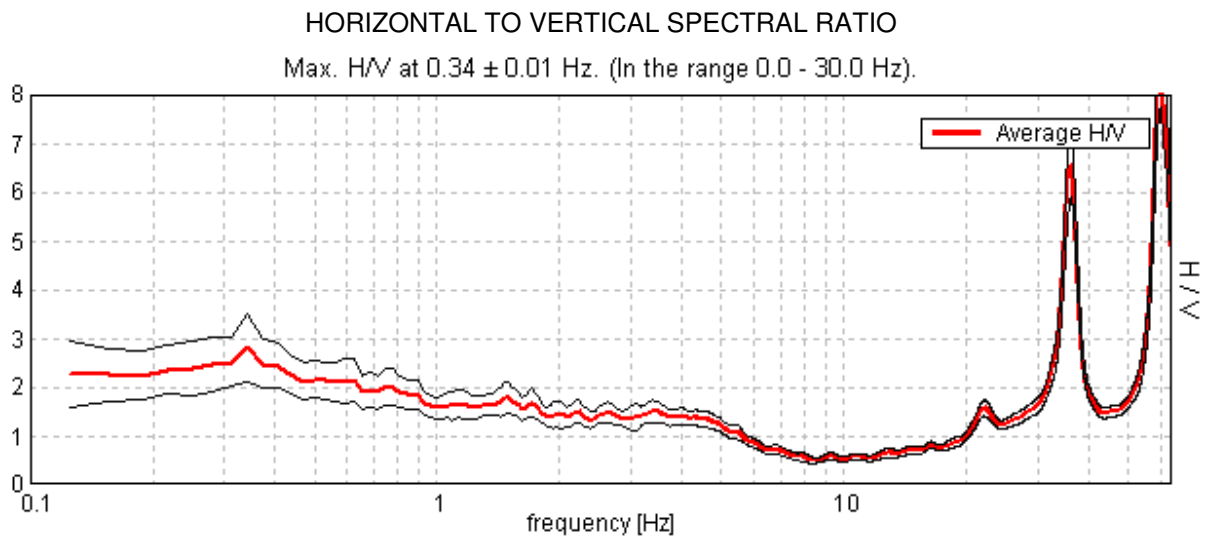
**Documentazione fotografica**



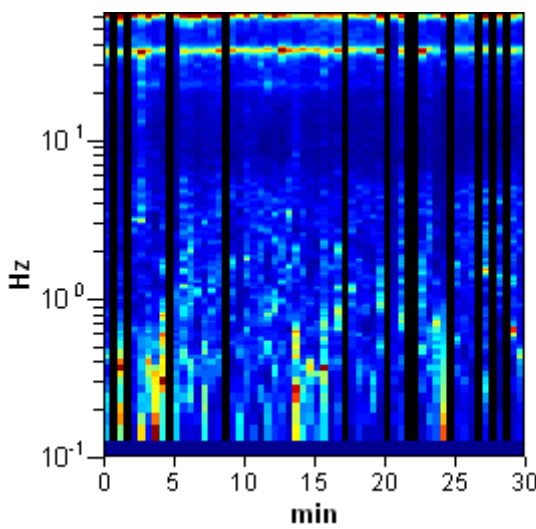
## TRIVELSICILIA PALERMO, PALERMO 0104

Start recording: 09/05/14 10:53:27      End recording: 09/05/14 11:23:28  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

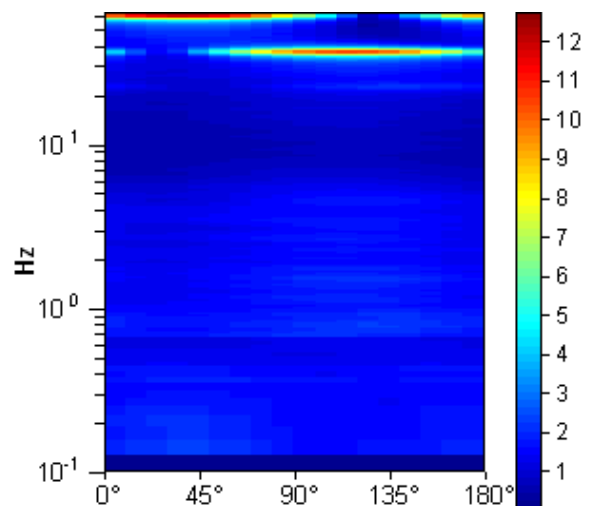
Trace length: 0h30'00".      Analyzed 80% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 30 s  
Smoothing window: Triangular window  
Smoothing: 5%



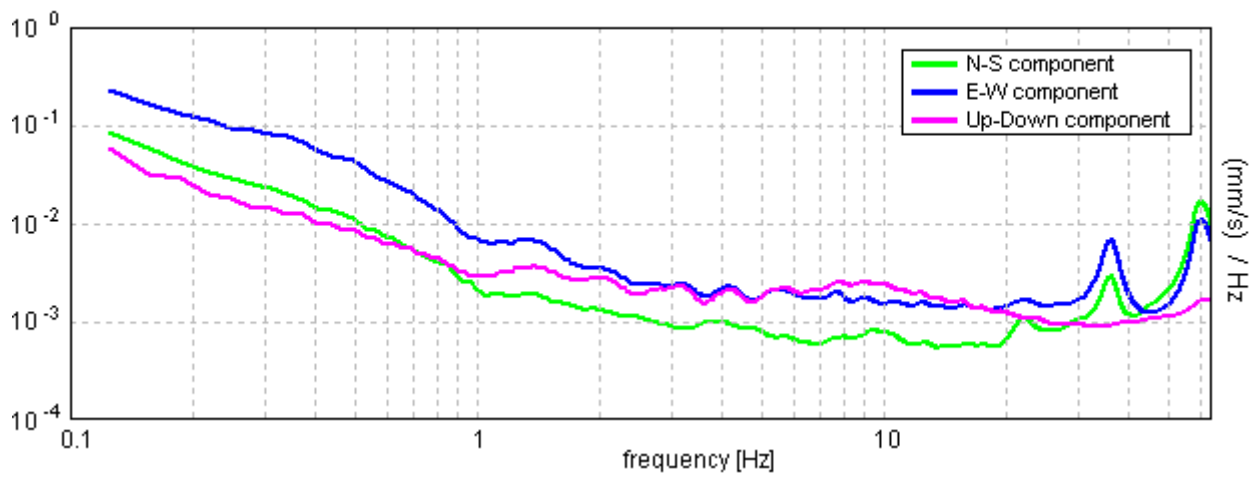
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $0.34 \pm 0.01$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.34 > 0.33$	OK	
$n_c(f_0) > 200$	$495.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 18 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.094 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$2.81 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01379  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.00474 < 0.06875$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.3391 < 2.5$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>	0105			
<b>Coordinate</b>	UTM	4221044.71	N	355511.14 E
	Gauss Boaga	4221043.131	N	2375506.136 E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®			
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>	09/05/2014, 11:30			
<b>Nome file</b>	0105			
<b>Durata</b>	30 min			
<b>Frequenza campionamento</b>	128 Hz			
<b>Accoppiamento strumento-suolo</b>	Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>	No		
	<b>Pioggia</b>	No		
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si		
	<b>Pedoni</b>	Si		
	<b>Altro</b>	No		

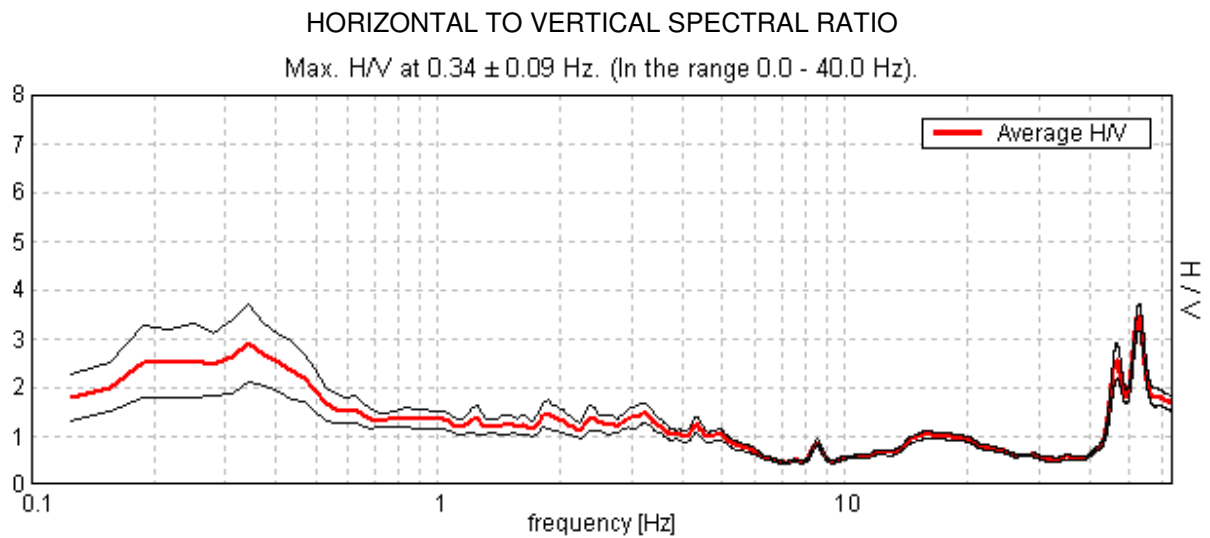
**Documentazione fotografica**



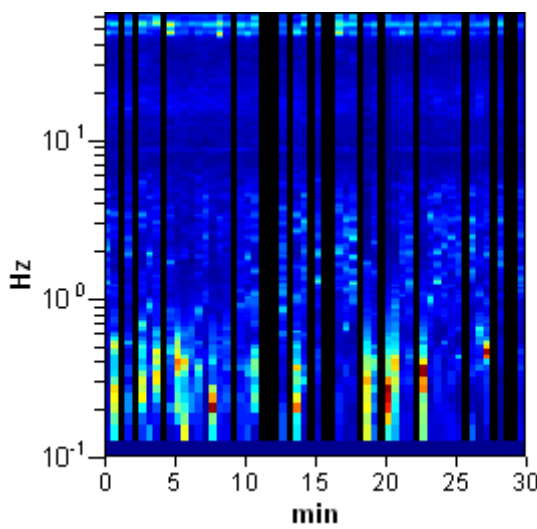
## TRIVELSICILIA PALERMO, PALERMO 0105

Start recording: 09/05/14 11:31:56      End recording: 09/05/14 12:01:57  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

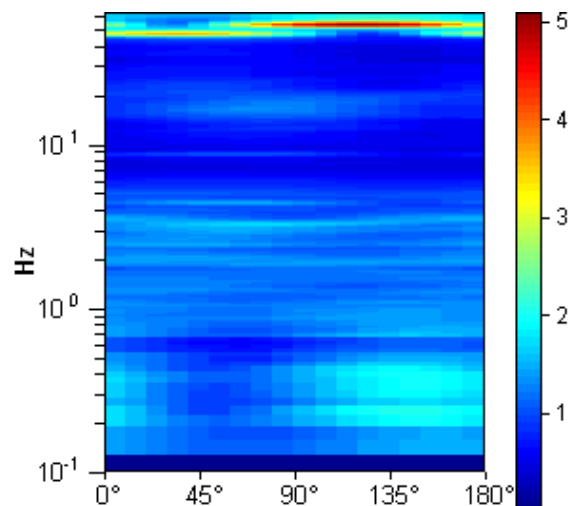
Trace length: 0h30'00".      Analyzed 70% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 30 s  
Smoothing window: Triangular window  
Smoothing: 5%



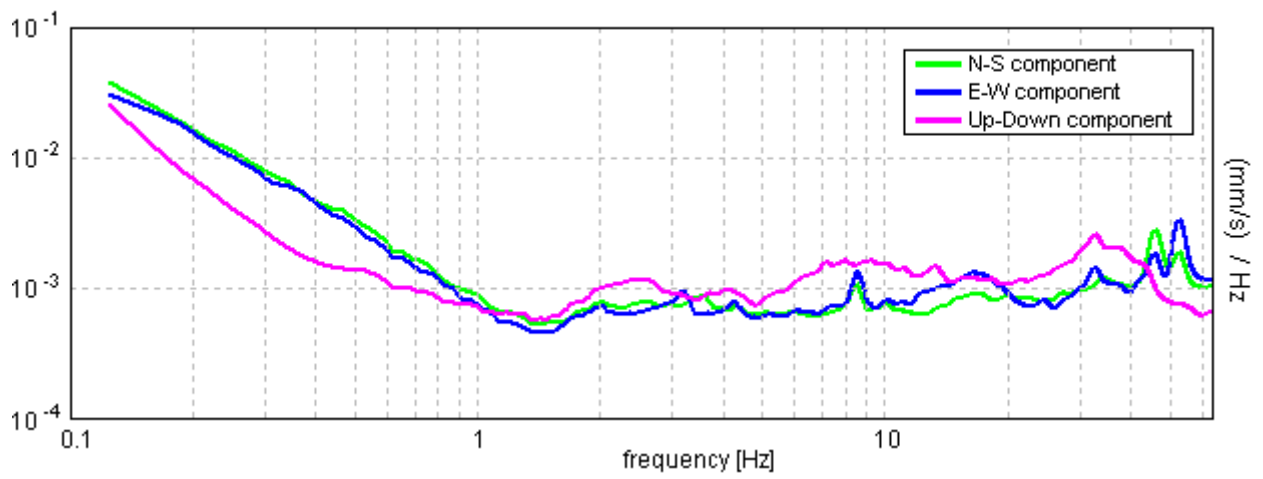
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 0.34 ± 0.09 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.34 > 0.33	OK	
$n_c(f_0) > 200$	433.1 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 18 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.094 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	0.656 Hz	OK	
$A_0 > 2$	2.91 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.12189  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	0.0419 < 0.06875	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.3903 < 2.5	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>				
<b>Nome base sismica</b>	0106				
<b>Coordinate</b>	<i>UTM</i>	4221058.43	N	355954.67	E
	<i>Gauss Boaga</i>	4221056.857	N	2375949.687	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	09/05/2014, 12:23				
<b>Nome file</b>	0106				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



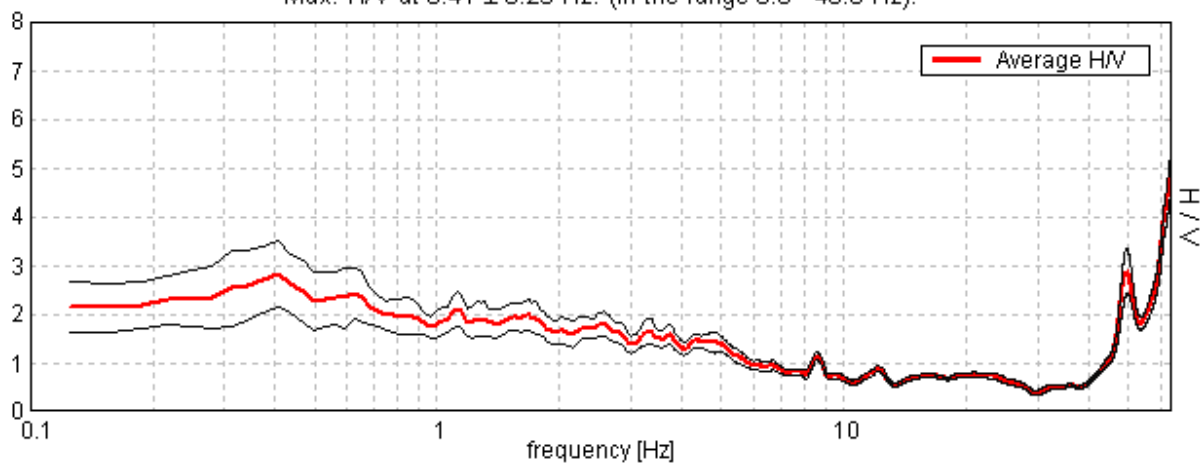
## TRIVELSICILIA PALERMO, PALERMO 0106

Start recording: 09/05/14 12:24:37      End recording: 09/05/14 12:54:38  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

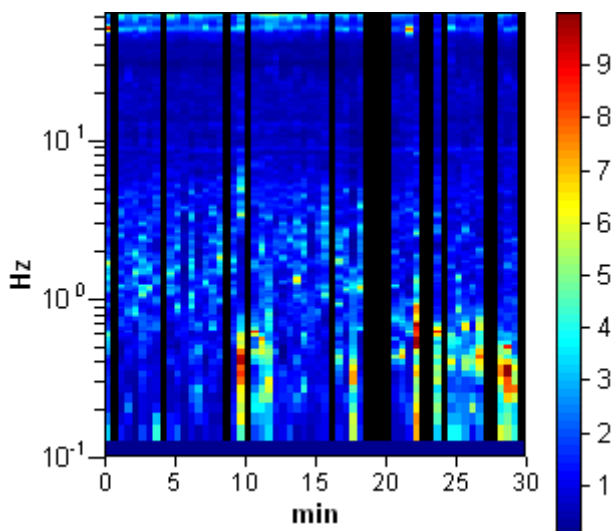
Trace length: 0h30'00".      Analyzed 75% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 30 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

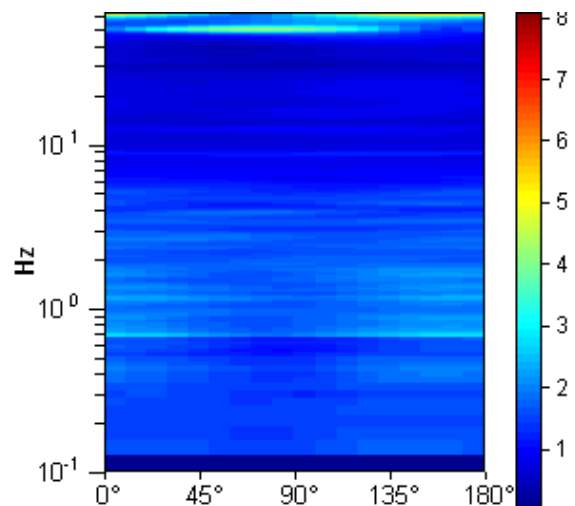
Max. H/V at  $0.41 \pm 0.25$  Hz. (In the range 0.0 - 40.0 Hz).



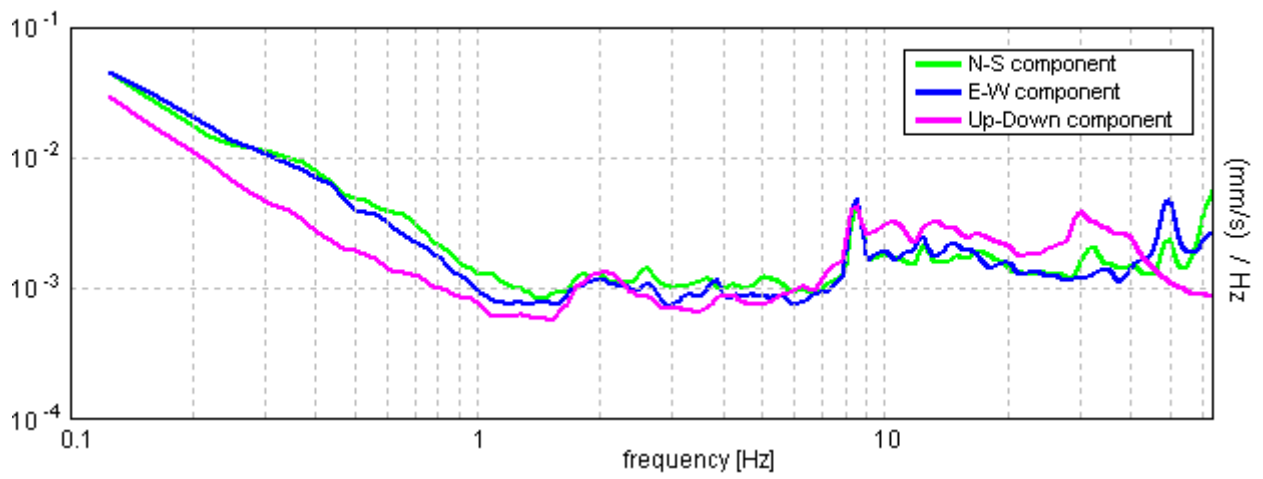
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $0.41 \pm 0.25$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.41 > 0.33$	OK	
$n_c(f_0) > 200$	$548.4 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 20 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.094 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$2.81 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.30287  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.12304 < 0.08125$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.3328 < 2.5$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0107			
<b>Coordinate</b>	UTM	4221072.68	N	356368.98	E
	Gauss Boaga	4221071.113	N	2376364.017	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		09/05/2014, 12:58			
<b>Nome file</b>		0107			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

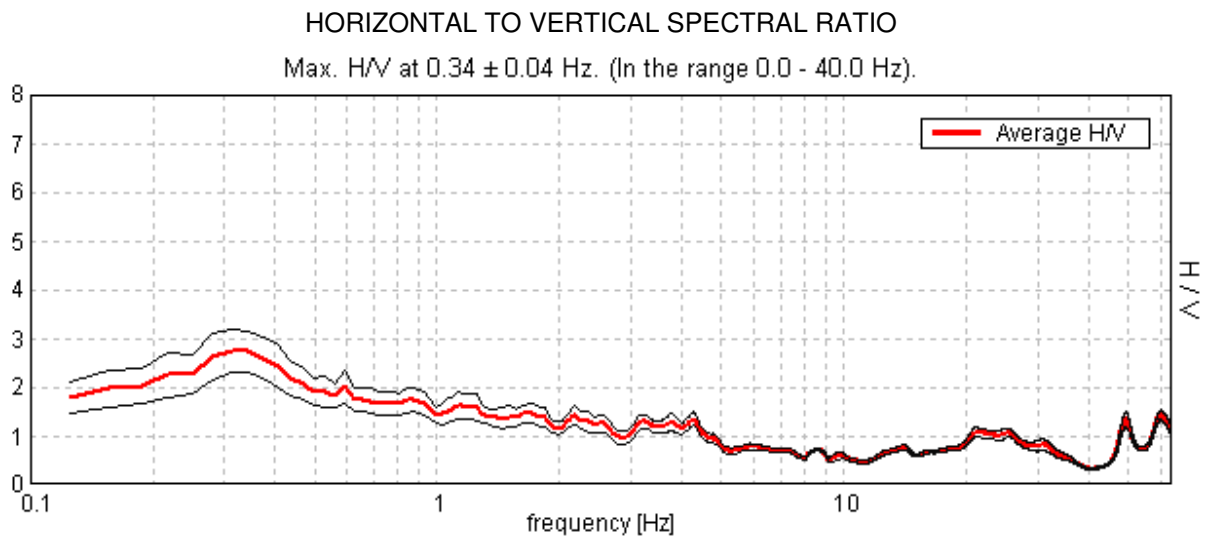
**Documentazione fotografica**



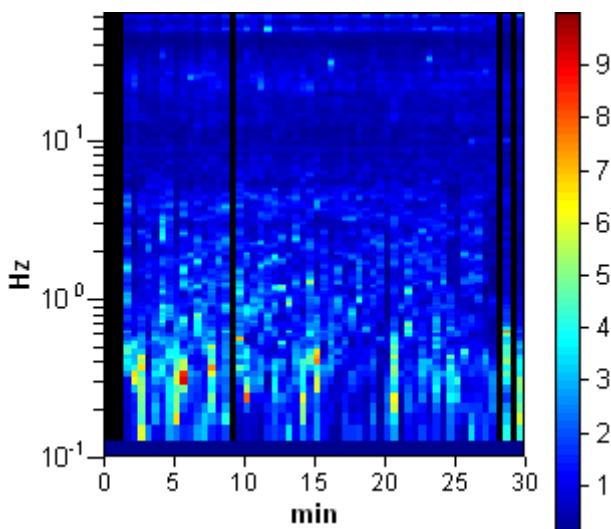
## TRIVELSICILIA PALERMO, PALERMO 0107

Start recording: 09/05/14 12:59:51      End recording: 09/05/14 13:29:52  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

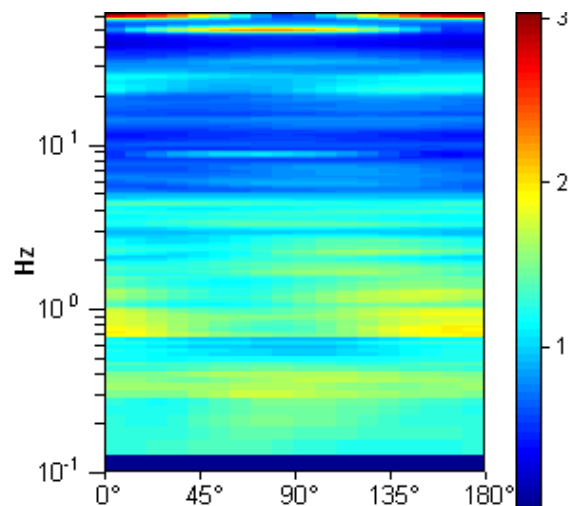
Trace length: 0h30'00".      Analyzed 90% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 30 s  
Smoothing window: Triangular window  
Smoothing: 5%



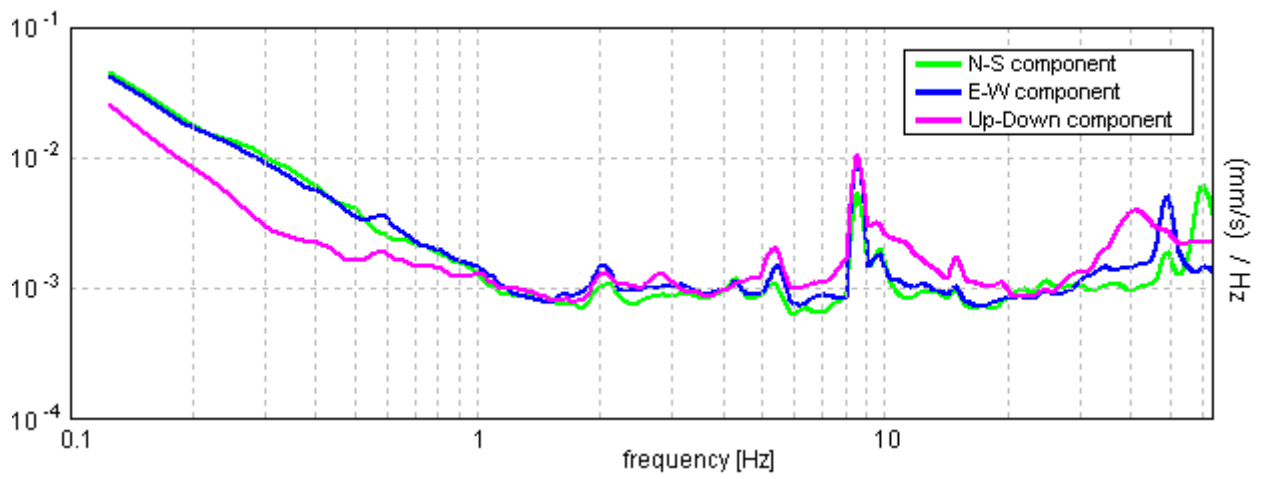
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $0.34 \pm 0.04$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.34 > 0.33$	OK	
$n_c(f_0) > 200$	$556.9 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 18 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.094 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$2.74 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.0627  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.02155 < 0.06875$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2065 < 2.5$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

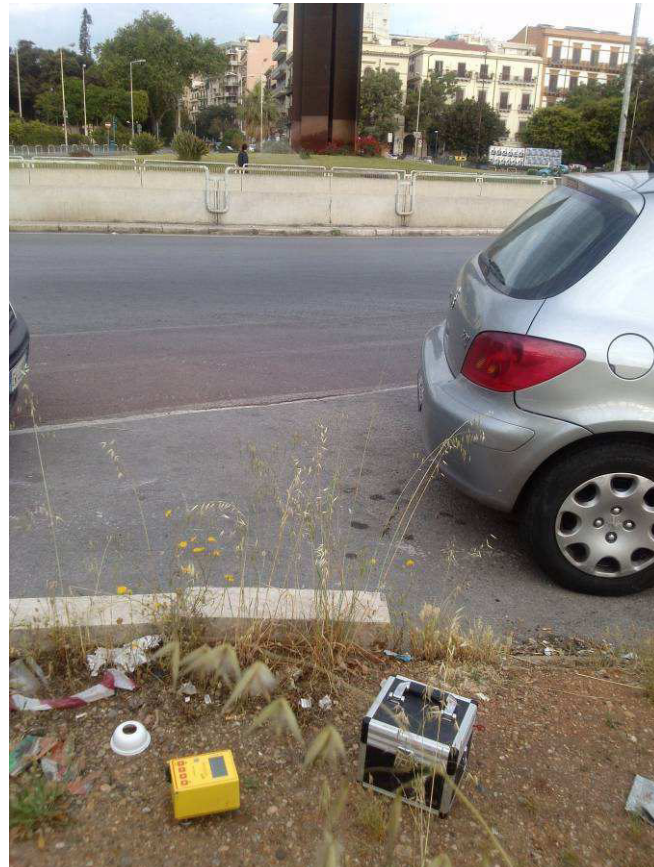


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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0108			
<b>Coordinate</b>	UTM	4220690.36	N	356717.85	E
	Gauss Boaga	4220688.781	N	2376712.890	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		12/05/2014, 07:35			
<b>Nome file</b>		0108			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>Si</b>		
		<b>Altro</b>	<b>No</b>		

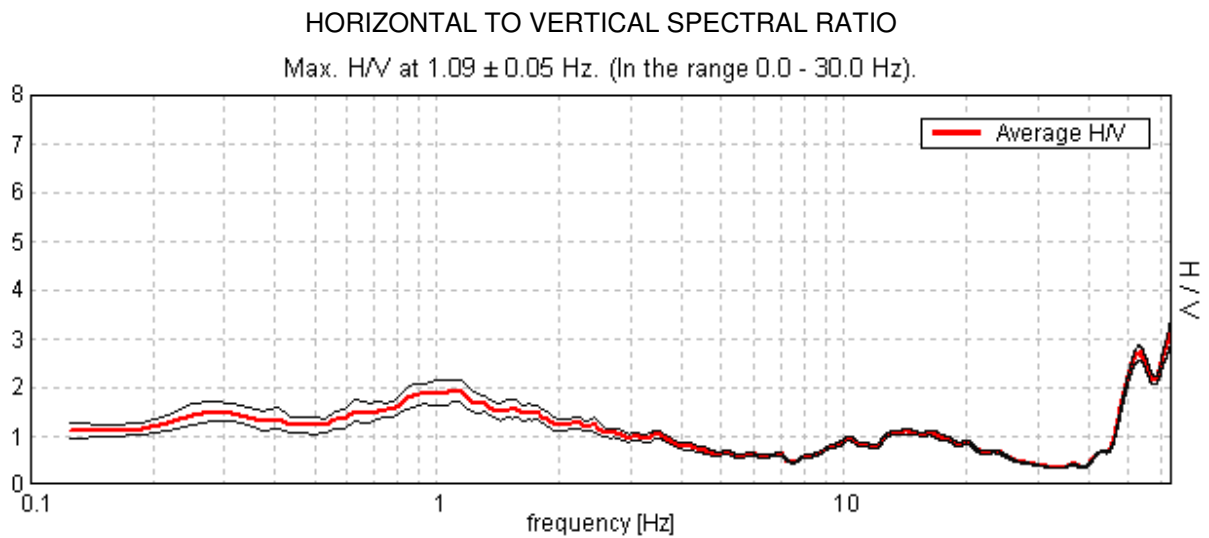
**Documentazione fotografica**



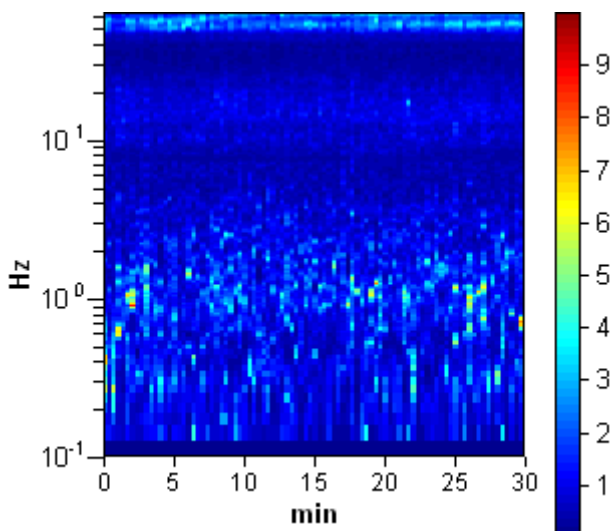
## TRIVELSICILIA PALERMO, PALERMO 0108

Start recording: 12/05/14 07:35:53      End recording: 12/05/14 08:05:54  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

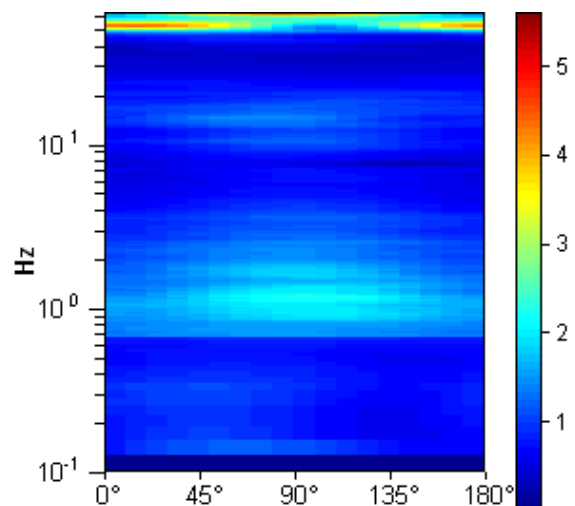
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



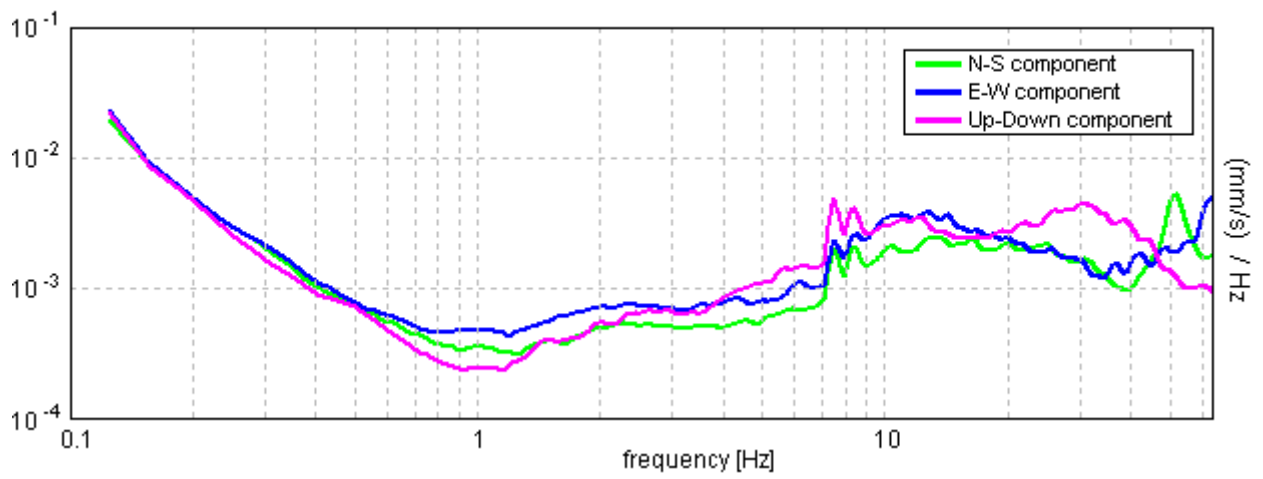
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.09 ± 0.05 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.09 > 0.50	OK	
$n_c(f_0) > 200$	1968.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 54 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.938 Hz	OK	
$A_0 > 2$	1.92 > 2		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02358  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02579 < 0.10938$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.113 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0109				
<b>Coordinate</b>	<i>UTM</i>	4220681.52	N	356345.02	E
	<i>Gauss Boaga</i>	4220679.936	N	2376340.043	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	12/05/2014, 08:09				
<b>Nome file</b>	0109				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



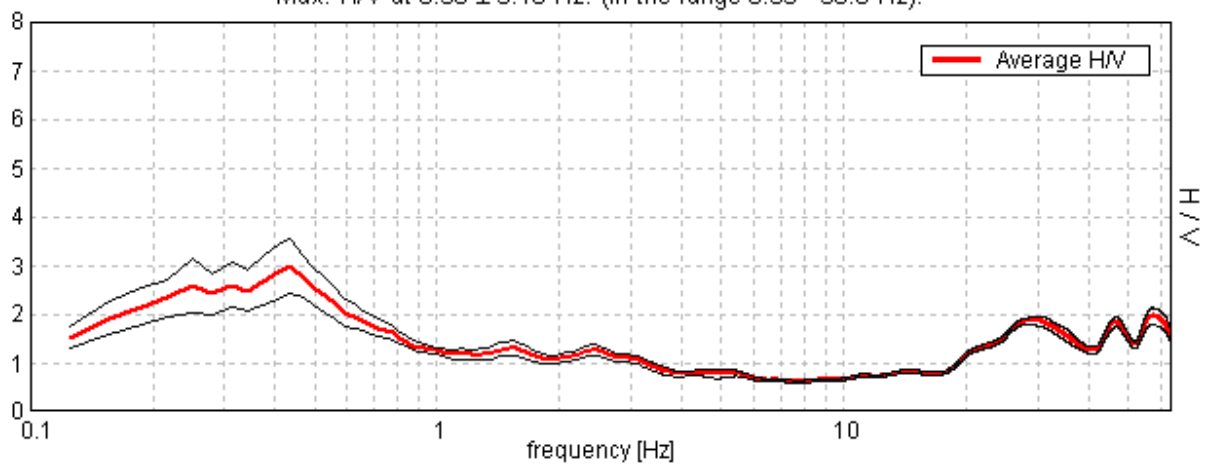
## TRIVELSICILIA PALERMO, PALERMO 0109

Start recording: 12/05/14 08:10:17      End recording: 12/05/14 08:40:18  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

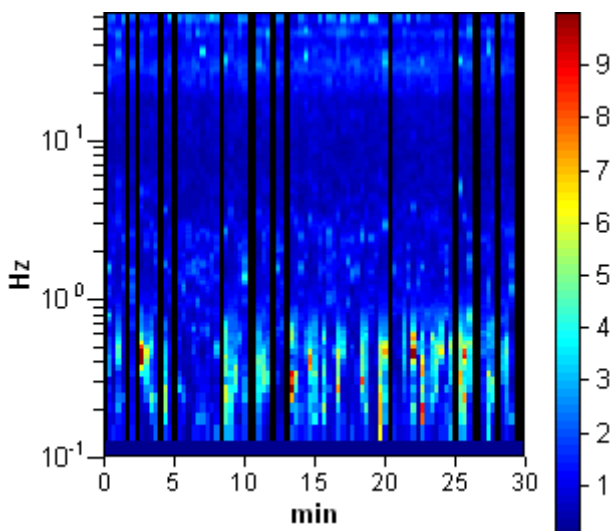
Trace length: 0h30'00".      Analyzed 81% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 10%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

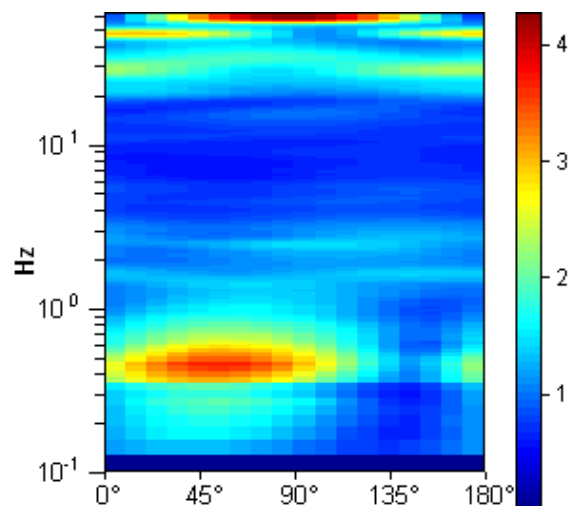
Max. H/V at  $0.56 \pm 3.18$  Hz. (In the range 0.55 - 30.0 Hz).



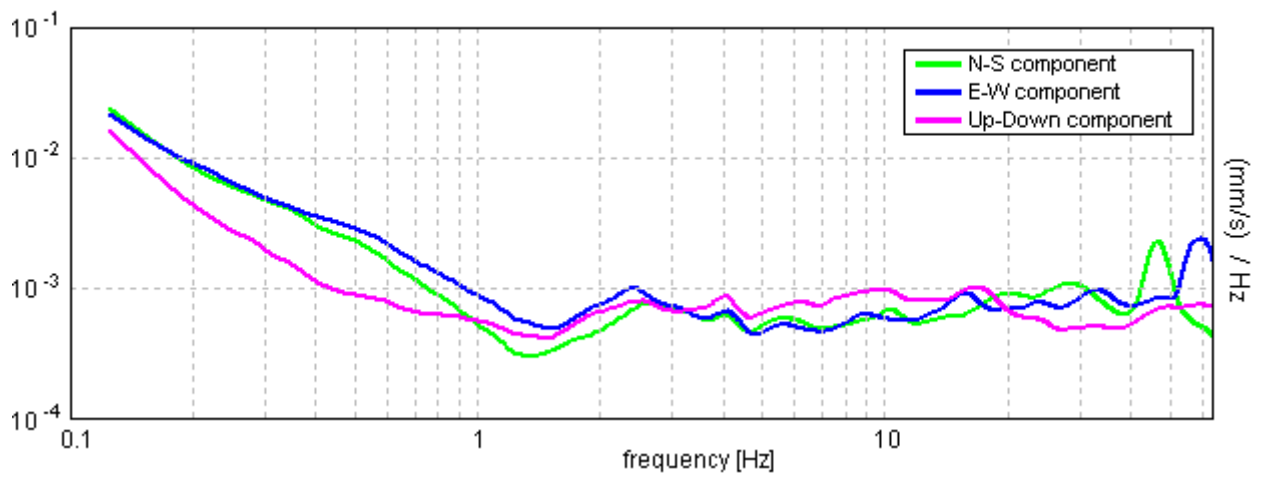
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $0.56 \pm 3.18$  Hz. (in the range 0.55 - 30.0 Hz).**

<b>Criteria for a reliable HVSR curve</b> [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	$0.56 > 0.50$	<b>OK</b>	
$n_c(f_0) > 200$	$821.3 > 200$	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 28 times	<b>OK</b>	
<b>Criteria for a clear HVSR peak</b> [At least 5 out of 6 should be fulfilled]			
<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.781 Hz	<b>OK</b>	
$A_0 > 2$	$2.22 > 2$	<b>OK</b>	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 2.8169  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	$1.58451 < 0.08438$		<b>NO</b>
$\sigma_A(f_0) < \theta(f_0)$	$0.1662 < 2.0$	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for $\sigma_f$ and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0110			
<b>Coordinate</b>	UTM	4220644.83	N	355979.01	E
	Gauss Boaga	4220643.240	N	2375974.014	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		12/05/2014, 08:46			
<b>Nome file</b>		0110			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

**Documentazione fotografica**



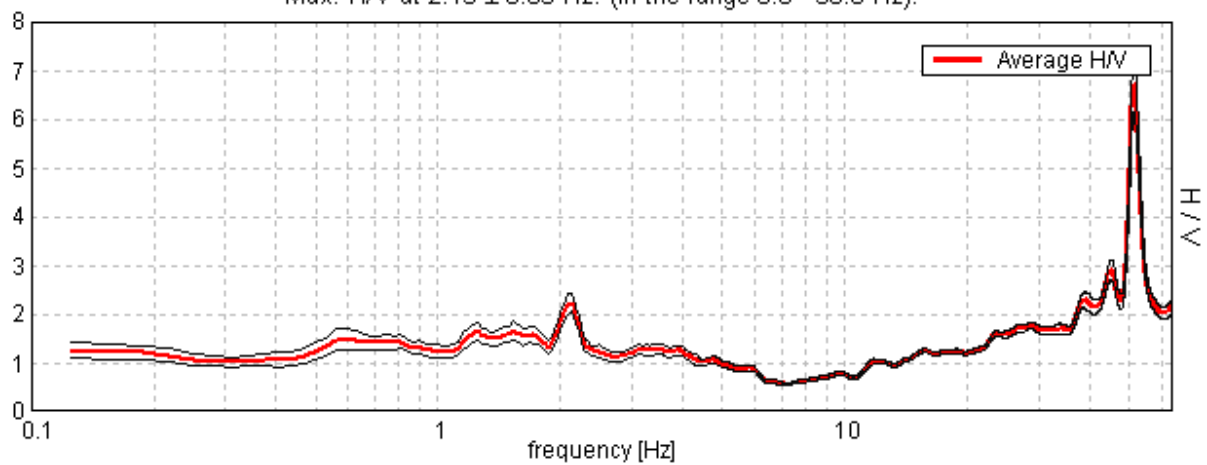
## TRIVELSICILIA PALERMO, PALERMO 0110

Start recording: 12/05/14 08:47:48      End recording: 12/05/14 09:17:49  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

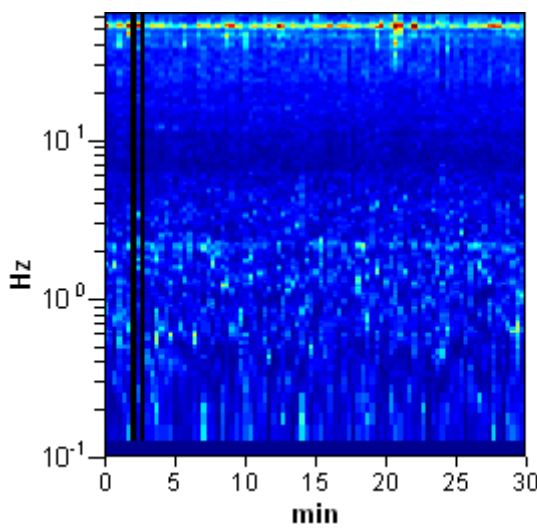
Trace length: 0h30'00".      Analyzed 98% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

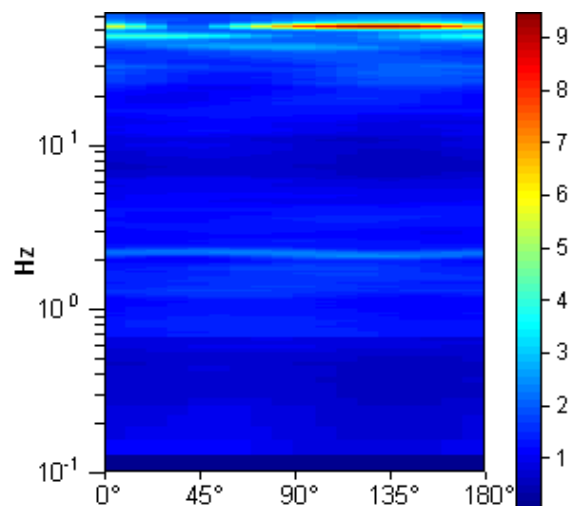
Max. H/V at  $2.13 \pm 0.03$  Hz. (In the range 0.0 - 30.0 Hz).



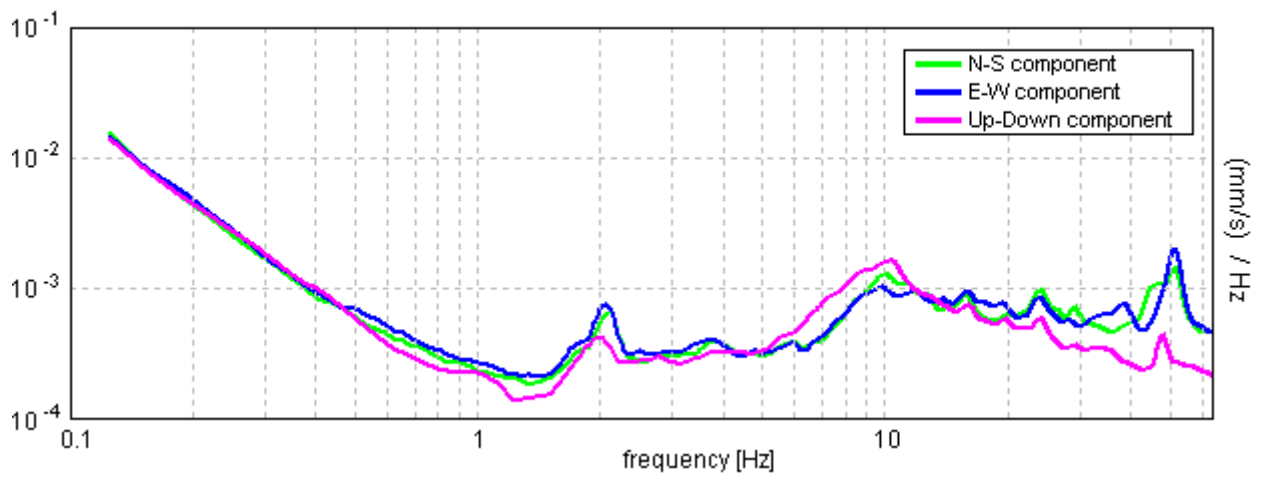
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 2.13 ± 0.03 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.13 > 0.50	OK	
$n_c(f_0) > 200$	3740.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 103 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.688 Hz	OK	
$A_0 > 2$	2.23 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00642  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01365 < 0.10625$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.0945 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0111			
<b>Coordinate</b>	UTM	4220674.65	N	355514.31	E
	Gauss Boaga	4220673.056	N	2375509.294	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		12/05/2014, 09:33			
<b>Nome file</b>		0111			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

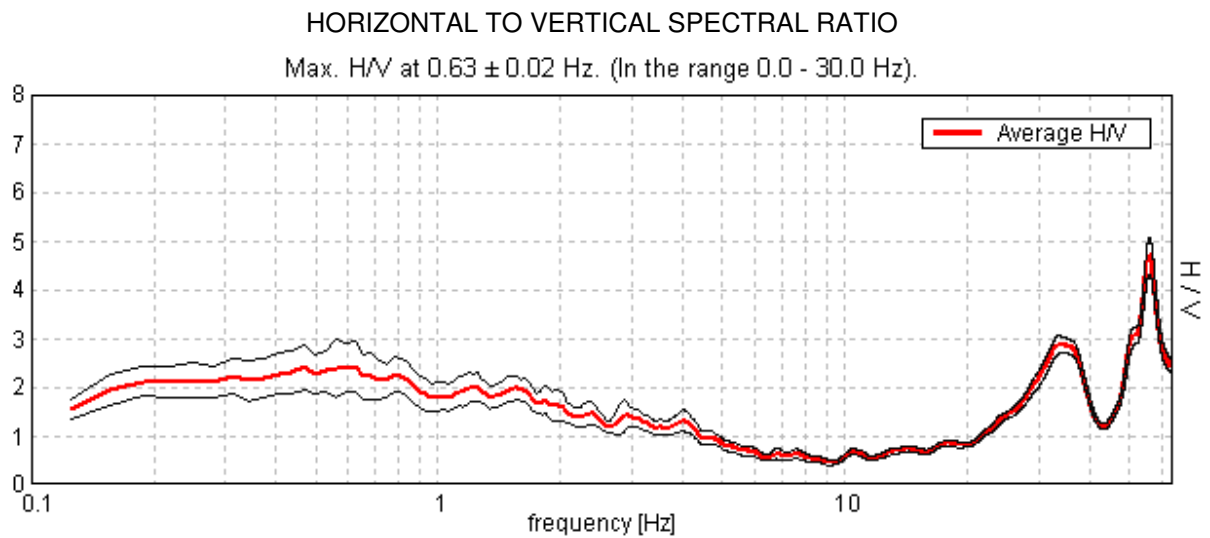
**Documentazione fotografica**



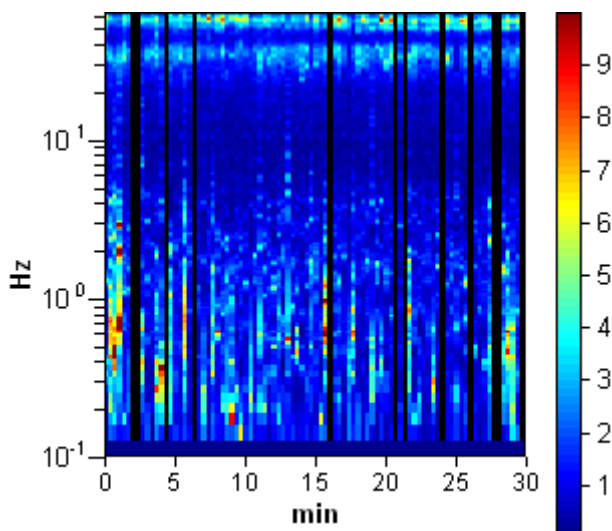
## TRIVELSICILIA PALERMO, PALERMO 0111

Start recording: 12/05/14 09:34:56      End recording: 12/05/14 10:04:57  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

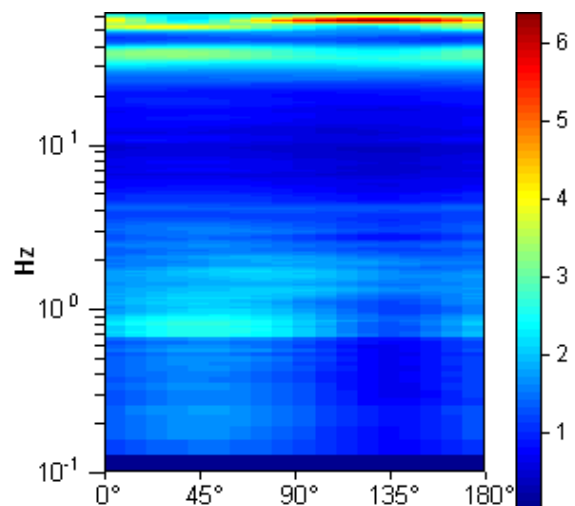
Trace length: 0h30'00".      Analyzed 87% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



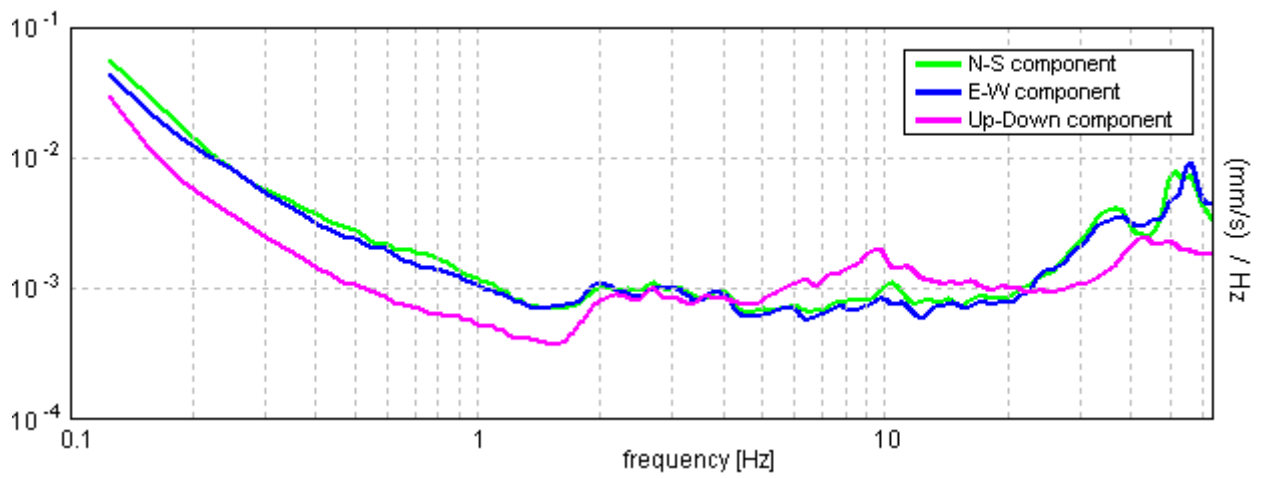
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $0.63 \pm 0.02$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.63 > 0.50$	OK	
$n_c(f_0) > 200$	$975.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 31 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$2.42 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01697  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01061 < 0.09375$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2638 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0112			
<b>Coordinate</b>	UTM	4220689.83	N	355180.88	E
	Gauss Boaga	4220688.232	N	2375175.849	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		12/05/2014, 10:10			
<b>Nome file</b>		0112			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

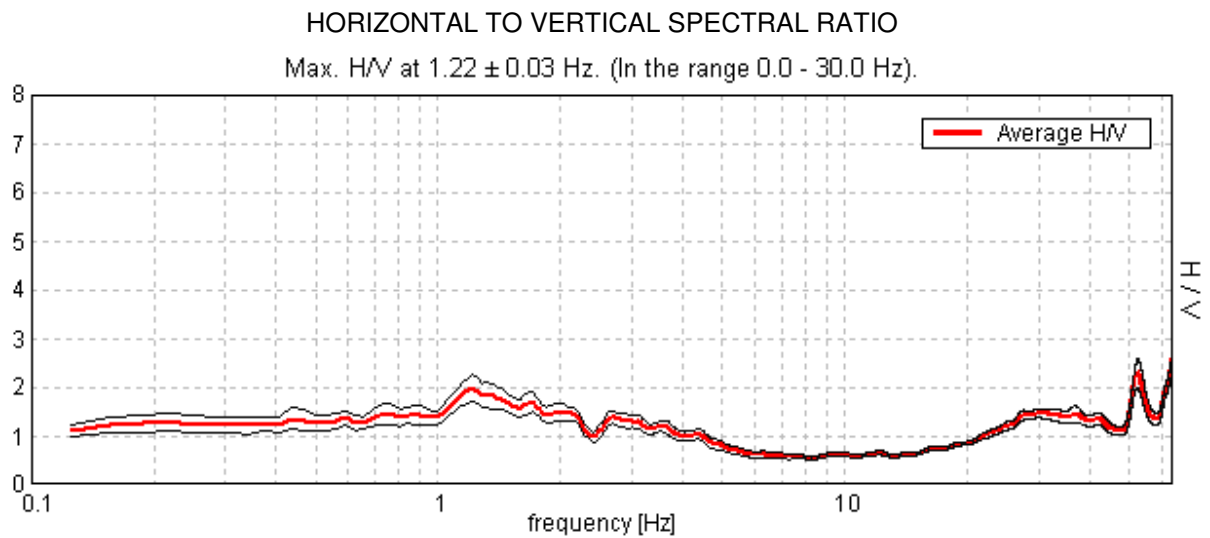
**Documentazione fotografica**



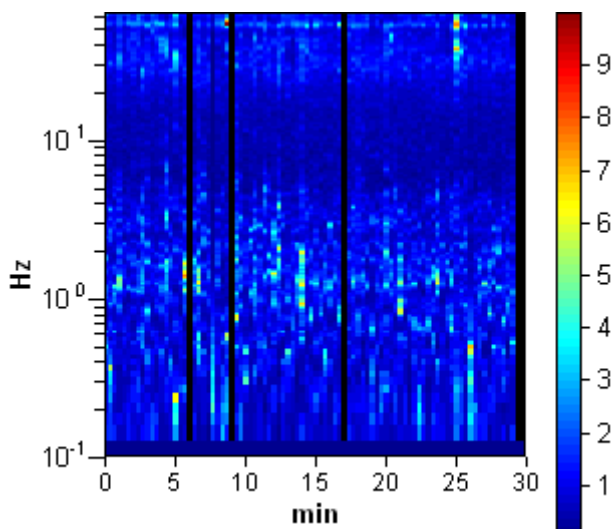
## TRIVELSICILIA PALERMO, PALERMO 0112

Start recording: 12/05/14 10:11:04      End recording: 12/05/14 10:41:05  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

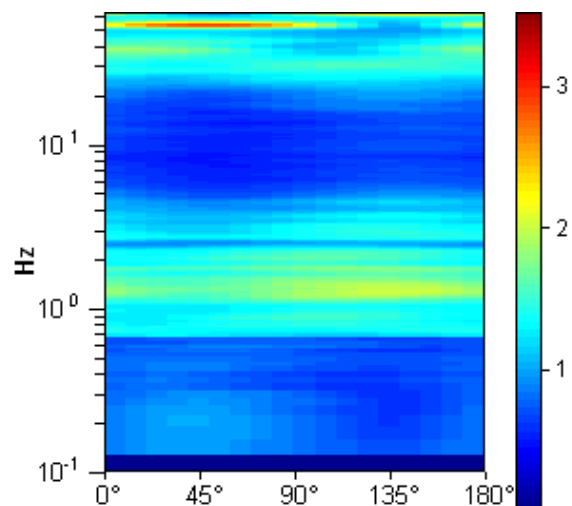
Trace length: 0h30'00".      Analyzed 94% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



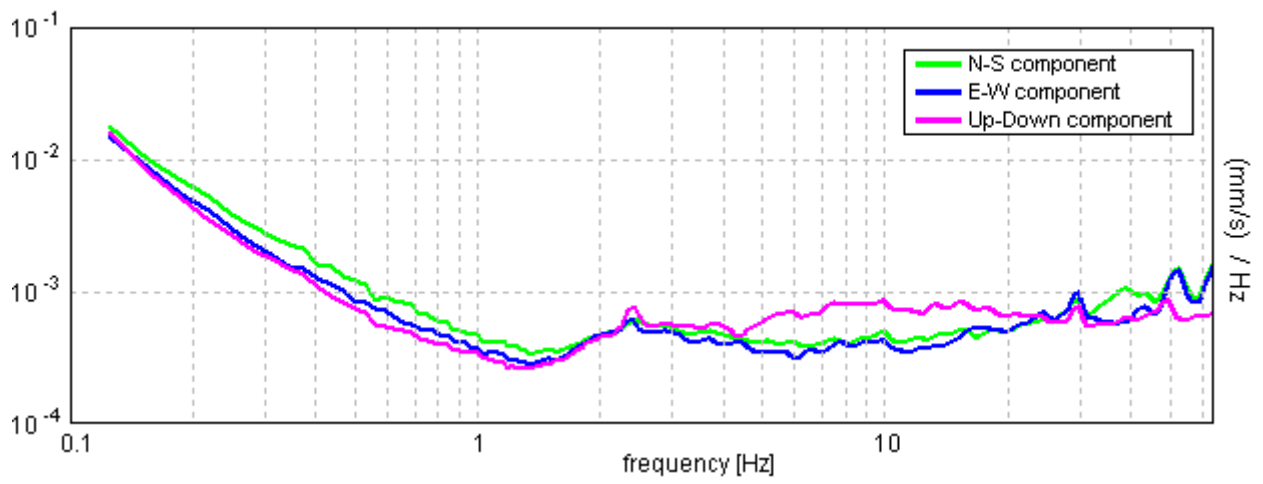
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.22 ± 0.03 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.22 > 0.50	OK	
$n_c(f_0) > 200$	2071.9 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 60 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.406 Hz	OK	
$A_0 > 2$	1.97 > 2		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01322  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.01611 < 0.12188	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1402 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0113			
<b>Coordinate</b>	UTM	4220659.05	N	354832.01	E
	Gauss Boaga	4220657.446	N	2374826.961	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		12/05/2014, 14:13			
<b>Nome file</b>		0113			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



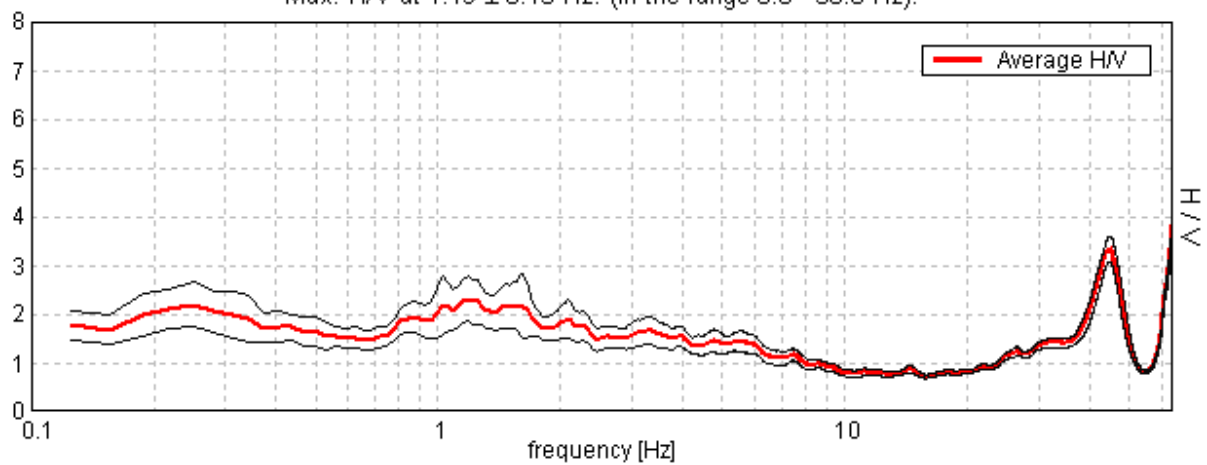
## TRIVELSICILIA PALERMO, PALERMO 0113

Start recording: 12/05/14 14:14:21      End recording: 12/05/14 14:44:22  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

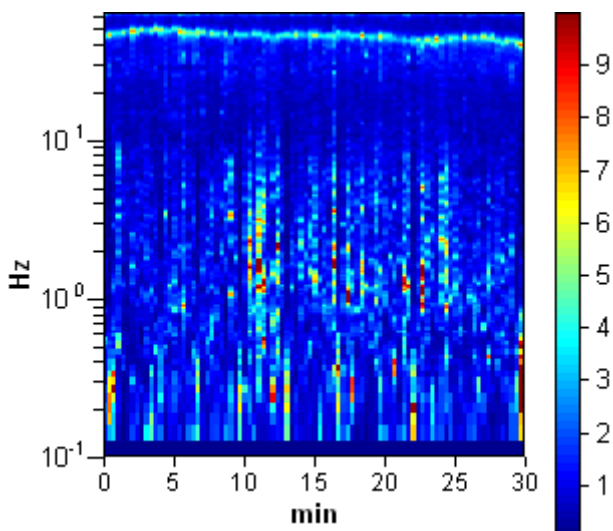
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

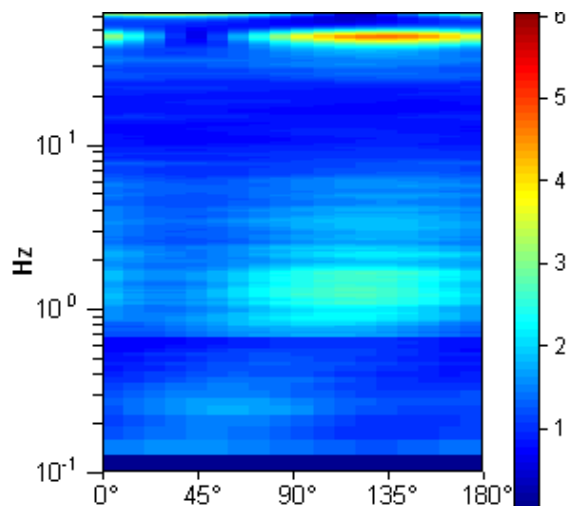
Max. H/V at  $1.19 \pm 0.15$  Hz. (In the range 0.0 - 30.0 Hz).



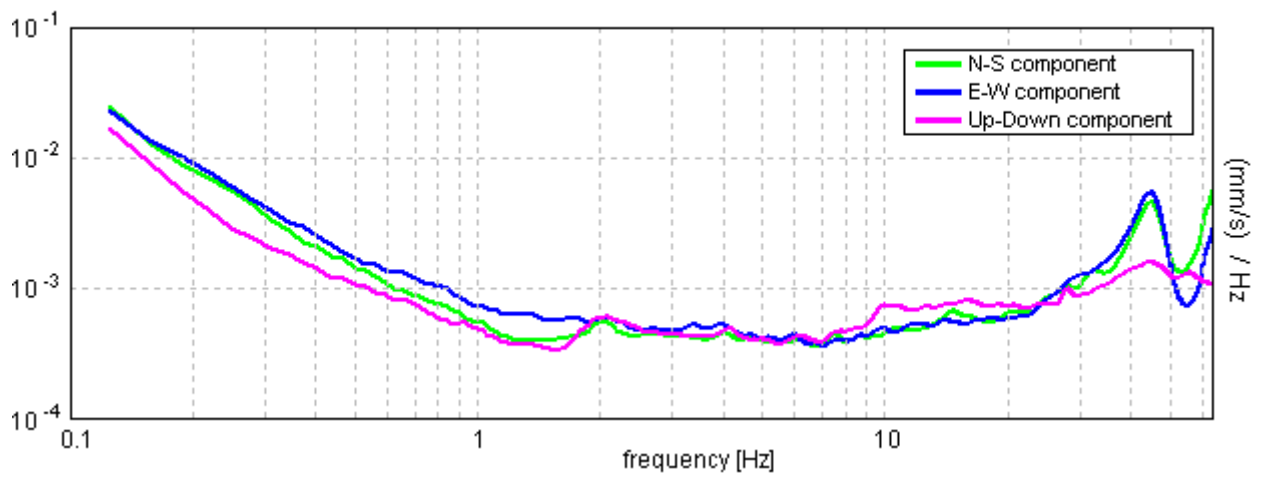
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.19 ± 0.15 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.19 > 0.50	OK	
$n_c(f_0) > 200$	2137.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 58 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>			<b>NO</b>
$A_0 > 2$	2.32 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.06425  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	0.0763 < 0.11875	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.2316 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0114			
<b>Coordinate</b>	UTM	4220641.92	N	354410.31	E
	Gauss Boaga	4220640.310	N	2374405.241	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		12/05/2014, 12:06			
<b>Nome file</b>		0114			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

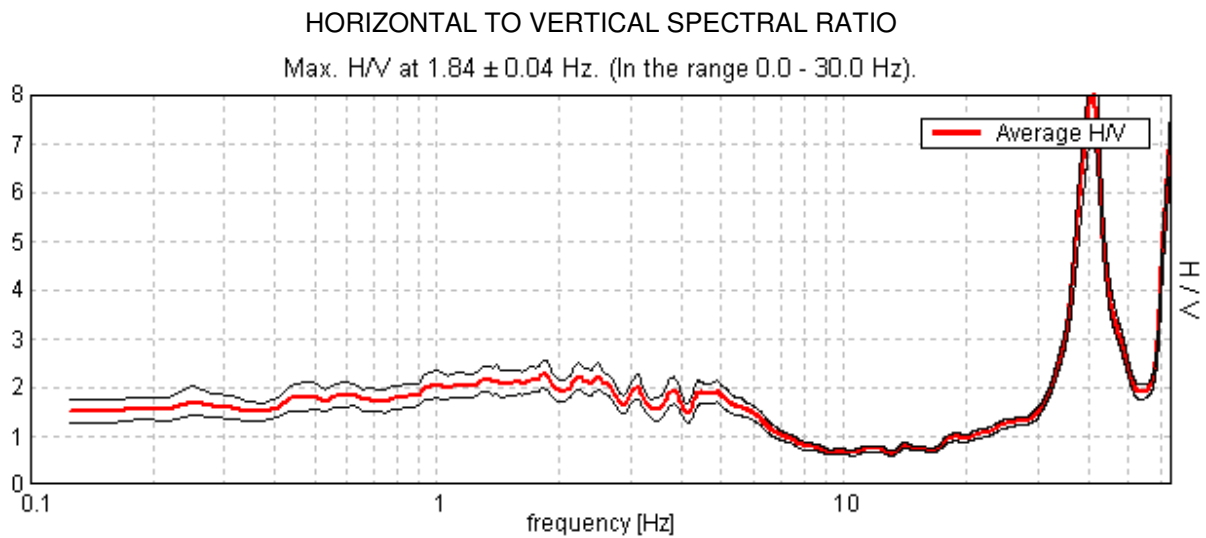
**Documentazione fotografica**



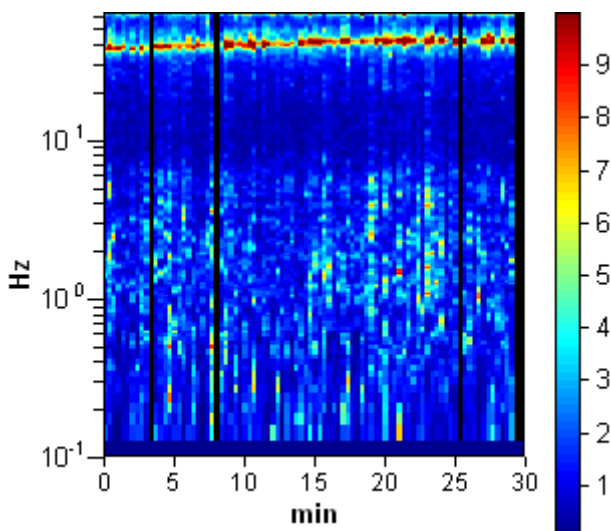
## TRIVELSICILIA PALERMO, PALERMO 0114

Start recording: 12/05/14 12:06:50      End recording: 12/05/14 12:36:51  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

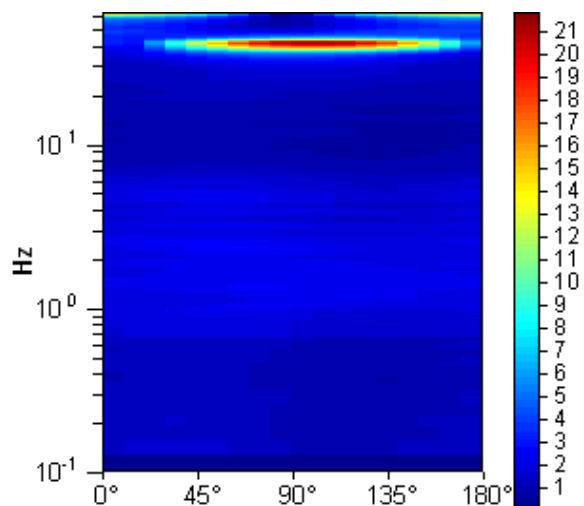
Trace length: 0h30'00".      Analyzed 94% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



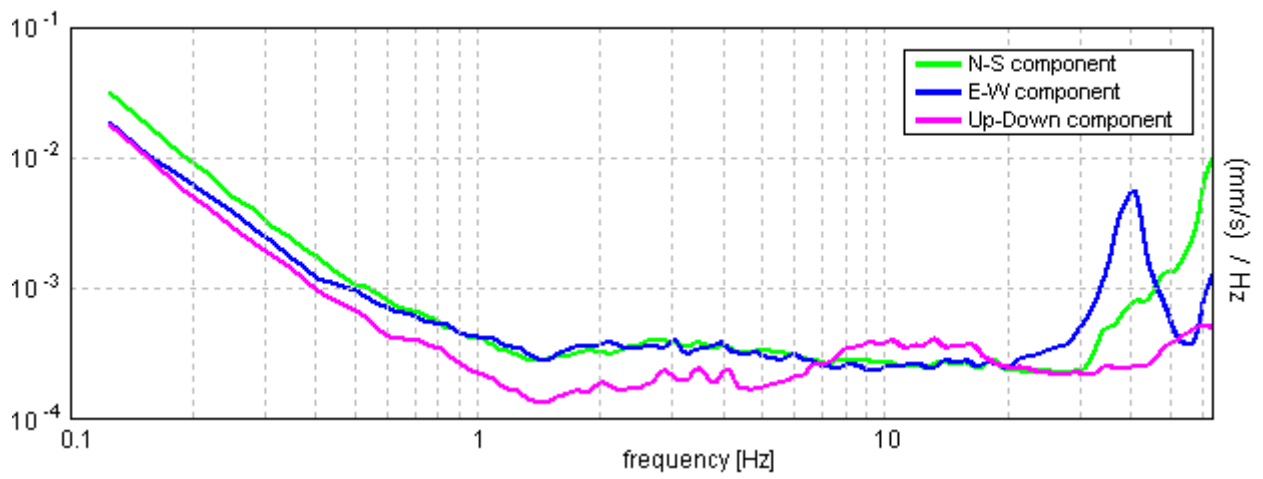
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.84 ± 0.04 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.84 > 0.50	OK	
$n_c(f_0) > 200$	3134.4 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 90 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	6.625 Hz	OK	
$A_0 > 2$	2.26 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01181  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02177 < 0.18438$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1488 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0115			
<b>Coordinate</b>	UTM	4220221.46	N	354473.43	E
	Gauss Boaga	4220219.833	N	2374468.357	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		13/05/2014, 11:34			
<b>Nome file</b>		0115			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>Si</b>		
		<b>Altro</b>	<b>No</b>		

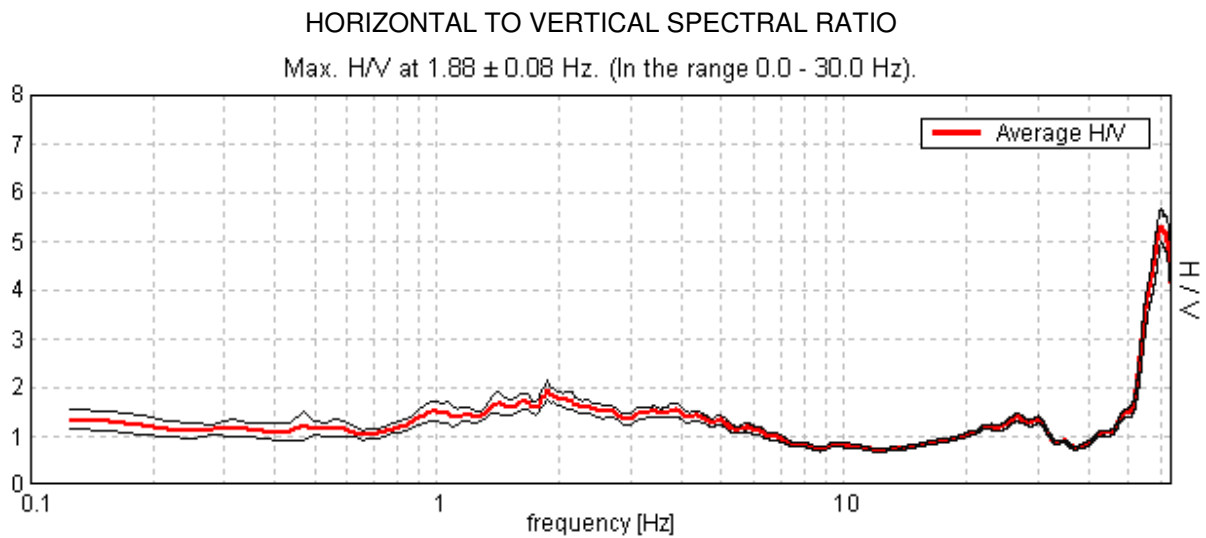
**Documentazione fotografica**



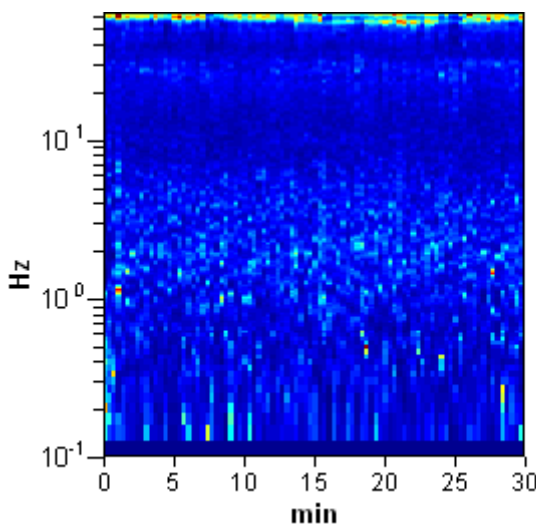
## TRIVELSICILIA PALERMO, PALERMO 0115

Start recording: 13/05/14 11:34:32      End recording: 13/05/14 12:04:33  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

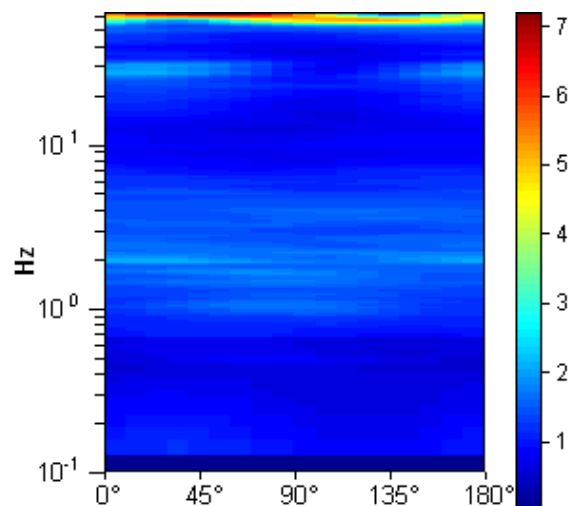
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



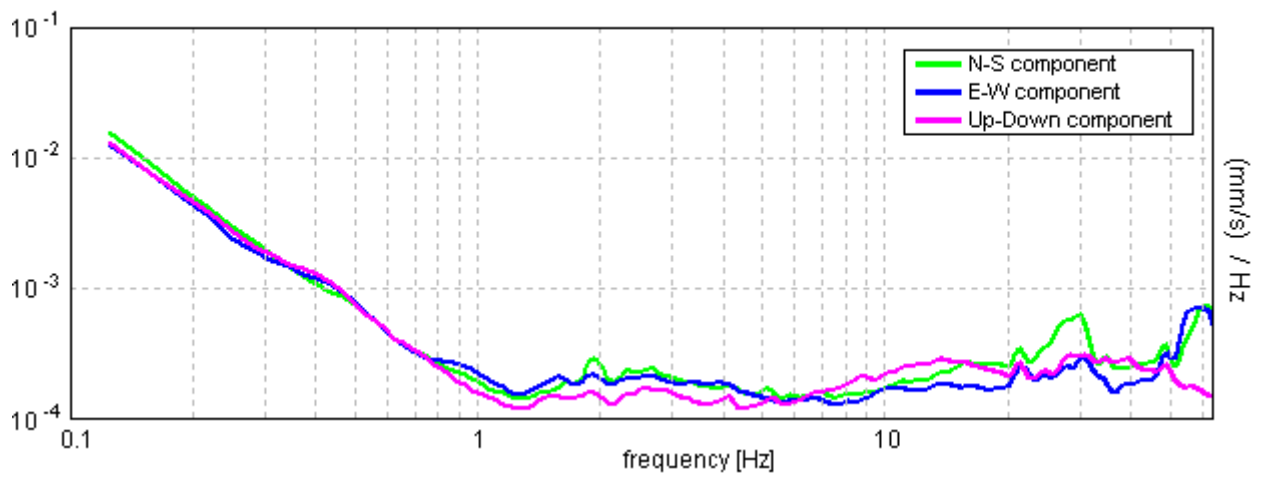
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.88 ± 0.08 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.88 > 0.50	OK	
$n_c(f_0) > 200$	3375.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 91 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	6.906 Hz	OK	
<b><math>A_0 &gt; 2</math></b>	1.94 > 2		<b>NO</b>
<b><math>f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%</math></b>	$ 0.02058  < 0.05$	OK	
<b><math>\sigma_f &lt; \varepsilon(f_0)</math></b>	$0.03859 < 0.1875$	OK	
<b><math>\sigma_A(f_0) &lt; \theta(f_0)</math></b>	$0.1004 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0116				
<b>Coordinate</b>	<i>UTM</i>	4220260.61	N	354698.23	E
	<i>Gauss Boaga</i>	4220258.988	N	2374693.167	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	12/05/2014, 12:42				
<b>Nome file</b>	0116				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Lastricato				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



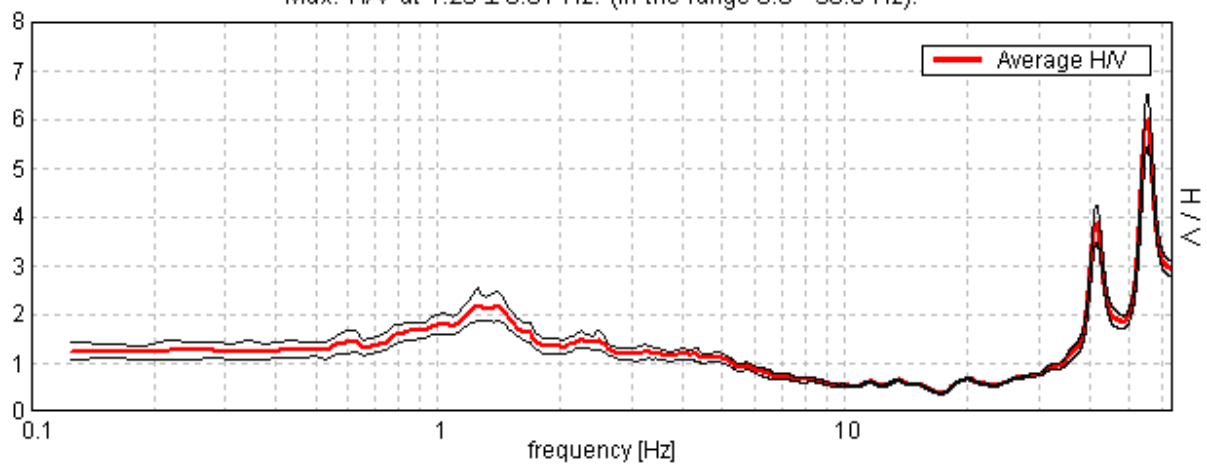
## TRIVELSICILIA PALERMO, PALERMO 0116

Start recording: 12/05/14 12:43:01      End recording: 12/05/14 13:13:02  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

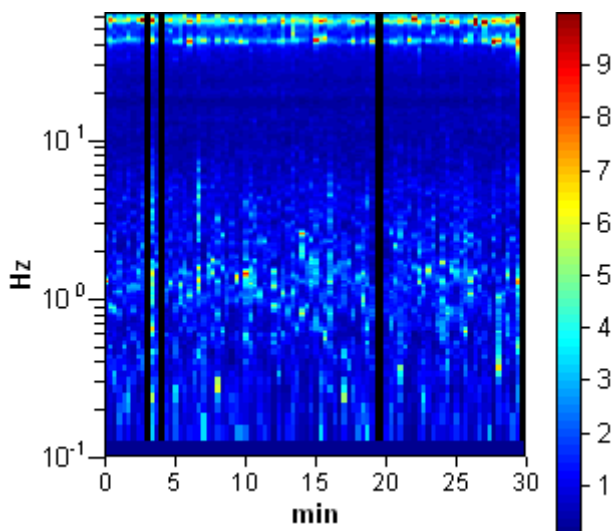
Trace length: 0h30'00".      Analyzed 94% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

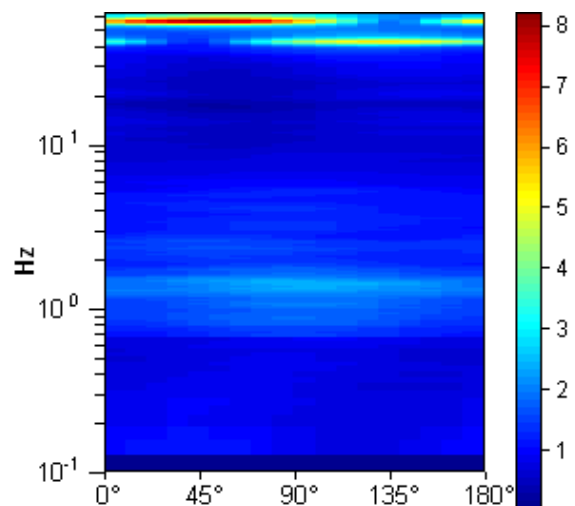
Max. H/V at  $1.25 \pm 0.01$  Hz. (In the range 0.0 - 30.0 Hz).



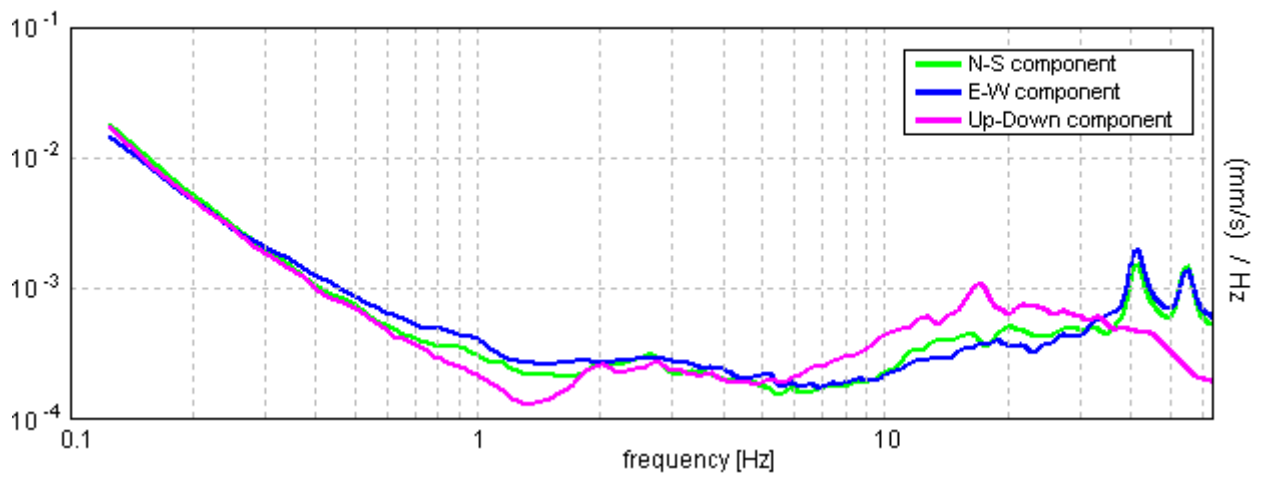
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $1.25 \pm 0.01$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.25 > 0.50$	OK	
$n_c(f_0) > 200$	$2125.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 61 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			<b>NO</b>
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	4.469 Hz	OK	
$A_0 > 2$	$2.20 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00591  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.00739 < 0.125$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1646 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0117				
<b>Coordinate</b>	UTM	4220270.54	N	355178.28	E
	Gauss Boaga	4220268.924	N	2375173.241	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	12/05/2014, 13:37				
<b>Nome file</b>	0117				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	Si			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

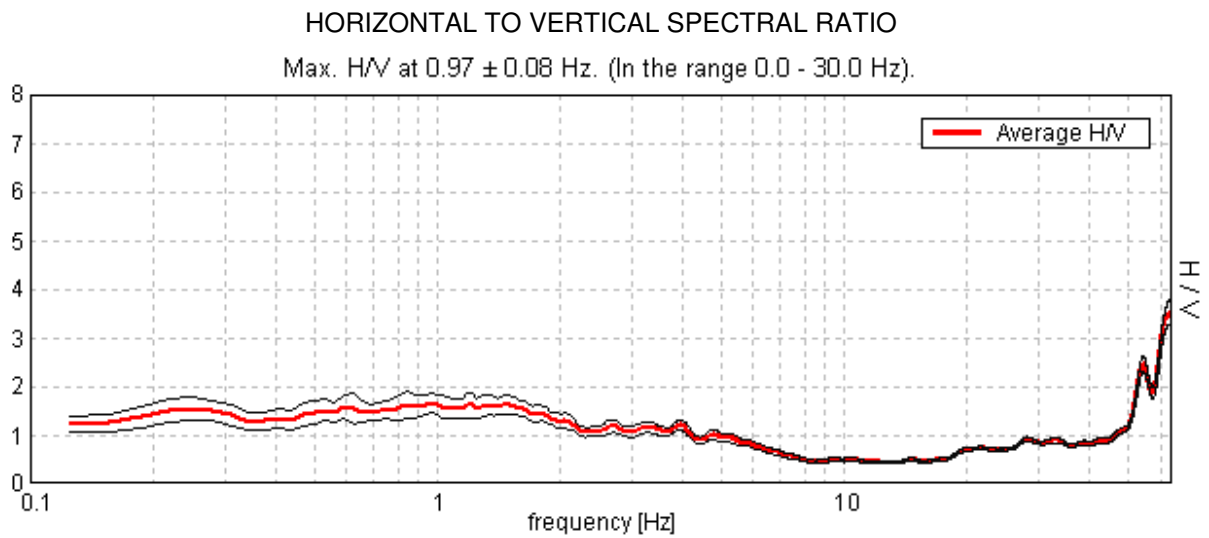
**Documentazione fotografica**



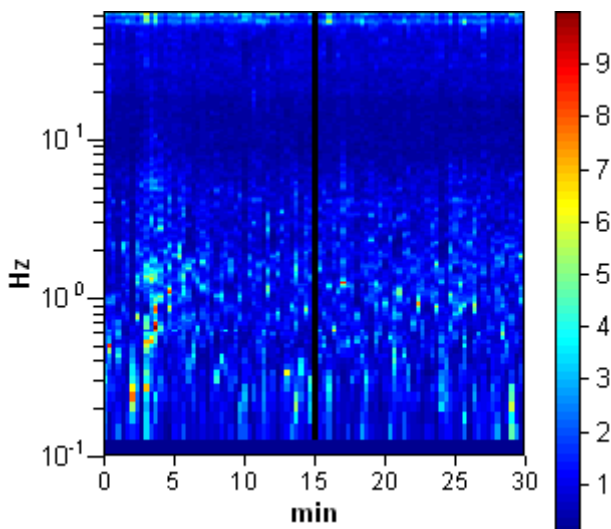
## TRIVELSICILIA PALERMO, PALERMO 0117

Start recording: 12/05/14 13:37:11      End recording: 12/05/14 14:07:12  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

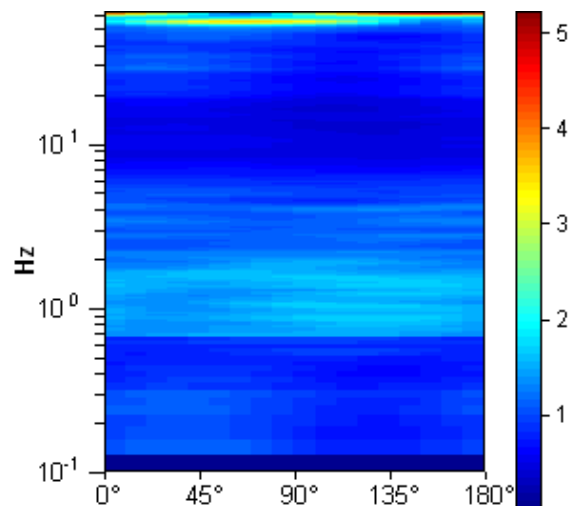
Trace length: 0h30'00".      Analyzed 99% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



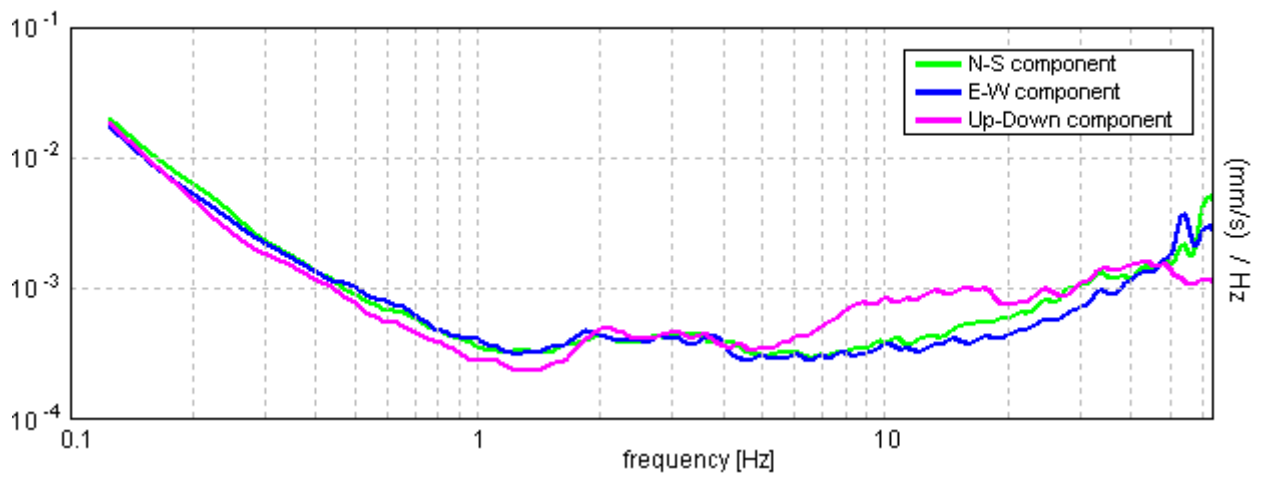
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $0.97 \pm 0.08$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.97 > 0.50$	OK	
$n_c(f_0) > 200$	$1724.4 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 48 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$1.65 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.04135  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.04006 < 0.14531$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1039 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0118				
<b>Coordinate</b>	<i>UTM</i>	4220247.12	N	355628.51	E
	<i>Gauss Boaga</i>	4220245.509	N	2375623.494	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	13/05/2014, 10:37				
<b>Nome file</b>	0118				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



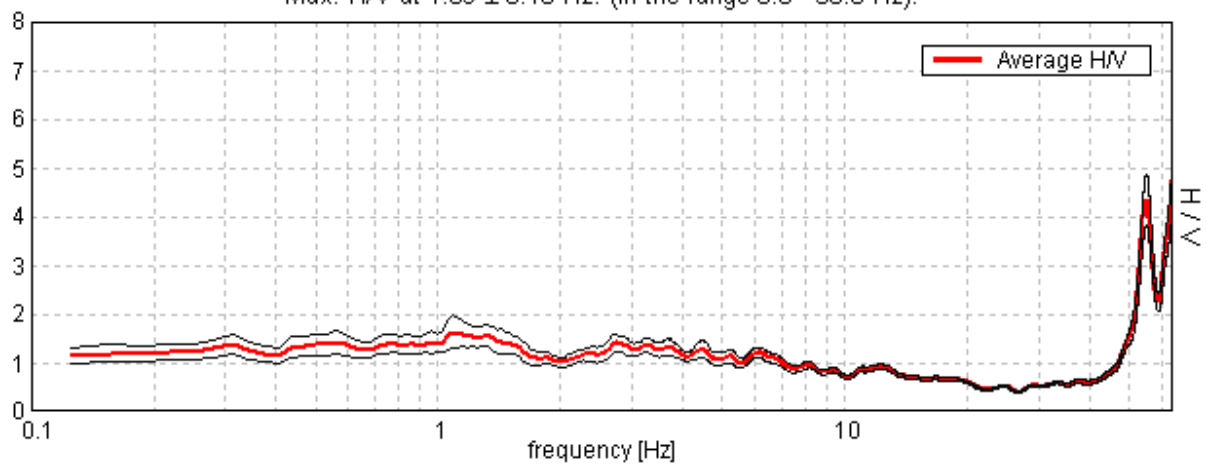
## TRIVELSICILIA PALERMO, PALERMO 0118

Start recording: 13/05/14 10:38:09      End recording: 13/05/14 11:08:09  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

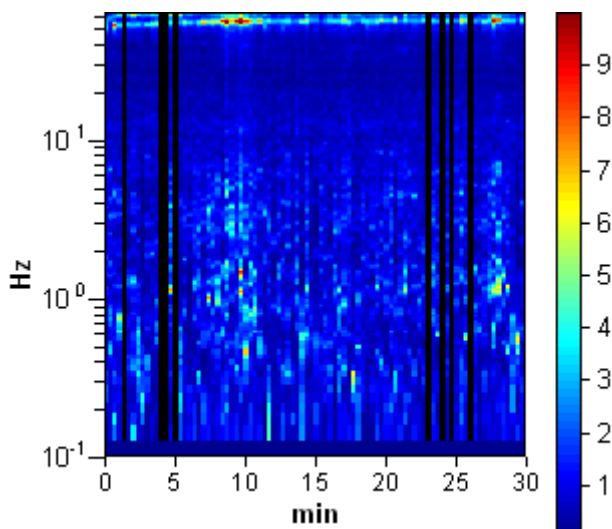
Trace length: 0h30'00".      Analyzed 91% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

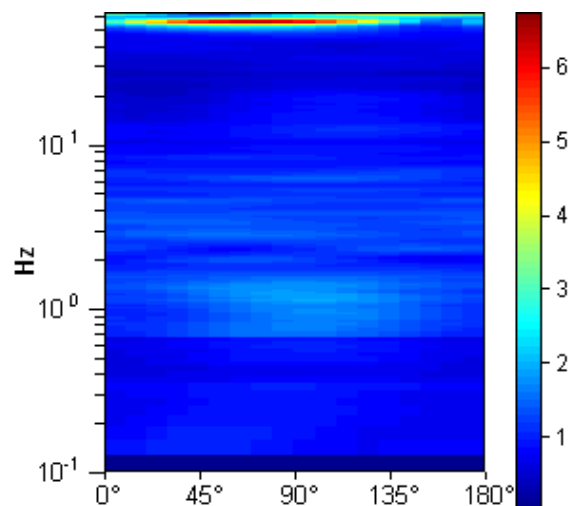
Max. H/V at  $1.09 \pm 0.18$  Hz. (In the range 0.0 - 30.0 Hz).



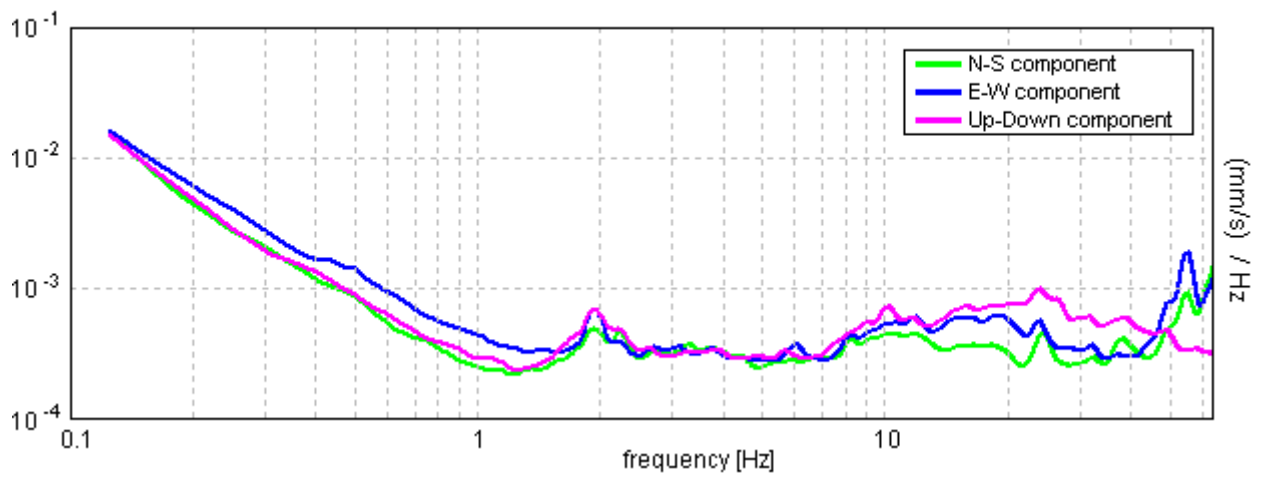
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.09 ± 0.18 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.09 > 0.50	OK	
$n_c(f_0) > 200$	1793.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 54 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	1.63 > 2		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.07996  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	0.08746 < 0.10938	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1636 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0119				
<b>Coordinate</b>	<i>UTM</i>	4220259.83	N	355955.14	E
	<i>Gauss Boaga</i>	4220258.223	N	2375950.140	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	13/05/2014, 09:54				
<b>Nome file</b>	0119				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Terreno				
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

**Documentazione fotografica**



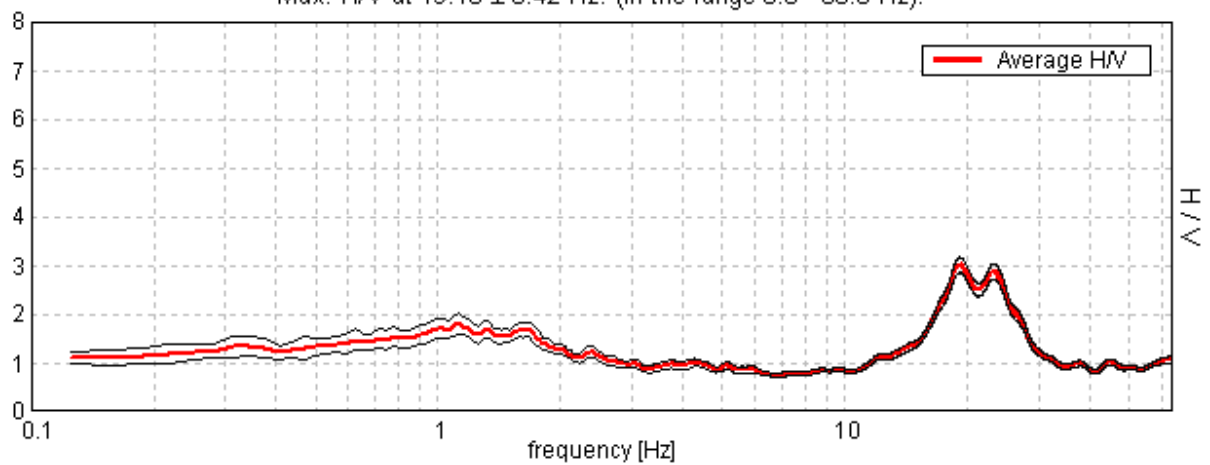
## TRIVELSICILIA PALERMO, PALERMO 0119

Start recording: 13/05/14 09:54:43      End recording: 13/05/14 10:24:44  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

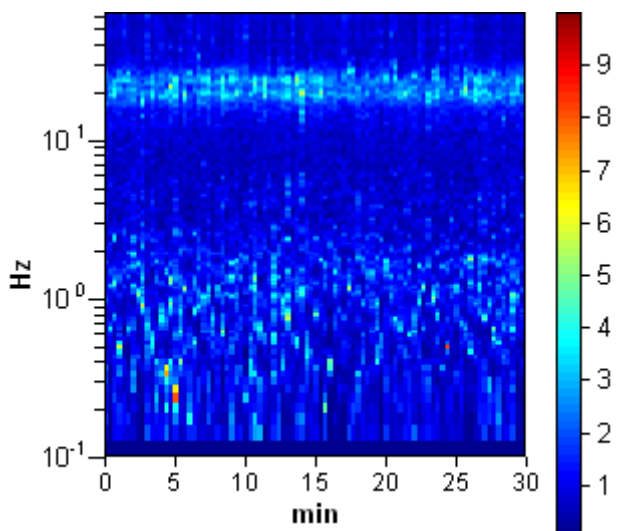
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

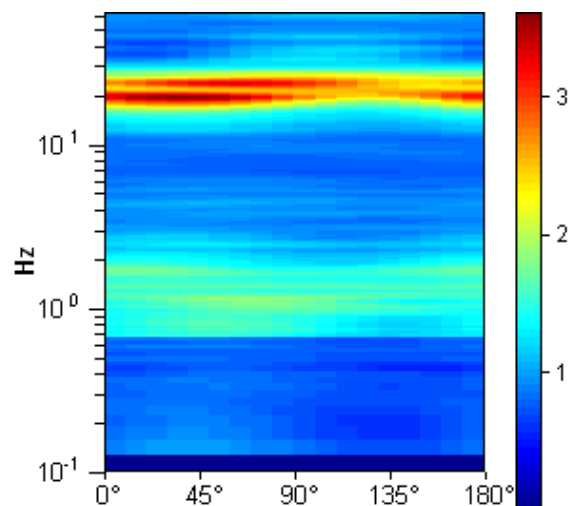
Max. H/V at  $19.16 \pm 0.42$  Hz. (In the range 0.0 - 60.0 Hz).



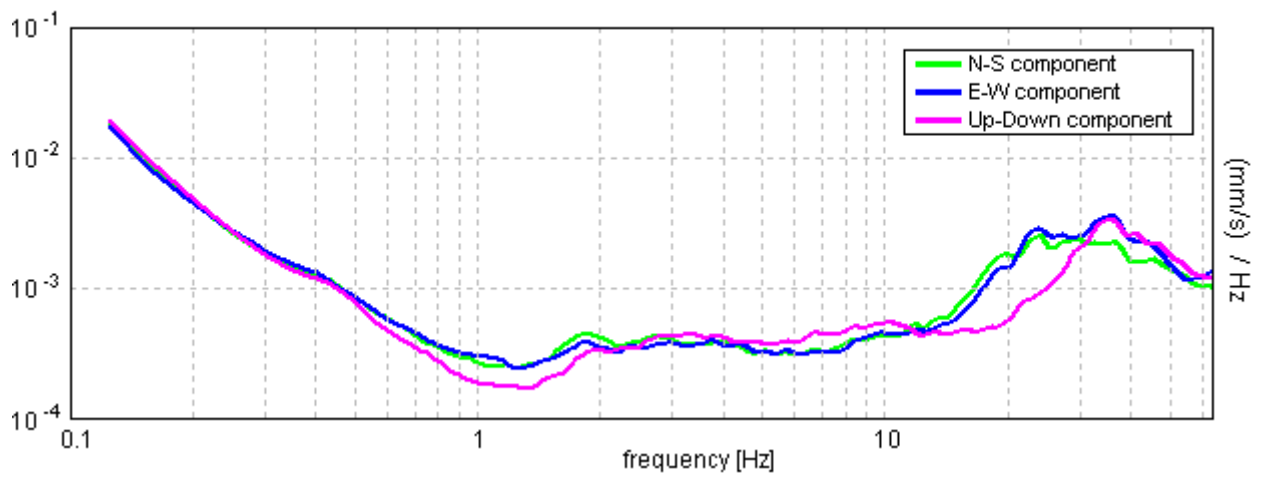
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 19.16 ± 0.42 Hz. (in the range 0.0 - 60.0 Hz).**

<b>Criteria for a reliable HVSR curve</b> [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	19.16 > 0.50	<b>OK</b>	
$n_c(f_0) > 200$	34481.3 > 200	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 920 times	<b>OK</b>	
<b>Criteria for a clear HVSR peak</b> [At least 5 out of 6 should be fulfilled]			
<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	15.5 Hz	<b>OK</b>	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	28.344 Hz	<b>OK</b>	
$A_0 > 2$	3.01 > 2	<b>OK</b>	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.011  < 0.05$	<b>OK</b>	
$\sigma_f < \varepsilon(f_0)$	0.21081 < 0.95781	<b>OK</b>	
$\sigma_A(f_0) < \theta(f_0)$	0.0797 < 1.58	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for $\sigma_f$ and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0120			
<b>Coordinate</b>	UTM	4220271.81	N	356371.89	E
	Gauss Boaga	4220270.209	N	2376366.910	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		13/05/2014, 09:03			
<b>Nome file</b>		0120			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



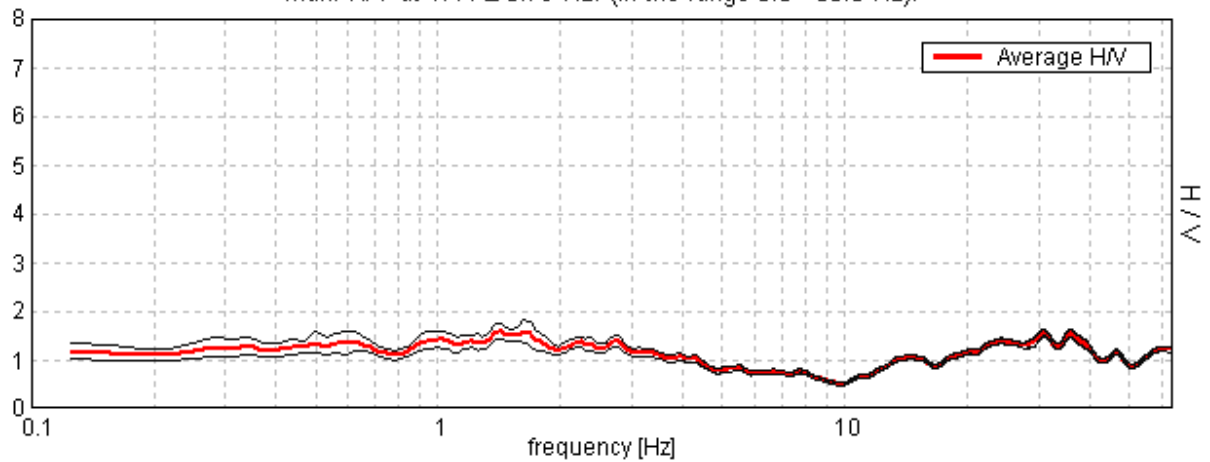
## TRIVELSICILIA PALERMO, PALERMO 0120

Start recording: 13/05/14 09:04:12      End recording: 13/05/14 09:34:13  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

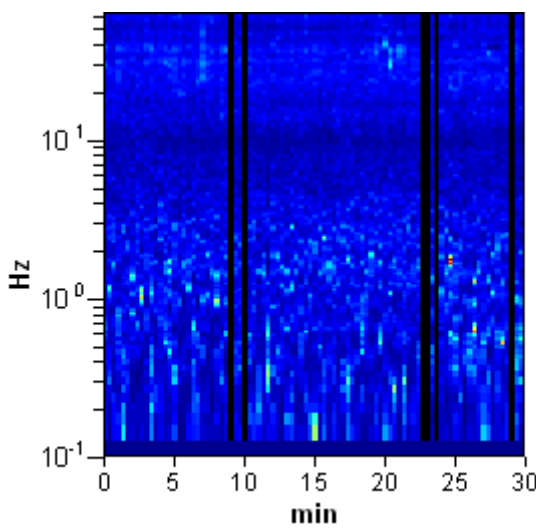
Trace length: 0h30'00".      Analyzed 93% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

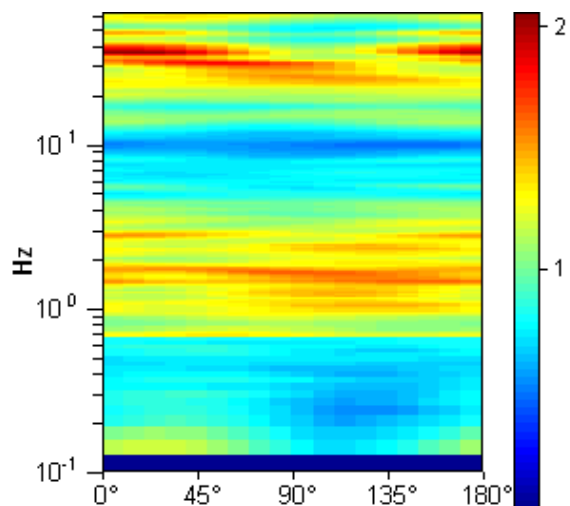
Max. H/V at  $1.44 \pm 3.79$  Hz. (In the range 0.0 - 60.0 Hz).



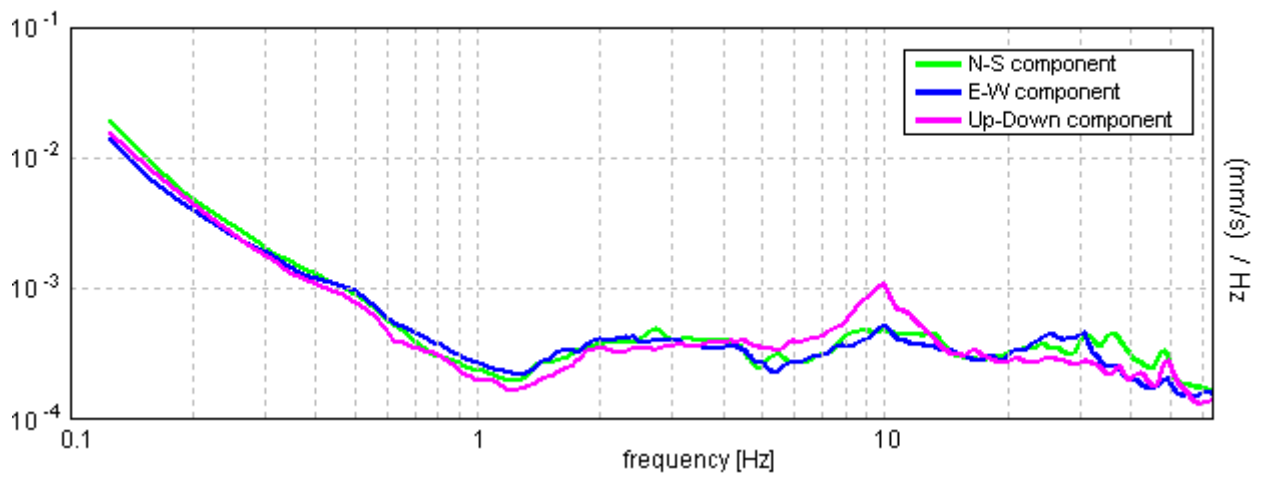
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.44 ± 3.79 Hz. (in the range 0.0 - 60.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.44 > 0.50	OK	
$n_c(f_0) > 200$	2415.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 70 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	4.781 Hz	OK	
<b><math>A_0 &gt; 2</math></b>	1.58 > 2		<b>NO</b>
<b><math>f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%</math></b>	$ 1.31896  < 0.05$		<b>NO</b>
<b><math>\sigma_f &lt; \varepsilon(f_0)</math></b>	1.89601 < 0.14375		<b>NO</b>
<b><math>\sigma_A(f_0) &lt; \theta(f_0)</math></b>	0.0784 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

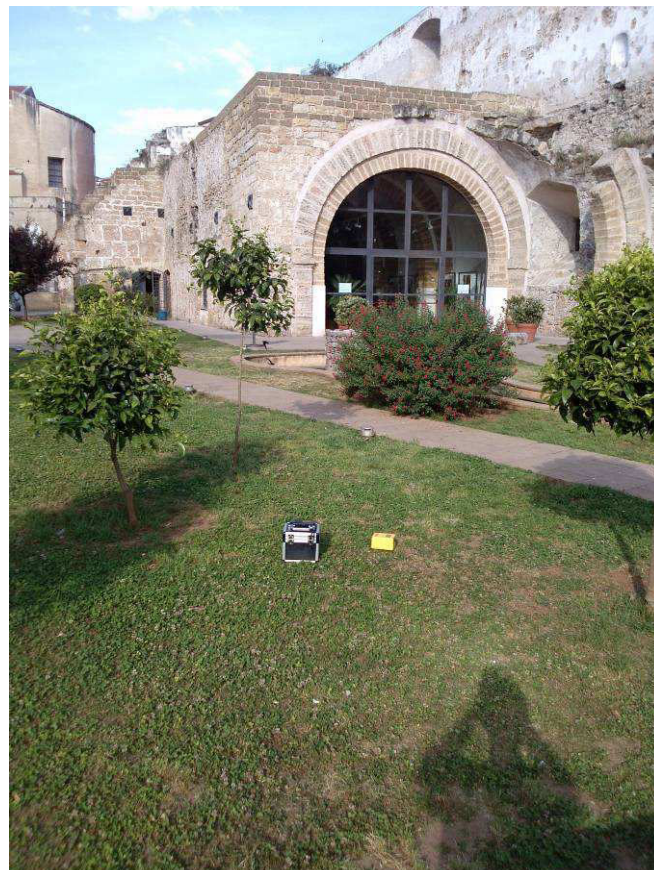


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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0121				
<b>Coordinate</b>	<i>UTM</i>	4220272.83	N	356790.87	E
	<i>Gauss Boaga</i>	4220271.234	N	2376785.911	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	13/05/2014, 08:20				
<b>Nome file</b>	0121				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Terreno				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

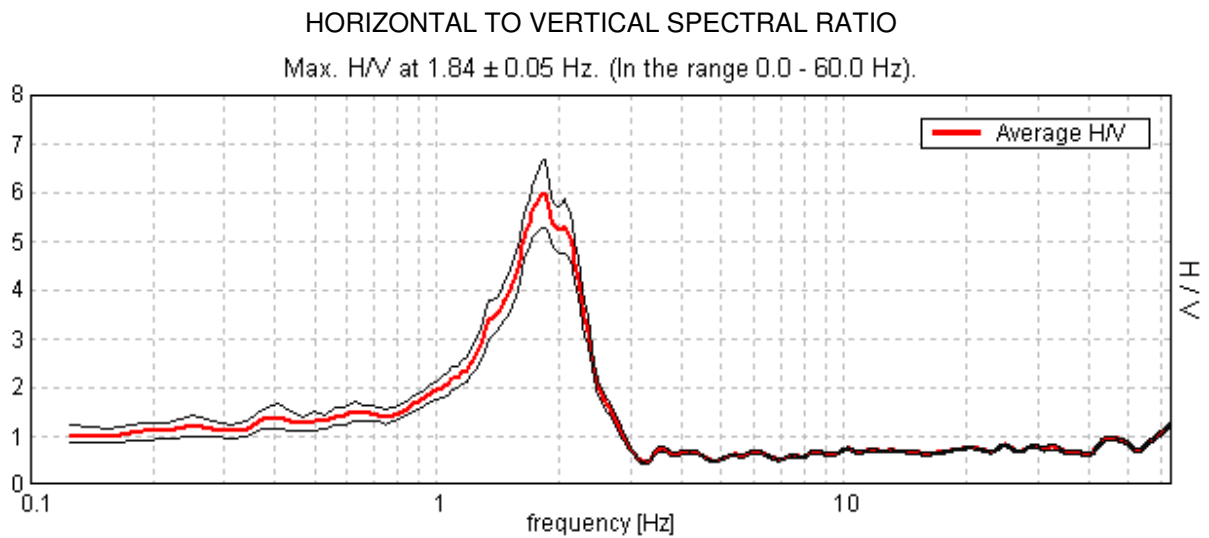
**Documentazione fotografica**



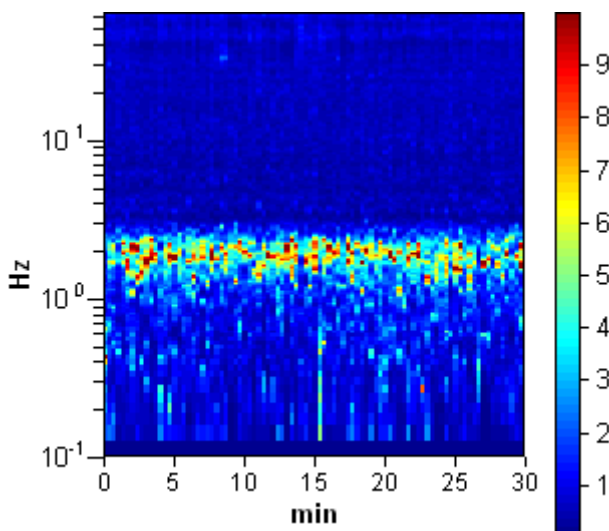
## TRIVELSICILIA PALERMO, PALERMO 0121

Start recording: 13/05/14 08:21:44      End recording: 13/05/14 08:51:45  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

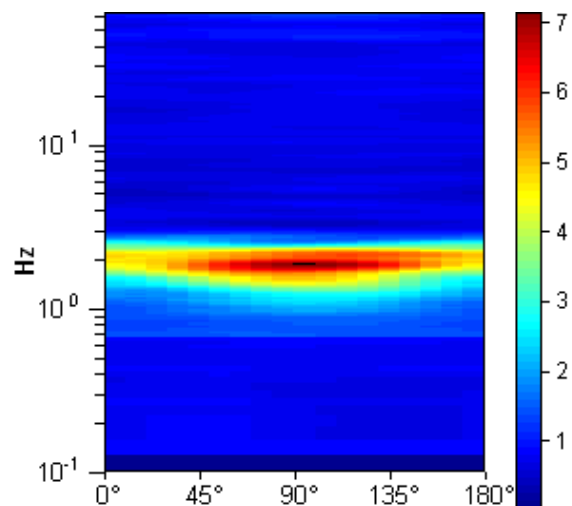
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



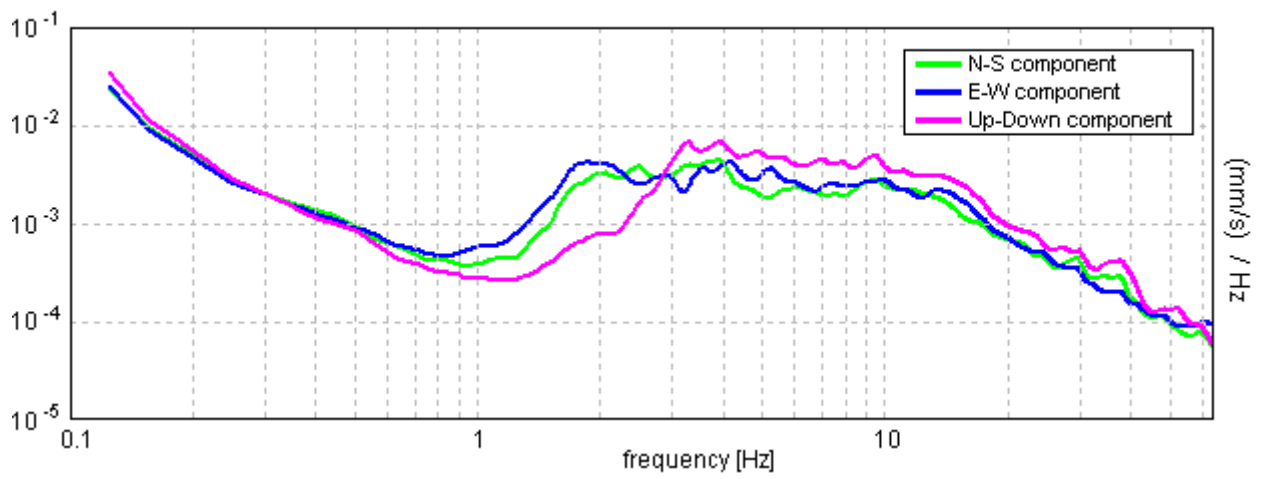
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.84 ± 0.05 Hz. (in the range 0.0 - 60.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.84 > 0.50	OK	
$n_c(f_0) > 200$	3318.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 90 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	1.281 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.375 Hz	OK	
$A_0 > 2$	5.97 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01332  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.02456 < 0.18438	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.3484 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0122			
<b>Coordinate</b>	UTM	4220271.94	N	357168.42	E
	Gauss Boaga	4220270.349	N	2377163.480	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		13/05/2014, 07:40			
<b>Nome file</b>		0122			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

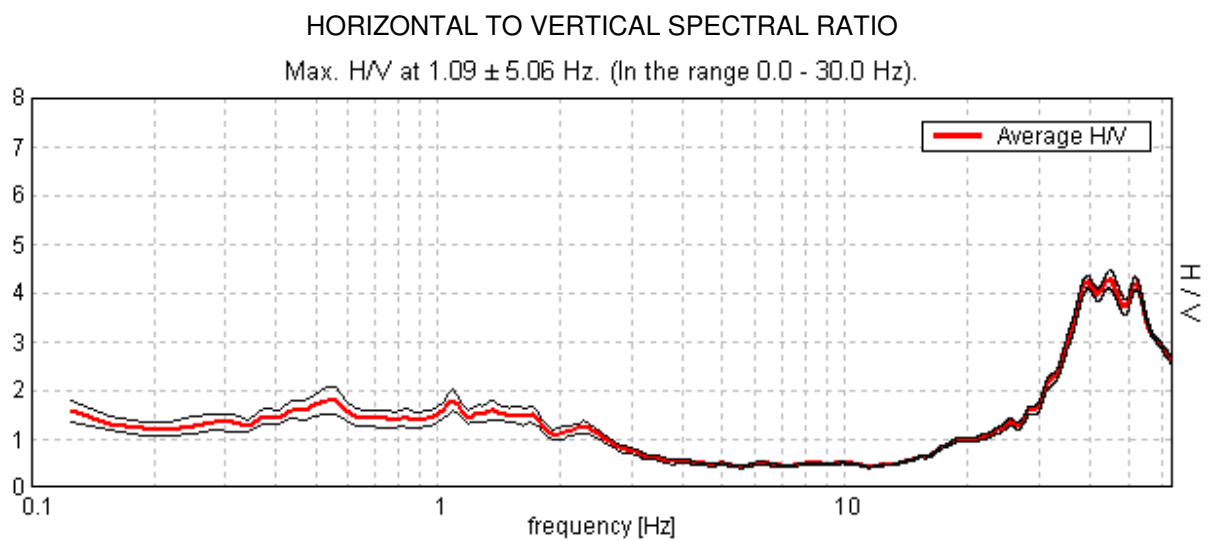
**Documentazione fotografica**



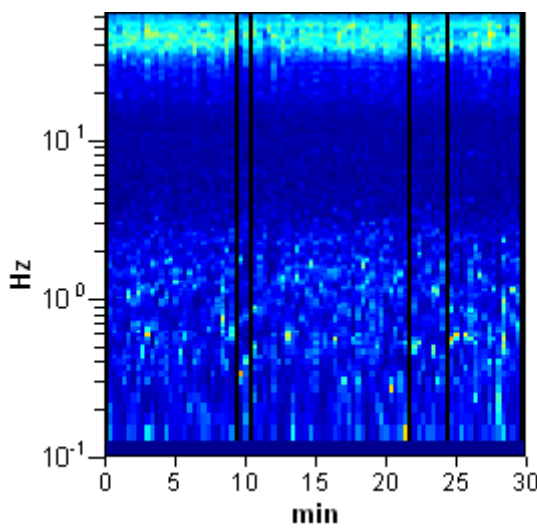
## TRIVELSICILIA PALERMO, PALERMO 0122

Start recording: 13/05/14 07:41:54      End recording: 13/05/14 08:11:54  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

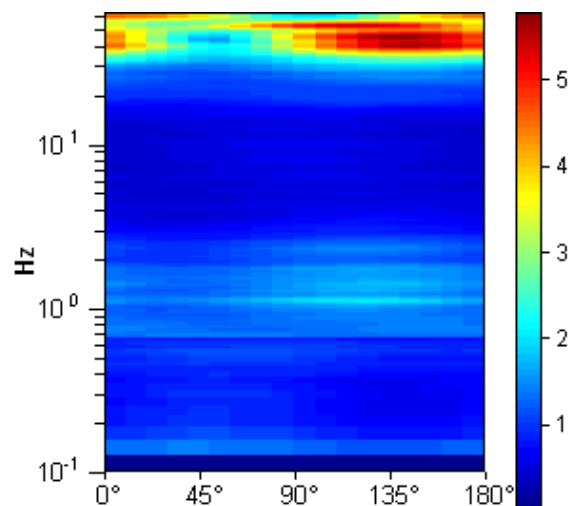
Trace length: 0h30'00".      Analyzed 93% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



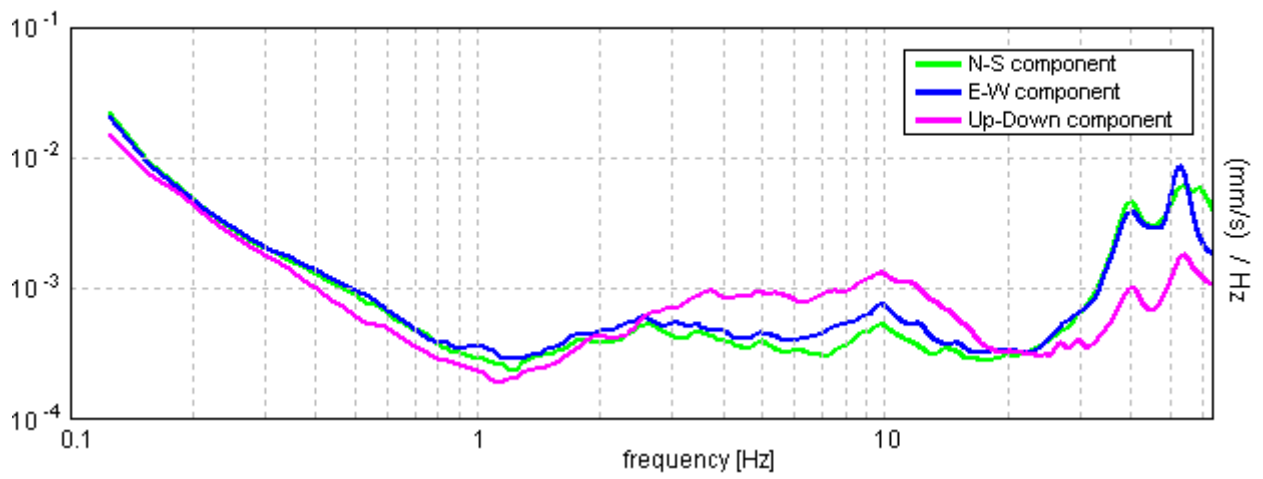
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.09 ± 5.06 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.09 > 0.50	OK	
$n_c(f_0) > 200$	1837.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 54 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.688 Hz	OK	
$A_0 > 2$	1.80 > 2		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 2.31213  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	2.52889 < 0.10938		<b>NO</b>
$\sigma_A(f_0) < \theta(f_0)$	0.1099 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0123				
<b>Coordinate</b>	<i>UTM</i>	4219883.35	N	357548.91	E
	<i>Gauss Boaga</i>	4219881.748	N	2377543.995	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	16/05/2014, 10:12				
<b>Nome file</b>	0123				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Terreno				
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

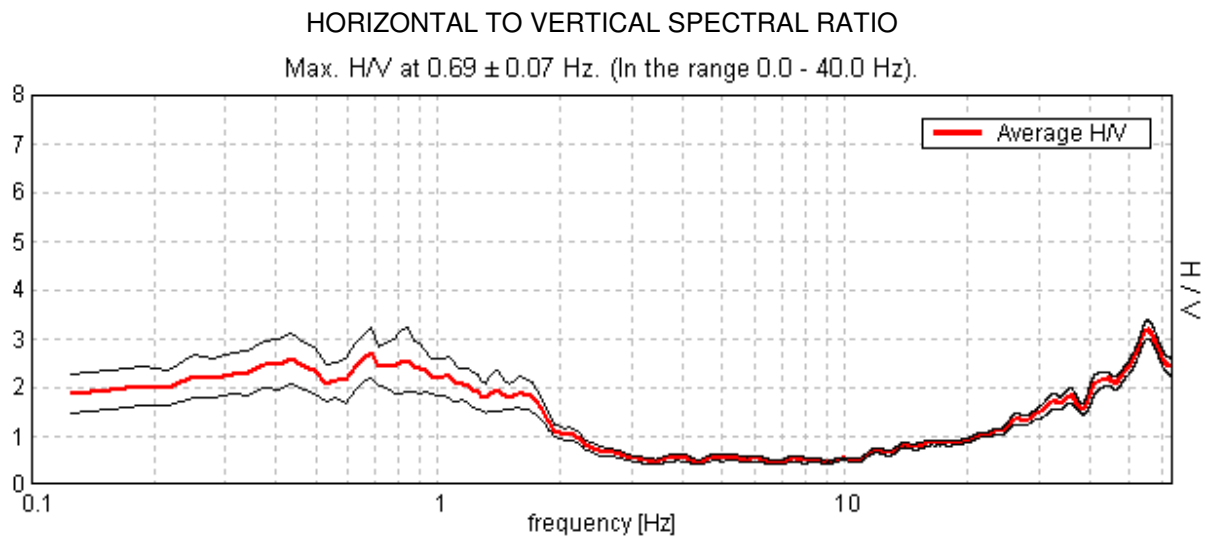
**Documentazione fotografica**



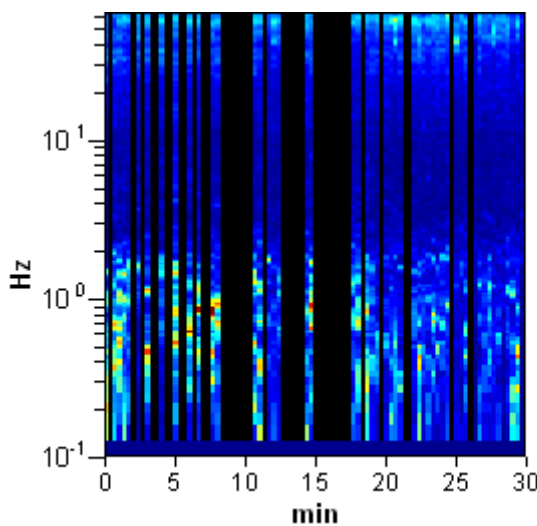
## TRIVELSICILIA PALERMO, PALERMO 0123

Start recording: 16/05/14 09:19:37      End recording: 16/05/14 09:49:38  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

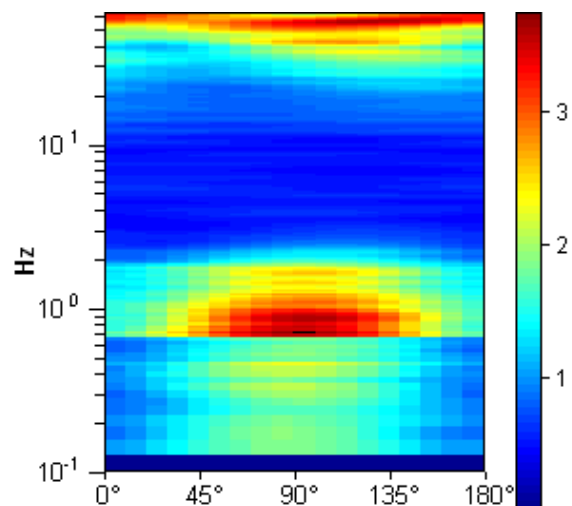
Trace length: 0h30'00".      Analyzed 57% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



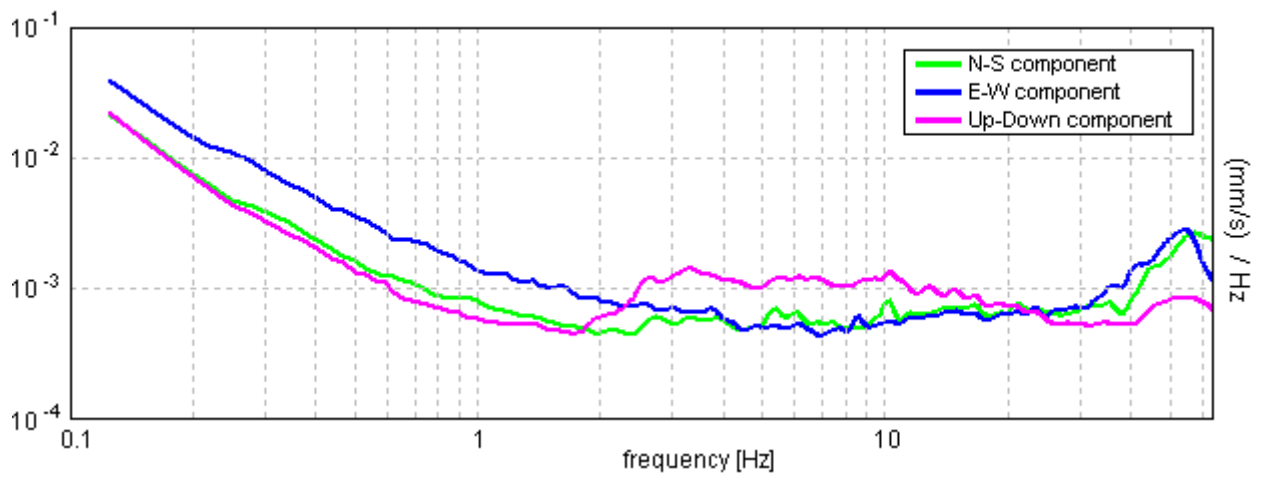
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $0.69 \pm 0.07$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.69 > 0.50$	OK	
$n_c(f_0) > 200$	$701.3 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 34 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.875 Hz	OK	
$A_0 > 2$	$2.69 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.04847  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.03333 < 0.10313$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2559 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0124				
<b>Coordinate</b>	<i>UTM</i>	4219798.57	N	357108.95	E
	<i>Gauss Boaga</i>	4219796.957	N	2377104.016	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	16/05/2014, 10:54				
<b>Nome file</b>	0124				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Terreno				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>Si</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

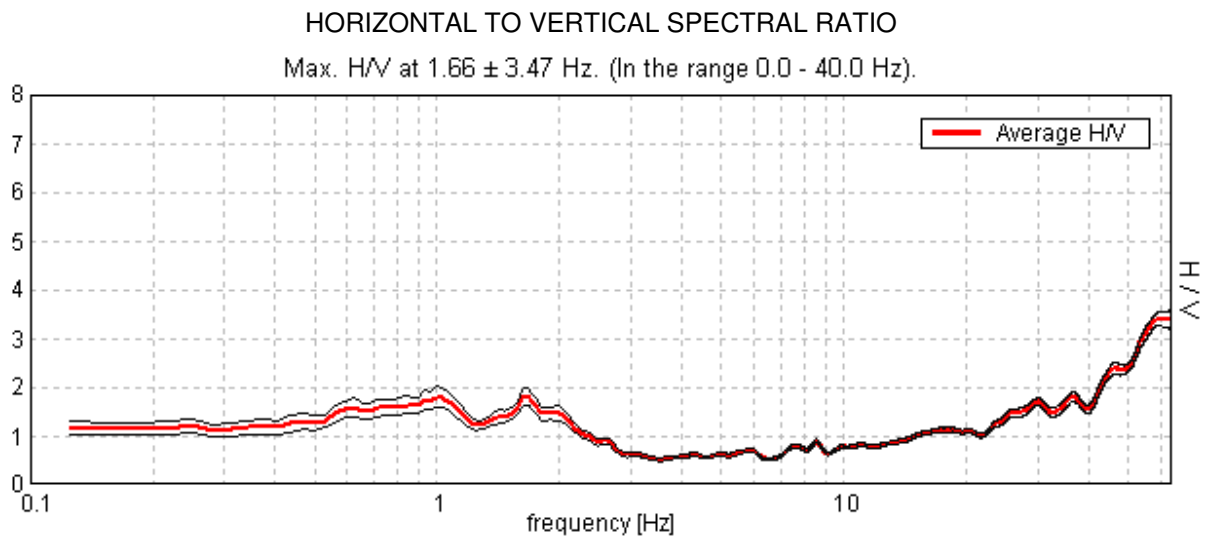
**Documentazione fotografica**



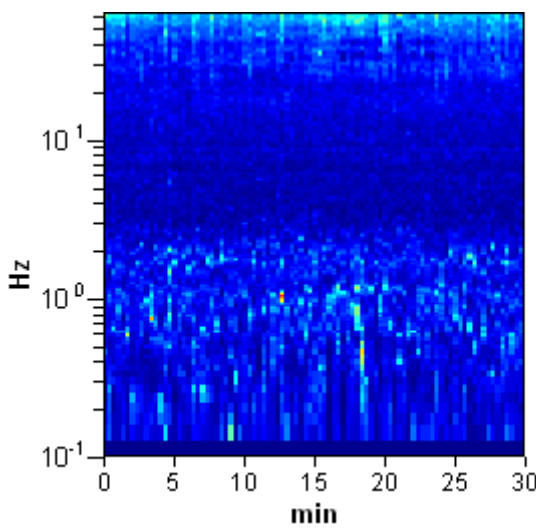
## TRIVELSICILIA PALERMO, PALERMO 0124

Start recording: 16/05/14 10:55:24      End recording: 16/05/14 11:25:25  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

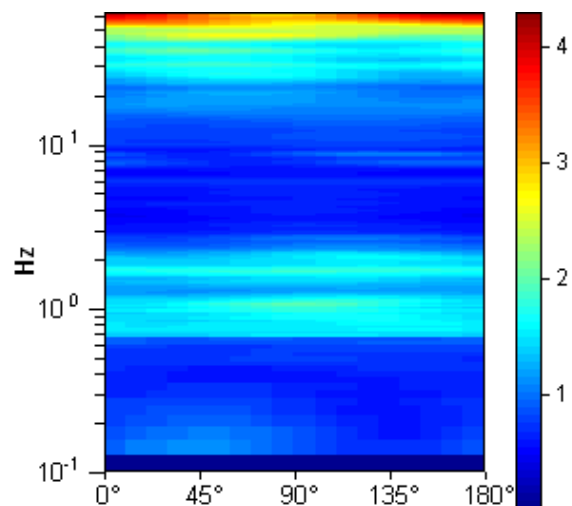
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



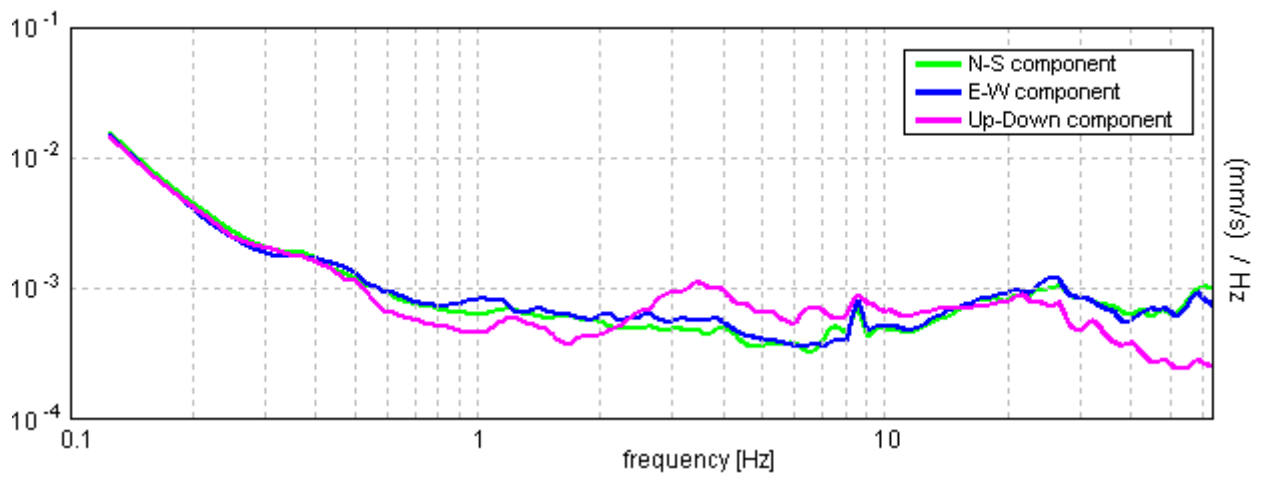
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.66 ± 3.47 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.66 > 0.50	OK	
$n_c(f_0) > 200$	2981.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 80 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.438 Hz	OK	
$A_0 > 2$	1.81 > 2		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 1.0482  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	1.73609 < 0.16563		<b>NO</b>
$\sigma_A(f_0) < \theta(f_0)$	0.0879 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0125			
<b>Coordinate</b>	UTM	4219835.39	N	356768.56	E
	Gauss Boaga	4219833.774	N	2376763.608	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		16/05/2014, 11:23			
<b>Nome file</b>		0125			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>		<b>Vento</b>	No		
		<b>Pioggia</b>	No		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	Si		
		<b>Pedoni</b>	Si		
		<b>Altro</b>	No		

**Documentazione fotografica**



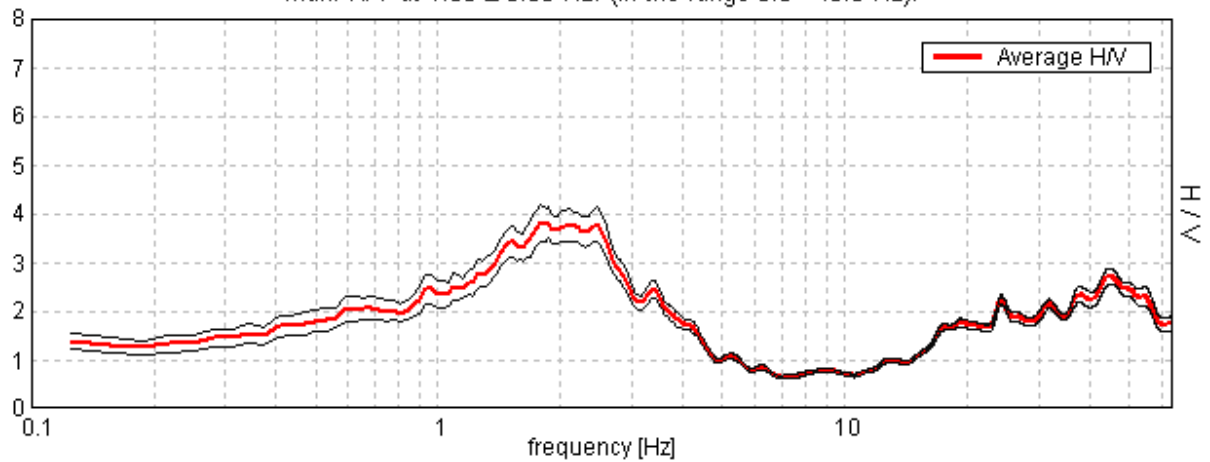
## TRIVELSICILIA PALERMO, PALERMO 0125

Start recording: 16/05/14 10:29:37      End recording: 16/05/14 10:59:38  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

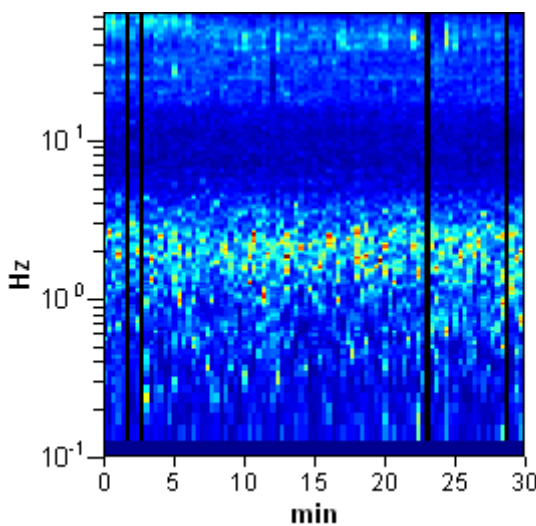
Trace length: 0h30'00".      Analyzed 96% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

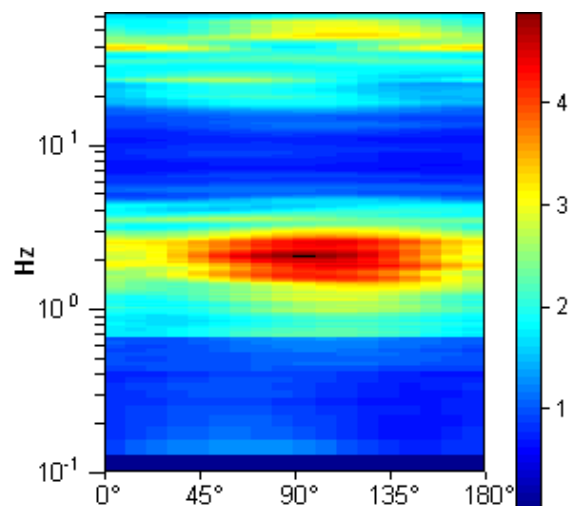
Max. H/V at  $1.88 \pm 0.05$  Hz. (In the range 0.0 - 40.0 Hz).



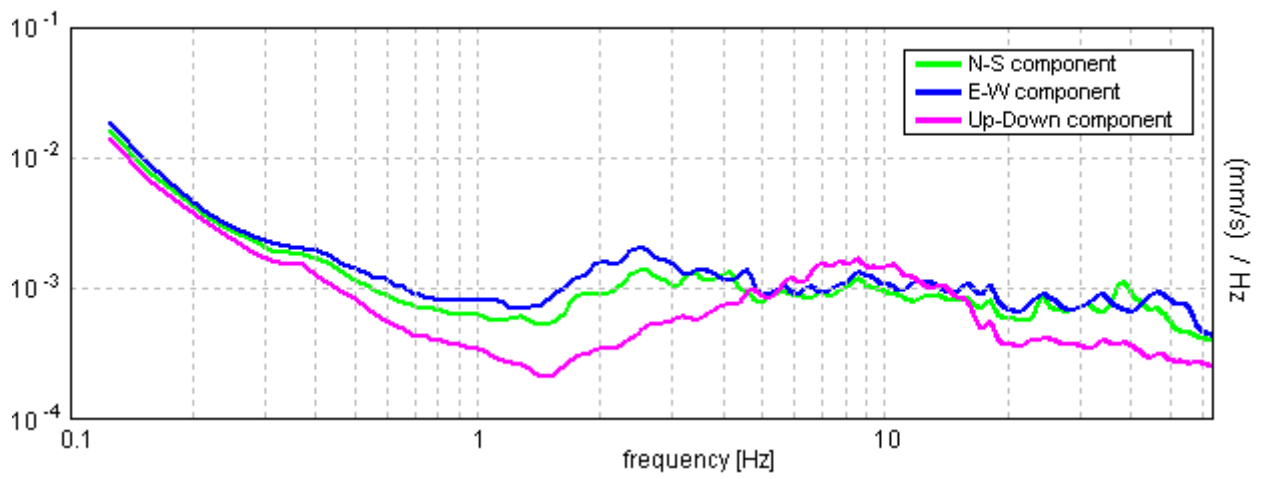
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.88 ± 0.05 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.88 > 0.50	OK	
$n_c(f_0) > 200$	3225.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 91 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.563 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	3.781 Hz	OK	
$A_0 > 2$	3.82 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01235  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02315 < 0.1875$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.166 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

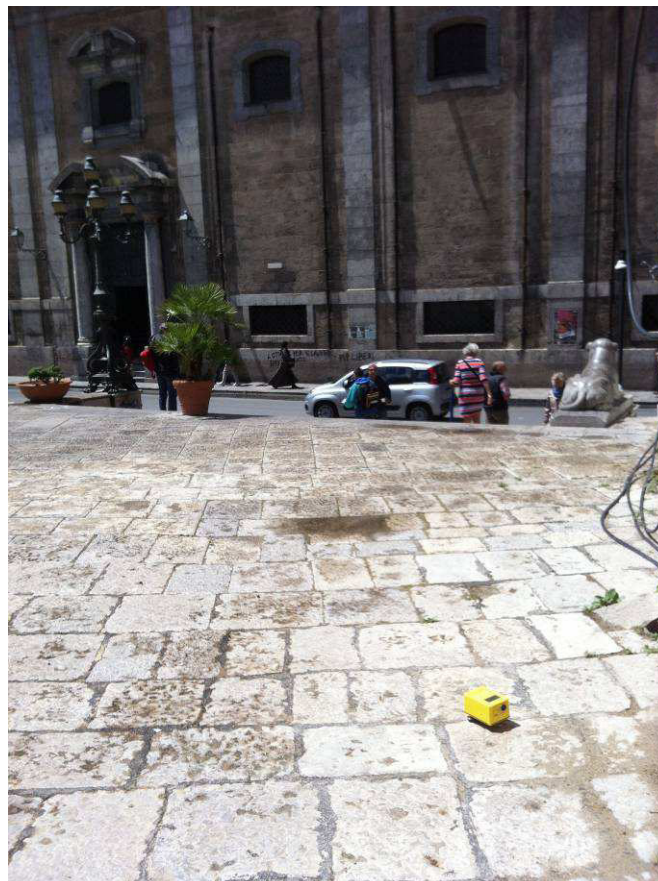


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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>	0126			
<b>Coordinate</b>	UTM	4219868.83	N	356428.11 E
	Gauss Boaga	4219867.212	N	2376423.141 E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®			
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>	16/05/2014, 11:58			
<b>Nome file</b>	0126			
<b>Durata</b>	30 min			
<b>Frequenza campionamento</b>	128 Hz			
<b>Accoppiamento strumento-suolo</b>	Basolato			
<b>Condizioni meteo</b>	<b>Vento</b>	No		
	<b>Pioggia</b>	No		
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si		
	<b>Pedoni</b>	Si		
	<b>Altro</b>	No		

**Documentazione fotografica**



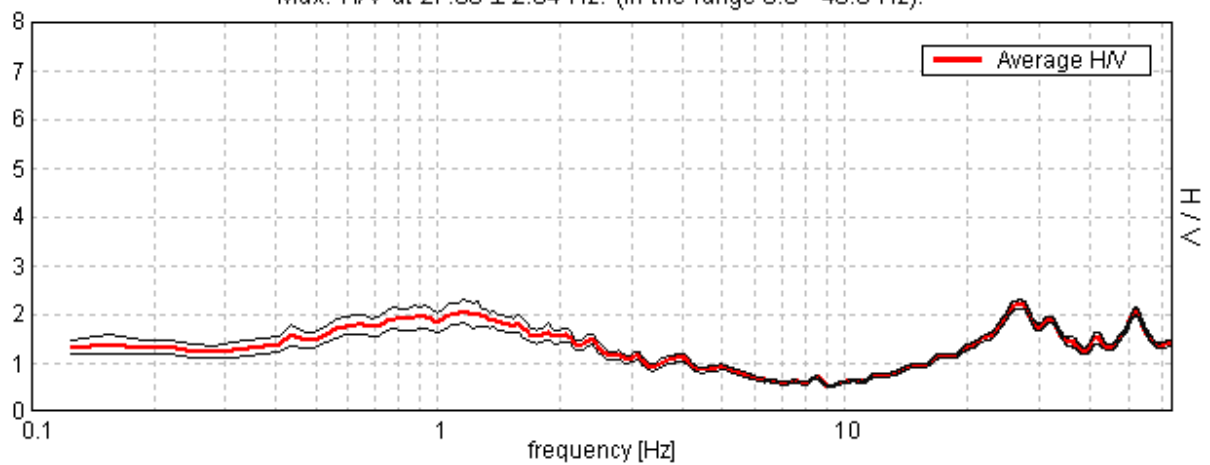
## TRIVELSICILIA PALERMO, PALERMO 0126

Start recording: 16/05/14 11:05:03      End recording: 16/05/14 11:35:04  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

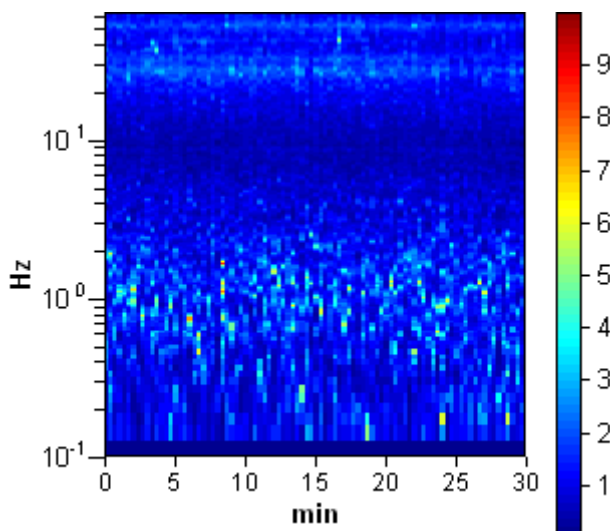
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

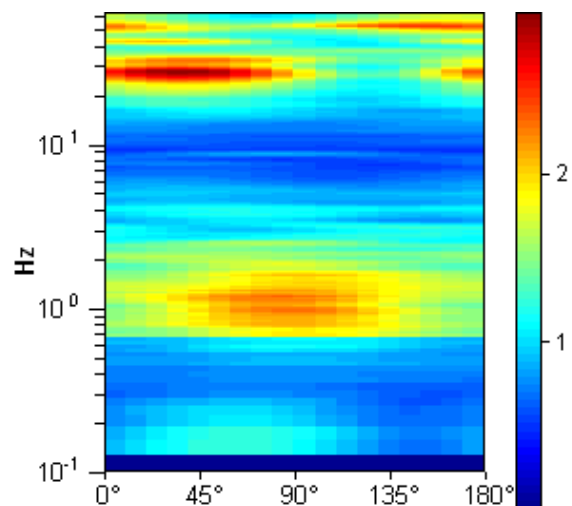
Max. H/V at  $27.06 \pm 2.64$  Hz. (In the range 0.0 - 40.0 Hz).



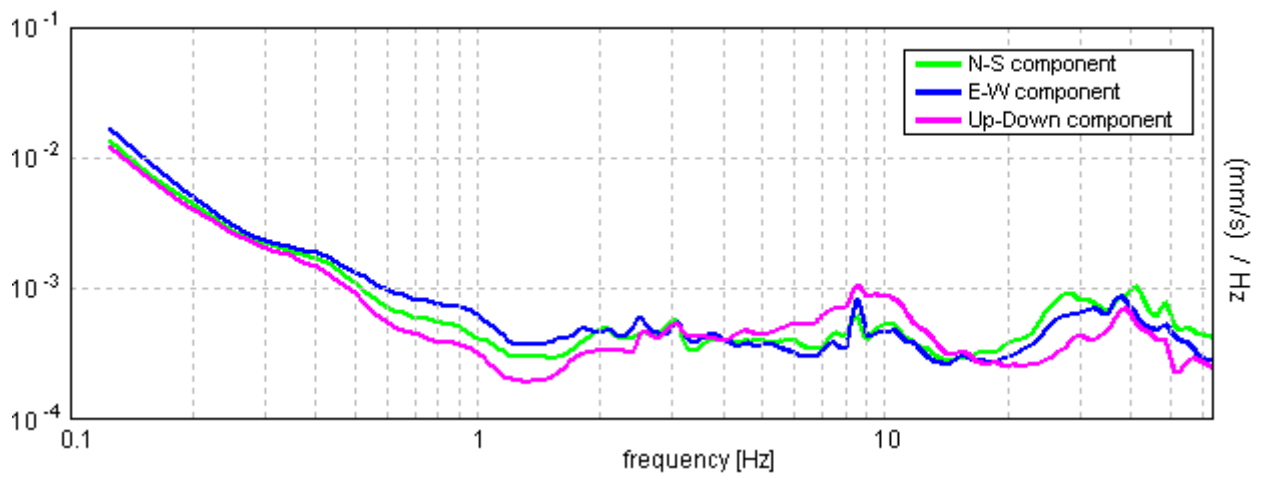
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 27.06 ± 2.64 Hz. (in the range 0.0 - 40.0 Hz).**

<b>Criteria for a reliable HVSR curve</b> [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	27.06 > 0.50	<b>OK</b>	
$n_c(f_0) > 200$	48712.5 > 200	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 1300 times	<b>OK</b>	
<b>Criteria for a clear HVSR peak</b> [At least 5 out of 6 should be fulfilled]			
<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	16.656 Hz	<b>OK</b>	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>			<b>NO</b>
$A_0 > 2$	2.20 > 2	<b>OK</b>	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.04888  < 0.05$	<b>OK</b>	
$\sigma_f < \varepsilon(f_0)$	1.32292 < 1.35313	<b>OK</b>	
$\sigma_A(f_0) < \theta(f_0)$	0.0421 < 1.58	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for $\sigma_f$ and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0127			
<b>Coordinate</b>	UTM	4219819.61	N	355915.68	E
	Gauss Boaga	4219817.983	N	2375910.686	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		16/05/2014, 12:34			
<b>Nome file</b>		0127			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

**Documentazione fotografica**



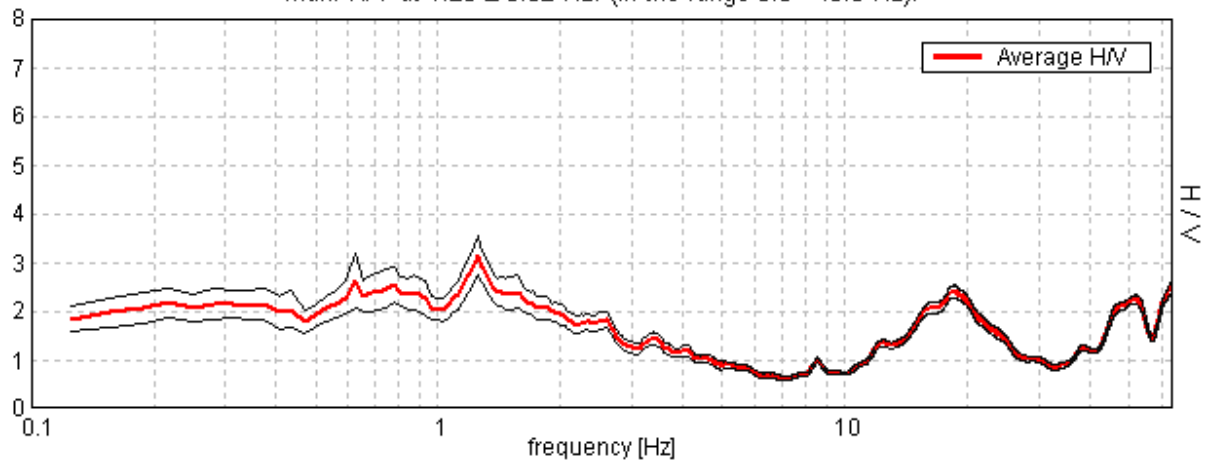
## TRIVELSICILIA PALERMO, PALERMO 0127

Start recording: 16/05/14 11:41:38      End recording: 16/05/14 12:11:39  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

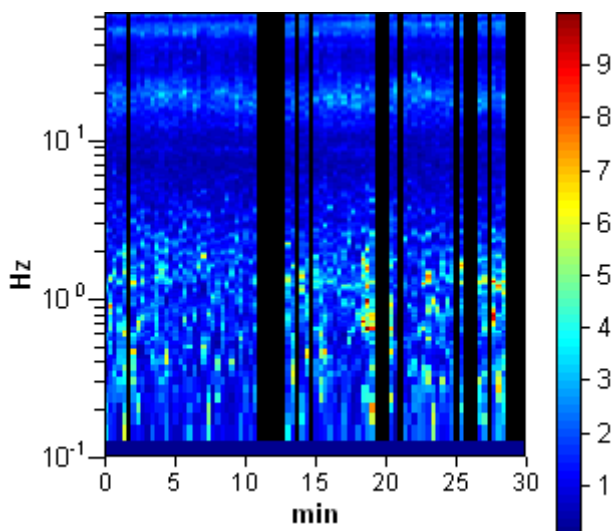
Trace length: 0h30'00".      Analyzed 76% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

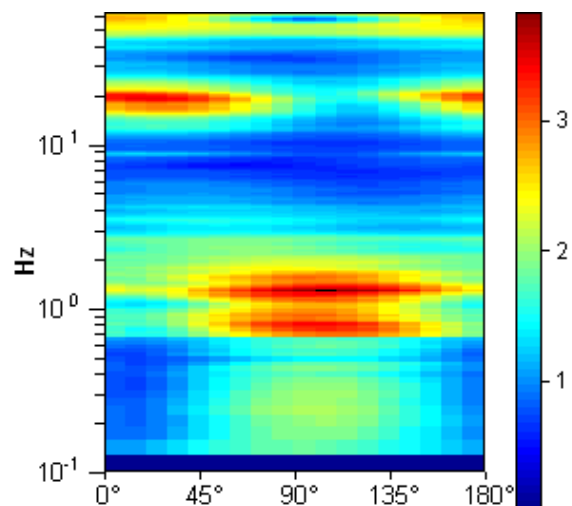
Max. H/V at  $1.25 \pm 0.02$  Hz. (In the range 0.0 - 40.0 Hz).



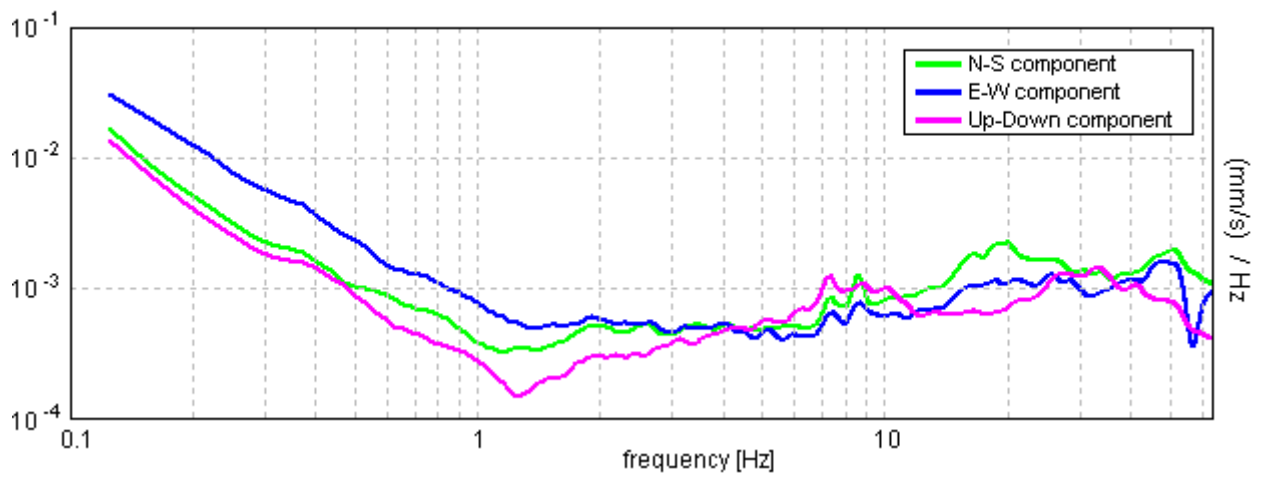
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.25 ± 0.02 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.25 > 0.50	OK	
$n_c(f_0) > 200$	1700.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 61 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.719 Hz	OK	
$A_0 > 2$	3.14 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00903  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01128 < 0.125$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2043 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0128			
<b>Coordinate</b>	UTM	4219834.78	N	355582.21	E
	Gauss Boaga	4219833.149	N	2375577.200	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		13/05/2014, 14:20			
<b>Nome file</b>		0128			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



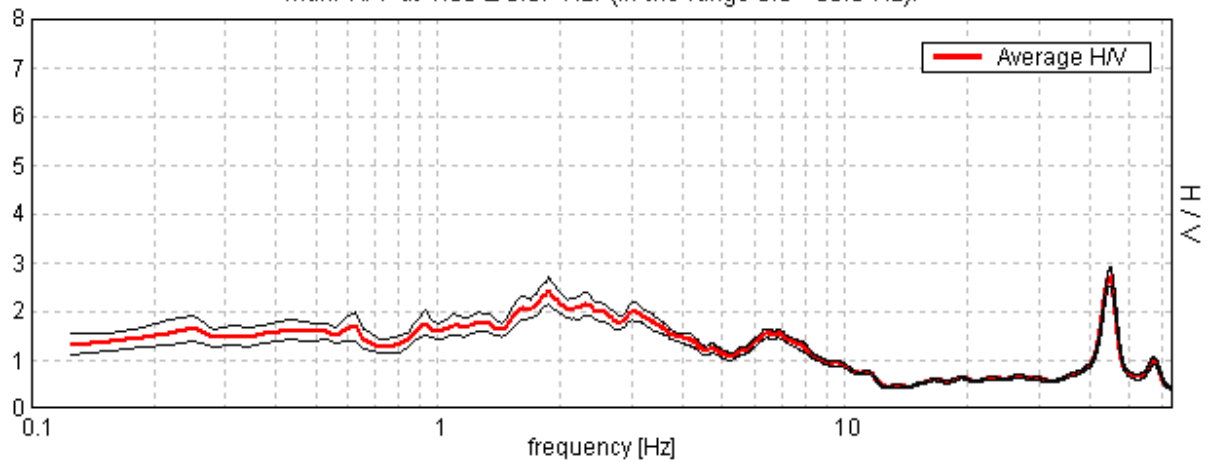
## TRIVELSICILIA PALERMO, PALERMO 0128

Start recording: 13/05/14 14:21:41      End recording: 13/05/14 14:51:42  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

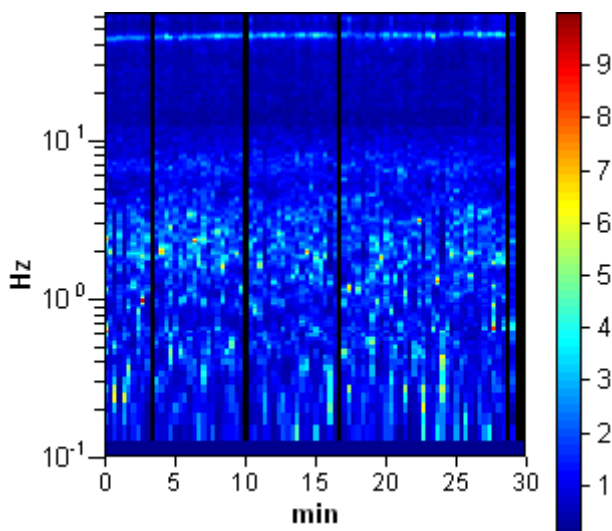
Trace length: 0h30'00".      Analyzed 93% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

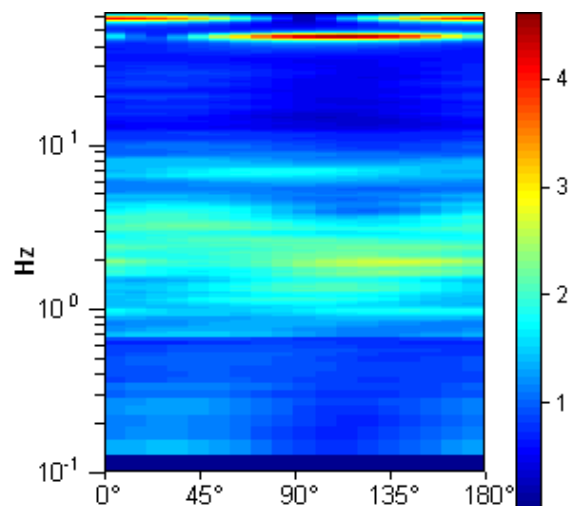
Max. H/V at  $1.88 \pm 0.07$  Hz. (In the range 0.0 - 30.0 Hz).



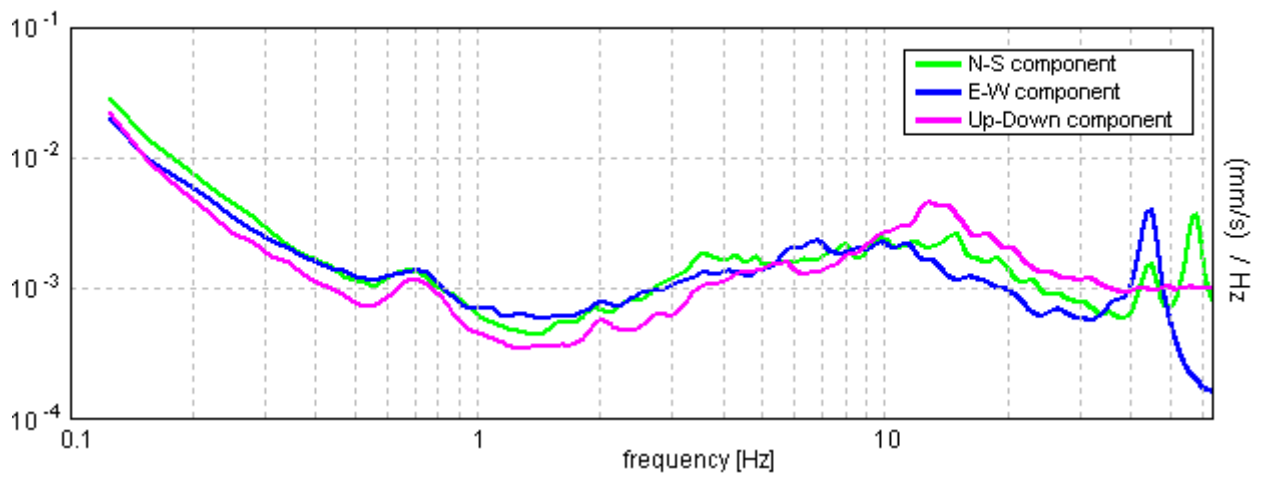
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $1.88 \pm 0.07$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.88 > 0.50$	OK	
$n_c(f_0) > 200$	$3150.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 91 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	4.469 Hz	OK	
$A_0 > 2$	$2.43 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01927  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.03613 < 0.1875$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1412 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0129			
<b>Coordinate</b>	UTM	4219882.51	N	355151.88	E
	Gauss Boaga	4219880.876	N	2375146.847	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		13/05/2014, 13:44			
<b>Nome file</b>		0129			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



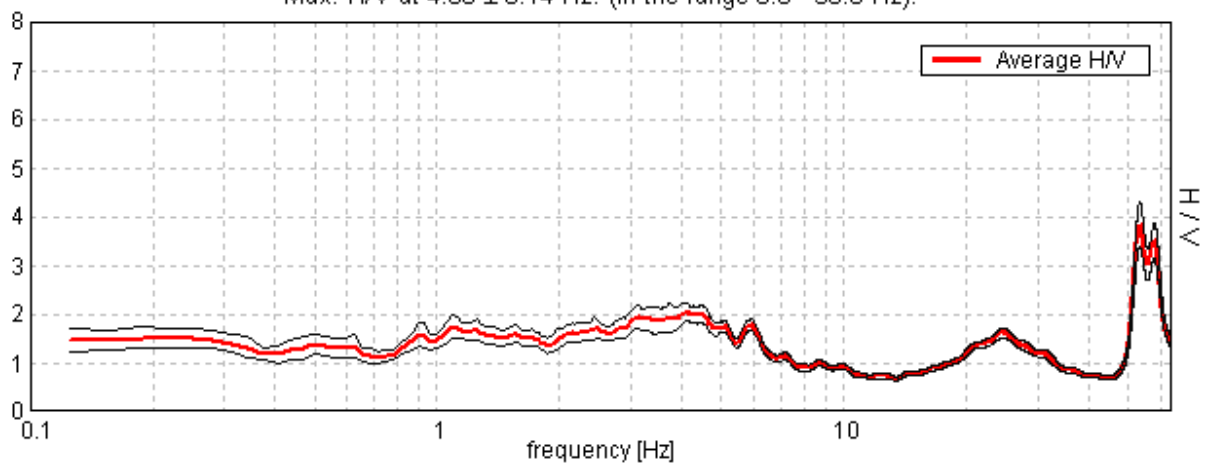
## TRIVELSICILIA PALERMO, PALERMO 0129

Start recording: 13/05/14 13:45:15      End recording: 13/05/14 14:15:16  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

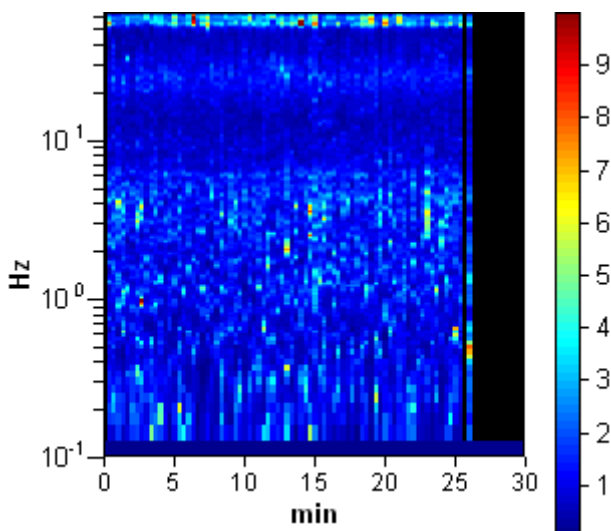
Trace length: 0h30'00".      Analyzed 86% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

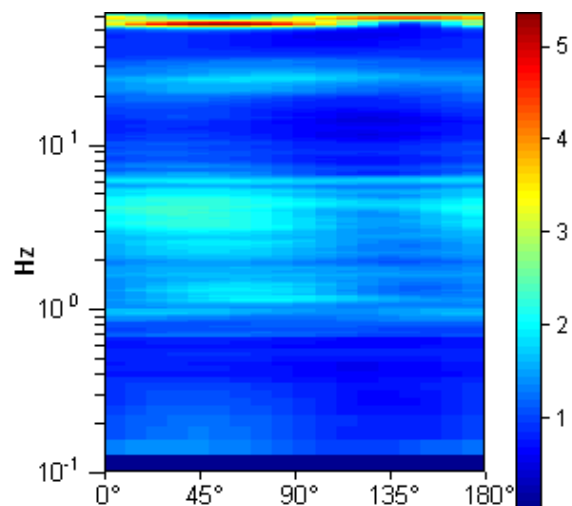
Max. H/V at  $4.06 \pm 0.14$  Hz. (In the range 0.0 - 30.0 Hz).



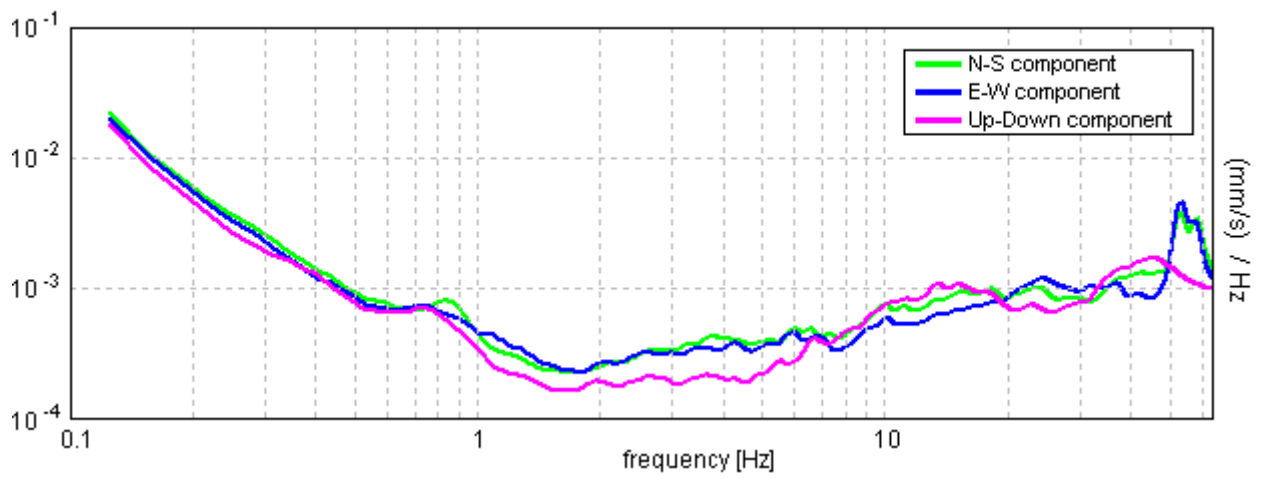
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 4.06 ± 0.14 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	4.06 > 0.50	OK	
$n_c(f_0) > 200$	6256.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 196 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	7.469 Hz	OK	
$A_0 > 2$	2.03 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01738  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.07061 < 0.20313	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.0976 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0130				
<b>Coordinate</b>	<i>UTM</i>	4219869.87	N	354771.64	E
	<i>Gauss Boaga</i>	4219868.231	N	2374766.589	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	13/05/2014, 13:03				
<b>Nome file</b>	0130				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

**Documentazione fotografica**



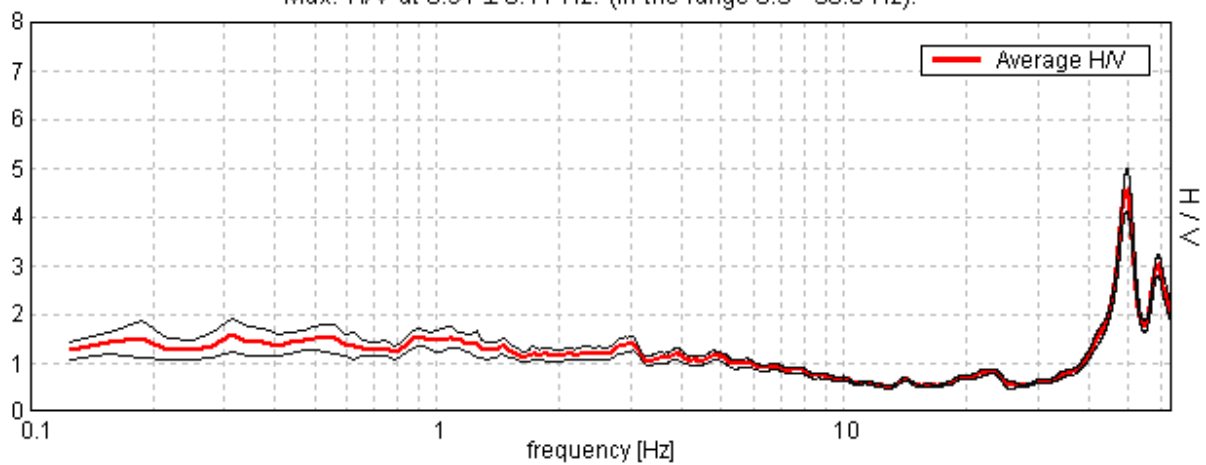
## TRIVELSICILIA PALERMO, PALERMO 0130

Start recording: 13/05/14 13:03:37      End recording: 13/05/14 13:33:38  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

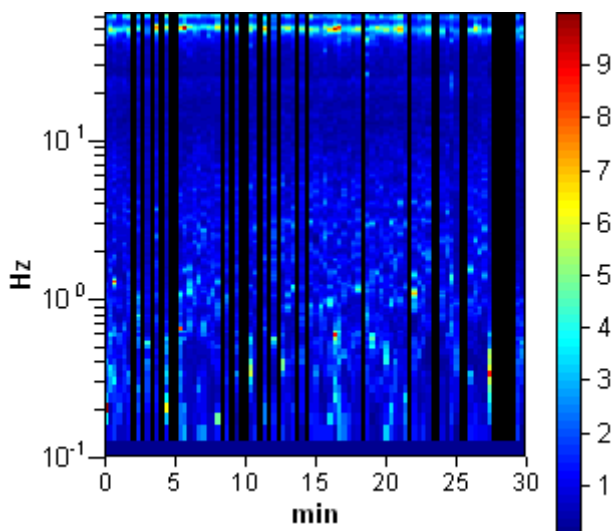
Trace length: 0h30'00".      Analyzed 71% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

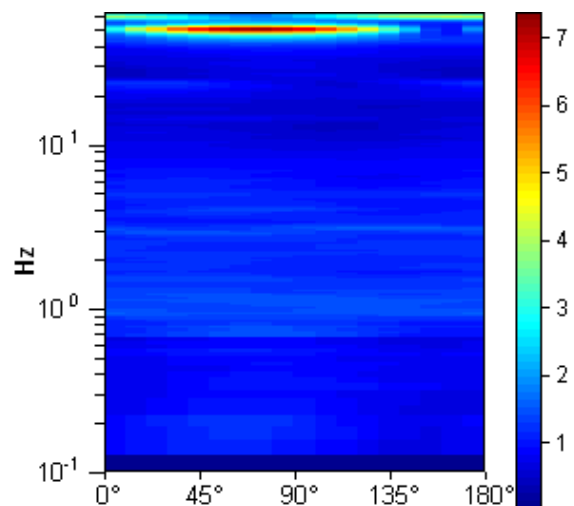
Max. H/V at  $0.91 \pm 0.11$  Hz. (In the range 0.5 - 30.0 Hz).



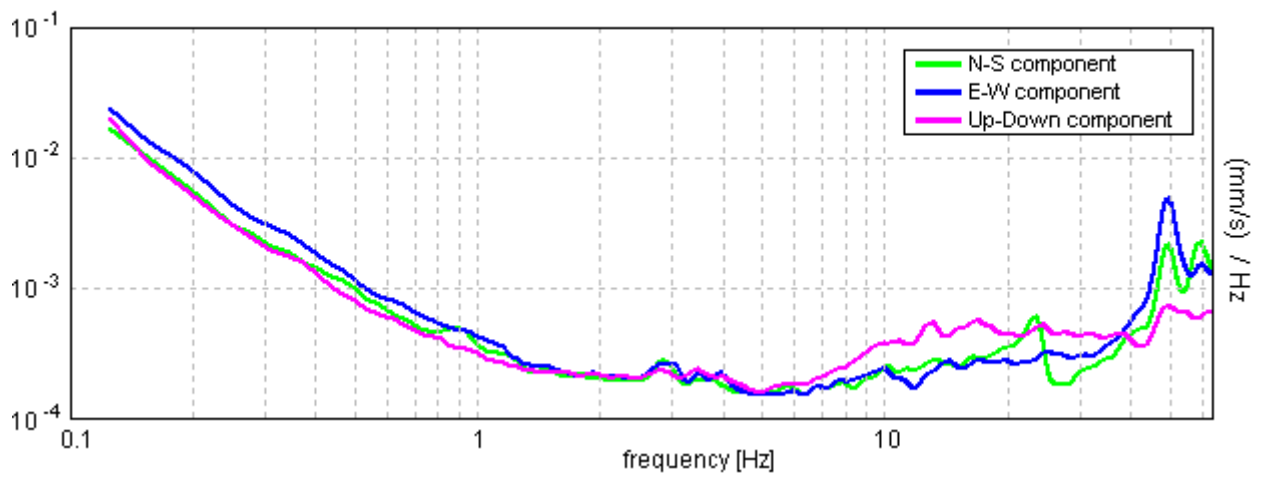
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 0.91 ± 0.11 Hz. (in the range 0.5 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.91 > 0.50	OK	
$n_c(f_0) > 200$	1160.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 44 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	1.53 > 2		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.05975  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	0.05415 < 0.13594	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.089 < 2.0	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0131			
<b>Coordinate</b>	UTM	4219900.55	N	354314.22	E
	Gauss Boaga	4219898.907	N	2374309.145	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		13/05/2014, 12:14			
<b>Nome file</b>		0131			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

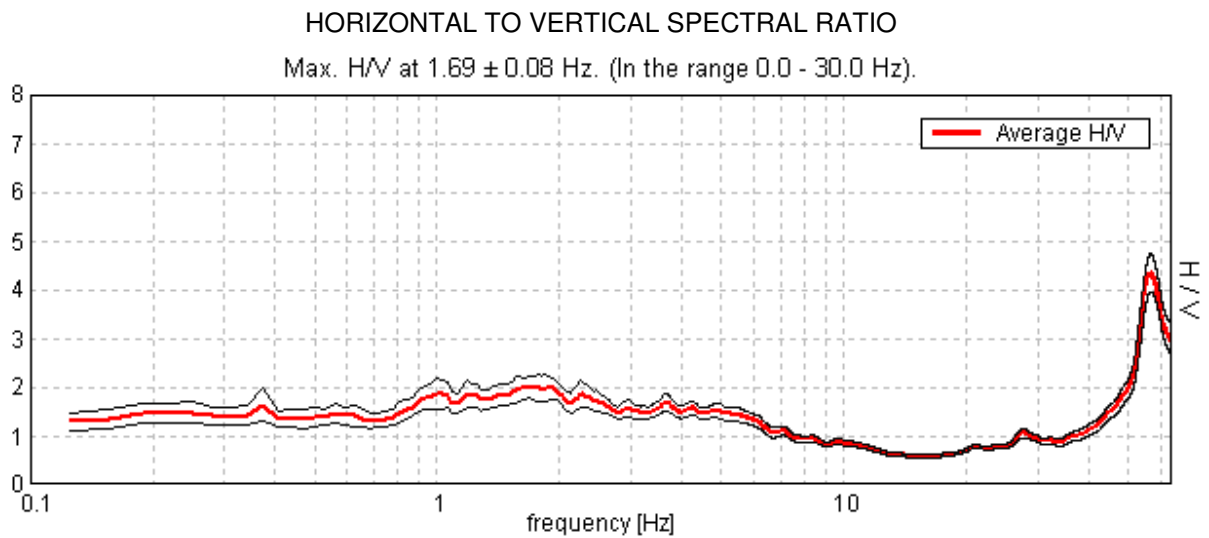
**Documentazione fotografica**



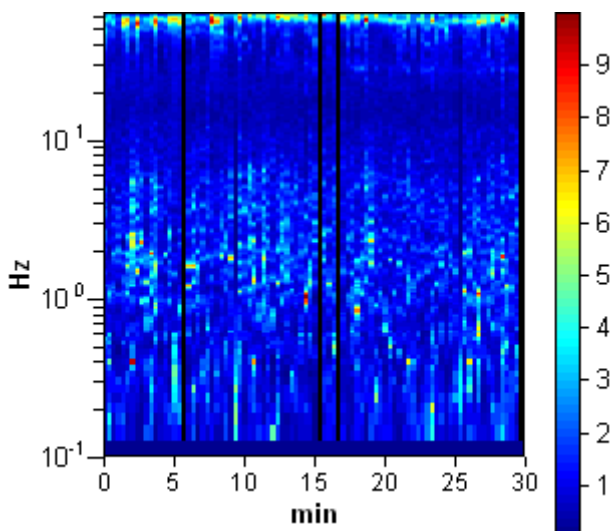
## TRIVELSICILIA PALERMO, PALERMO 0131

Start recording: 13/05/14 12:14:46      End recording: 13/05/14 12:44:47  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

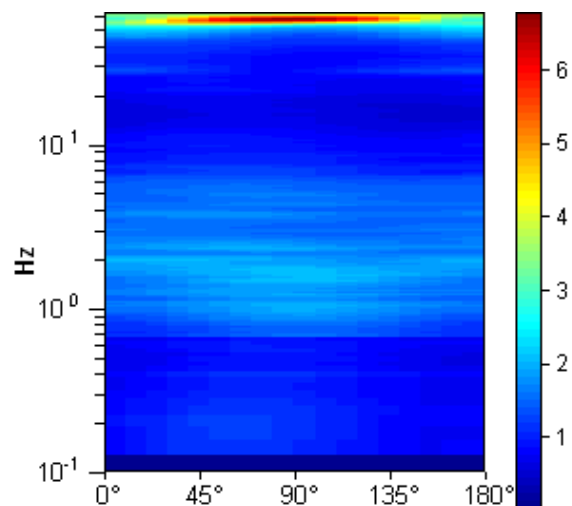
Trace length: 0h30'00".      Analyzed 96% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



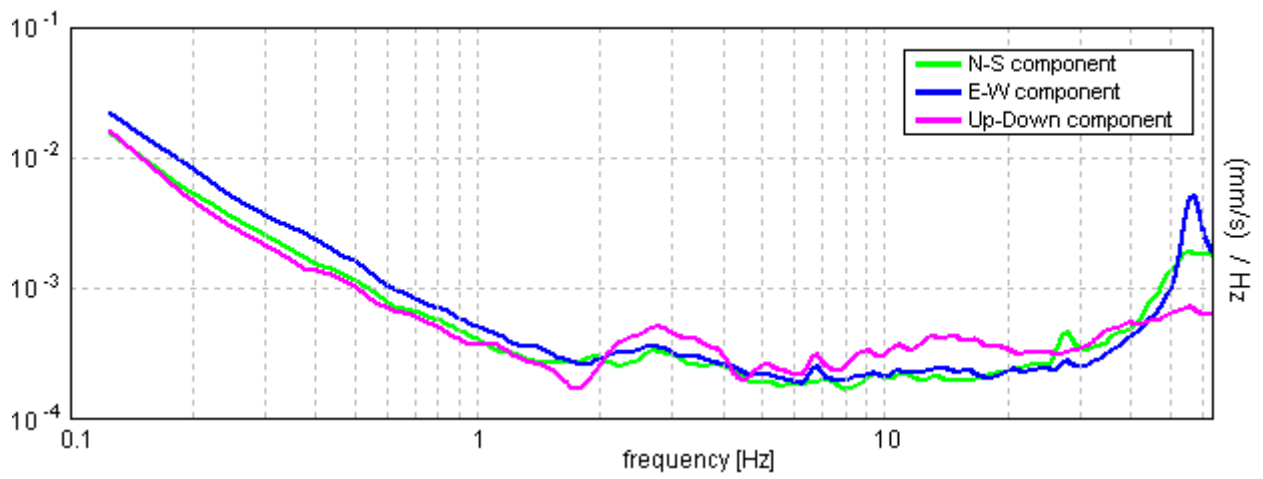
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $1.69 \pm 0.08$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.69 > 0.50$	OK	
$n_c(f_0) > 200$	$2902.5 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 82 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$1.99 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02345  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.03956 < 0.16875$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1118 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

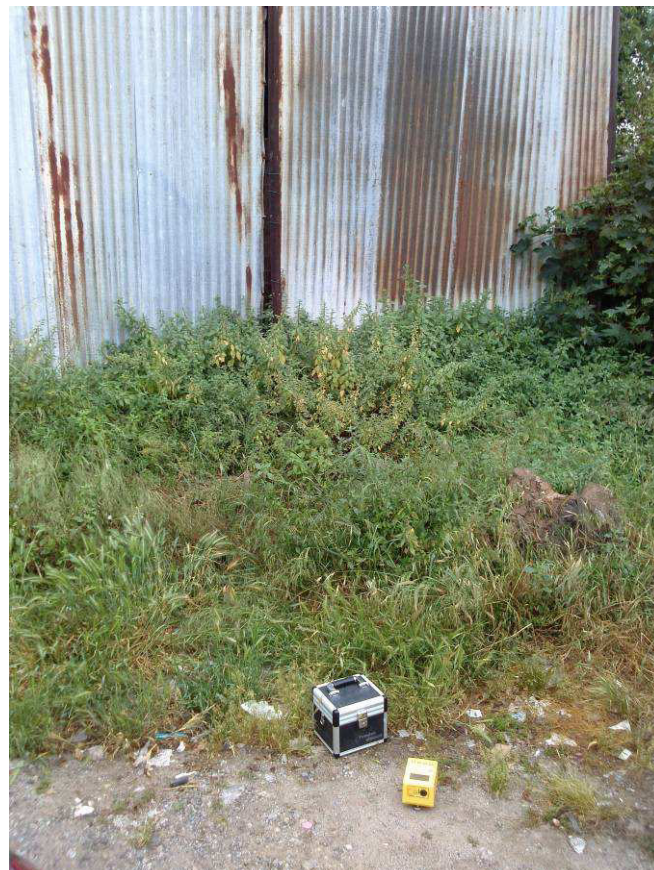


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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0132			
<b>Coordinate</b>	UTM	4219492.94	N	354348.33	E
	Gauss Boaga	4219491.279	N	2374343.265	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		19/05/2014, 08:46			
<b>Nome file</b>		0132			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

**Documentazione fotografica**



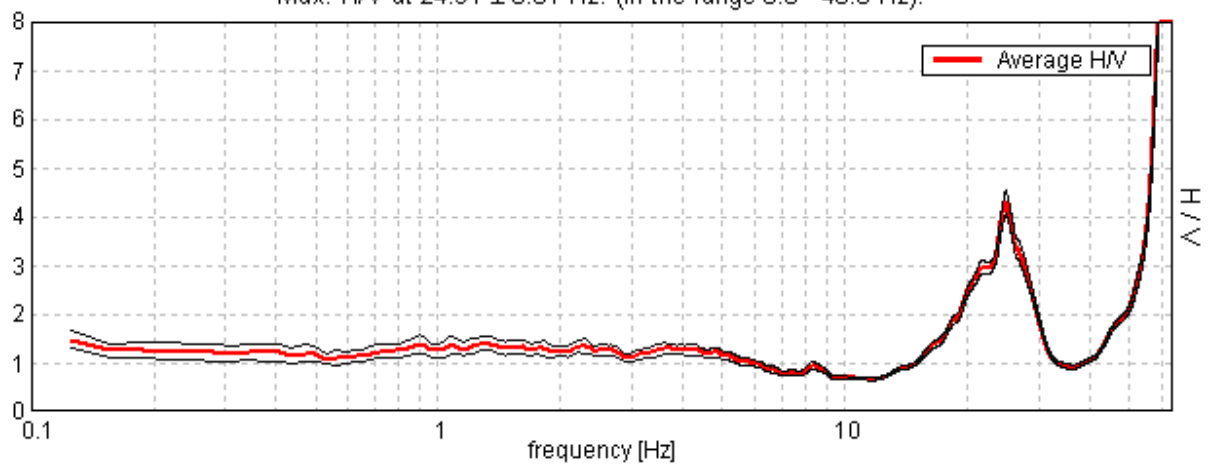
## TRIVELSICILIA PALERMO, PALERMO 0132

Start recording: 19/05/14 08:47:44      End recording: 19/05/14 09:17:45  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

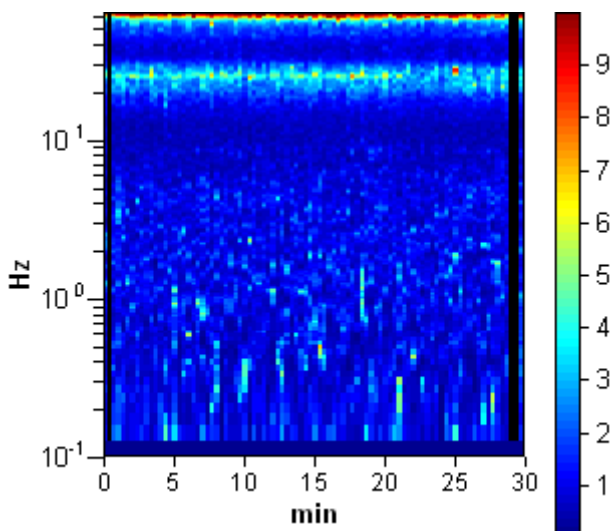
Trace length: 0h30'00".      Analyzed 97% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

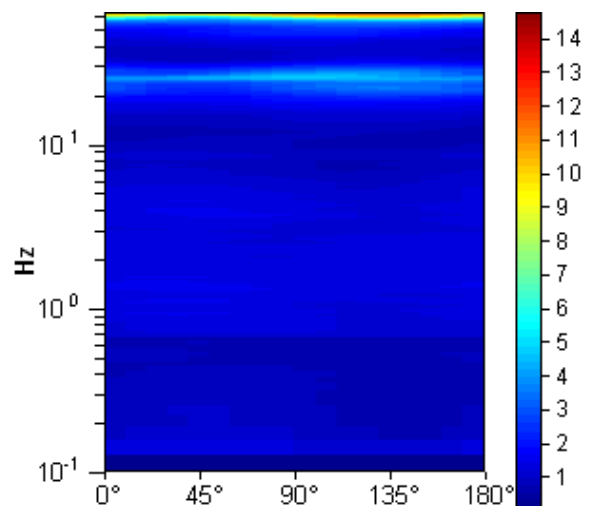
Max. H/V at  $24.91 \pm 0.01$  Hz. (In the range 0.0 - 40.0 Hz).



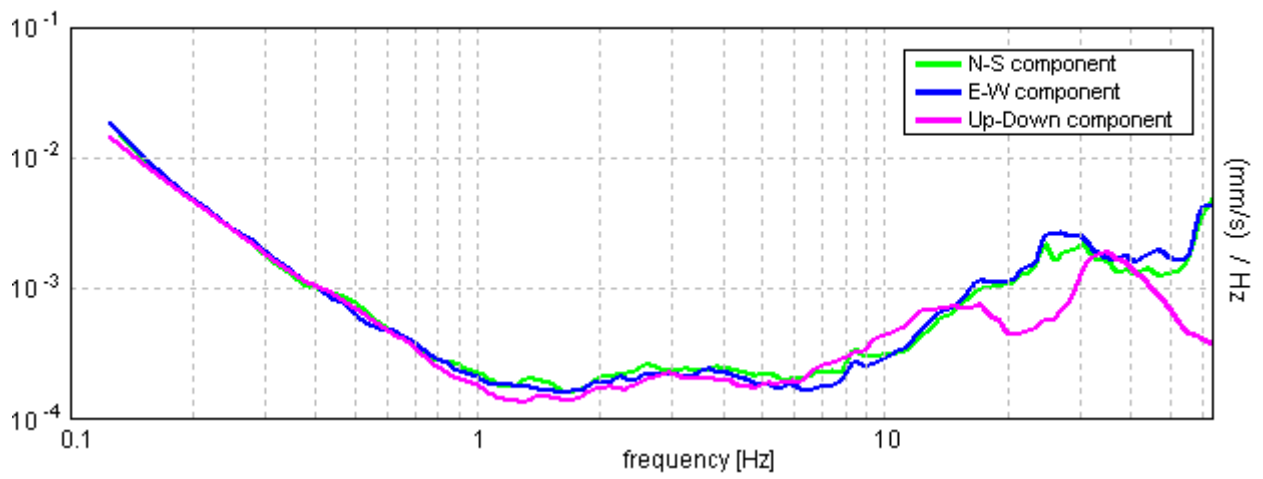
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 24.91 ± 0.01 Hz. (in the range 0.0 - 40.0 Hz).**

<b>Criteria for a reliable HVSR curve</b> [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	24.91 > 0.50	<b>OK</b>	
$n_c(f_0) > 200$	43336.9 > 200	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 1196 times	<b>OK</b>	
<b>Criteria for a clear HVSR peak</b> [At least 5 out of 6 should be fulfilled]			
<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	19.469 Hz	<b>OK</b>	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	29.469 Hz	<b>OK</b>	
$A_0 > 2$	4.30 > 2	<b>OK</b>	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00017  < 0.05$	<b>OK</b>	
$\sigma_f < \varepsilon(f_0)$	0.00419 < 1.24531	<b>OK</b>	
$\sigma_A(f_0) < \theta(f_0)$	0.1198 < 1.58	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for $\sigma_f$ and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0133			
<b>Coordinate</b>	UTM	4219553.52	N	354753.81	E
	Gauss Boaga	4219551.867	N	2374748.764	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		19/05/2014, 09:24			
<b>Nome file</b>		0133			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

**Documentazione fotografica**



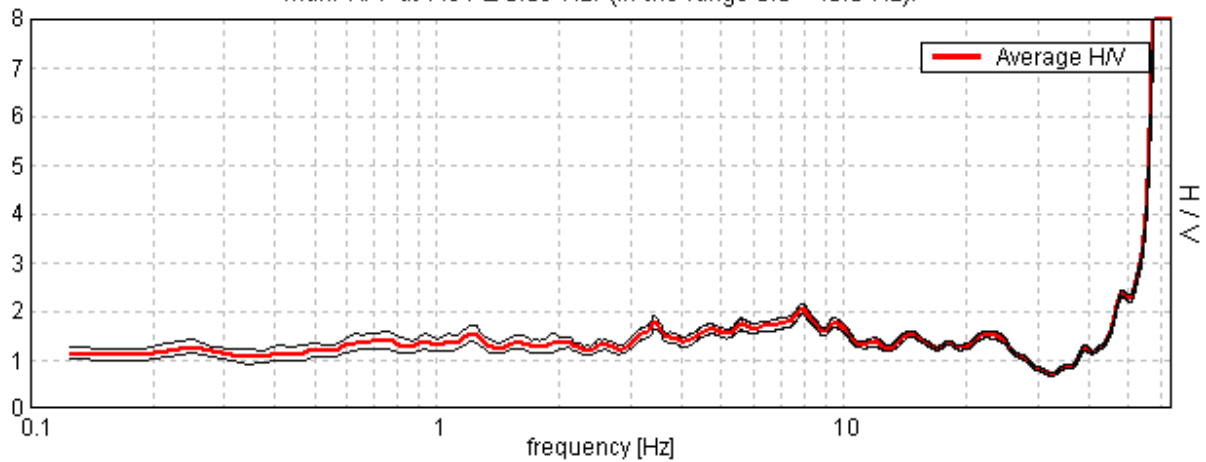
### TRIVELSICILIA PALERMO, PALERMO 0133

Start recording: 19/05/14 09:25:56      End recording: 19/05/14 09:55:57  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

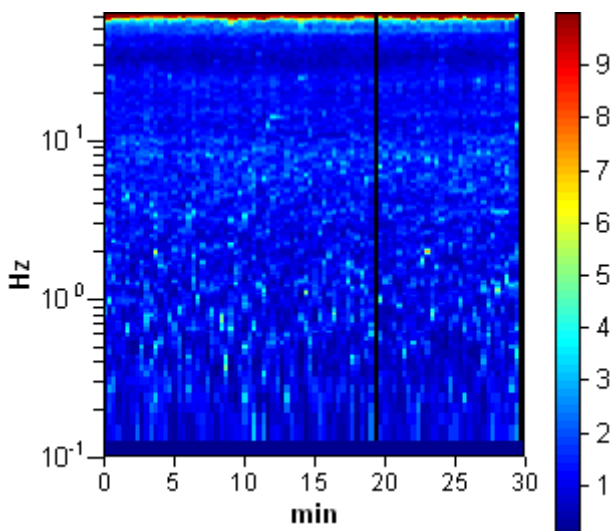
Trace length: 0h30'00".      Analyzed 98% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

#### HORIZONTAL TO VERTICAL SPECTRAL RATIO

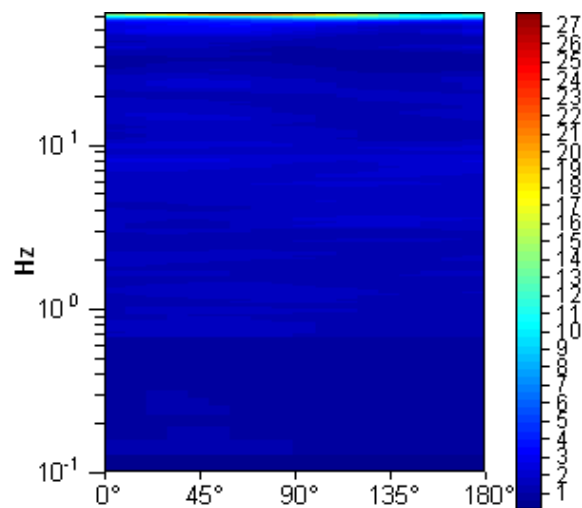
Max. H/V at  $7.91 \pm 0.39$  Hz. (In the range 0.0 - 40.0 Hz).



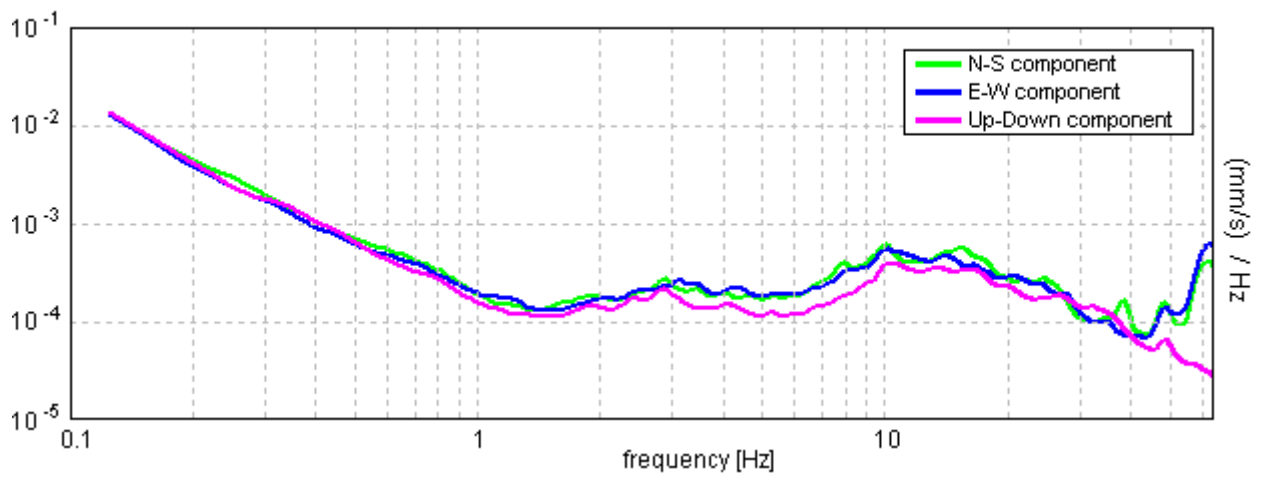
#### H/V TIME HISTORY



#### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 7.91 ± 0.39 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	7.91 > 0.50	OK	
$n_c(f_0) > 200$	13915.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 380 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	27.906 Hz	OK	
$A_0 > 2$	2.04 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02469  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.19517 < 0.39531	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.0554 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0134				
<b>Coordinate</b>	<i>UTM</i>	4219434.05	N	355056.20	E
	<i>Gauss Boaga</i>	4219432.395	N	2375051.171	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	16/05/2014, 13:23				
<b>Nome file</b>	0134				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

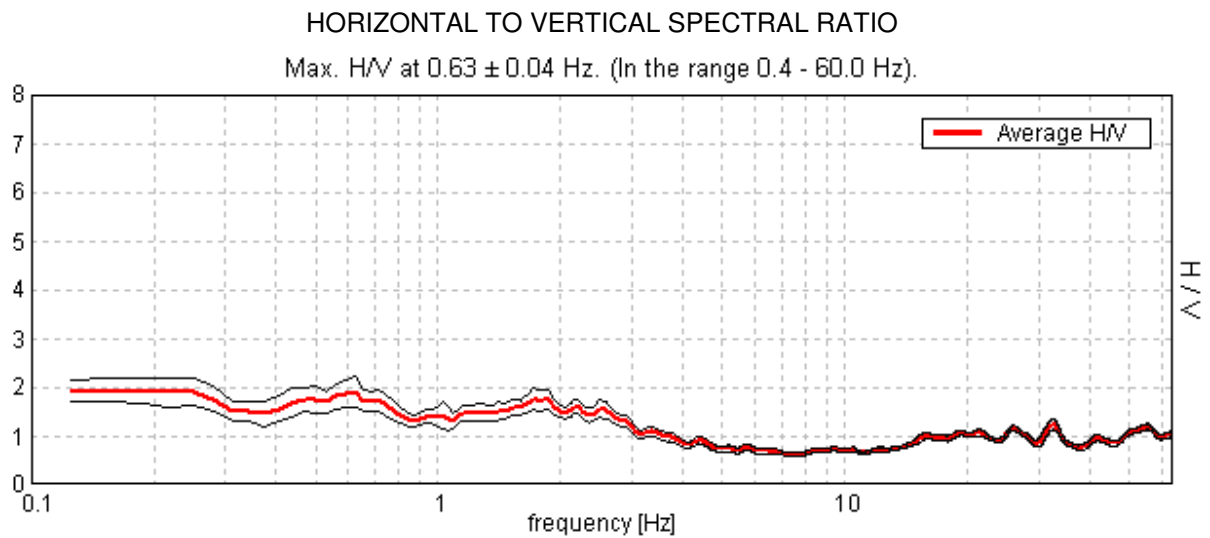
**Documentazione fotografica**



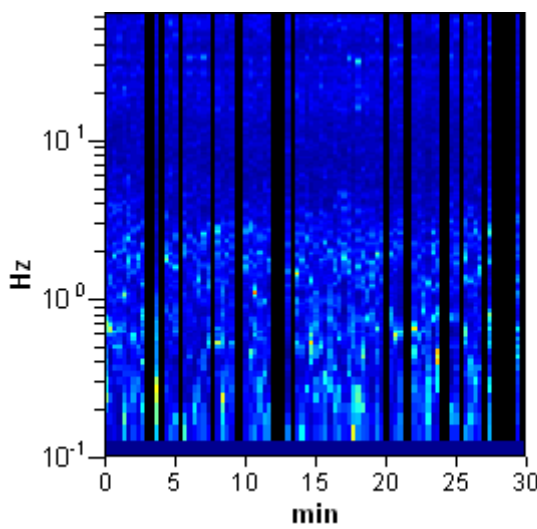
## TRIVELSICILIA PALERMO, PALERMO 0134

Start recording: 16/05/14 12:30:35      End recording: 16/05/14 13:00:36  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

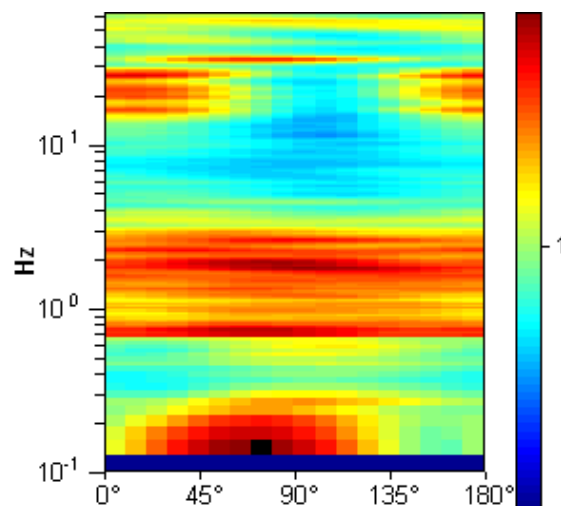
Trace length: 0h30'00".      Analyzed 73% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



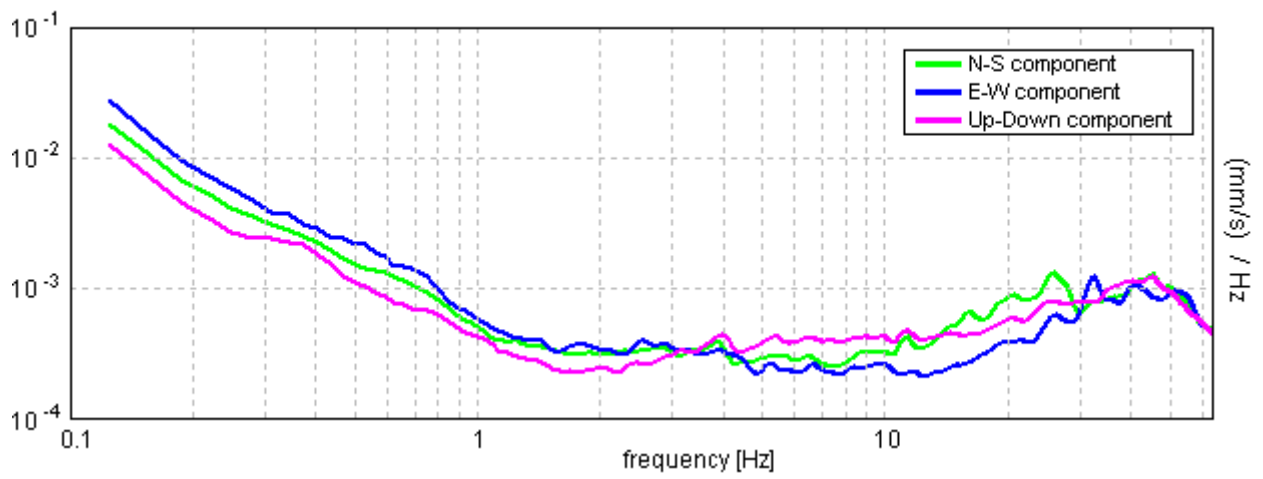
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $0.63 \pm 0.04$  Hz. (in the range 0.4 - 60.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.63 > 0.50$	OK	
$n_c(f_0) > 200$	$825.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 31 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$1.89 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03246  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02029 < 0.09375$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1527 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0135				
<b>Coordinate</b>	<i>UTM</i>	4219517.56	N	355561.86	E
	<i>Gauss Boaga</i>	4219515.915	N	2375556.855	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	16/05/2014, 13:58				
<b>Nome file</b>	0135				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Terreno				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



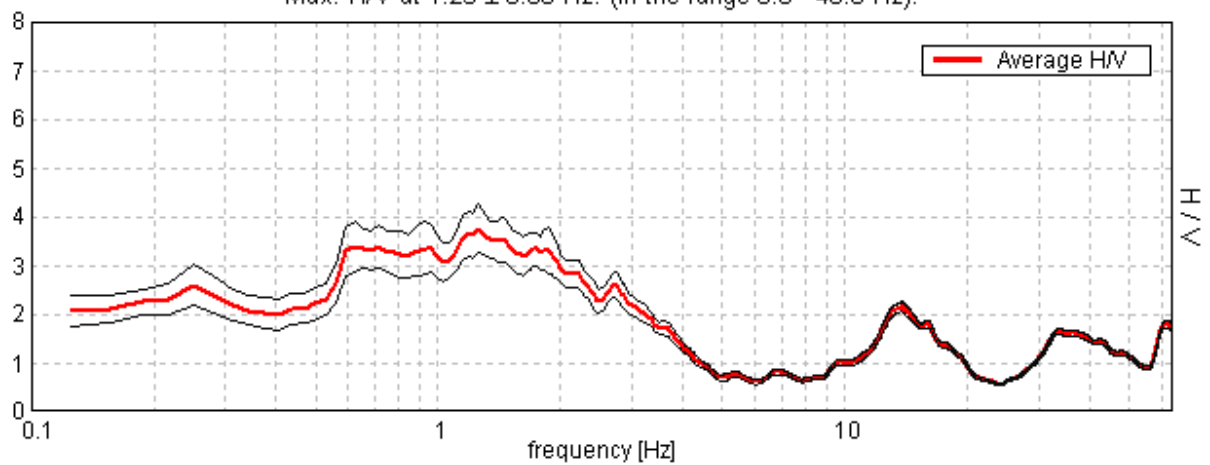
## TRIVELSICILIA PALERMO, PALERMO 0135

Start recording: 16/05/14 13:06:30      End recording: 16/05/14 13:36:31  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

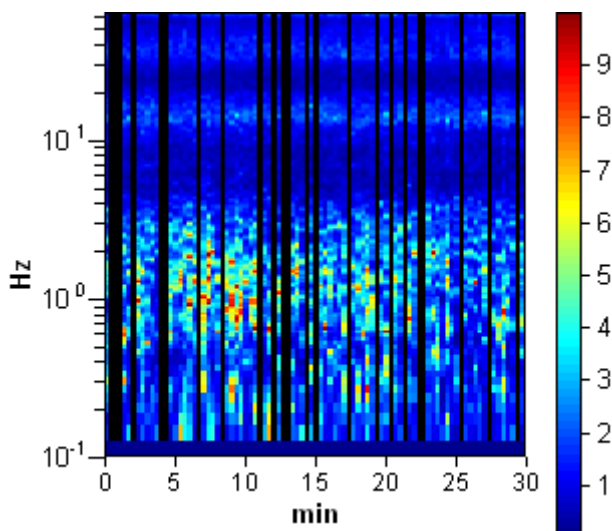
Trace length: 0h30'00".      Analyzed 74% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

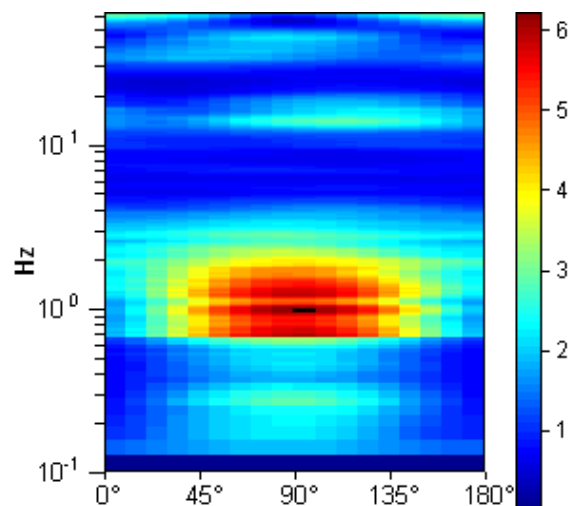
Max. H/V at  $1.25 \pm 0.06$  Hz. (In the range 0.0 - 40.0 Hz).



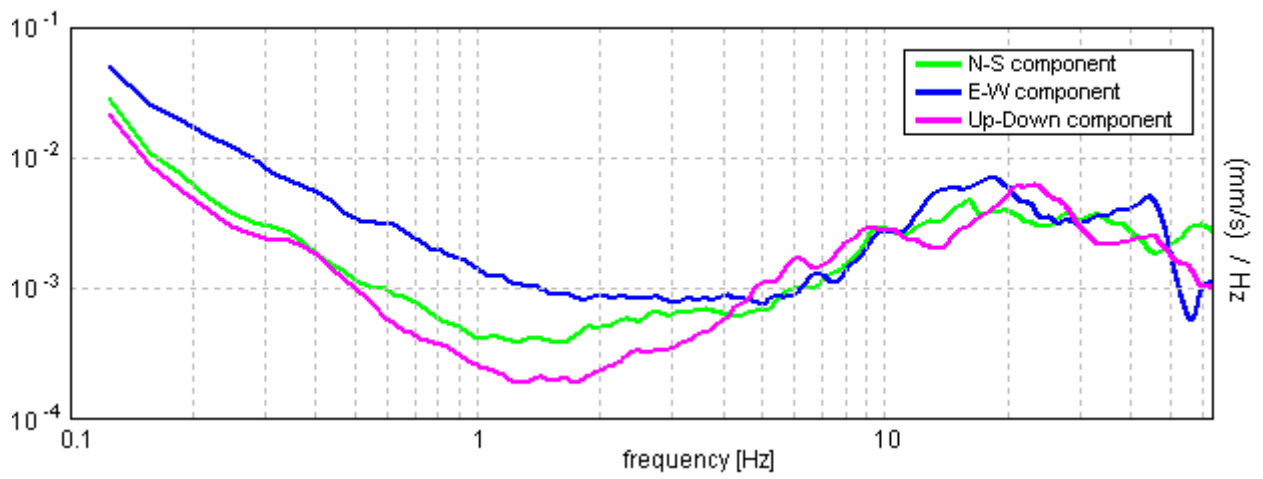
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.25 ± 0.06 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.25 > 0.50	OK	
$n_c(f_0) > 200$	1675.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 61 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	3.375 Hz	OK	
$A_0 > 2$	3.75 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02242  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.02803 < 0.125	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.2535 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0136			
<b>Coordinate</b>	UTM	4219511.81	N	355885.86	E
	Gauss Boaga	4219510.169	N	2375880.871	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		16/05/2014, 14:35			
<b>Nome file</b>		0136			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	
<b>Nota</b>		Base sismica ripetuta per l'inattendibilità del segnale			

**Documentazione fotografica**



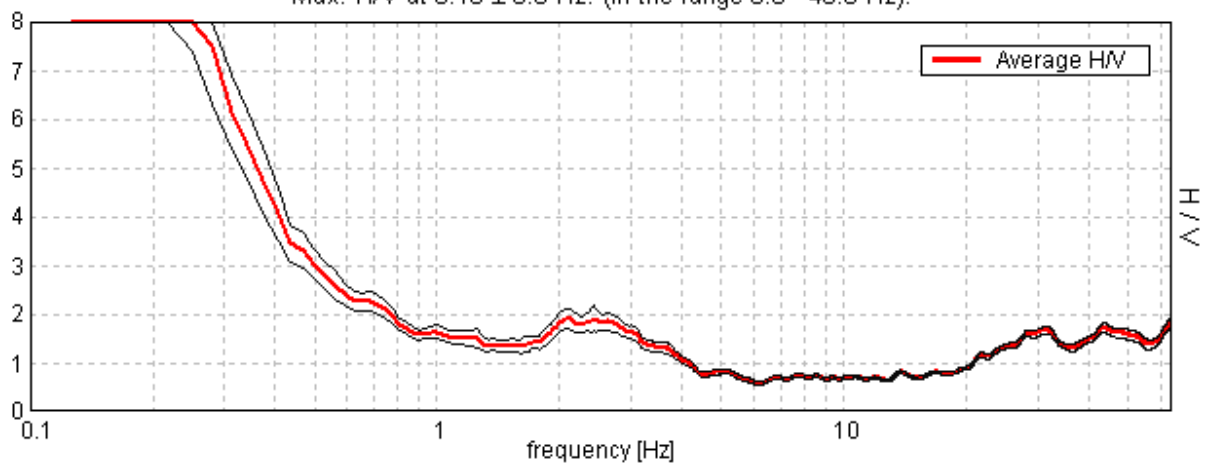
## TRIVELSICILIA PALERMO, PALERMO 0136

Start recording: 16/05/14 13:41:55      End recording: 16/05/14 14:11:56  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

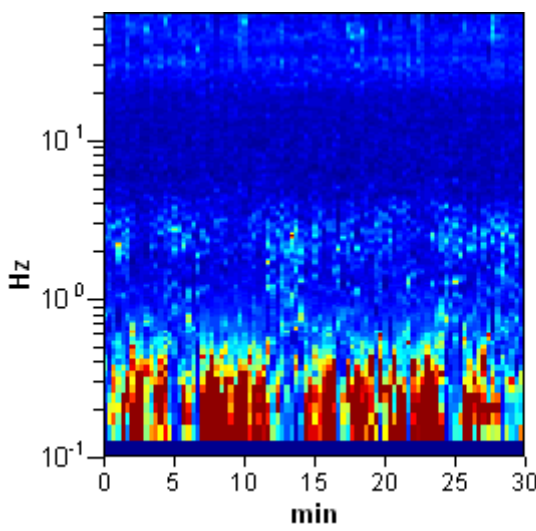
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

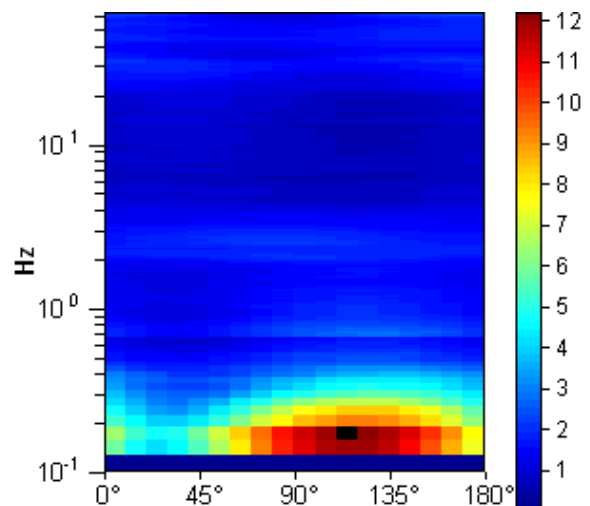
Max. H/V at  $0.16 \pm 0.0$  Hz. (In the range 0.0 - 40.0 Hz).



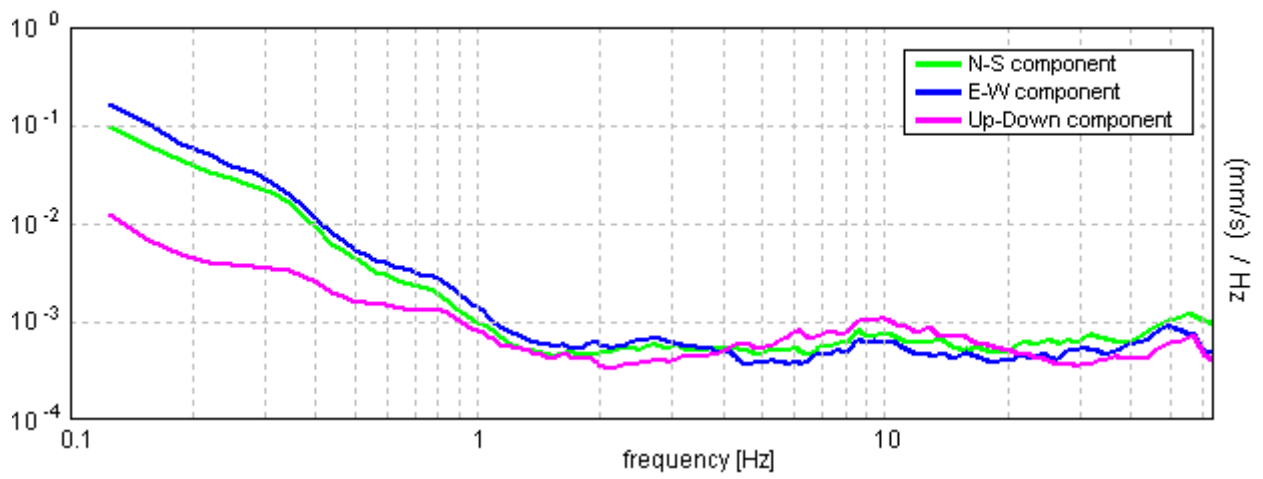
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $0.16 \pm 0.0$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.16 > 0.50$		<b>NO</b>
$n_c(f_0) > 200$	$281.3 > 200$	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 8 times	<b>OK</b>	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.094 Hz	<b>OK</b>	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	0.313 Hz	<b>OK</b>	
$A_0 > 2$	$12.43 > 2$	<b>OK</b>	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01405  < 0.05$	<b>OK</b>	
$\sigma_f < \varepsilon(f_0)$	$0.0022 < 0.03906$	<b>OK</b>	
$\sigma_A(f_0) < \theta(f_0)$	$1.2057 < 3.0$	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0136 bis			
<b>Coordinate</b>	<i>UTM</i>	4219359.85	N	355761.36	E
	<i>Gauss Boaga</i>	4219358.200	N	2375756.368	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		16/06/2014, 09:15			
<b>Nome file</b>		0136 bis			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>Si</b>		
		<b>Altro</b>	<b>No</b>		

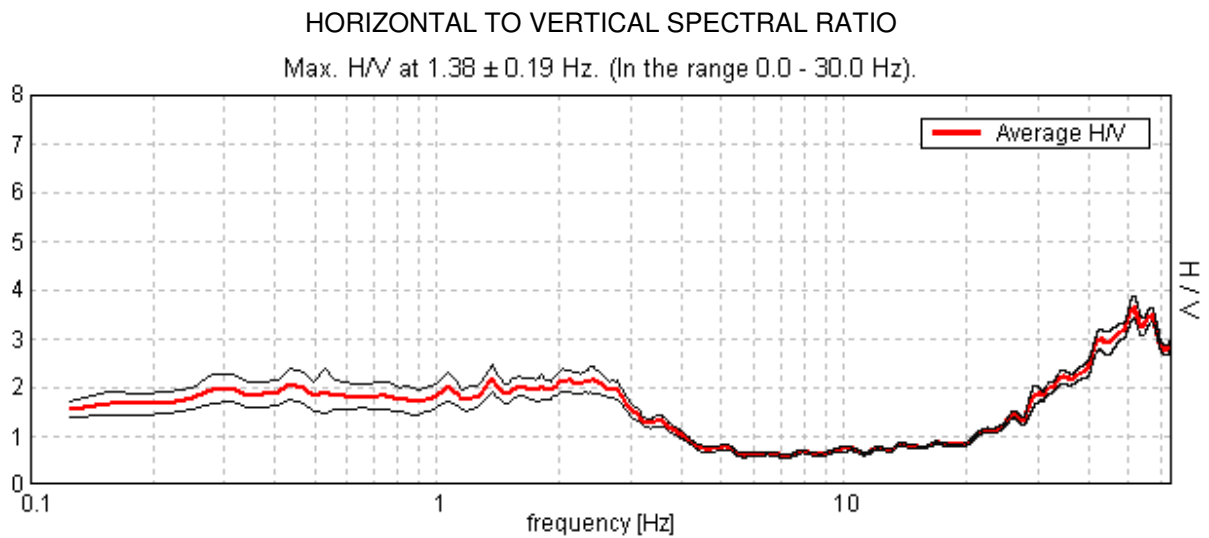
**Documentazione fotografica**



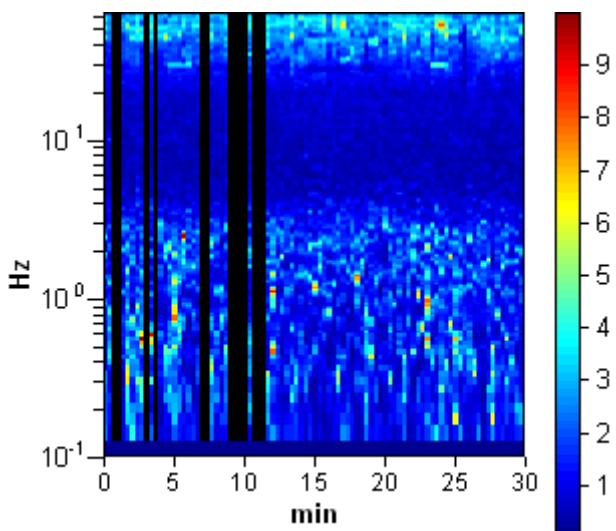
## TRIVEL SICILIA PALERMO, PALERMO 0136BIS

Start recording: 16/06/14 09:25:23      End recording: 16/06/14 09:55:24  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

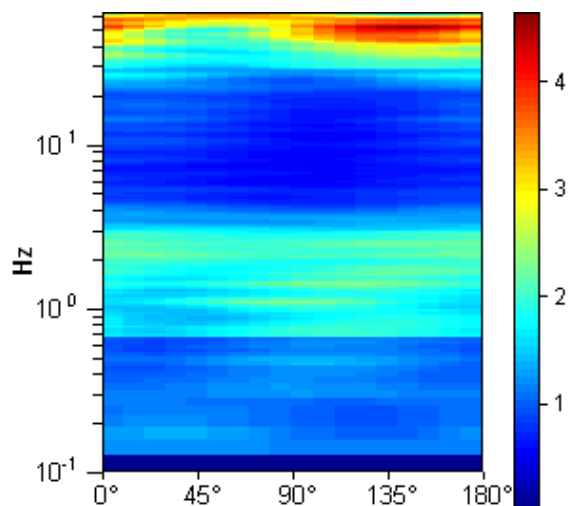
Trace length: 0h30'00".      Analyzed 86% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



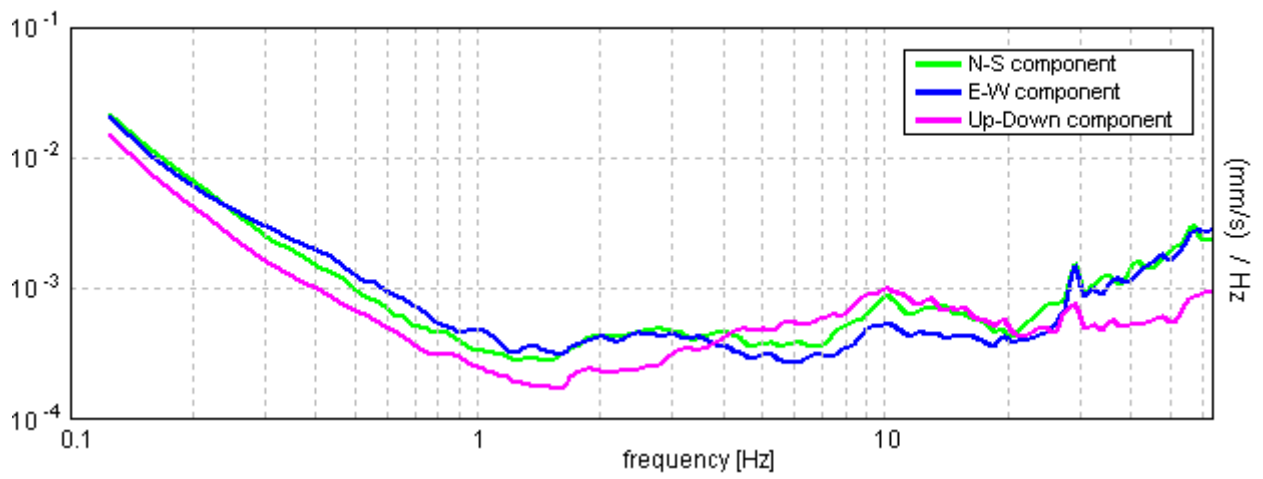
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.38 ± 0.19 Hz. (in the range 0.0 - 30.0 Hz).**

<b>Criteria for a reliable HVSR curve</b> [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	1.38 > 0.50	<b>OK</b>	
$n_c(f_0) > 200$	2117.5 > 200	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 67 times	<b>OK</b>	
<b>Criteria for a clear HVSR peak</b> [At least 5 out of 6 should be fulfilled]			
<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	3.875 Hz	<b>OK</b>	
$A_0 > 2$	2.17 > 2	<b>OK</b>	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.06929  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	0.09527 < 0.1375	<b>OK</b>	
$\sigma_A(f_0) < \theta(f_0)$	0.1419 < 1.78	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for $\sigma_f$ and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0137			
<b>Coordinate</b>	UTM	4219480.96	N	356374.98	E
	Gauss Boaga	4219479.323	N	2376370.016	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		19/05/2014, 11:10			
<b>Nome file</b>		0137			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Basolato			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



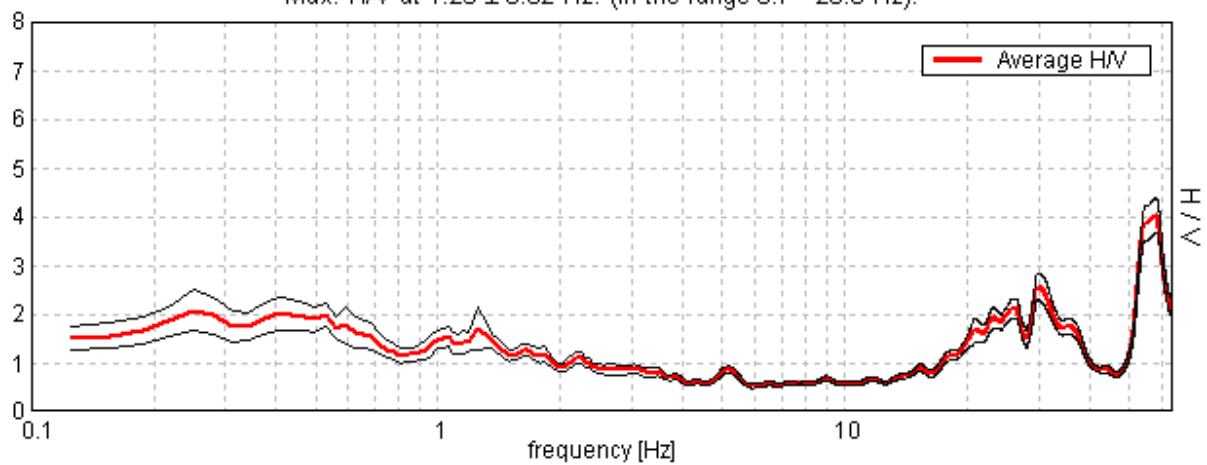
## TRIVELSICILIA PALERMO, PALERMO 0137

Start recording: 19/05/14 11:12:09      End recording: 19/05/14 11:42:10  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

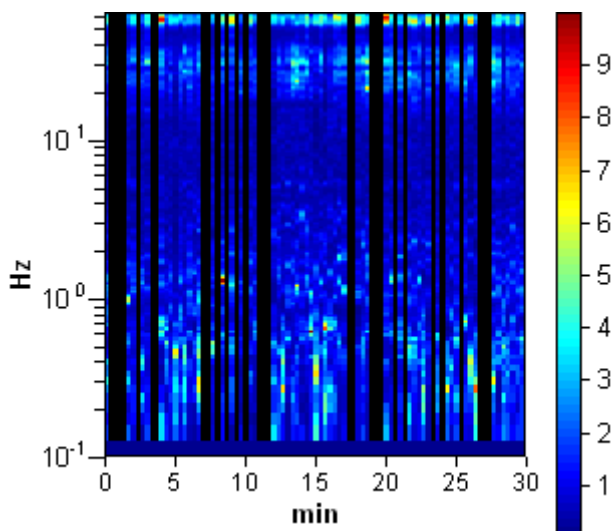
Trace length: 0h30'00".      Analyzed 68% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

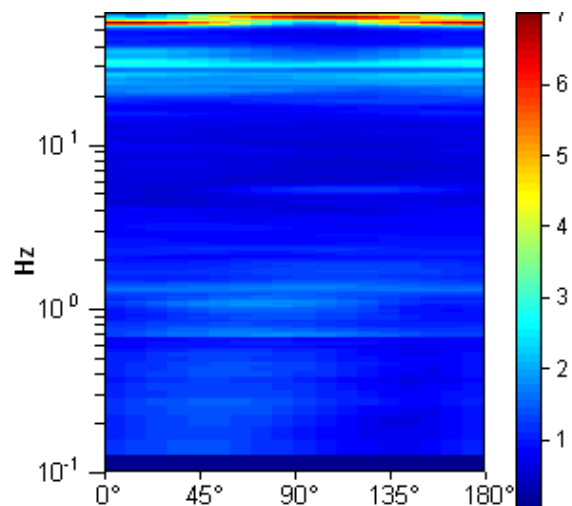
Max. H/V at  $1.25 \pm 0.02$  Hz. (In the range 0.7 - 20.0 Hz).



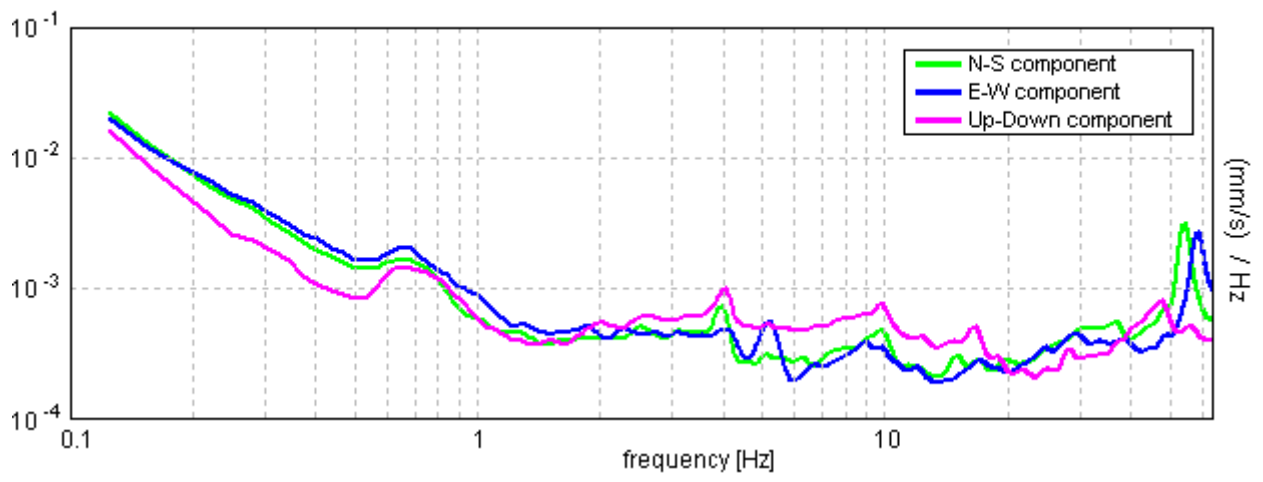
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $1.25 \pm 0.02$  Hz. (in the range 0.7 - 20.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.25 > 0.50$	OK	
$n_c(f_0) > 200$	$1525.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 61 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.75 Hz	OK	
$A_0 > 2$	$1.70 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00896  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.0112 < 0.125$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2167 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0138				
<b>Coordinate</b>	<i>UTM</i>	4219434.70	N	356760.40	E
	<i>Gauss Boaga</i>	4219433.066	N	2376755.456	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	16/05/2014, 15:15				
<b>Nome file</b>	0138				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



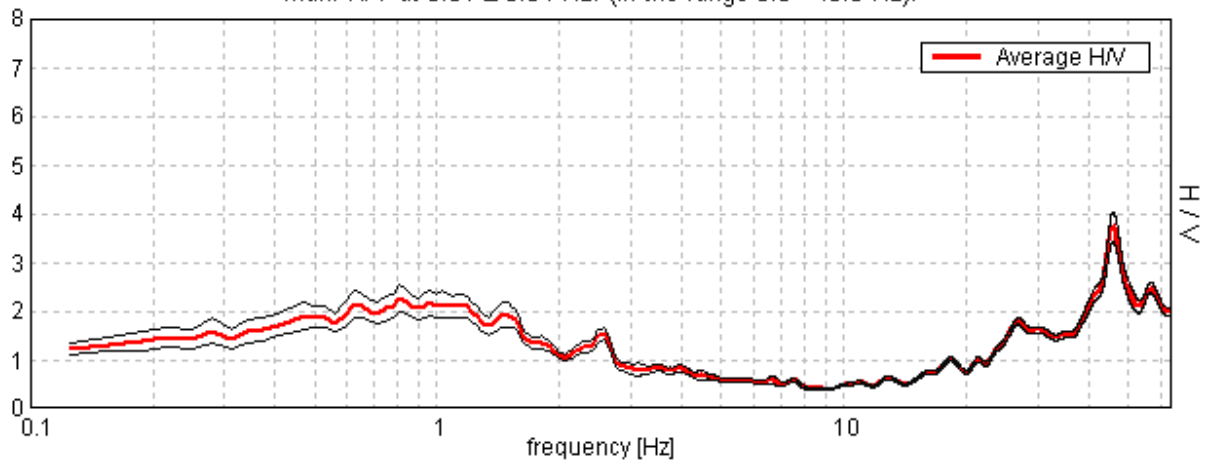
## TRIVELSICILIA PALERMO, PALERMO 0138

Start recording: 16/05/14 14:22:14      End recording: 16/05/14 14:52:15  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

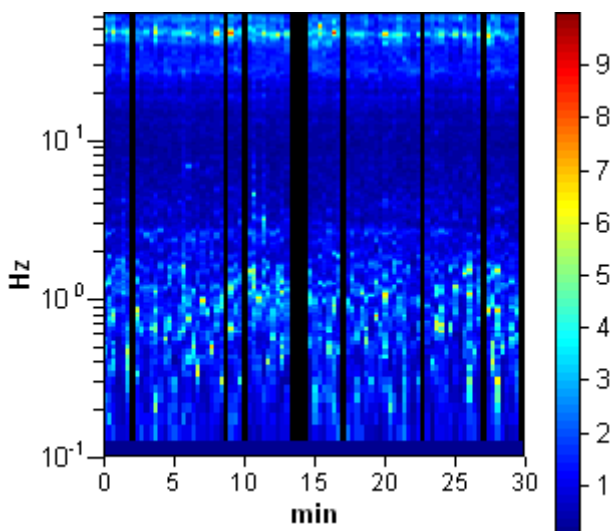
Trace length: 0h30'00".      Analyzed 88% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

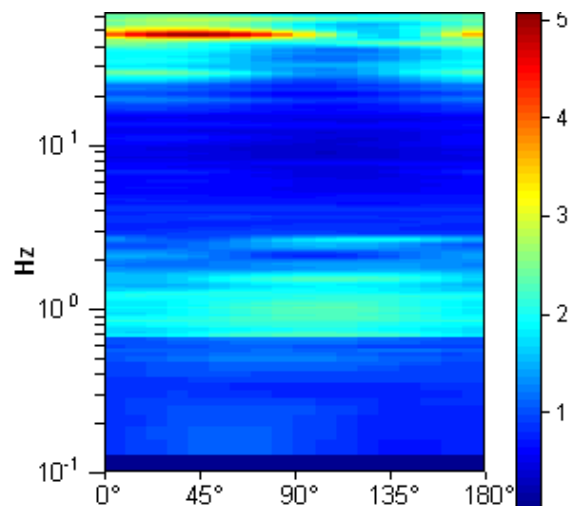
Max. H/V at  $0.81 \pm 0.04$  Hz. (In the range 0.0 - 40.0 Hz).



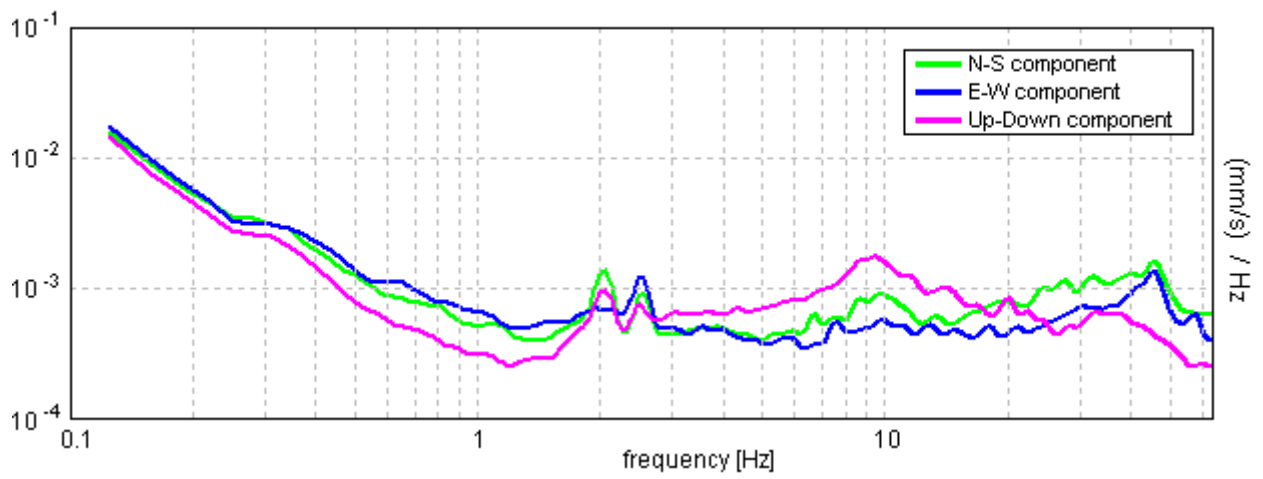
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 0.81 ± 0.04 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.81 > 0.50	OK	
$n_c(f_0) > 200$	1283.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 40 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.969 Hz	OK	
$A_0 > 2$	2.25 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02366  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.01922 < 0.12188	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1418 < 2.0	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0139				
<b>Coordinate</b>	<i>UTM</i>	4219468.97	N	357161.00	E
	<i>Gauss Boaga</i>	4219467.343	N	2377156.075	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	16/05/2014, 15:51				
<b>Nome file</b>	0139				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



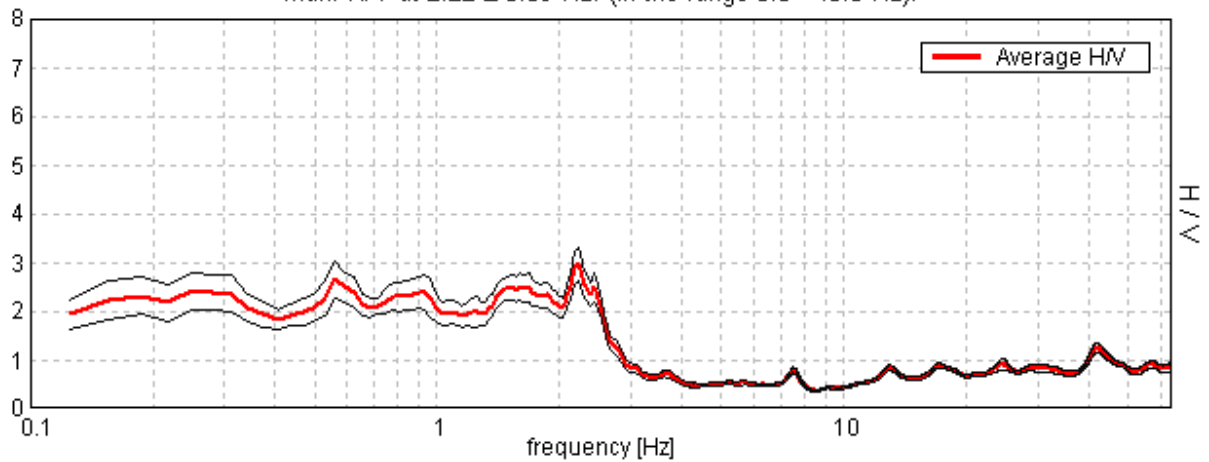
## TRIVELSICILIA PALERMO, PALERMO 0139

Start recording: 16/05/14 14:58:24      End recording: 16/05/14 15:28:25  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

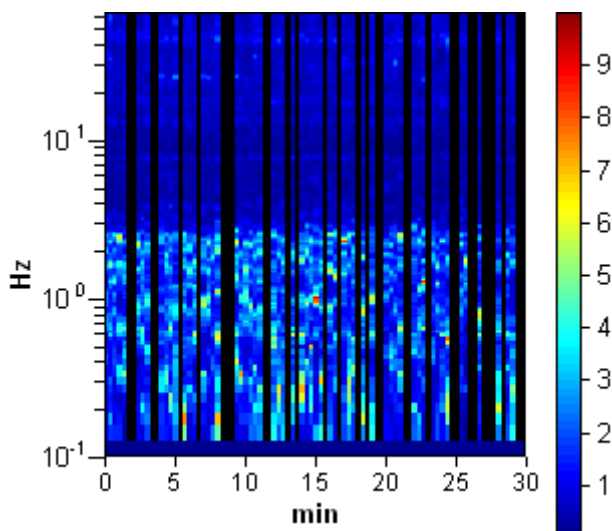
Trace length: 0h30'00".      Analyzed 64% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

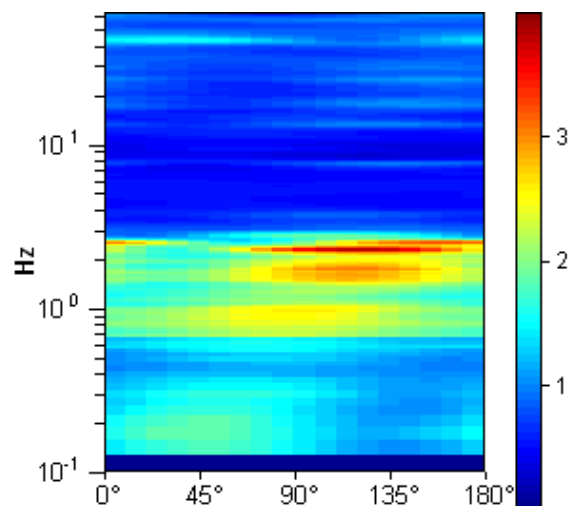
Max. H/V at  $2.22 \pm 0.09$  Hz. (In the range 0.0 - 40.0 Hz).



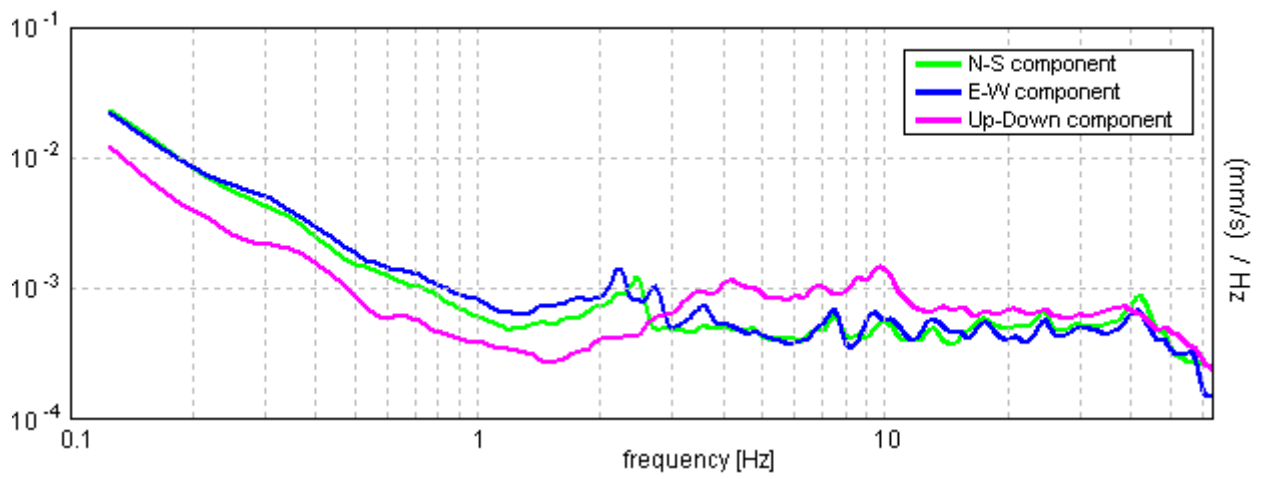
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 2.22 ± 0.09 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.22 > 0.50	OK	
$n_c(f_0) > 200$	2573.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 108 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.656 Hz	OK	
$A_0 > 2$	2.96 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01983  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.04399 < 0.11094$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1762 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0140			
<b>Coordinate</b>	UTM	4219491.00	N	357545.94	E
	Gauss Boaga	4219489.381	N	2377541.032	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		19/05/2014, 12:02			
<b>Nome file</b>		0140			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	No			
	<b>Pedoni</b>	No			
	<b>Altro</b>	No			

**Documentazione fotografica**



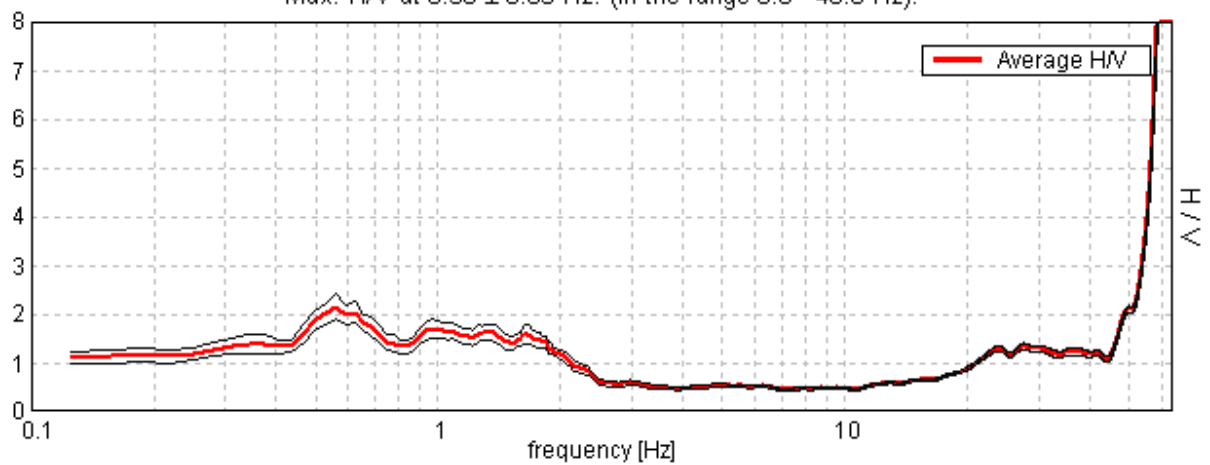
## TRIVELSICILIA PALERMO, PALERMO 0140

Start recording: 19/05/14 12:04:44      End recording: 19/05/14 12:34:45  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

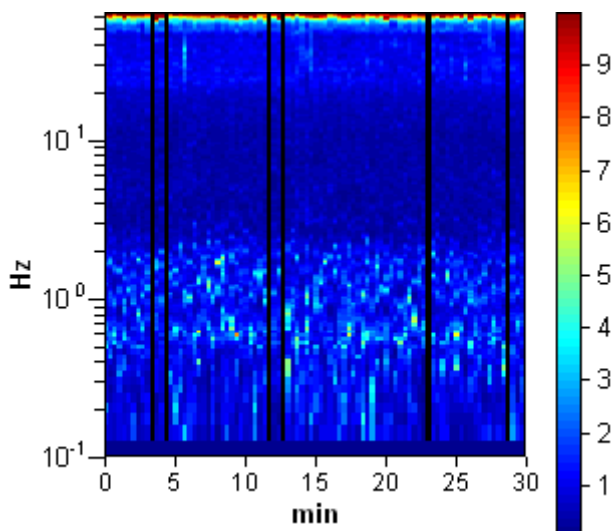
Trace length: 0h30'00".      Analyzed 93% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

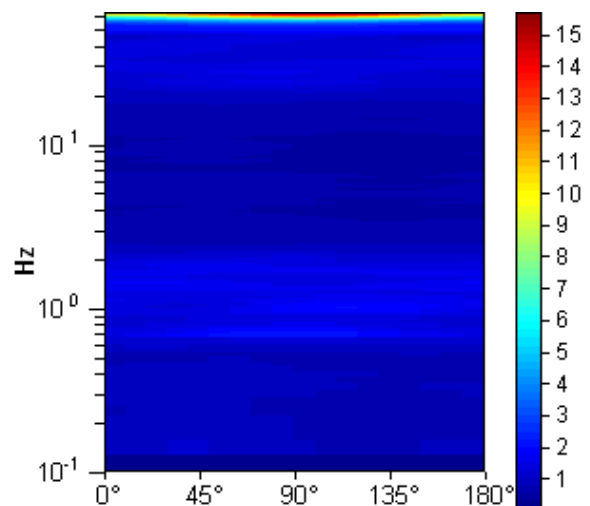
Max. H/V at  $0.56 \pm 0.03$  Hz. (In the range 0.0 - 40.0 Hz).



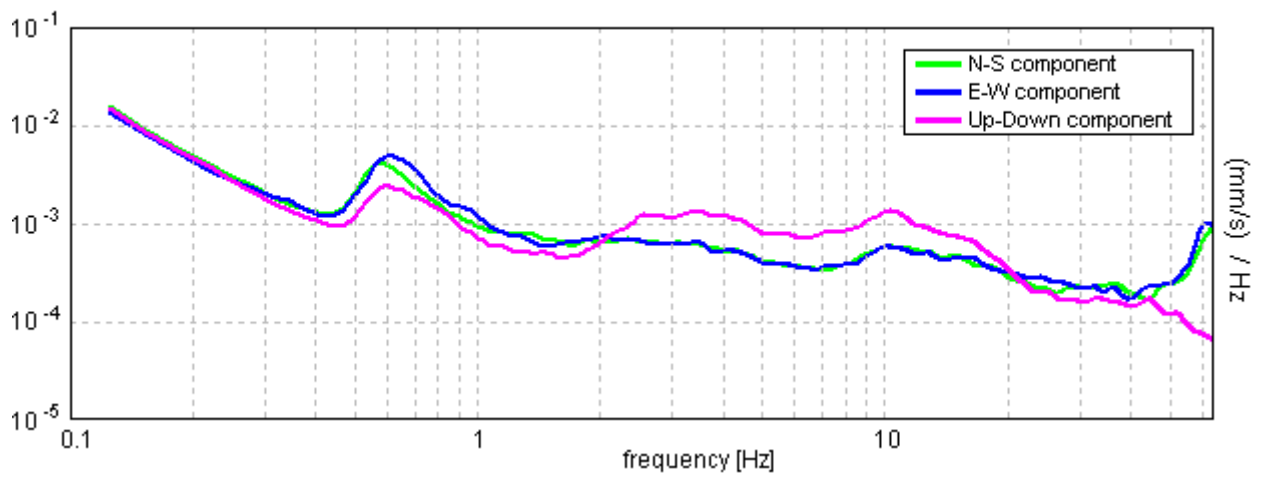
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $0.56 \pm 0.03$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.56 > 0.50$	OK	
$n_c(f_0) > 200$	$945.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 28 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.094 Hz	OK	
$A_0 > 2$	$2.16 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02326  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01308 < 0.08438$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1354 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0141				
<b>Coordinate</b>	<i>UTM</i>	4219532.63	N	357857.02	E
	<i>Gauss Boaga</i>	4219531.019	N	2377852.125	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	19/05/2014, 12:45				
<b>Nome file</b>	0141				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Terreno				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

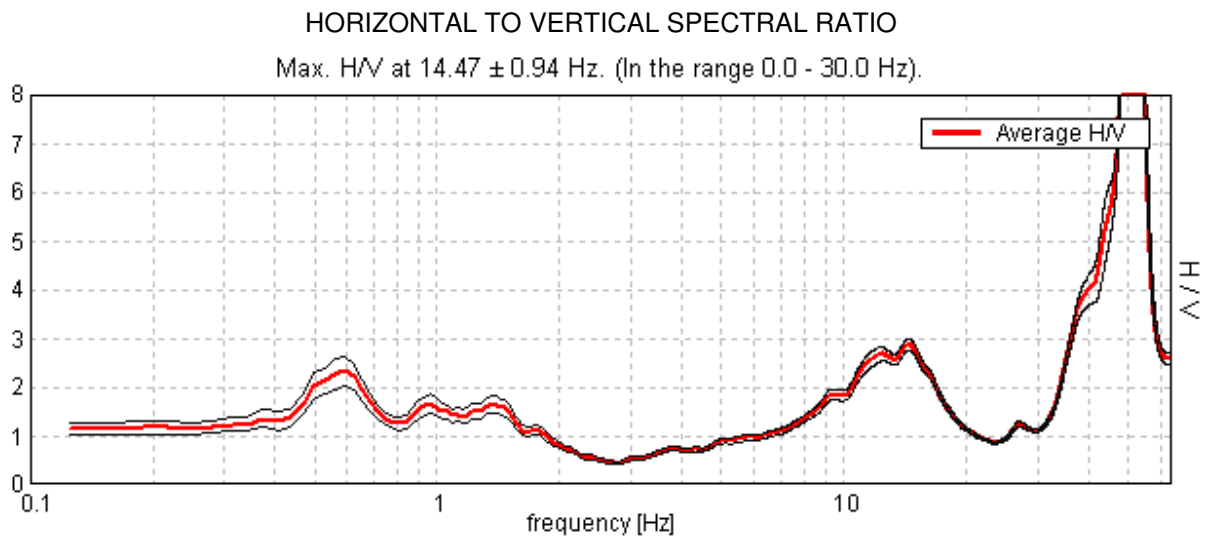
**Documentazione fotografica**



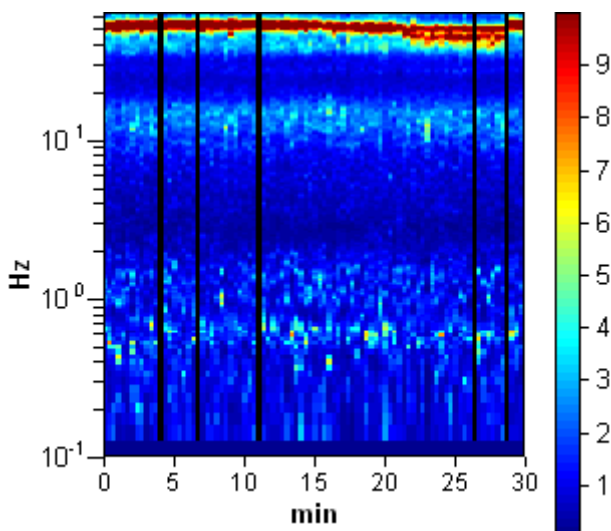
## TRIVELSICILIA PALERMO, PALERMO 0141

Start recording: 19/05/14 12:46:29      End recording: 19/05/14 13:16:30  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

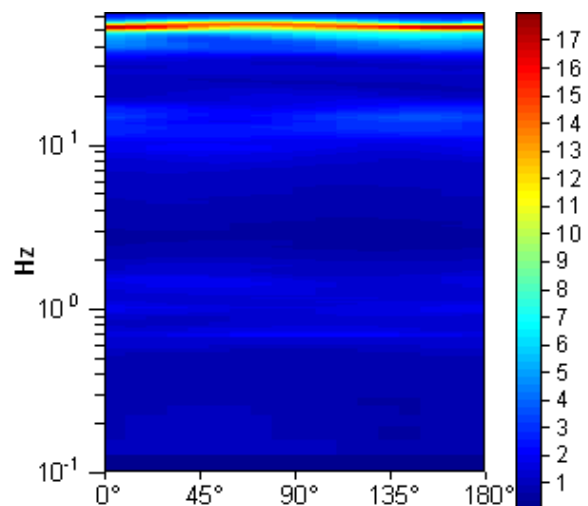
Trace length: 0h30'00".      Analyzed 94% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



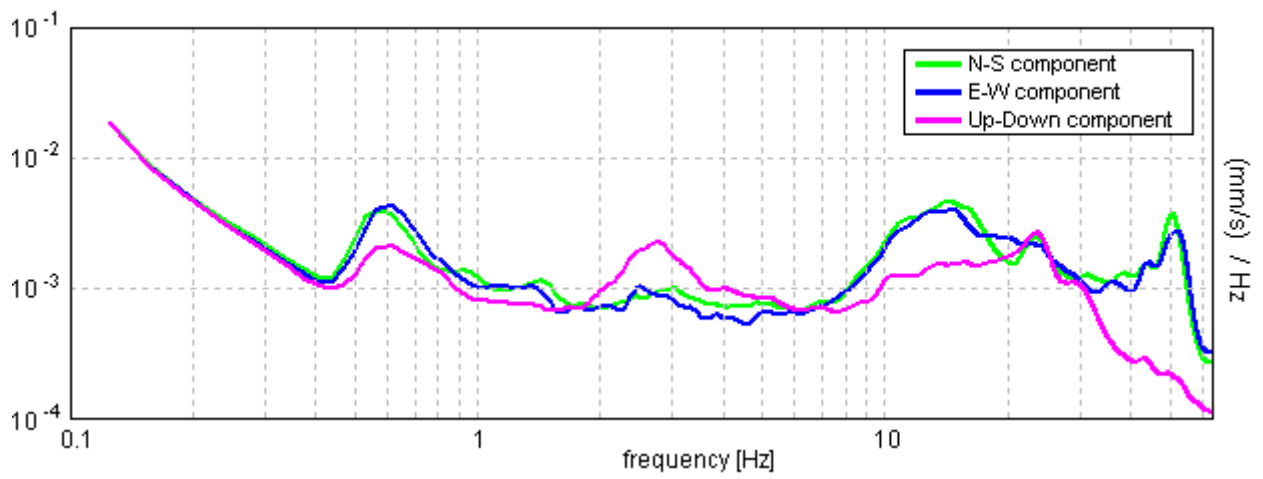
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 14.47 ± 0.94 Hz. (in the range 0.0 - 30.0 Hz).**

<b>Criteria for a reliable HVSR curve</b> [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	14.47 > 0.50	<b>OK</b>	
$n_c(f_0) > 200$	24596.9 > 200	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 696 times	<b>OK</b>	
<b>Criteria for a clear HVSR peak</b> [At least 5 out of 6 should be fulfilled]			
<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	8.281 Hz	<b>OK</b>	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	18.531 Hz	<b>OK</b>	
$A_0 > 2$	2.86 > 2	<b>OK</b>	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03263  < 0.05$	<b>OK</b>	
$\sigma_f < \varepsilon(f_0)$	0.47213 < 0.72344	<b>OK</b>	
$\sigma_A(f_0) < \theta(f_0)$	0.0638 < 1.58	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for $\sigma_f$ and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>				
<b>Nome base sismica</b>	0142				
<b>Coordinate</b>	<i>UTM</i>	4218974.76	N	358375.94	E
	<i>Gauss Boaga</i>	4218973.134	N	2378371.079	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	16/05/2014, 08:49				
<b>Nome file</b>	0142				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	No			
	<b>Pedoni</b>	No			
	<b>Altro</b>	No			

**Documentazione fotografica**



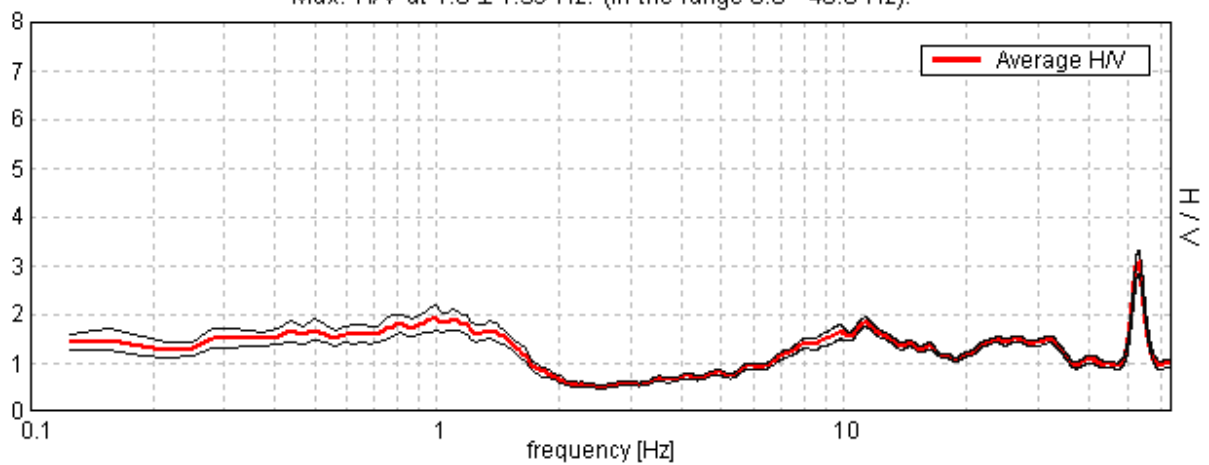
## TRIVELSICILIA PALERMO, PALERMO 0142

Start recording: 16/05/14 08:49:25      End recording: 16/05/14 09:19:26  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

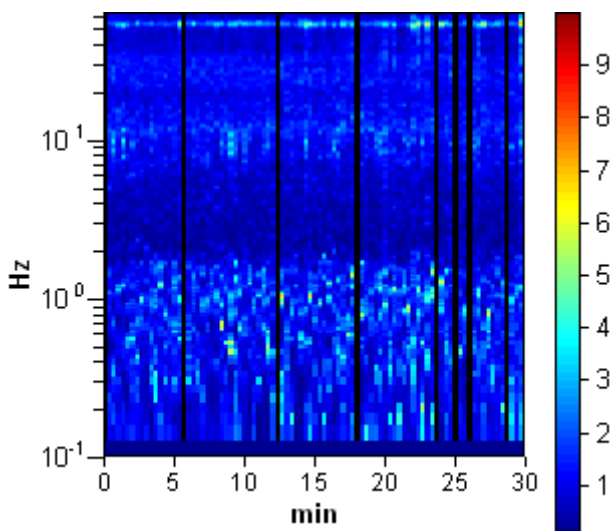
Trace length: 0h30'00".      Analyzed 91% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

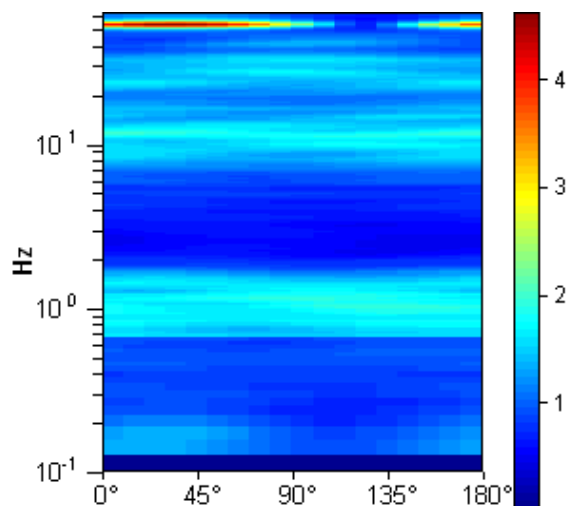
Max. H/V at  $1.0 \pm 1.59$  Hz. (In the range 0.0 - 40.0 Hz).



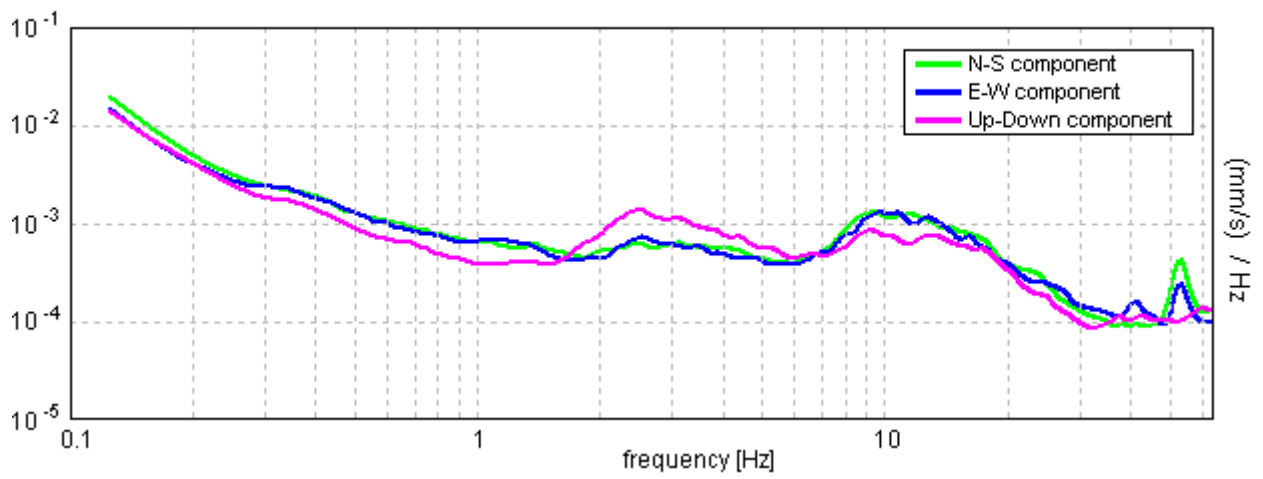
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $1.0 \pm 1.59$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.00 > 0.50$	OK	
$n_c(f_0) > 200$	$1640.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 49 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	1.719 Hz	OK	
$A_0 > 2$	$1.91 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.79445  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.79445 < 0.1$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.1318 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0143				
<b>Coordinate</b>	<i>UTM</i>	4218995.11	N	357915.85	E
	<i>Gauss Boaga</i>	4218993.476	N	2377910.969	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	16/05/2014, 09:23				
<b>Nome file</b>	0143				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



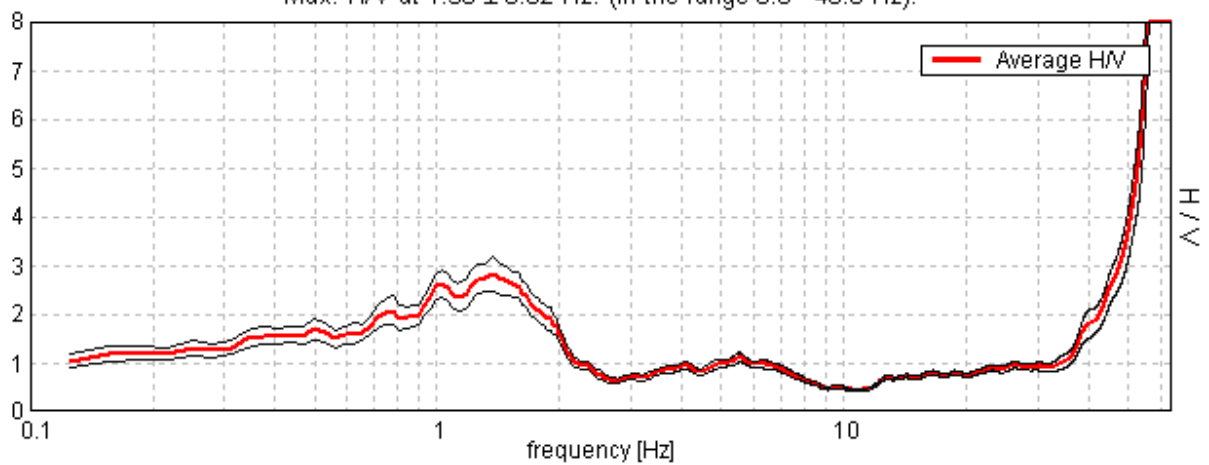
### TRIVELSICILIA PALERMO, PALERMO 0143

Start recording: 16/05/14 09:24:44      End recording: 16/05/14 09:54:45  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

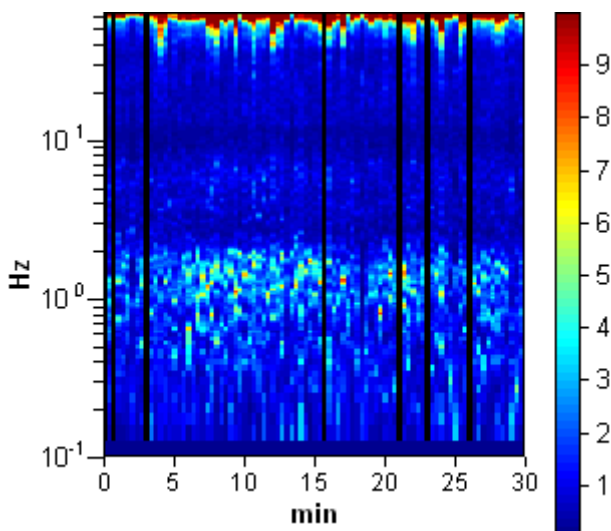
Trace length: 0h30'00".      Analyzed 92% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

#### HORIZONTAL TO VERTICAL SPECTRAL RATIO

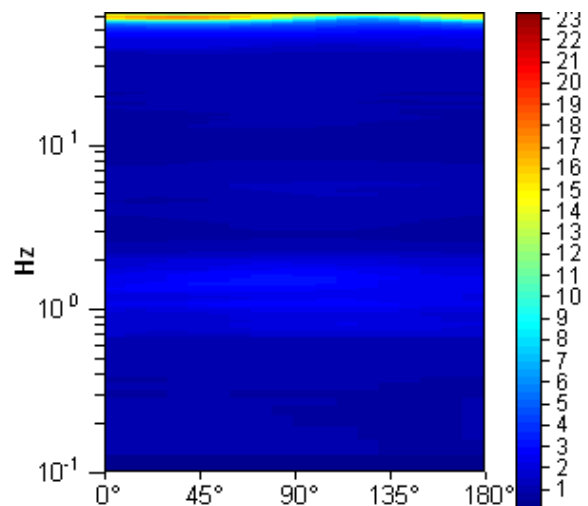
Max. H/V at  $1.38 \pm 0.02$  Hz. (In the range 0.0 - 40.0 Hz).



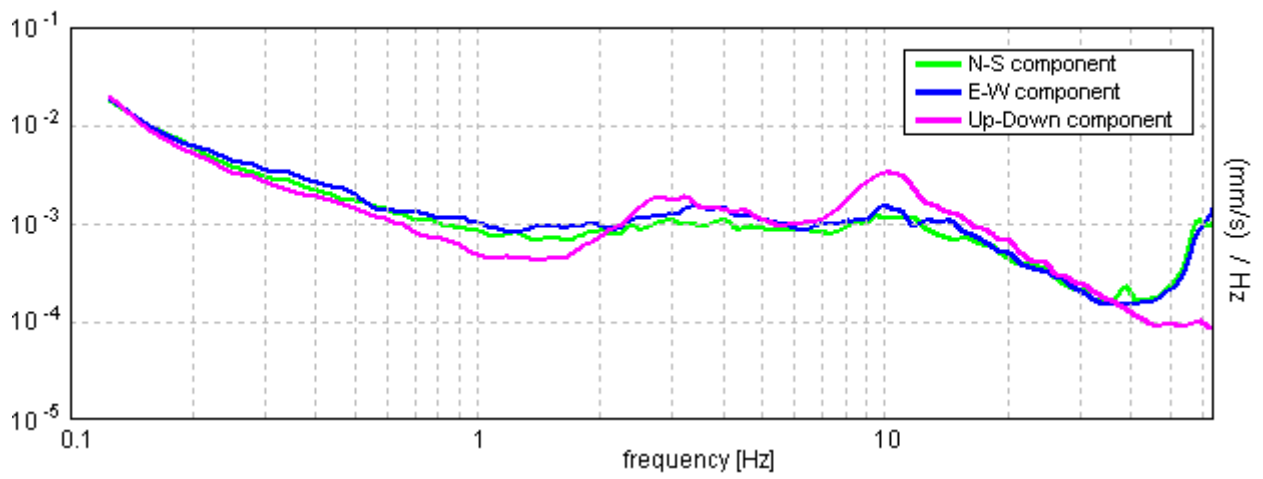
#### H/V TIME HISTORY



#### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.38 ± 0.02 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.38 > 0.50	OK	
$n_c(f_0) > 200$	2282.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 67 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.063 Hz	OK	
$A_0 > 2$	2.81 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00834  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01147 < 0.1375$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1754 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

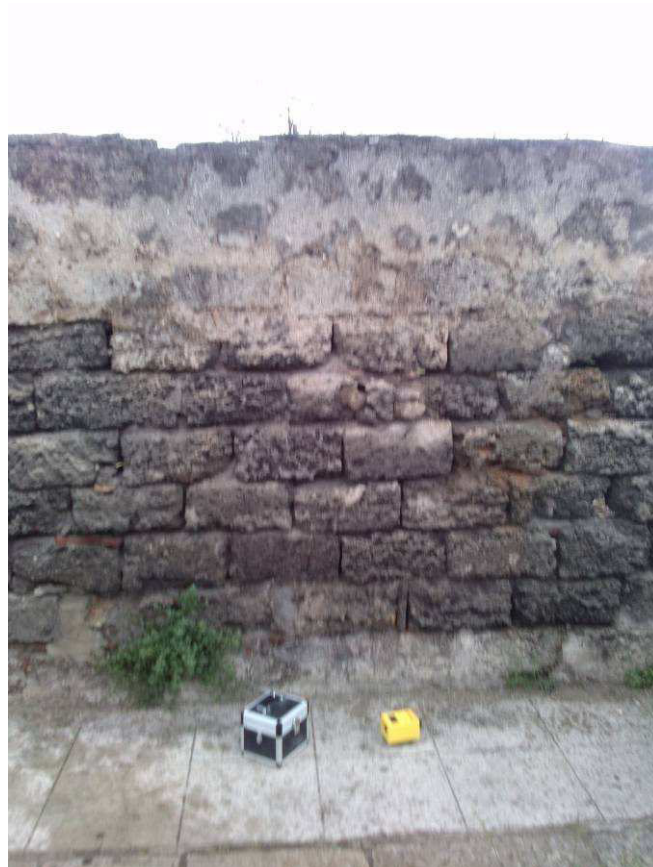


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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0144				
<b>Coordinate</b>	<i>UTM</i>	4219119.32	N	357513.12	E
	<i>Gauss Boaga</i>	4219117.684	N	2377508.218	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	16/05/2014, 10:10				
<b>Nome file</b>	0144				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

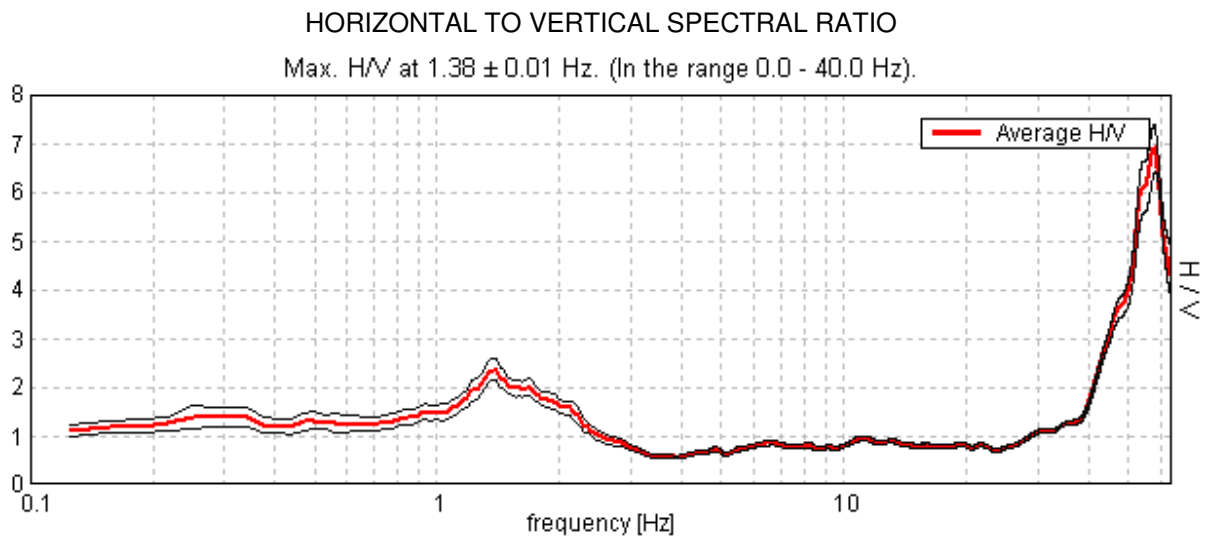
**Documentazione fotografica**



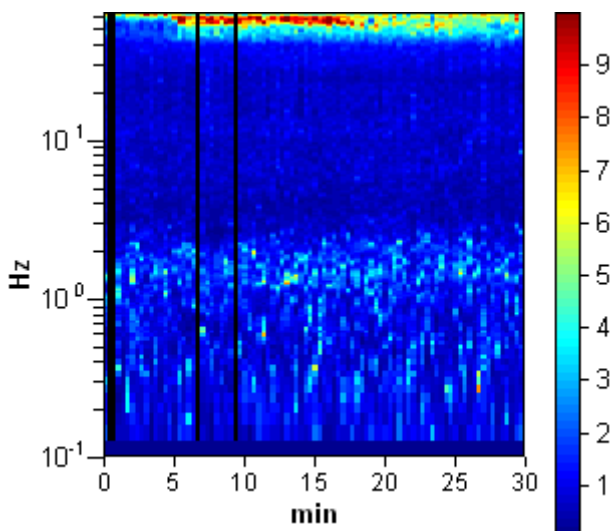
## TRIVELSICILIA PALERMO, PALERMO 0144

Start recording: 16/05/14 10:10:31      End recording: 16/05/14 10:40:32  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

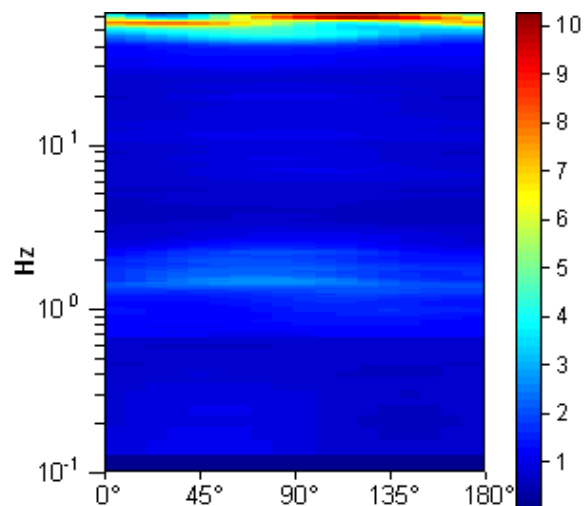
Trace length: 0h30'00".      Analyzed 96% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



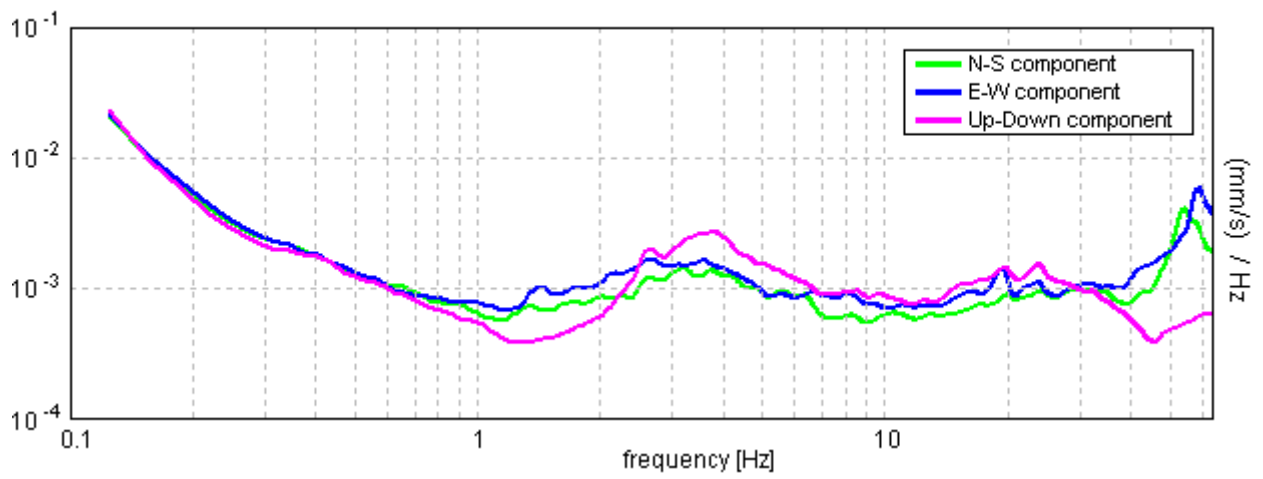
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $1.38 \pm 0.01$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.38 > 0.50$	OK	
$n_c(f_0) > 200$	$2365.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 67 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			<b>NO</b>
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.344 Hz	OK	
$A_0 > 2$	$2.36 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00451  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.0062 < 0.1375$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1137 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0145			
<b>Coordinate</b>	UTM	4219110.39	N	357143.15	E
	Gauss Boaga	4219108.746	N	2377138.231	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		16/05/2014, 11:35			
<b>Nome file</b>		0145			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	
<b>Nota</b>		Base sismica ripetuta per l'inattendibilità del segnale			

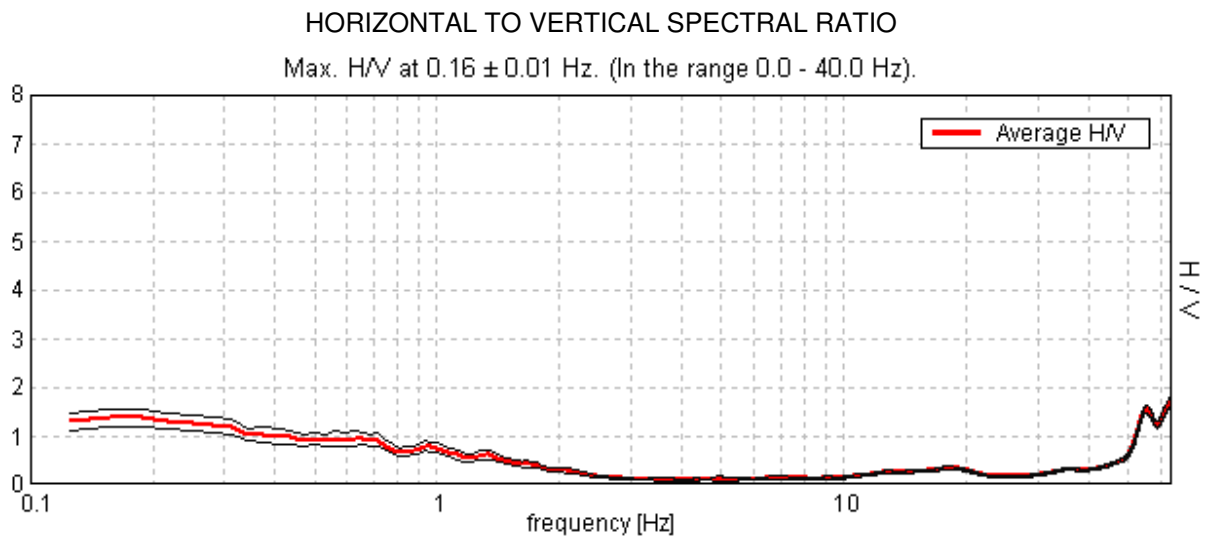
**Documentazione fotografica**



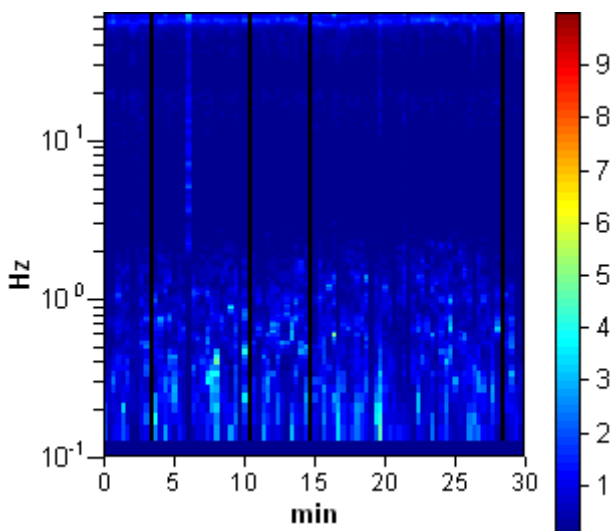
## TRIVELSICILIA PALERMO, PALERMO 0145

Start recording: 16/05/14 11:35:52      End recording: 16/05/14 12:05:53  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

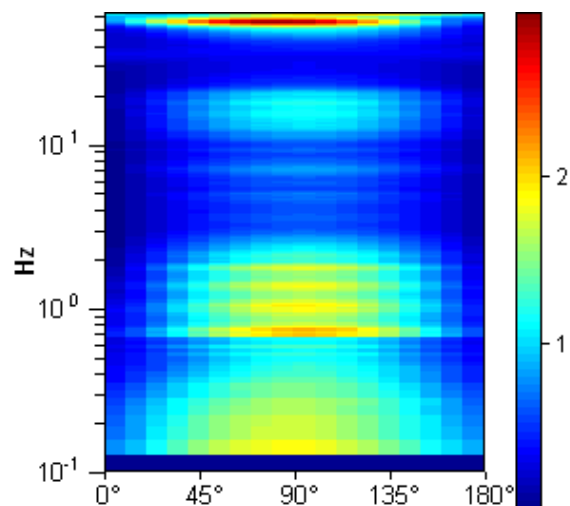
Trace length: 0h30'00".      Analyzed 96% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



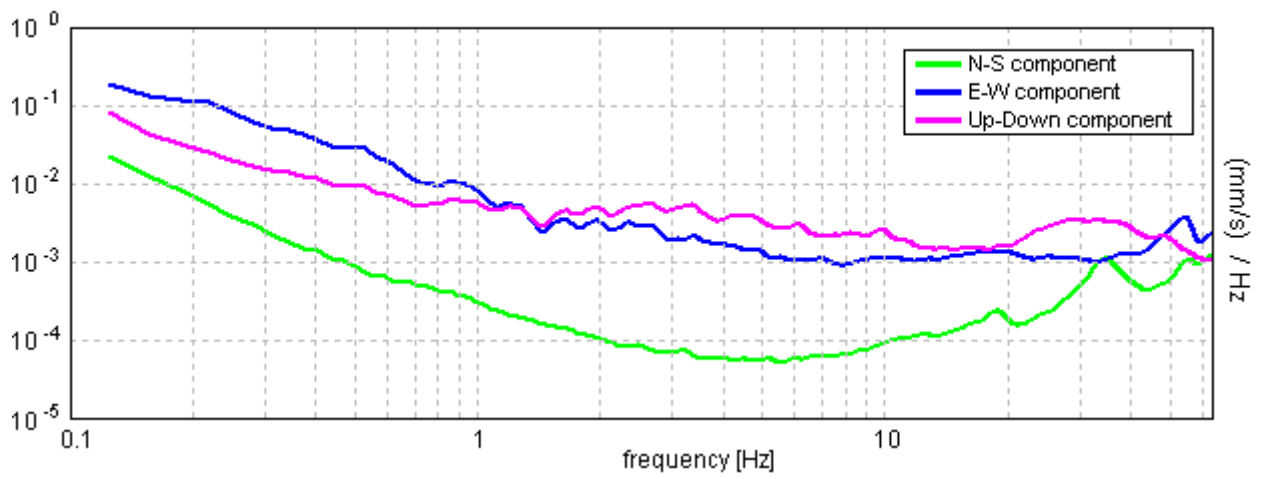
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 0.16 ± 0.01 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.16 > 0.50		<b>NO</b>
$n_c(f_0) > 200$	268.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 8 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.094 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>			<b>NO</b>
$A_0 > 2$	1.37 > 2		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02439  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.00381 < 0.03906	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.0887 < 3.0	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0145 bis			
<b>Coordinate</b>	UTM	4219051.35	N	357168.91	E
	Gauss Boaga	4219049.704	N	2377163.994	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		16/06/2014, 11:30			
<b>Nome file</b>		0145 bis			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>Si</b>		
		<b>Altro</b>	<b>No</b>		

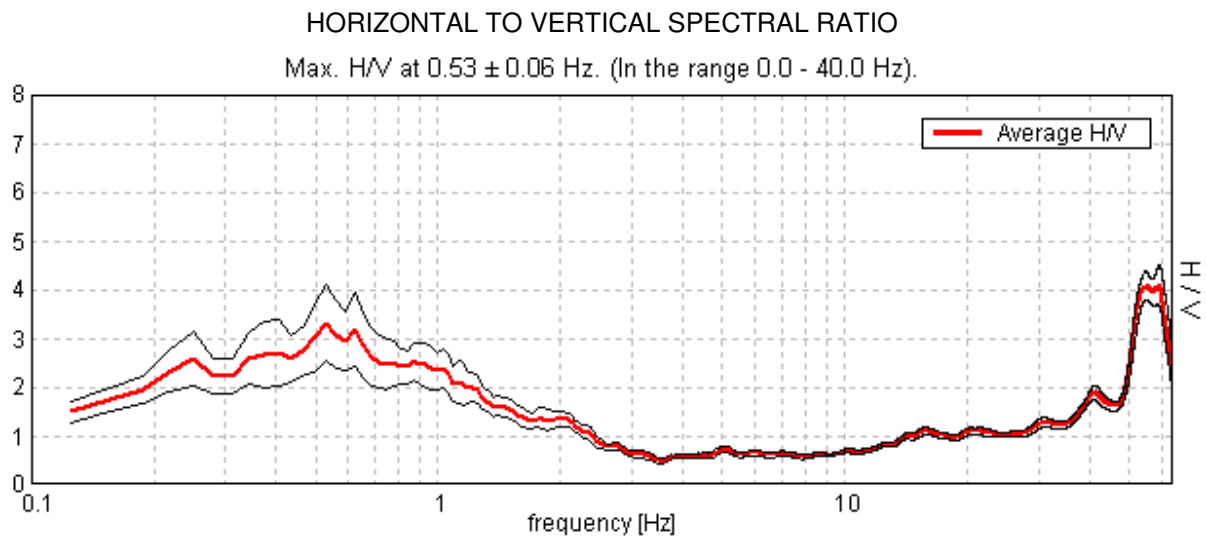
**Documentazione fotografica**



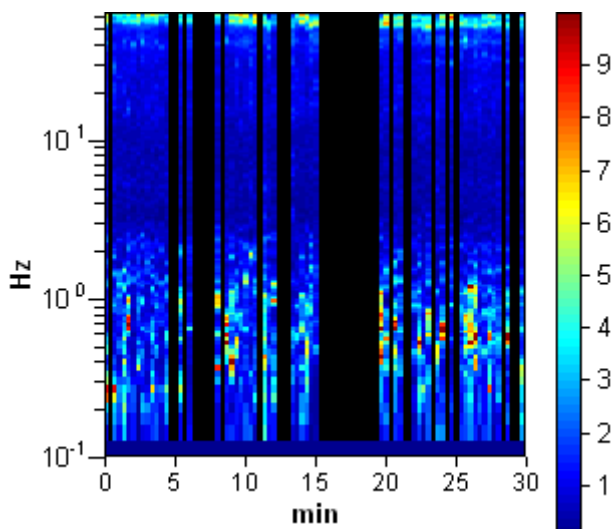
## TRIVEL SICILIA PALERMO, PALERMO 0145 BIS

Start recording: 16/06/14 11:35:17      End recording: 16/06/14 12:05:18  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

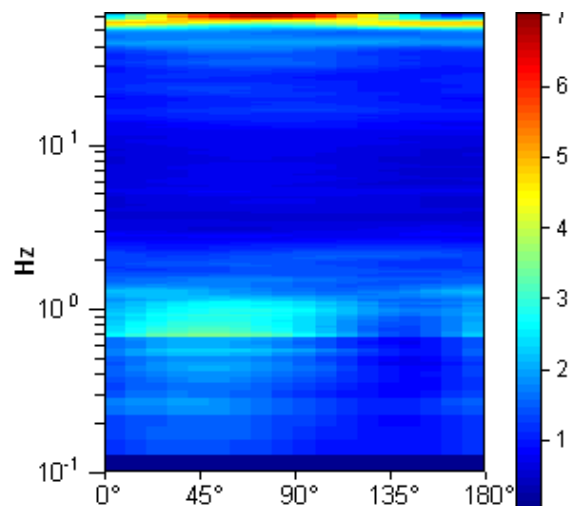
Trace length: 0h30'00".      Analyzed 60% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



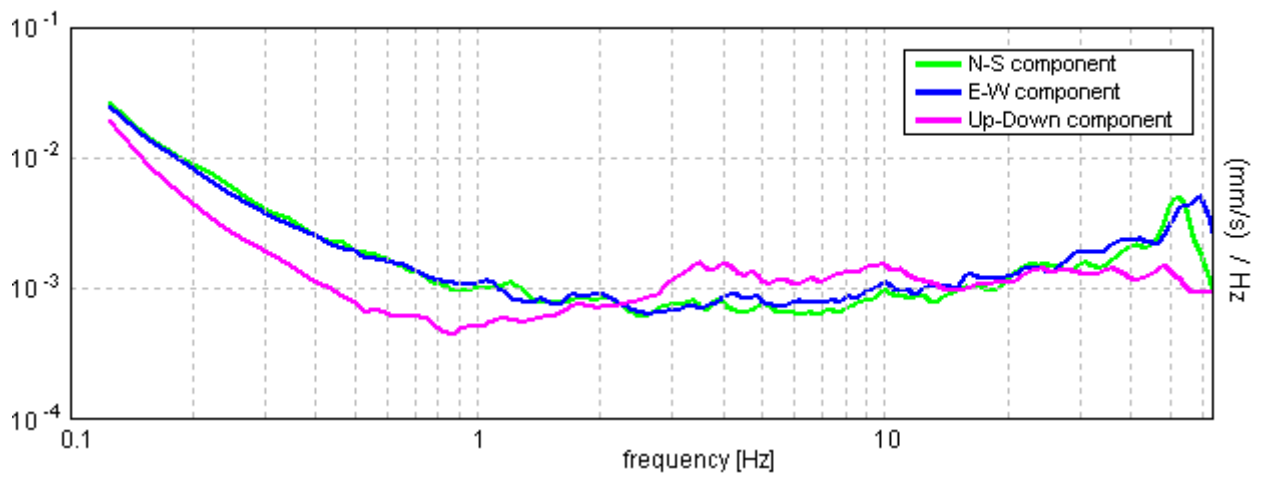
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $0.53 \pm 0.06$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.53 > 0.50$	OK	
$n_c(f_0) > 200$	$573.8 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 26 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.125 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	1.375 Hz	OK	
$A_0 > 2$	$3.31 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.05722  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.0304 < 0.07969$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.3887 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>				
<b>Nome base sismica</b>	0146				
<b>Coordinate</b>	<i>UTM</i>	4219058.33	N	356771.93	E
	<i>Gauss Boaga</i>	4219056.679	N	2376766.994	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	16/05/2014, 12:17				
<b>Nome file</b>	0146				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

**Documentazione fotografica**



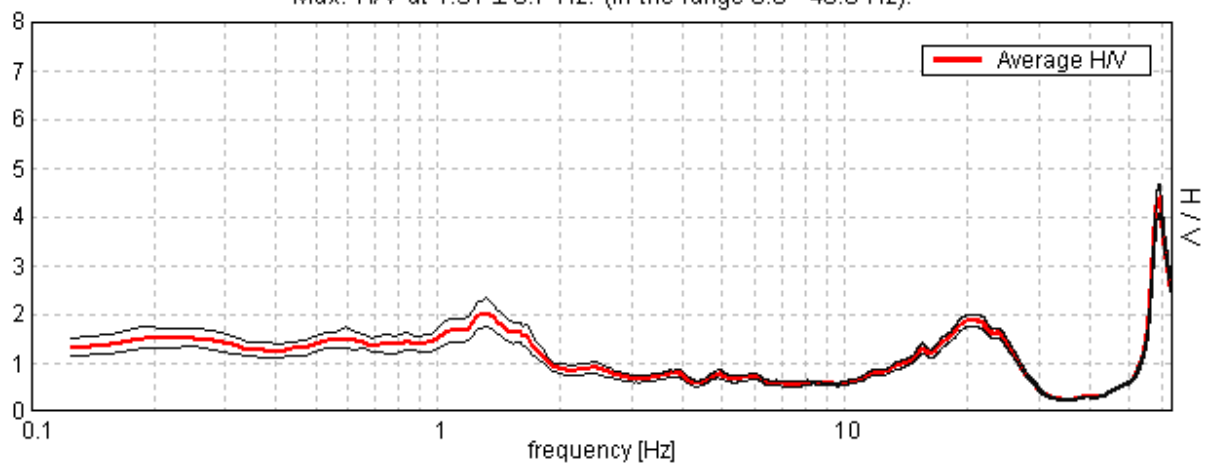
## TRIVELSICILIA PALERMO, PALERMO 0146

Start recording: 16/05/14 12:17:56      End recording: 16/05/14 12:47:57  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

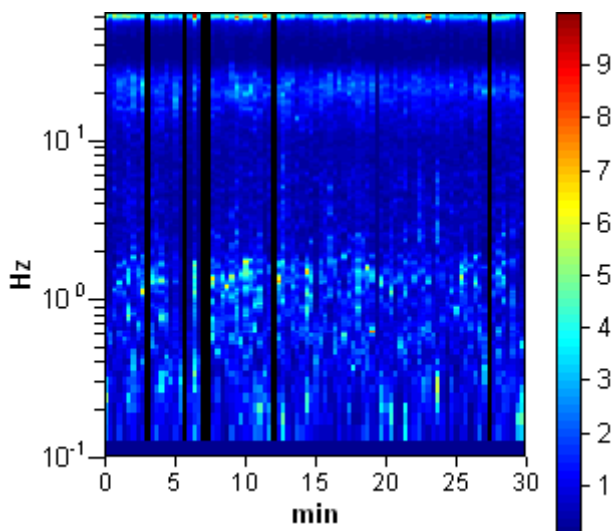
Trace length: 0h30'00".      Analyzed 93% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

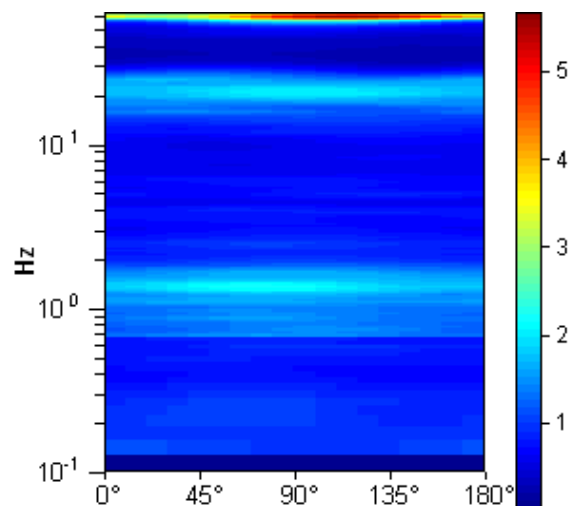
Max. H/V at  $1.31 \pm 0.7$  Hz. (In the range 0.0 - 40.0 Hz).



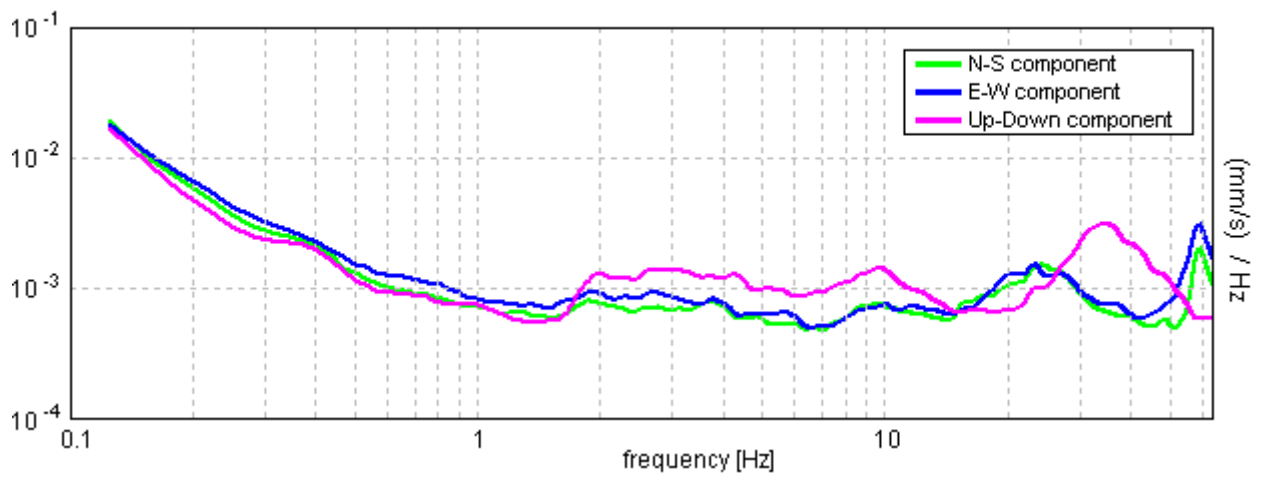
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.31 ± 0.7 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.31 > 0.50	OK	
$n_c(f_0) > 200$	2205.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 64 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.875 Hz	OK	
$A_0 > 2$	2.03 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.26646  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	$0.34973 < 0.13125$		<b>NO</b>
$\sigma_A(f_0) < \theta(f_0)$	$0.1495 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0147			
<b>Coordinate</b>	UTM	4219062.98	N	356333.49	E
	Gauss Boaga	4219061.324	N	2376328.532	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		16/05/2014, 12:58			
<b>Nome file</b>		0147			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

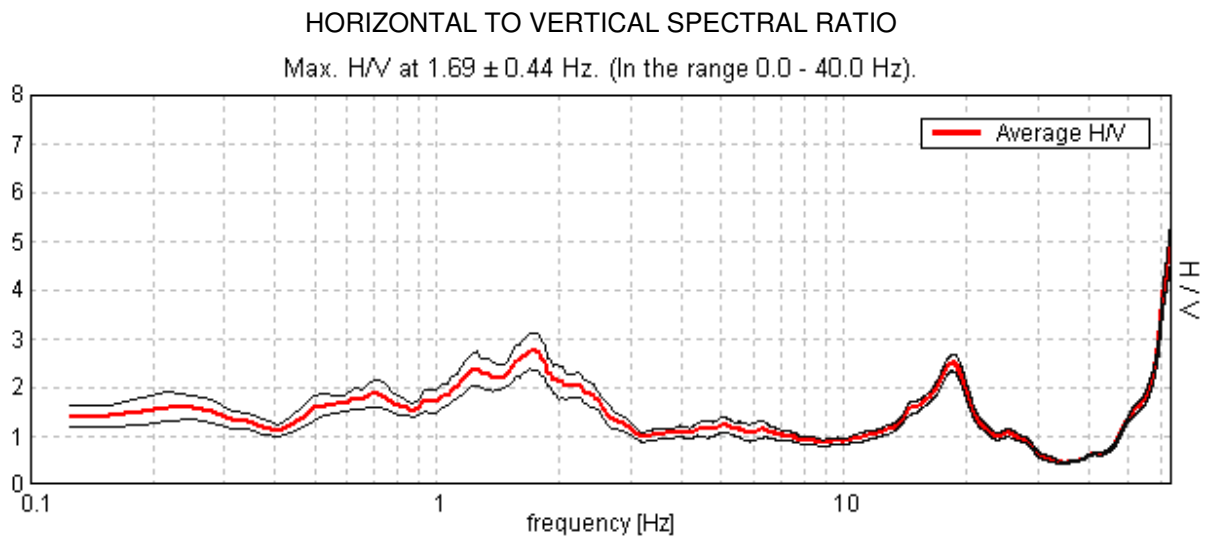
**Documentazione fotografica**



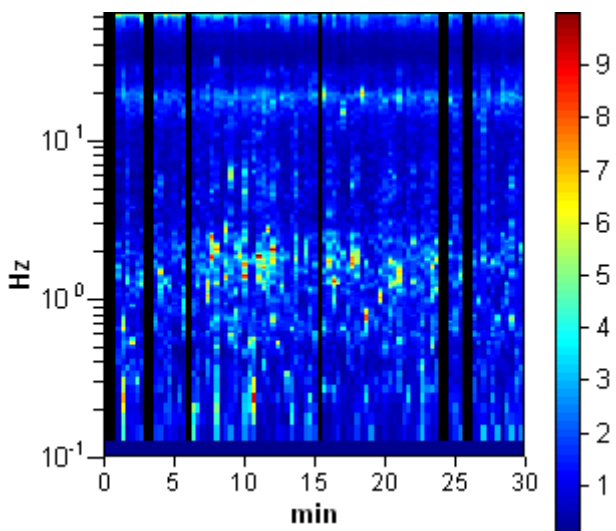
## TRIVELSICILIA PALERMO, PALERMO 0147

Start recording: 16/05/14 13:00:39      End recording: 16/05/14 13:30:40  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

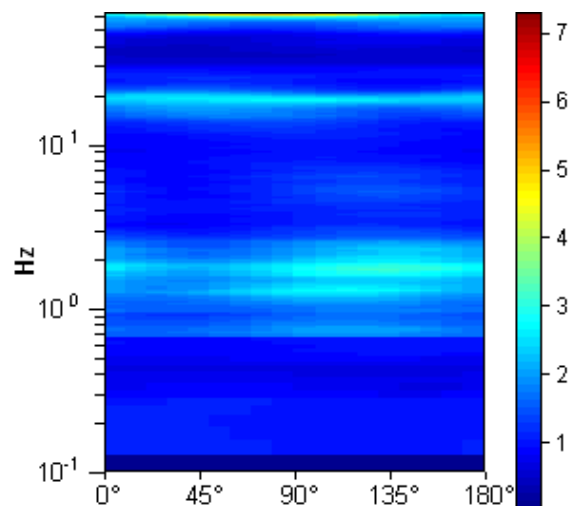
Trace length: 0h30'00".      Analyzed 88% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



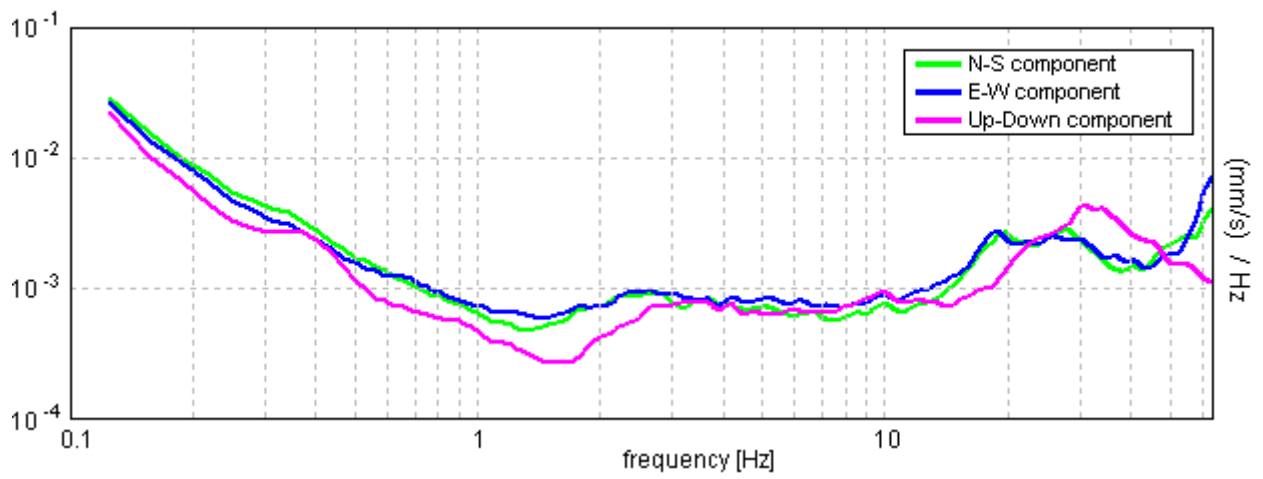
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.69 ± 0.44 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.69 > 0.50	OK	
$n_c(f_0) > 200$	2666.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 82 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.438 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.688 Hz	OK	
$A_0 > 2$	2.74 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.13133  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.22161 < 0.16875$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.1855 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0148			
<b>Coordinate</b>	UTM	4219069.35	N	355973.04	E
	Gauss Boaga	4219067.690	N	2375968.064	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		16/05/2014, 13:52			
<b>Nome file</b>		0148			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>Si</b>		
		<b>Altro</b>	<b>No</b>		
<b>Nota</b>		Base sismica ripetuta per l'inattendibilità del segnale			

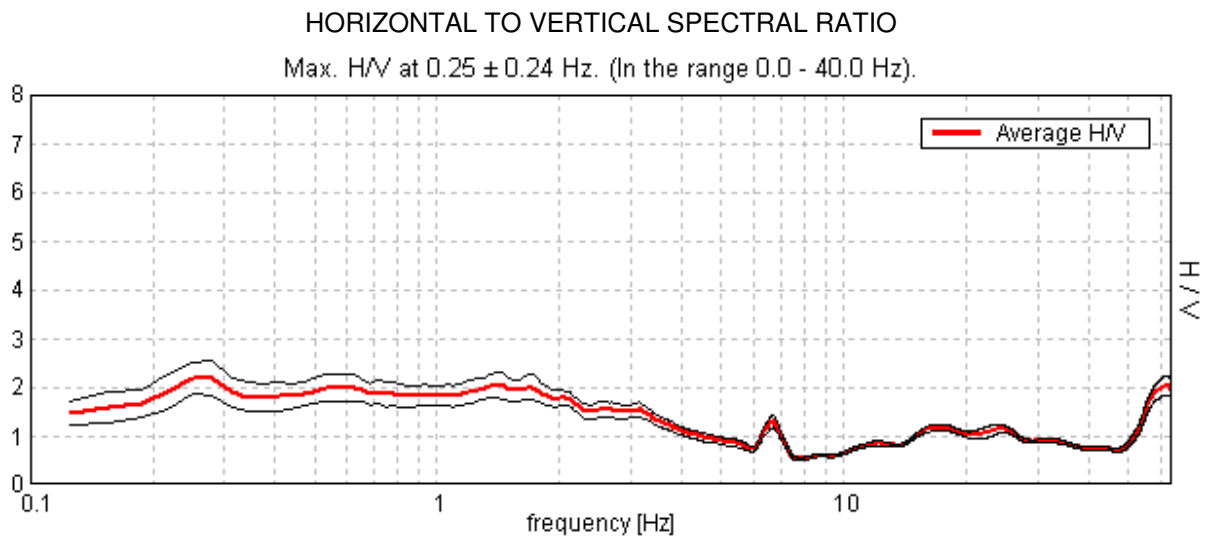
**Documentazione fotografica**



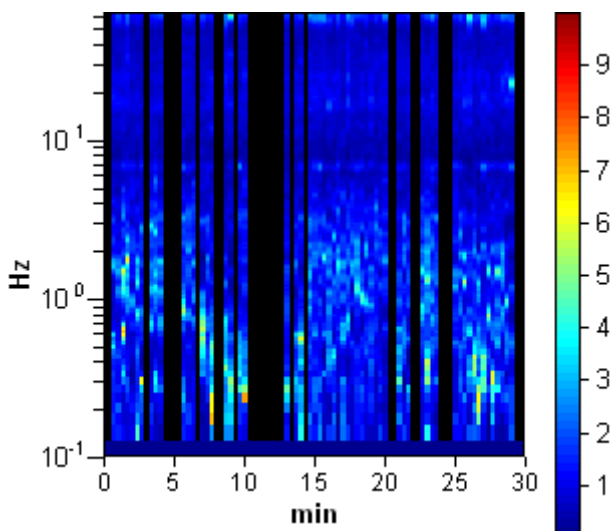
## TRIVELSICILIA PALERMO, PALERMO 0148

Start recording: 16/05/14 13:54:04      End recording: 16/05/14 14:24:05  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

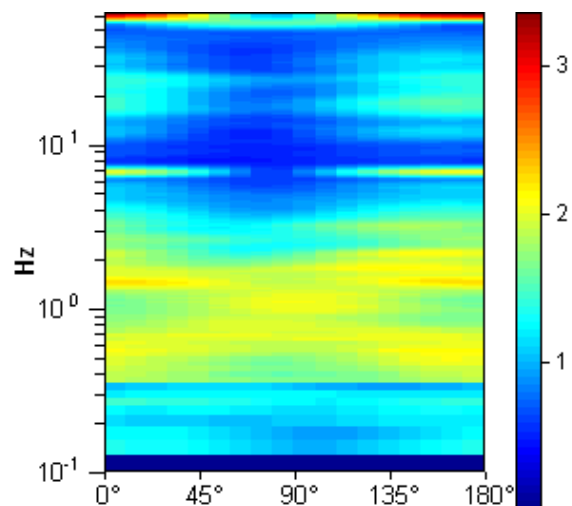
Trace length: 0h30'00".      Analyzed 67% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 10%



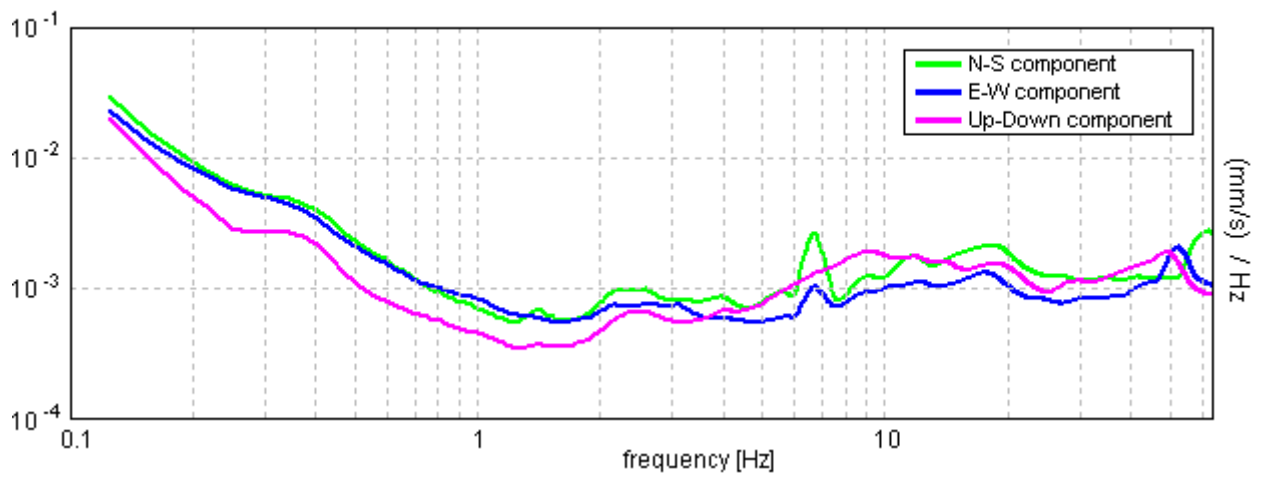
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $0.25 \pm 0.24$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.25 > 0.50		<b>NO</b>
$n_c(f_0) > 200$	300.0 > 200	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 13 times	<b>OK</b>	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.094 Hz	<b>OK</b>	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>			<b>NO</b>
$A_0 > 2$	2.19 > 2	<b>OK</b>	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.47483  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	0.11871 < 0.05		<b>NO</b>
$\sigma_A(f_0) < \theta(f_0)$	0.1612 < 2.5	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0148 bis				
<b>Coordinate</b>	<i>UTM</i>	4219129.51	N	355971.18	E
	<i>Gauss Boaga</i>	4219127.853	N	2375966.203	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	16/06/2014, 10:10				
<b>Nome file</b>	0148 bis				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	MarciapiEDE				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



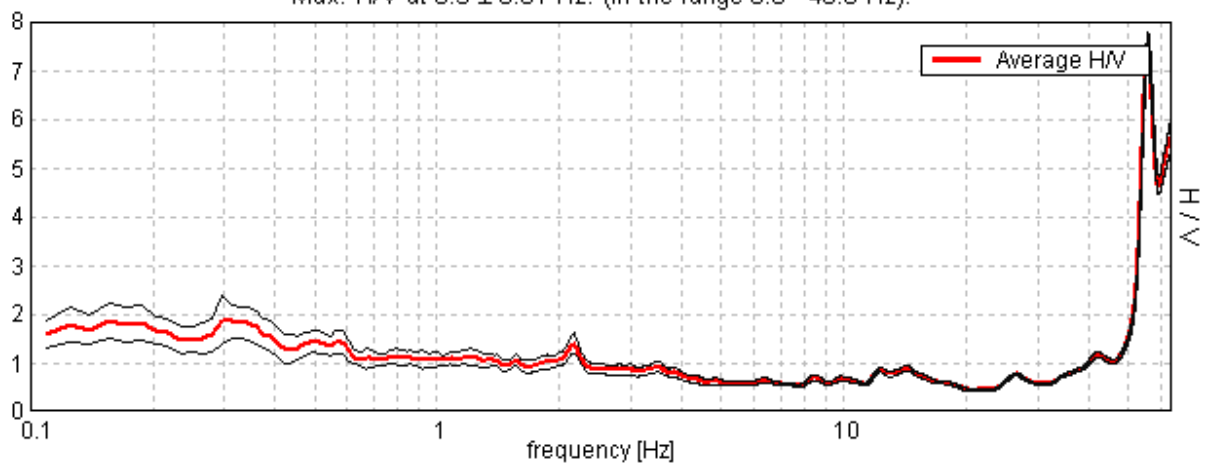
## TRIVEL SICILIA PALERMO, PALERMO 0148 BIS

Start recording: 16/06/14 10:03:29      End recording: 16/06/14 10:33:30  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

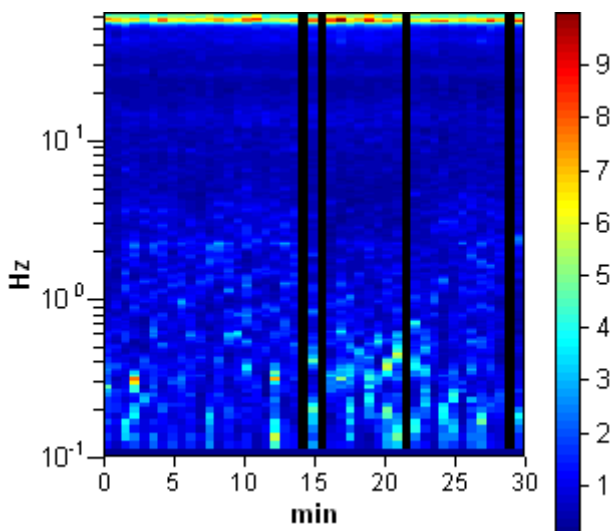
Trace length: 0h30'00".      Analyzed 91% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 40 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

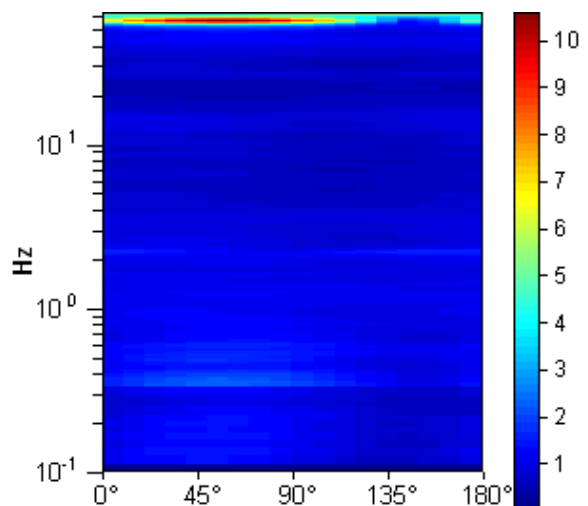
Max. H/V at  $0.3 \pm 0.01$  Hz. (In the range 0.0 - 40.0 Hz).



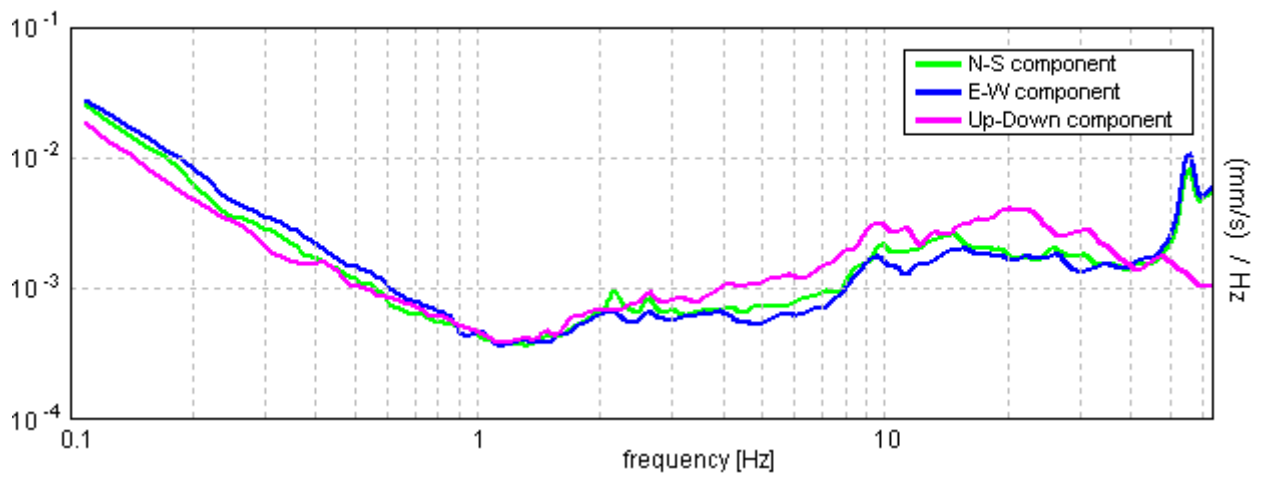
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $0.3 \pm 0.01$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.30 > 0.25$	OK	
$n_c(f_0) > 200$	$486.9 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 30 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.094 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$1.87 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01211  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.0036 < 0.05938$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2489 < 2.5$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

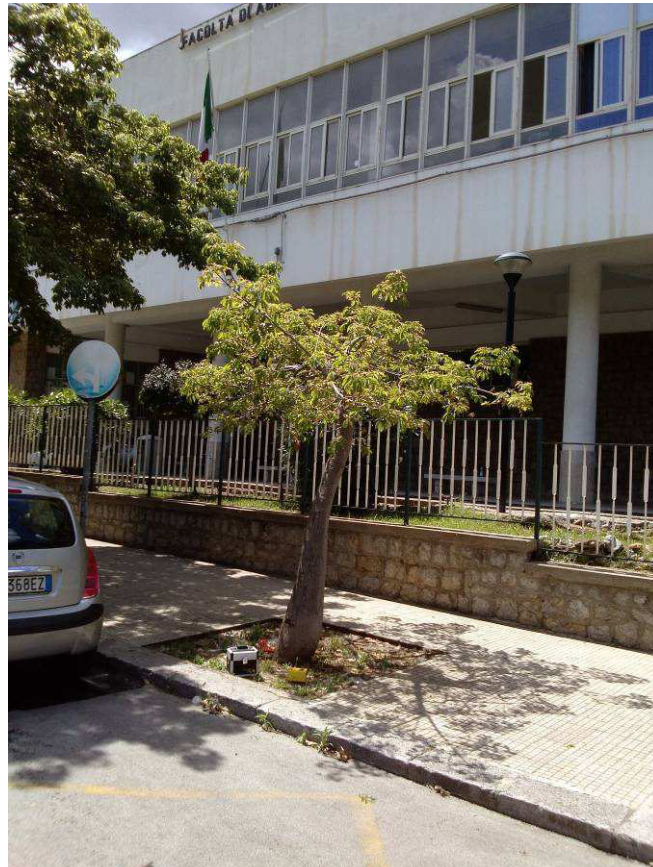


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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0149				
<b>Coordinate</b>	<i>UTM</i>	4219035.75	N	355607.01	E
	<i>Gauss Boaga</i>	4219034.084	N	2375602.017	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	16/05/2014, 14:34				
<b>Nome file</b>	0149				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Terreno				
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

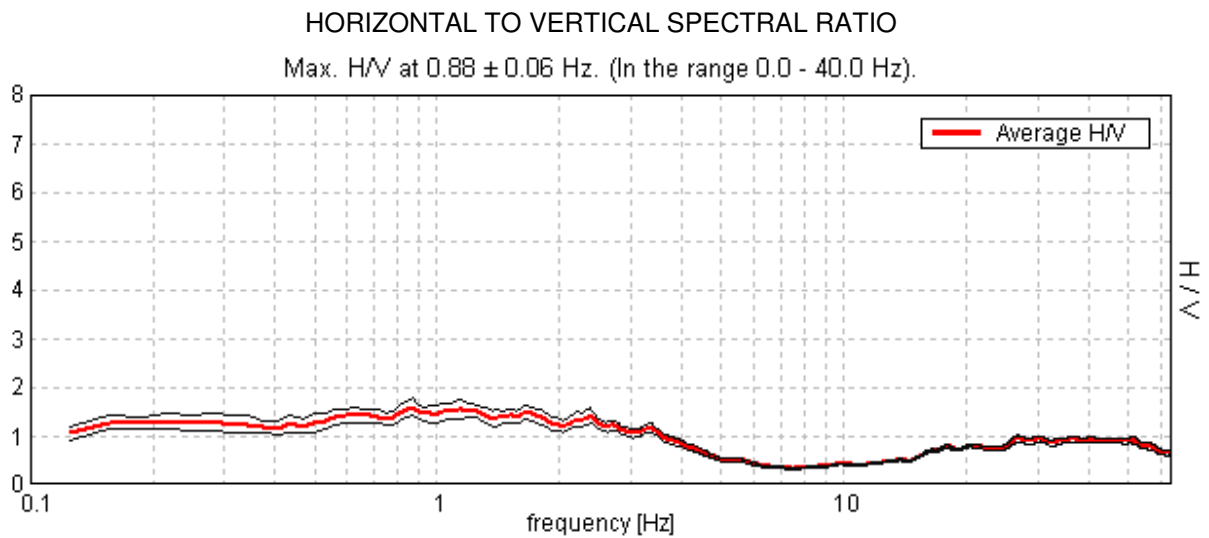
**Documentazione fotografica**



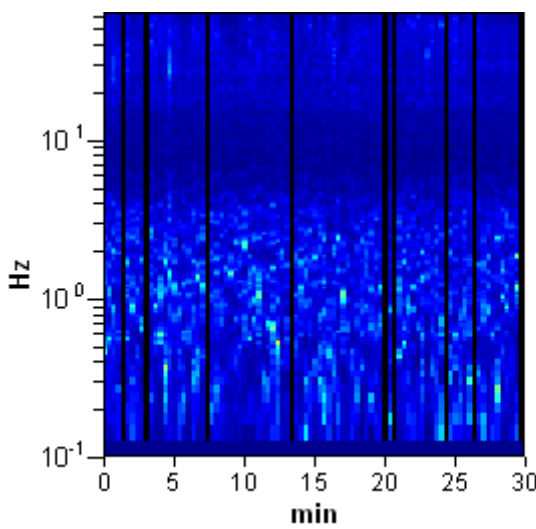
## TRIVELSICILIA PALERMO, PALERMO 0149

Start recording: 16/05/14 14:35:18      End recording: 16/05/14 15:05:19  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

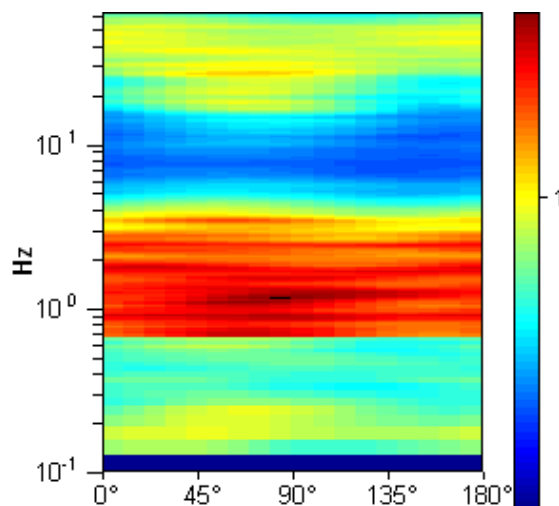
Trace length: 0h30'00".      Analyzed 90% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



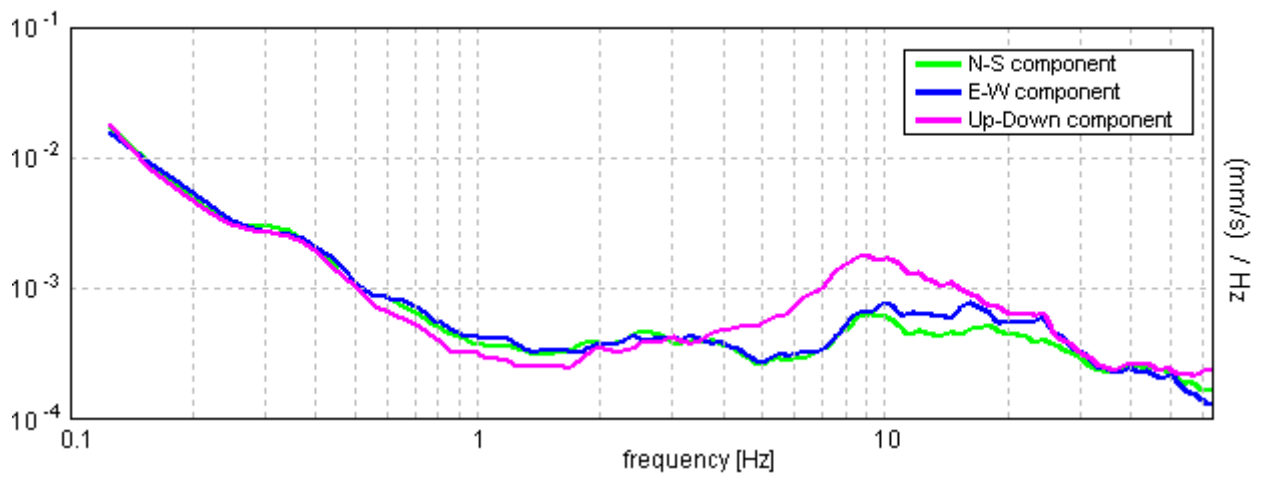
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA





[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $0.88 \pm 0.06$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.88 > 0.50$	OK	
$n_c(f_0) > 200$	$1417.5 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 43 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$1.59 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03411  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02984 < 0.13125$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.0895 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0150			
<b>Coordinate</b>	UTM	4219065.51	N	355147.08	E
	Gauss Boaga	4219063.839	N	2375142.063	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		16/05/2014, 15:35			
<b>Nome file</b>		0150			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>Si</b>		
		<b>Altro</b>	<b>No</b>		

**Documentazione fotografica**



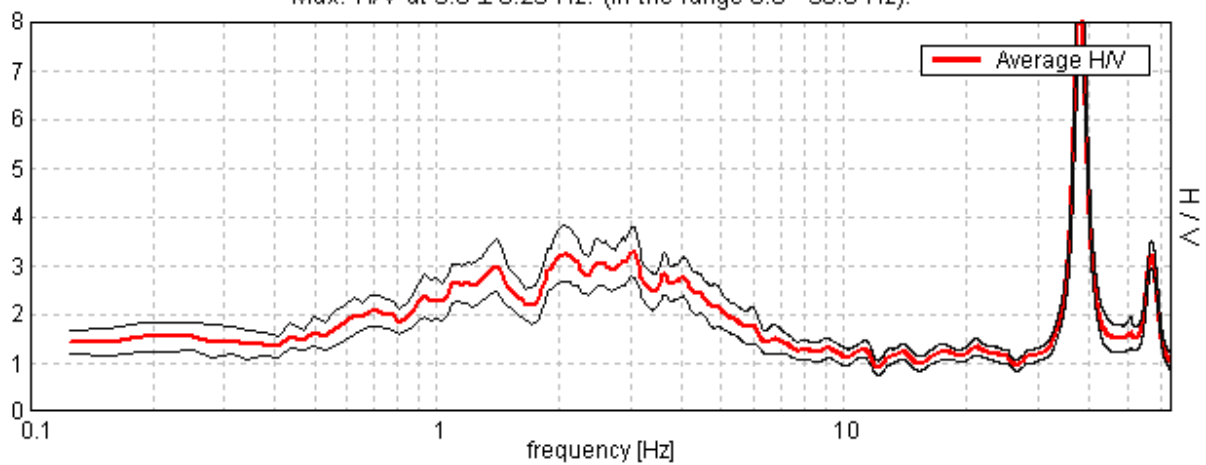
## TRIVELSICILIA PALERMO, PALERMO 0150

Start recording: 16/05/14 15:37:01      End recording: 16/05/14 16:07:02  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

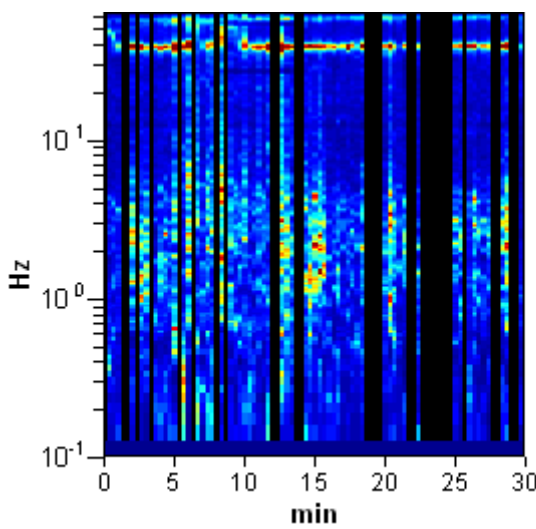
Trace length: 0h30'00".      Analyzed 66% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

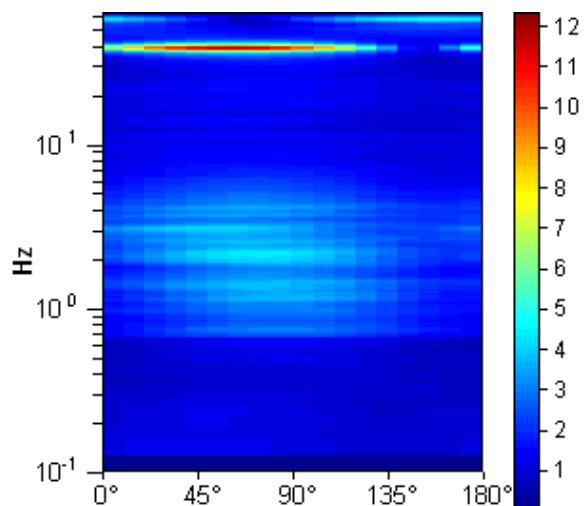
Max. H/V at  $3.0 \pm 0.23$  Hz. (In the range 0.0 - 30.0 Hz).



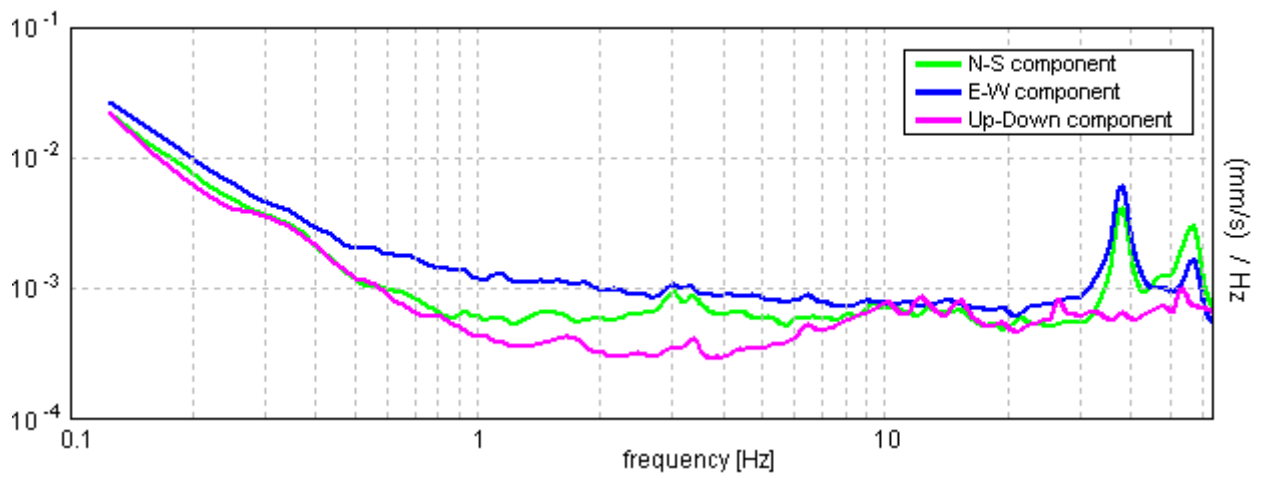
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $3.0 \pm 0.23$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$3.00 > 0.50$	OK	
$n_c(f_0) > 200$	$3540.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 145 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			<b>NO</b>
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	6.156 Hz	OK	
$A_0 > 2$	$3.28 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03877  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.1163 < 0.15$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2542 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0151				
<b>Coordinate</b>	<i>UTM</i>	4219121.95	N	354748.54	E
	<i>Gauss Boaga</i>	4219120.277	N	2374743.502	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	19/05/2014, 10:09				
<b>Nome file</b>	0151				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



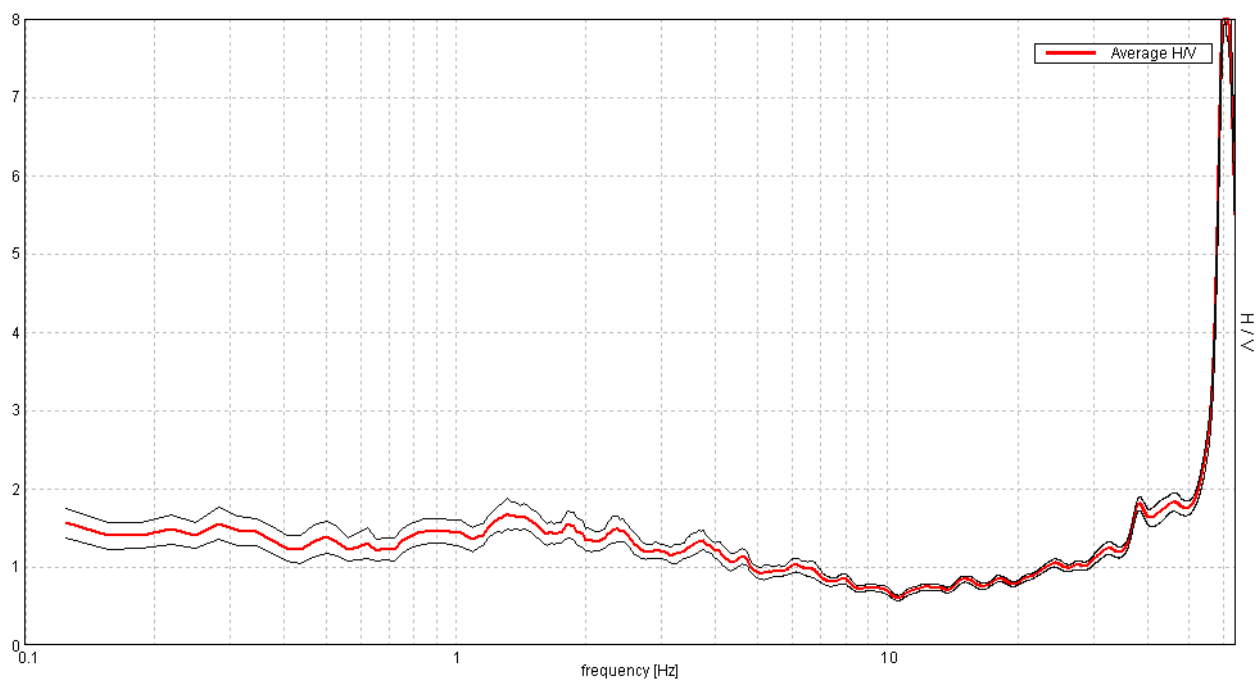
## TRIVELSICILIA PALERMO, PALERMO 0151

Start recording: 19/05/14 10:10:37      End recording: 19/05/14 10:40:38  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

Trace length: 0h30'00".      Analyzed 86% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

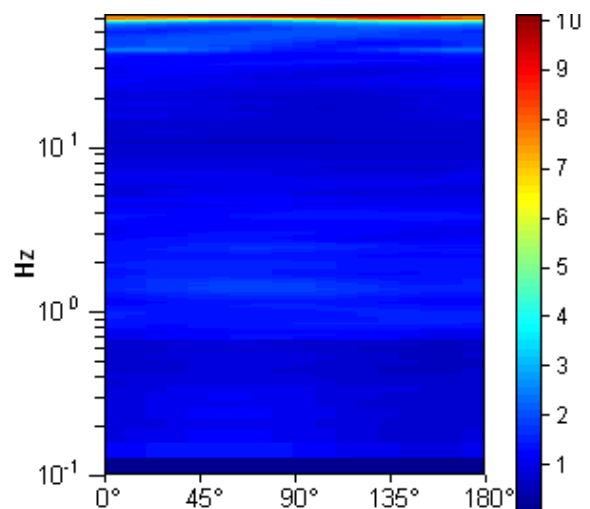
### HORIZONTAL TO VERTICAL SPECTRAL RATIO

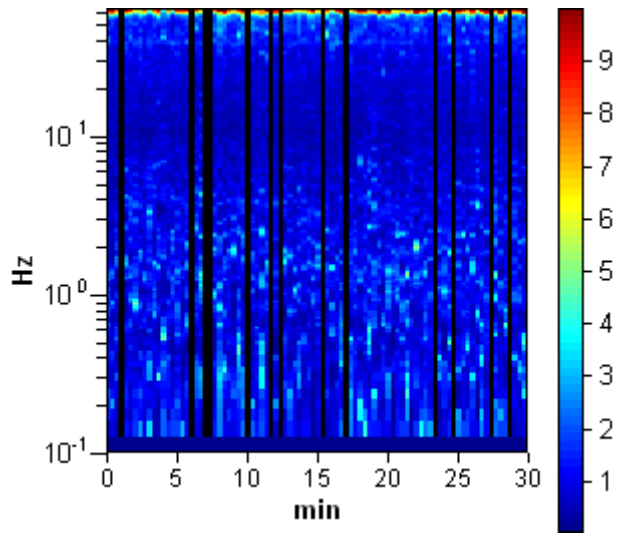
Max. H/V at 1.31 ± 0.11 Hz. (In the range 0.0 - 30.0 Hz).



### H/V TIME HISTORY

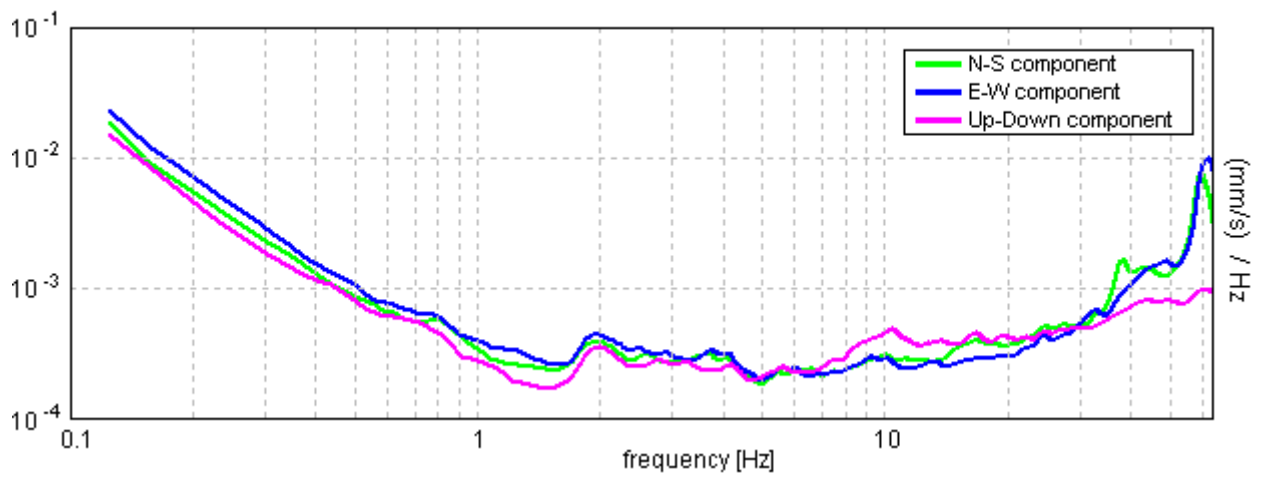
### DIRECTIONAL H/V







### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.31 ± 0.11 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.31 > 0.50	OK	
$n_c(f_0) > 200$	2021.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 64 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>			<b>NO</b>
$A_0 > 2$	1.68 > 2		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.04147  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.05443 < 0.13125$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.0986 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0152			
<b>Coordinate</b>	UTM	4219066.70	N	354389.00	E
	Gauss Boaga	4219065.020	N	2374383.946	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		19/05/2014, 08:09			
<b>Nome file</b>		0152			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>Si</b>		
		<b>Altro</b>	<b>No</b>		

**Documentazione fotografica**



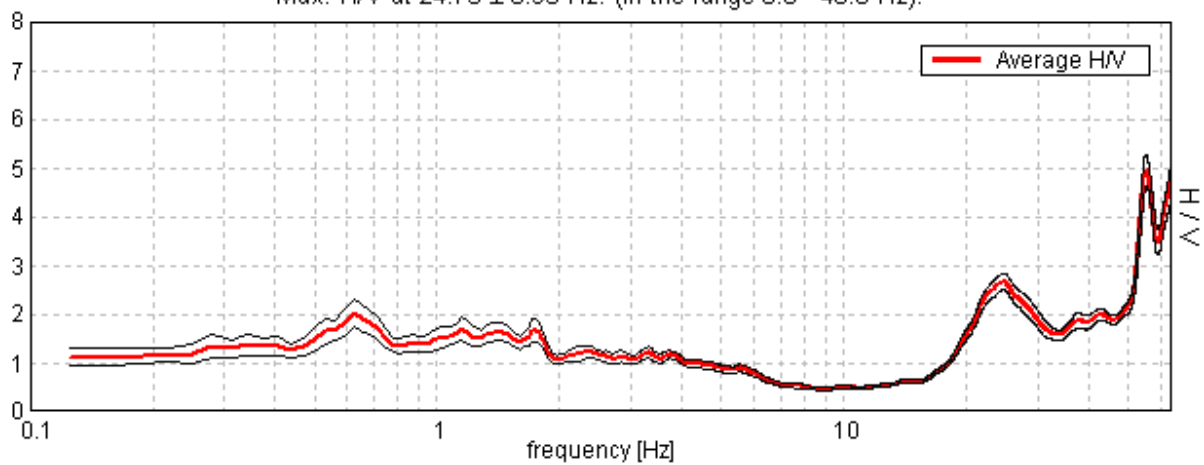
## TRIVELSICILIA PALERMO, PALERMO 0152

Start recording: 19/05/14 08:11:11      End recording: 19/05/14 08:41:12  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

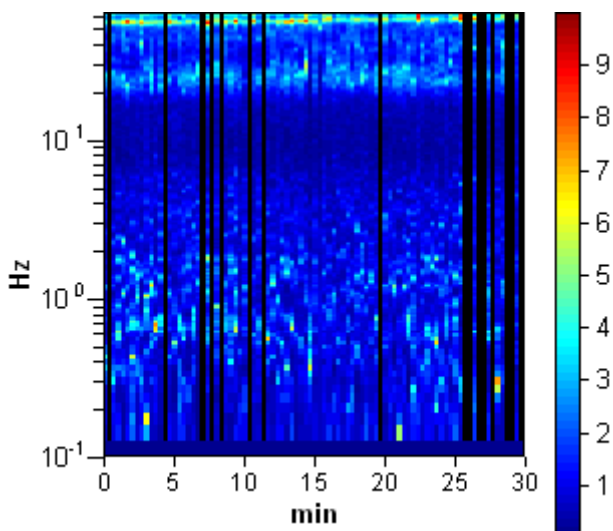
Trace length: 0h30'00".      Analyzed 82% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

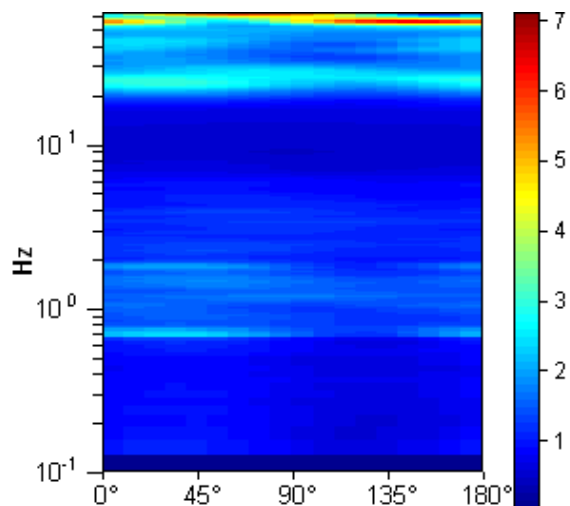
Max. H/V at  $24.75 \pm 0.93$  Hz. (In the range 0.0 - 40.0 Hz).



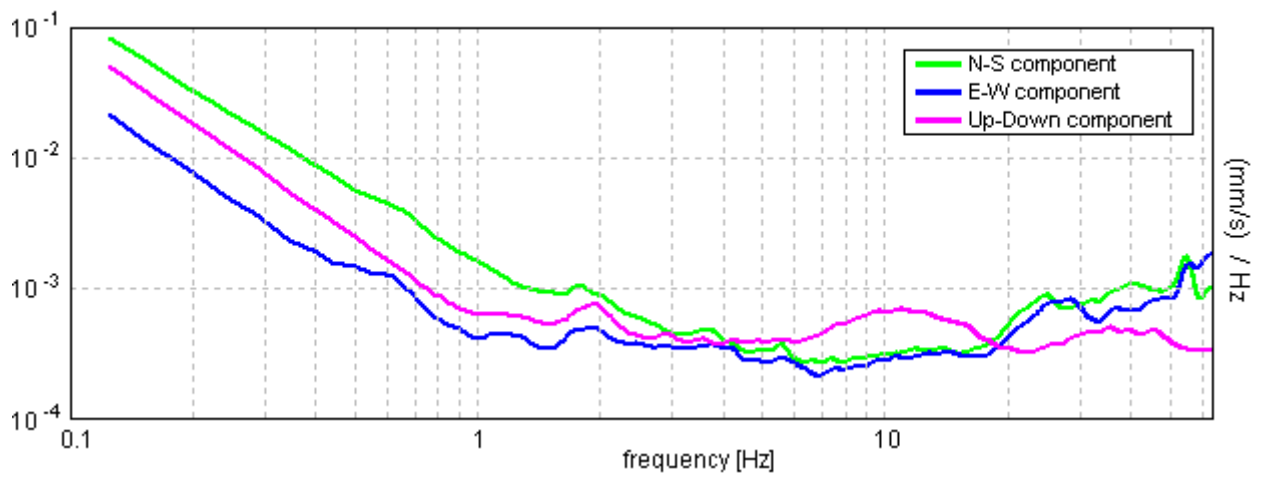
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 24.75 ± 0.93 Hz. (in the range 0.0 - 40.0 Hz).**

<b>Criteria for a reliable HVSR curve</b> [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	24.75 > 0.50	OK	
$n_c(f_0) > 200$	36630.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 1189 times	OK	
<b>Criteria for a clear HVSR peak</b> [At least 5 out of 6 should be fulfilled]			
<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	19.188 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>			NO
$A_0 > 2$	2.67 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01879  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.46515 < 1.2375	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.0838 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for $\sigma_f$ and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

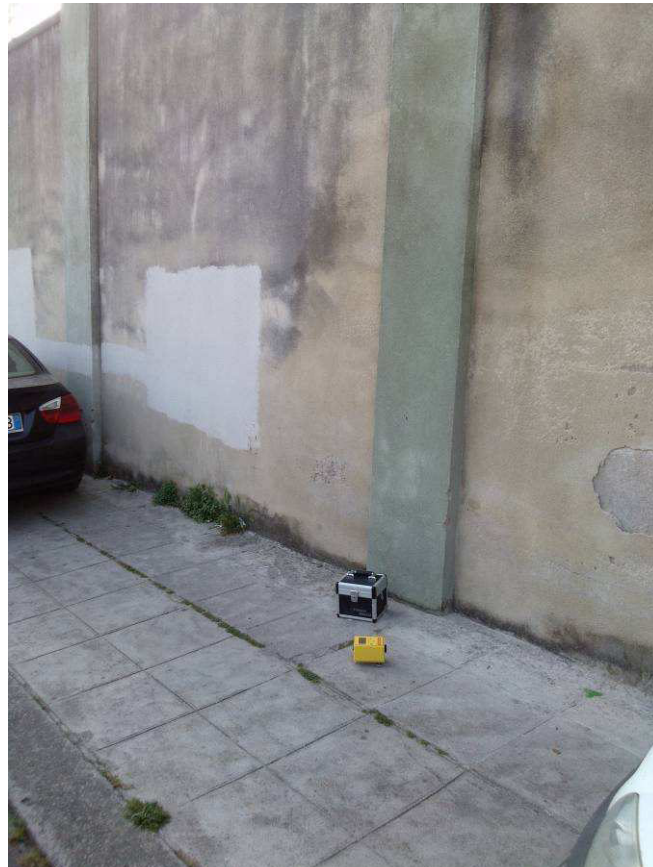


Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0153				
<b>Coordinate</b>	<i>UTM</i>	4218642.73	N	354303.88	E
	<i>Gauss Boaga</i>	4218641.030	N	2374298.830	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	20/05/2014, 07:44				
<b>Nome file</b>	0153				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



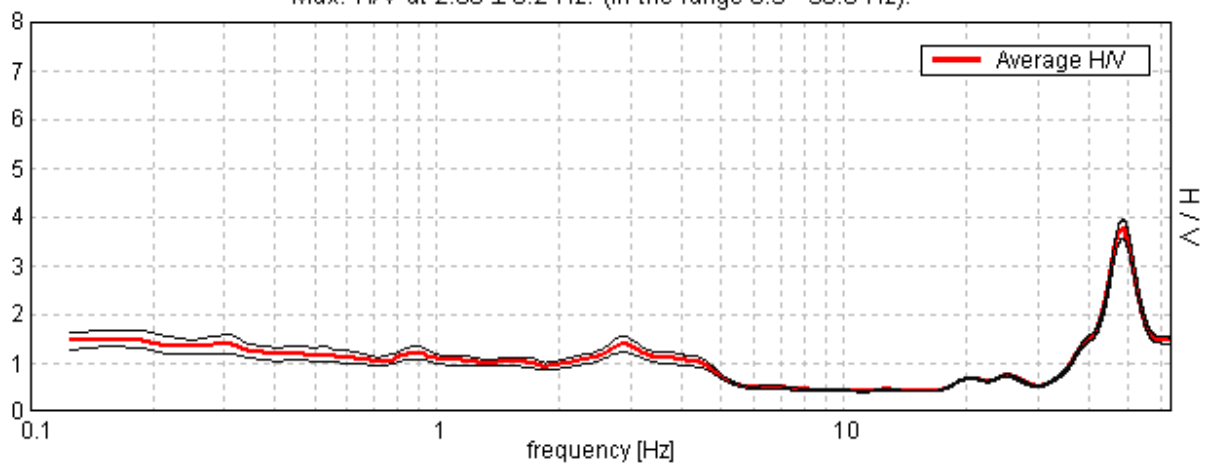
## TRIVELSICILIA PALERMO, PALERMO 0153

Start recording: 20/05/14 07:45:26      End recording: 20/05/14 08:15:27  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

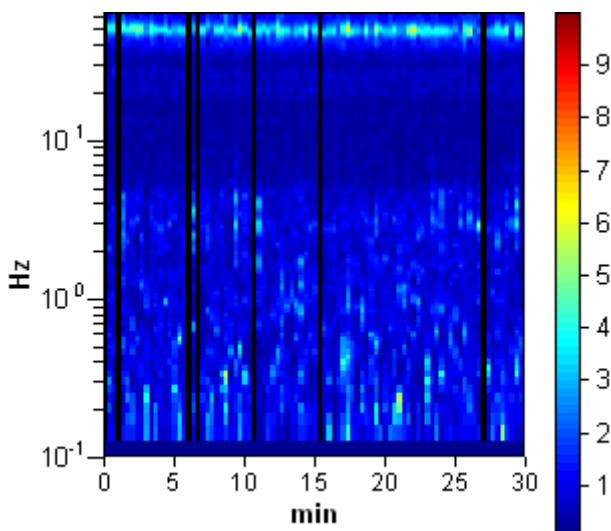
Trace length: 0h30'00".      Analyzed 92% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 10%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

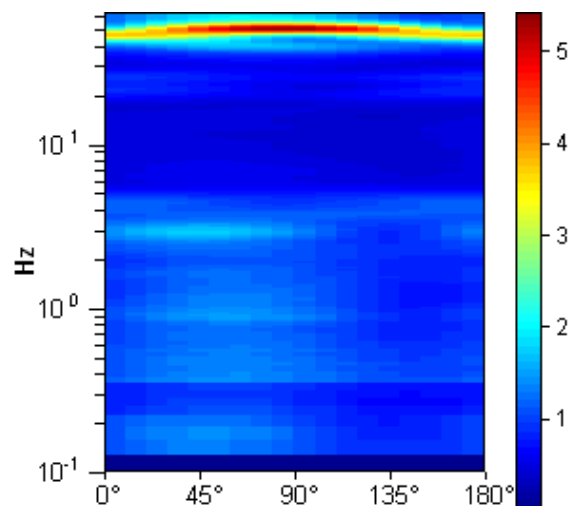
Max. H/V at  $2.88 \pm 0.2$  Hz. (In the range 0.5 - 30.0 Hz).



### H/V TIME HISTORY

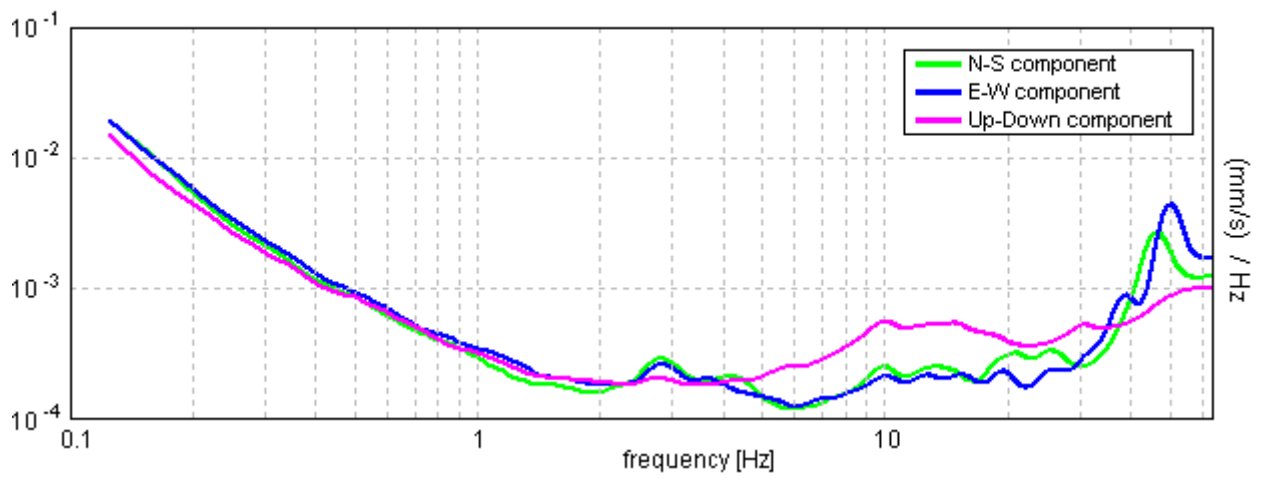


### DIRECTIONAL H/V





### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 2.88 ± 0.2 Hz. (in the range 0.5 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.88 > 0.50	OK	
$n_c(f_0) > 200$	4772.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 139 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	5.094 Hz	OK	
<b><math>A_0 &gt; 2</math></b>	1.37 > 2		<b>NO</b>
<b><math>f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%</math></b>	$ 0.03524  < 0.05$	OK	
<b><math>\sigma_f &lt; \varepsilon(f_0)</math></b>	$0.10132 < 0.14375$	OK	
<b><math>\sigma_A(f_0) &lt; \theta(f_0)</math></b>	$0.0805 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

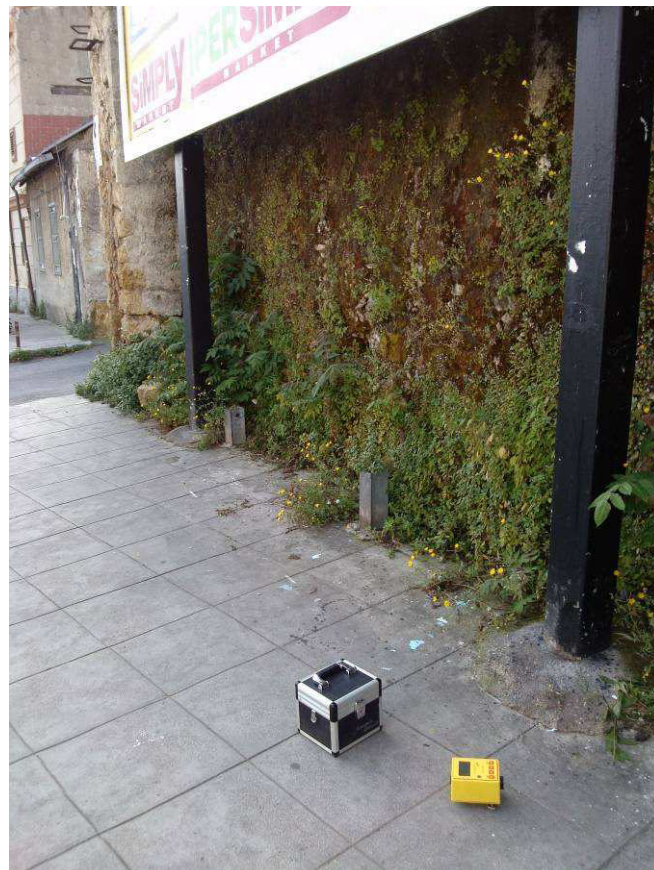


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n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0154				
<b>Coordinate</b>	<i>UTM</i>	4218777.00	N	354698.00	E
	<i>Gauss Boaga</i>	4218775.311	N	2374692.967	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	20/05/2014, 08:22				
<b>Nome file</b>	0154				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

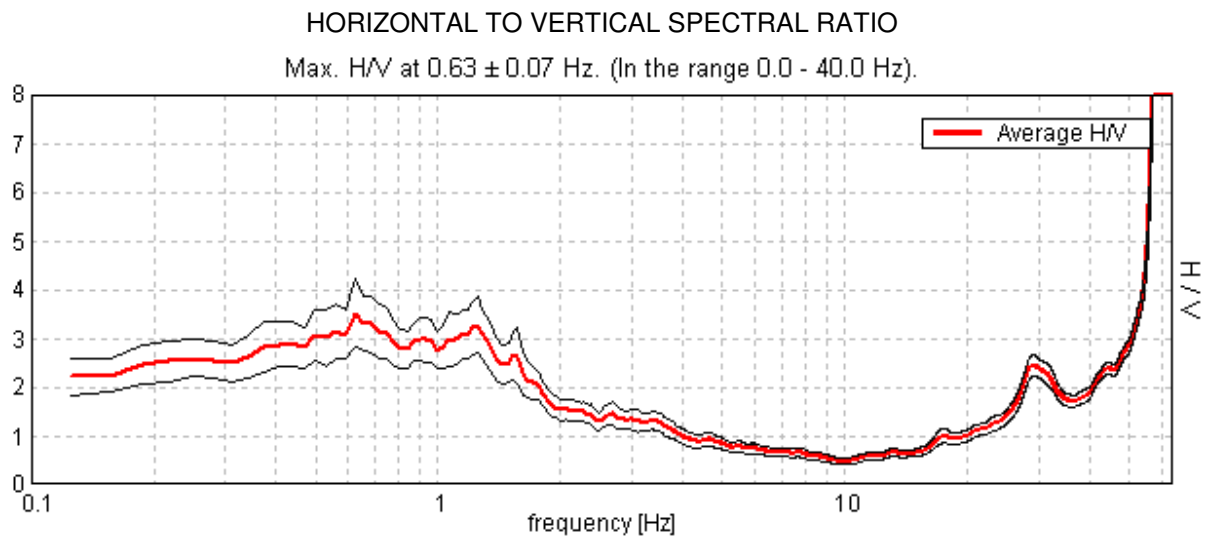
**Documentazione fotografica**



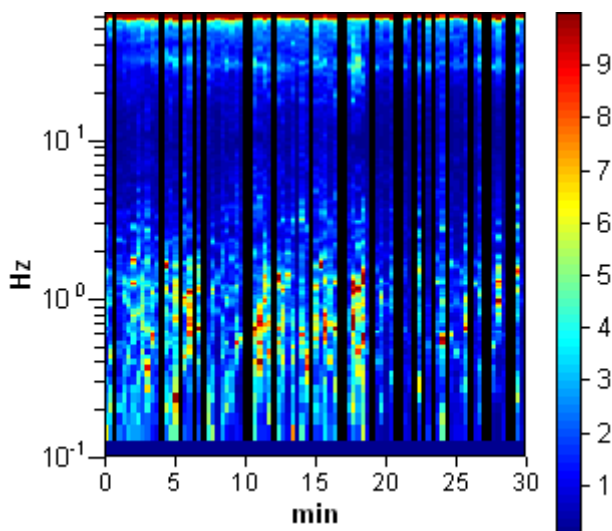
## TRIVELSICILIA PALERMO, PALERMO 0154

Start recording: 20/05/14 08:22:56      End recording: 20/05/14 08:52:57  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

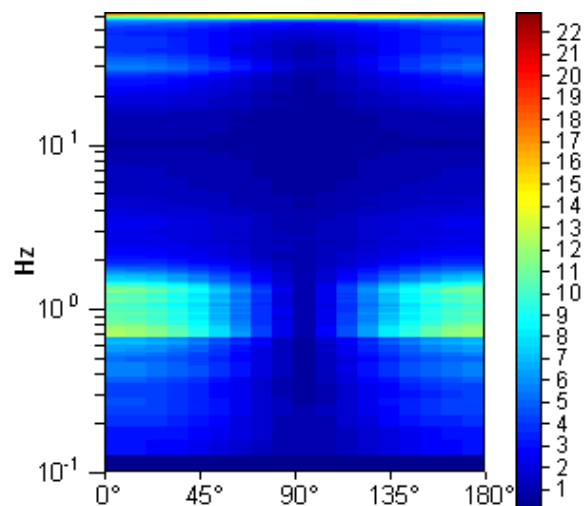
Trace length: 0h30'00".      Analyzed 74% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



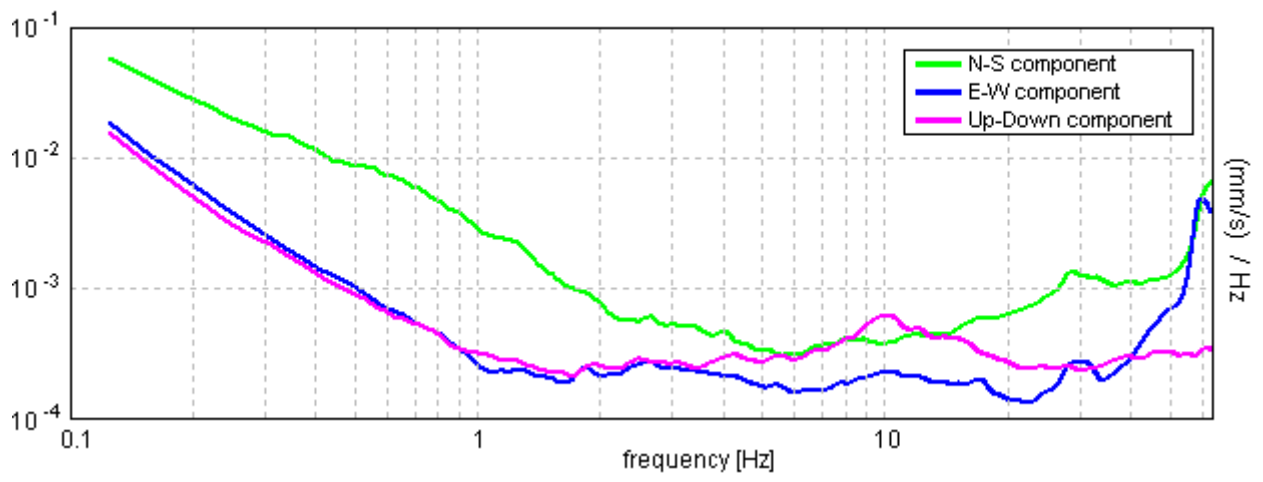
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $0.63 \pm 0.07$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.63 > 0.50$	OK	
$n_c(f_0) > 200$	$837.5 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 31 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	1.875 Hz	OK	
$A_0 > 2$	$3.51 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.05785  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.03616 < 0.09375$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.3448 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>				
<b>Nome base sismica</b>	0155				
<b>Coordinate</b>	<i>UTM</i>	4218704.53	N	355160.15	E
	<i>Gauss Boaga</i>	4218702.843	N	2375155.141	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	20/05/2014, 09:01				
<b>Nome file</b>	0155				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Terreno				
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

**Documentazione fotografica**



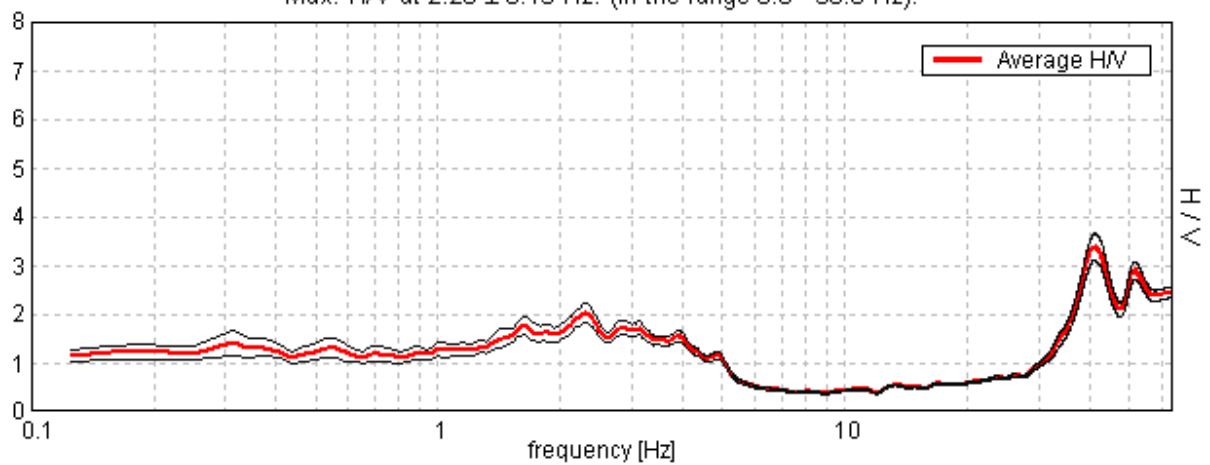
## TRIVELSICILIA PALERMO, PALERMO 0155

Start recording: 20/05/14 09:02:29      End recording: 20/05/14 09:32:30  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

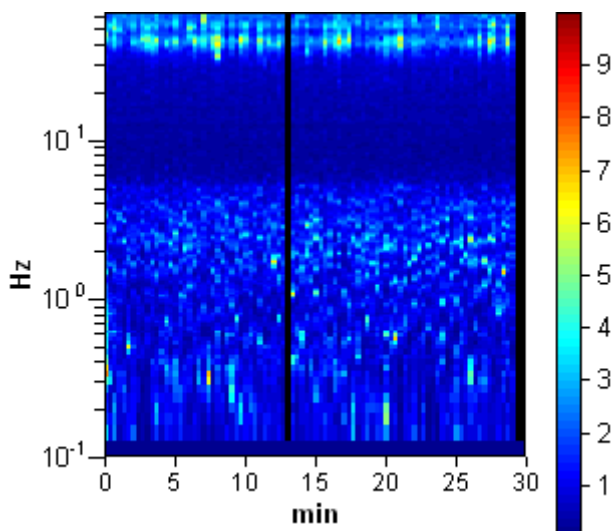
Trace length: 0h30'00".      Analyzed 97% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

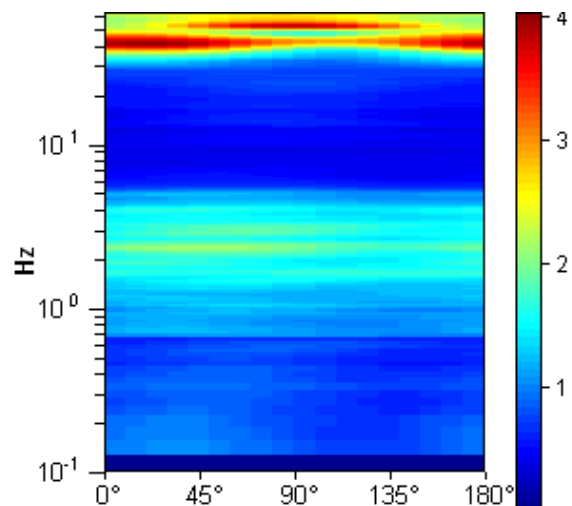
Max. H/V at  $2.28 \pm 0.15$  Hz. (In the range 0.0 - 30.0 Hz).



### H/V TIME HISTORY

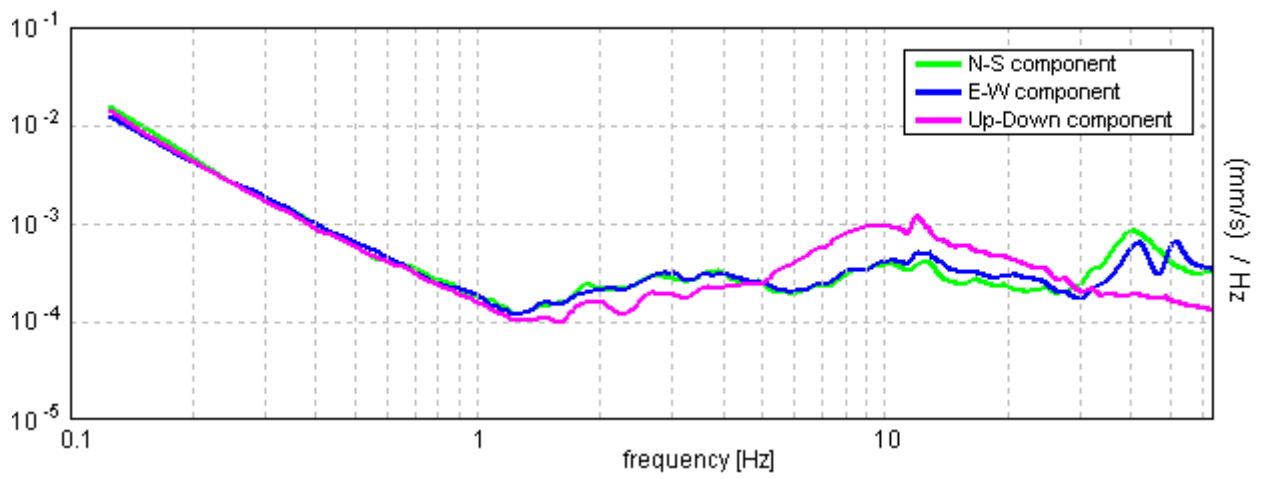


### DIRECTIONAL H/V





### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 2.28 ± 0.15 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.28 > 0.50	OK	
$n_c(f_0) > 200$	3969.4 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 110 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	5.094 Hz	OK	
$A_0 > 2$	2.02 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03247  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.07407 < 0.11406	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.0963 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0156			
<b>Coordinate</b>	UTM	4218709.41	N	355579.29	E
	Gauss Boaga	4218707.729	N	2375574.302	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		20/05/2014, 09:46			
<b>Nome file</b>		0156			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

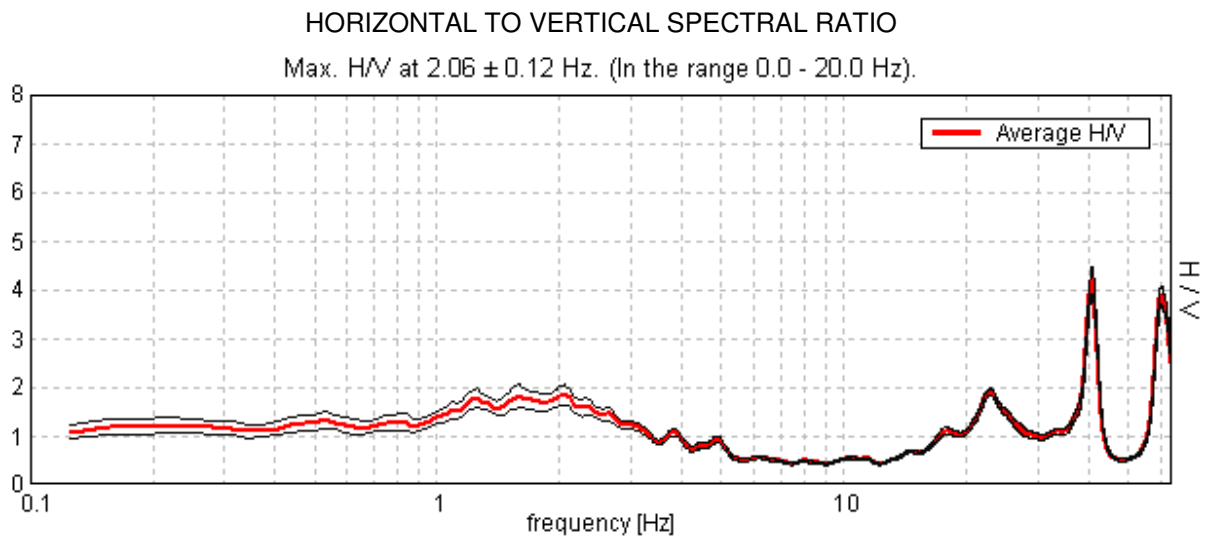
**Documentazione fotografica**



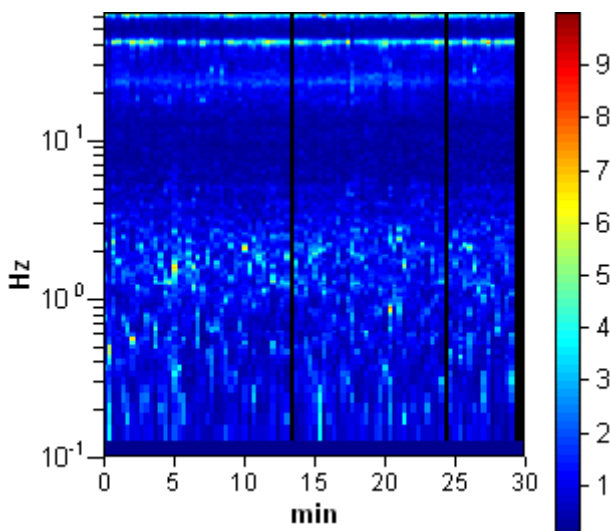
## TRIVELSICILIA PALERMO, PALERMO 0156

Start recording: 20/05/14 09:48:05      End recording: 20/05/14 10:18:06  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

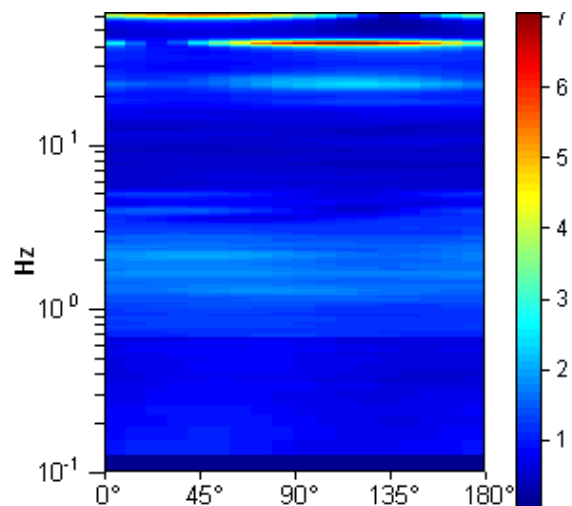
Trace length: 0h30'00".      Analyzed 96% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



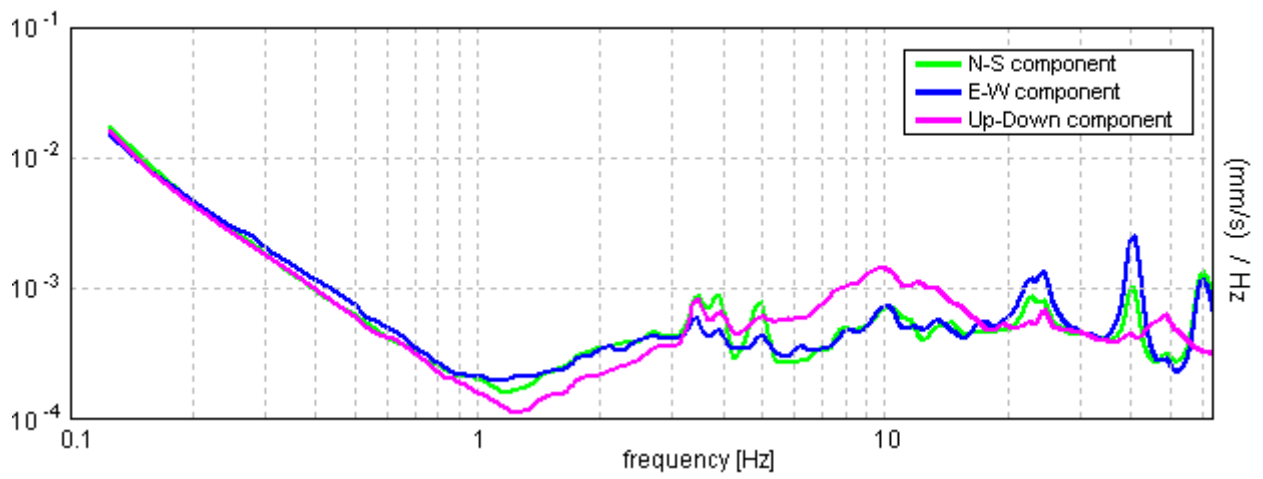
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 2.06 ± 0.12 Hz. (in the range 0.0 - 20.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.06 > 0.50	OK	
$n_c(f_0) > 200$	3547.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 100 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	3.438 Hz	OK	
$A_0 > 2$	1.84 > 2		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02958  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.06101 < 0.10313	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1025 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0157				
<b>Coordinate</b>	<i>UTM</i>	4218675.07	N	355951.44	E
	<i>Gauss Boaga</i>	4218673.392	N	2375946.471	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	20/05/2014, 10:27				
<b>Nome file</b>	0157				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



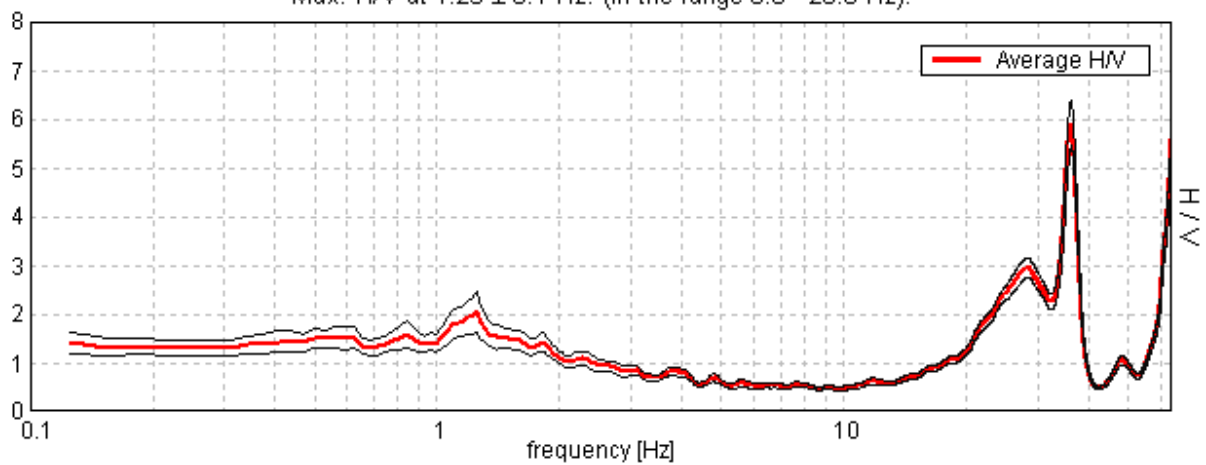
## TRIVELSICILIA PALERMO, PALERMO 0157

Start recording: 20/05/14 10:28:18      End recording: 20/05/14 10:58:19  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

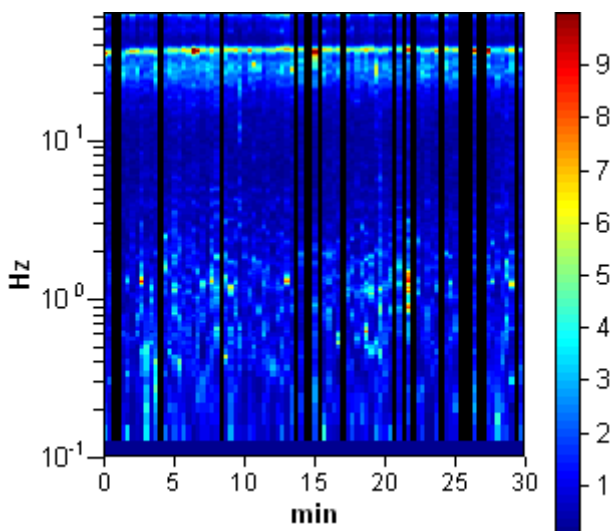
Trace length: 0h30'00".      Analyzed 79% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

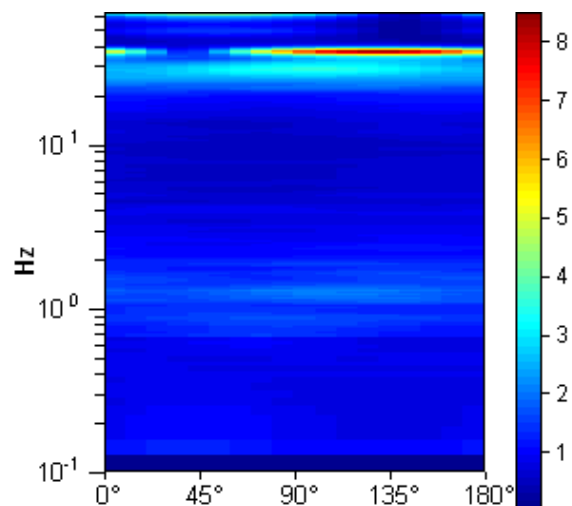
Max. H/V at  $1.25 \pm 0.1$  Hz. (In the range 0.0 - 20.0 Hz).



### H/V TIME HISTORY

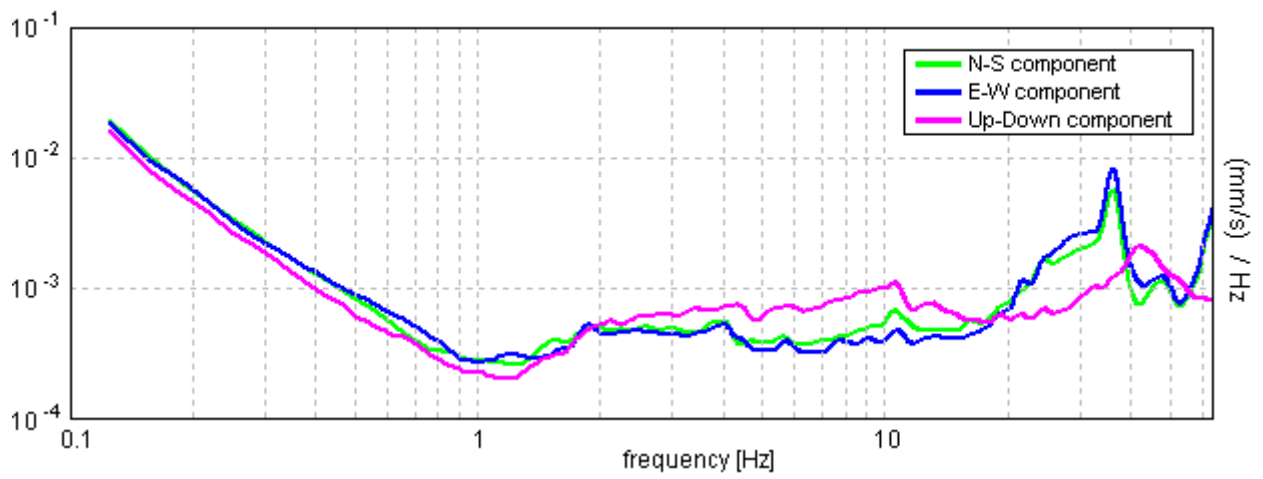


### DIRECTIONAL H/V





SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.25 ± 0.1 Hz. (in the range 0.0 - 20.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.25 > 0.50	OK	
$n_c(f_0) > 200$	1775.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 61 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.094 Hz	OK	
$A_0 > 2$	2.04 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03808  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.0476 < 0.125$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2146 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0158			
<b>Coordinate</b>	UTM	4218676.69	N	356382.00	E
	Gauss Boaga	4218675.017	N	2376377.052	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		20/05/2014, 11:17			
<b>Nome file</b>		0158			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

**Documentazione fotografica**



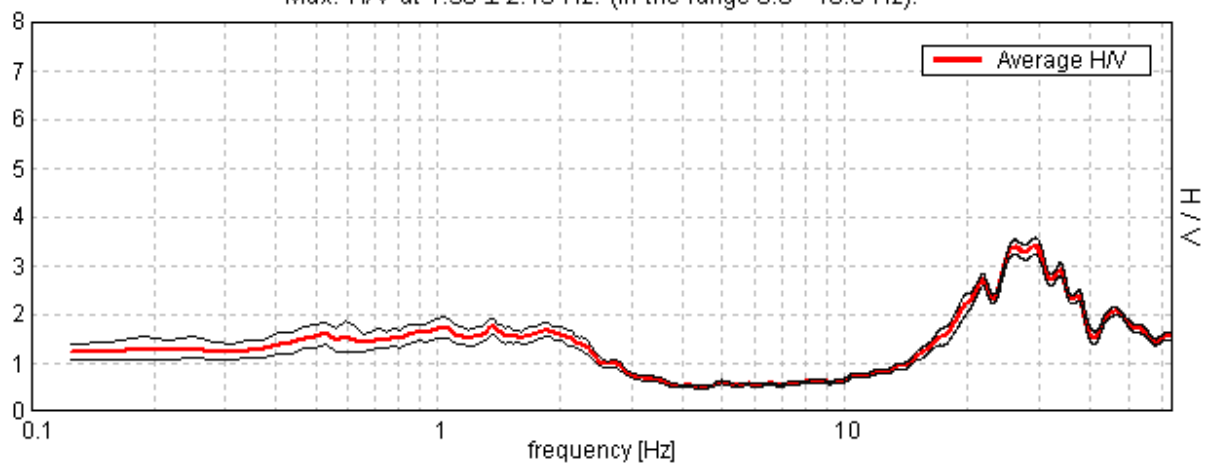
## TRIVELSICILIA PALERMO, PALERMO 0158

Start recording: 20/05/14 11:19:14      End recording: 20/05/14 11:49:15  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

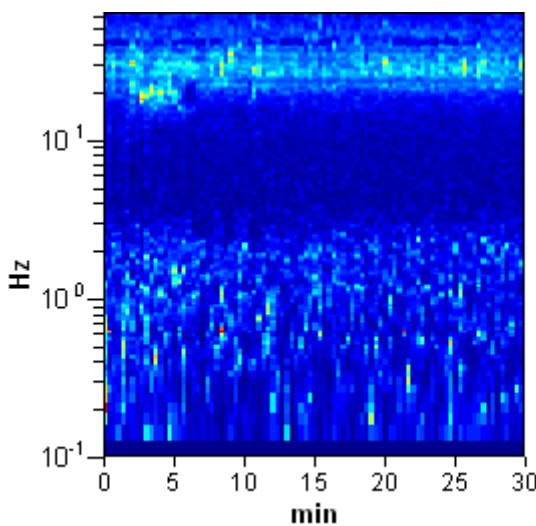
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

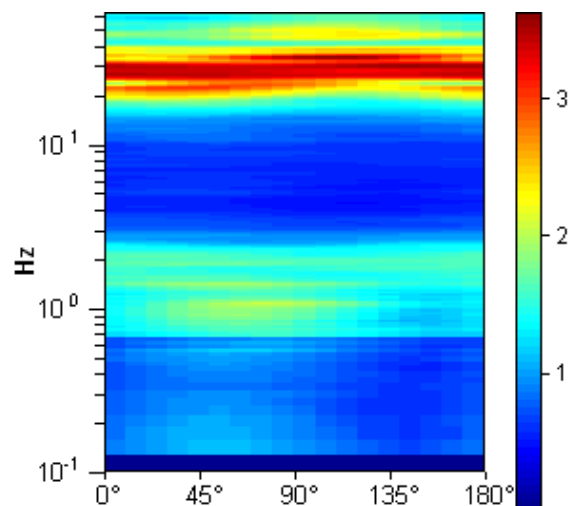
Max. H/V at  $1.38 \pm 2.15$  Hz. (In the range 0.0 - 18.0 Hz).



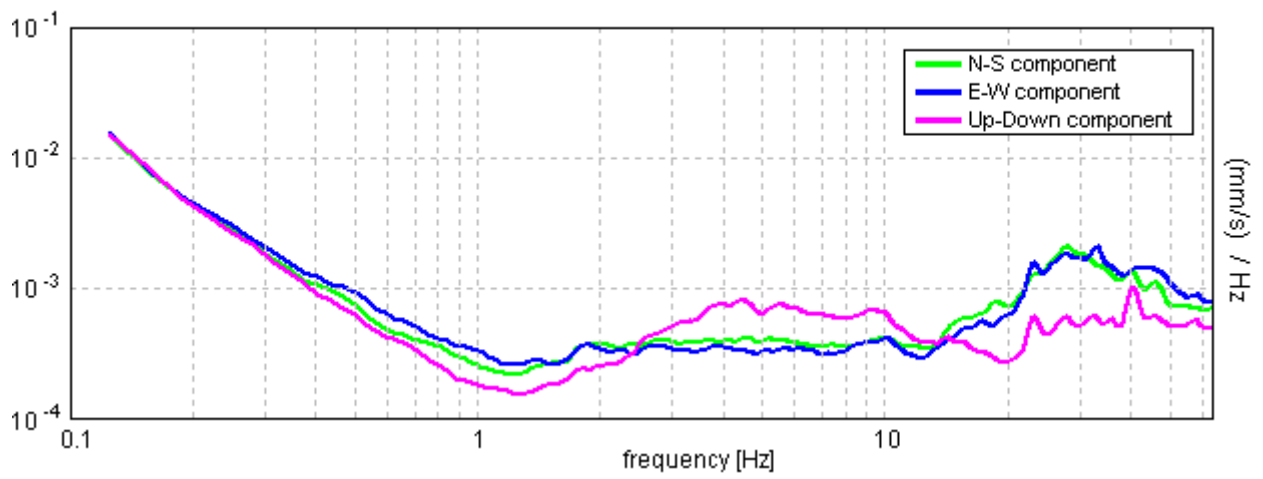
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.38 ± 2.15 Hz. (in the range 0.0 - 18.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.38 > 0.50	OK	
$n_c(f_0) > 200$	2475.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 67 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.875 Hz	OK	
$A_0 > 2$	1.73 > 2		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.78388  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	1.07784 < 0.1375		NO
$\sigma_A(f_0) < \theta(f_0)$	0.0828 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0159			
<b>Coordinate</b>	UTM	4218682.33	N	356762.88	E
	Gauss Boaga	4218680.662	N	2376757.951	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		20/05/2014, 12:07			
<b>Nome file</b>		0159			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>Si</b>		
		<b>Altro</b>	<b>No</b>		

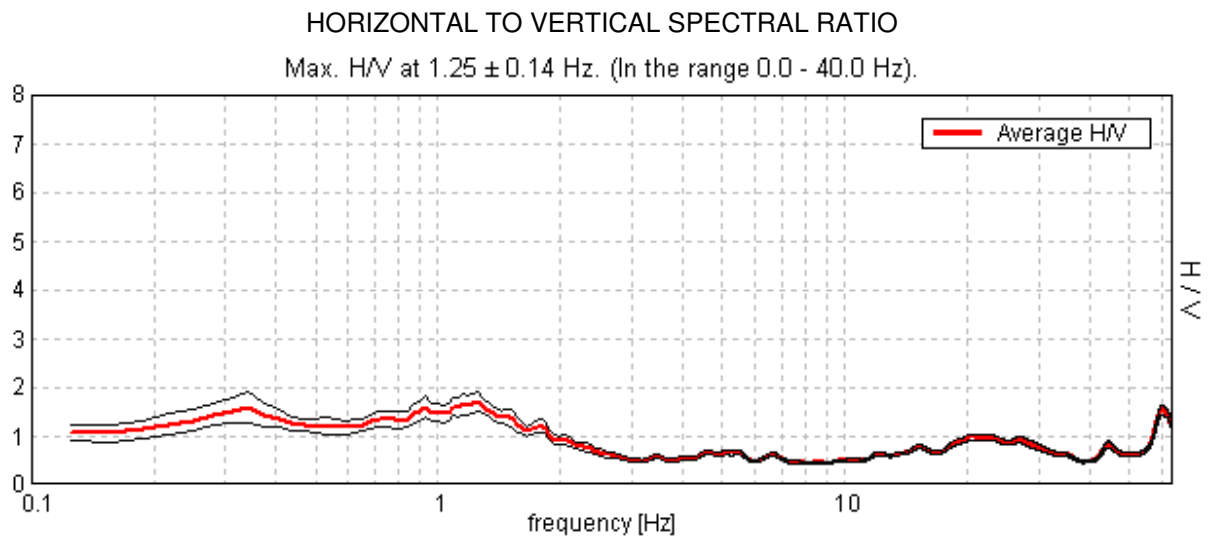
**Documentazione fotografica**



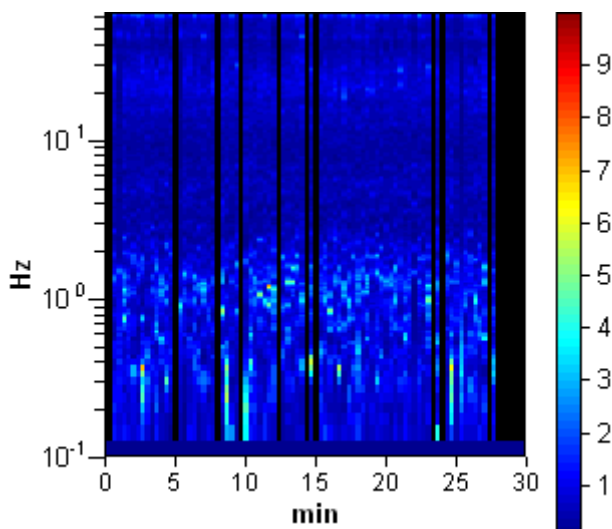
## TRIVELSICILIA PALERMO, PALERMO 0159

Start recording: 20/05/14 12:08:55      End recording: 20/05/14 12:38:56  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

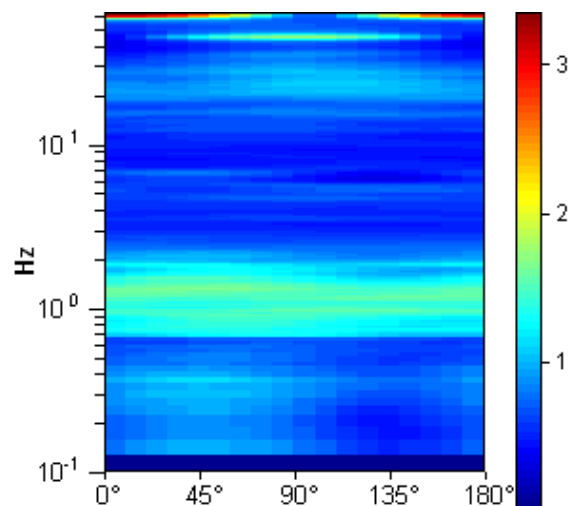
Trace length: 0h30'00".      Analyzed 81% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



H/V TIME HISTORY

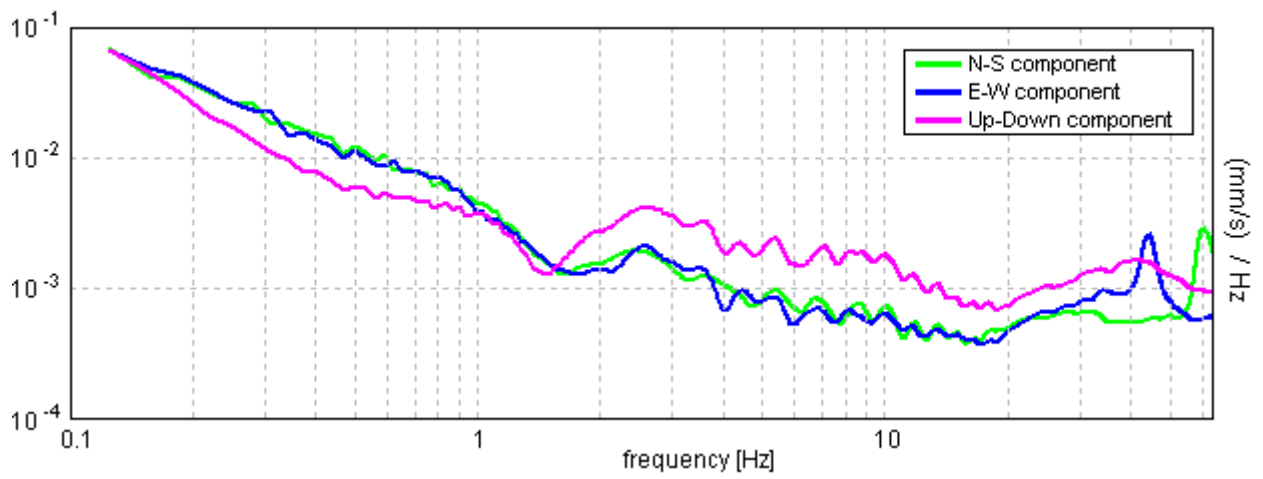


DIRECTIONAL H/V





### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $1.25 \pm 0.14$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.25 > 0.50$	OK	
$n_c(f_0) > 200$	$1825.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 61 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.156 Hz	OK	
$A_0 > 2$	$1.69 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.05601  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.07001 < 0.125$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1013 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0160			
<b>Coordinate</b>	UTM	4218694.06	N	357148.02	E
	Gauss Boaga	4218692.397	N	2377143.110	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		20/05/2014, 12:44			
<b>Nome file</b>		0160			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Cemento			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

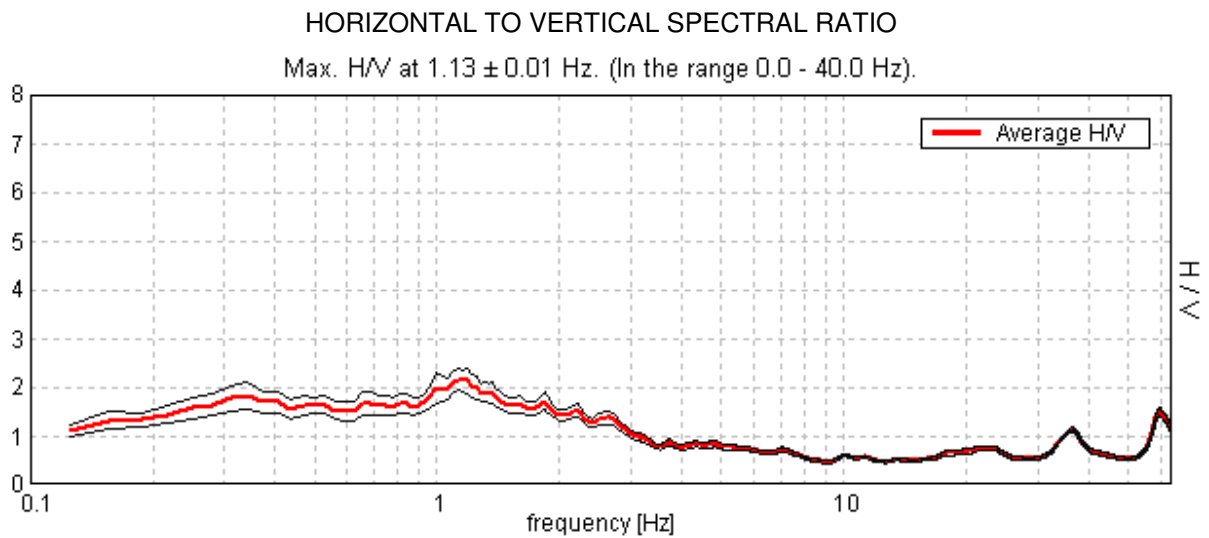
**Documentazione fotografica**



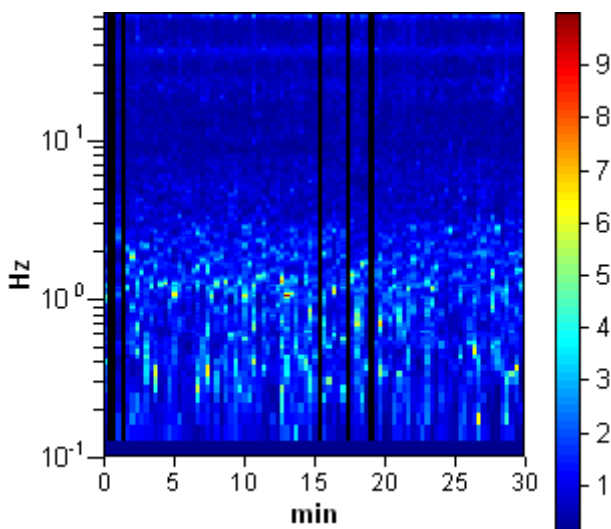
## TRIVELSICILIA PALERMO, PALERMO 0160

Start recording: 20/05/14 12:43:29      End recording: 20/05/14 13:13:30  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

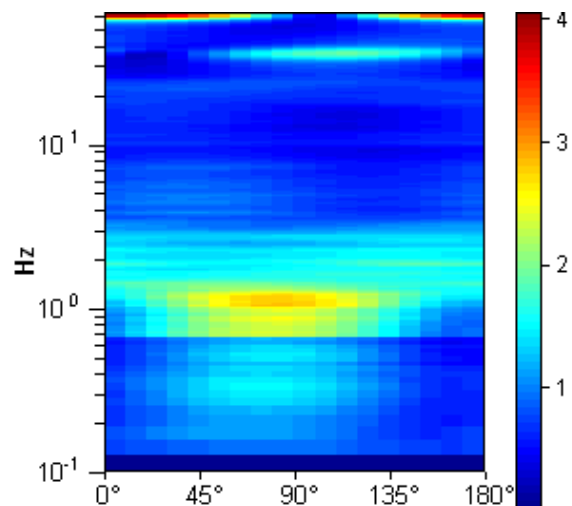
Trace length: 0h30'00".      Analyzed 93% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



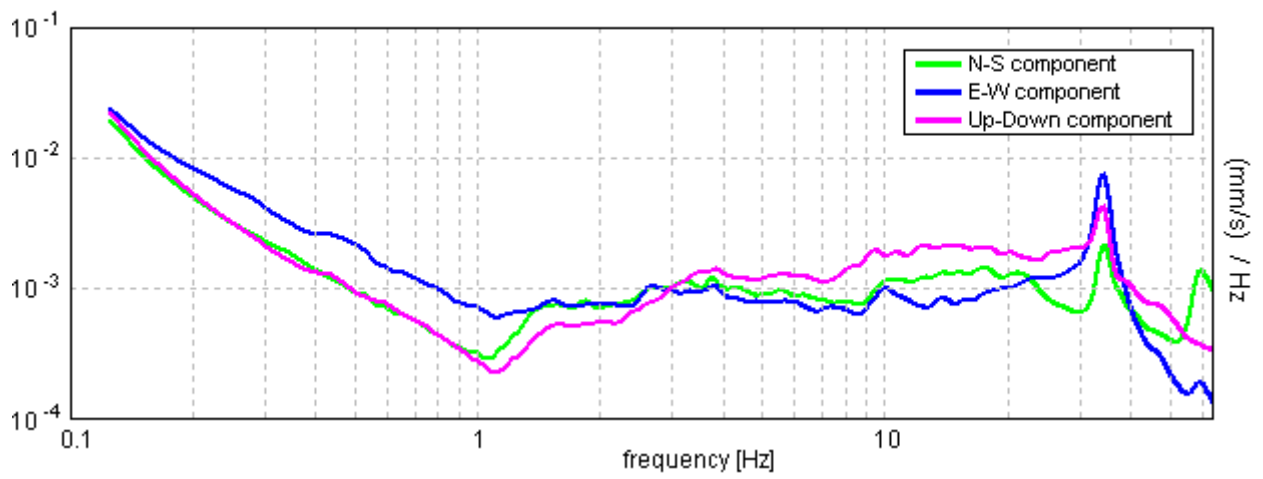
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.13 ± 0.01 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.13 > 0.50	OK	
$n_c(f_0) > 200$	1890.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 55 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.969 Hz	OK	
$A_0 > 2$	2.15 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00585  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.00658 < 0.1125$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.113 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

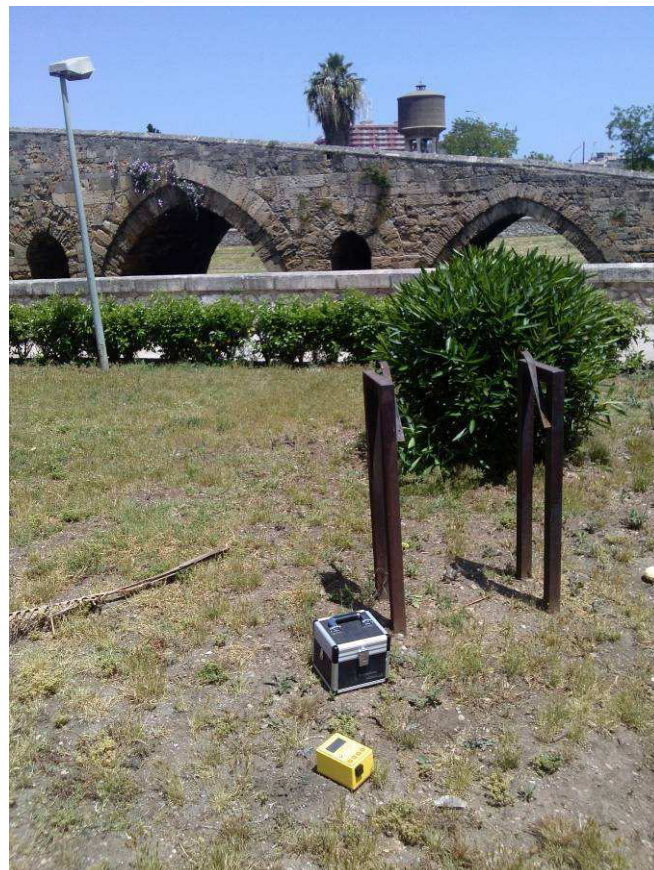


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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0161			
<b>Coordinate</b>	<i>UTM</i>	4218666.08	N	357512.98	E
	<i>Gauss Boaga</i>	4218664.423	N	2377508.087	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		20/05/2014, 13:19			
<b>Nome file</b>		0161			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

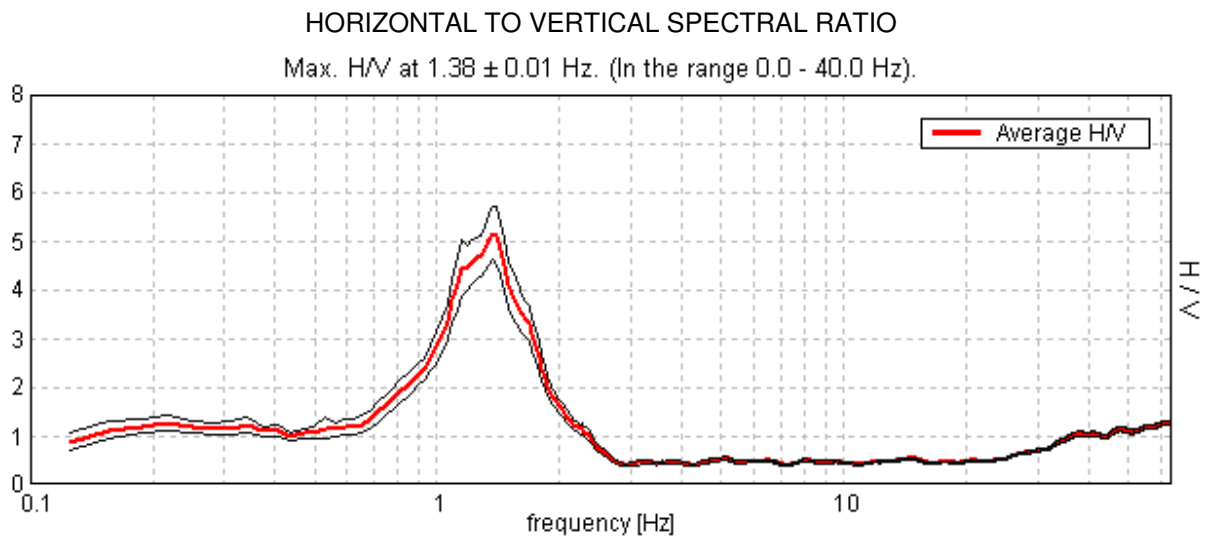
**Documentazione fotografica**



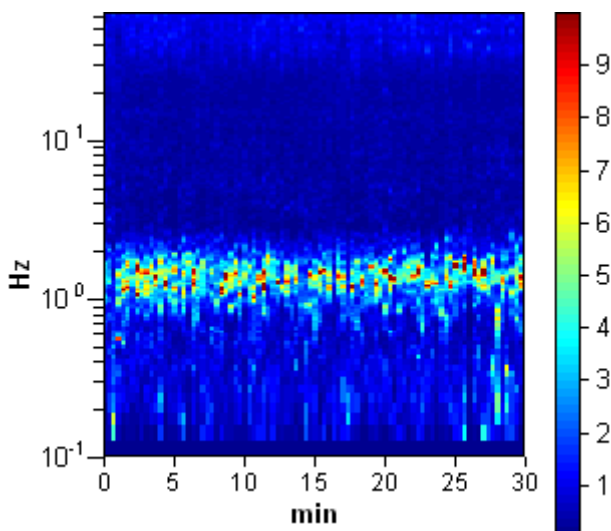
## TRIVELSICILIA PALERMO, PALERMO 0161

Start recording: 20/05/14 13:20:55      End recording: 20/05/14 13:50:56  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

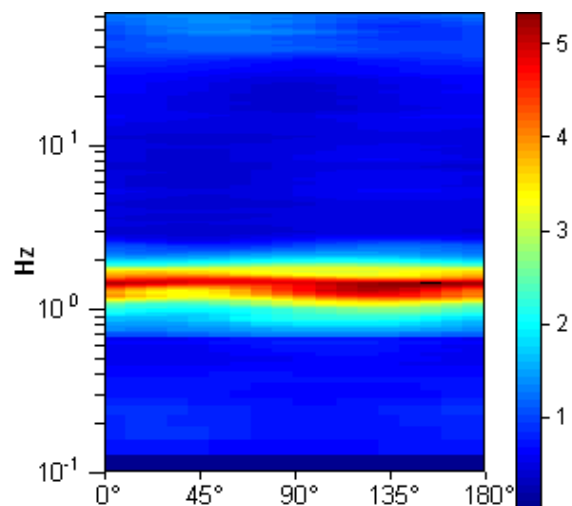
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



H/V TIME HISTORY

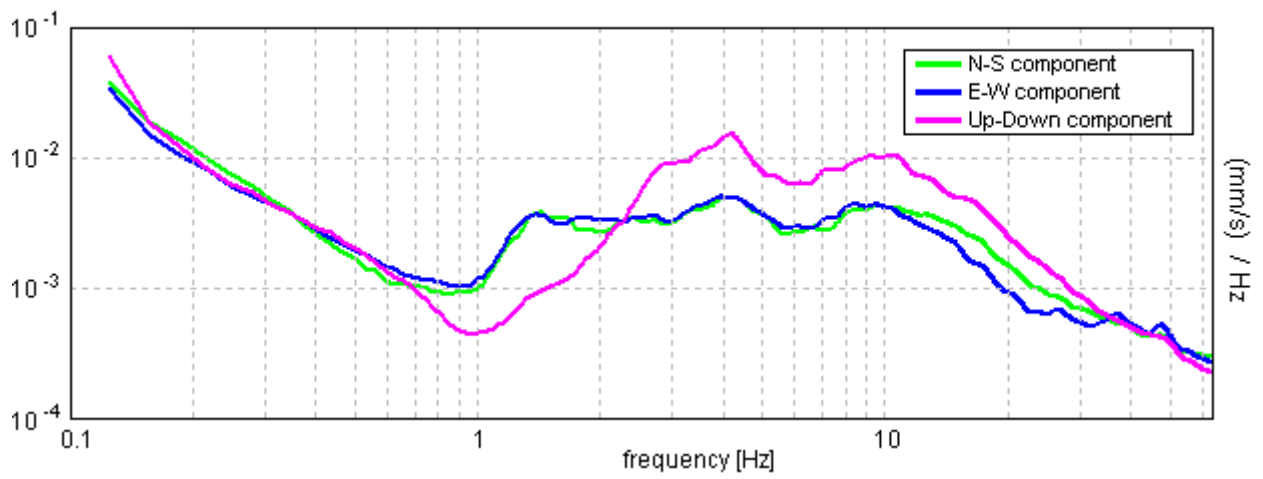


DIRECTIONAL H/V





### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.38 ± 0.01 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.38 > 0.50	OK	
$n_c(f_0) > 200$	2475.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 67 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.938 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.813 Hz	OK	
$A_0 > 2$	5.16 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00389  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.00535 < 0.1375	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.2779 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0162			
<b>Coordinate</b>	UTM	4218642.32	N	357990.09	E
	Gauss Boaga	4218640.672	N	2377985.219	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		19/05/2014, 15:00			
<b>Nome file</b>		0162			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

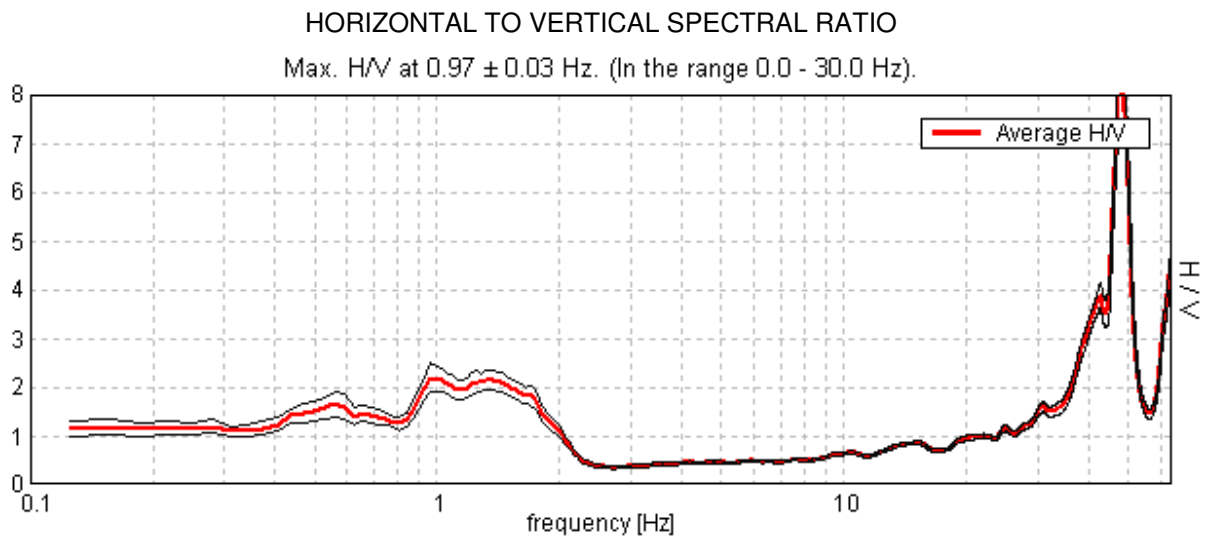
**Documentazione fotografica**



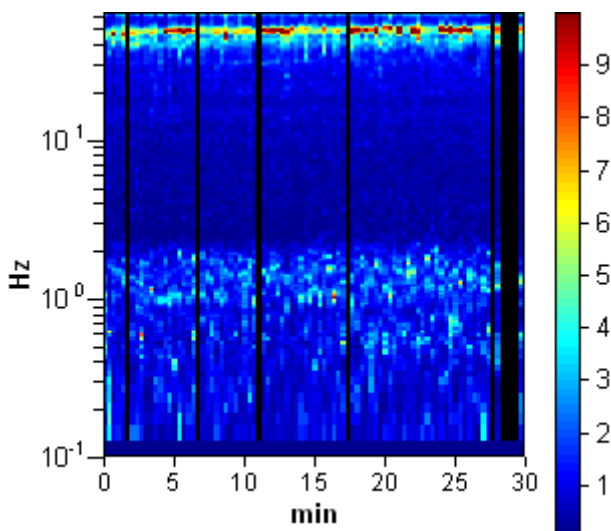
## TRIVELSICILIA PALERMO, PALERMO 0162

Start recording: 19/05/14 15:02:48      End recording: 19/05/14 15:32:49  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

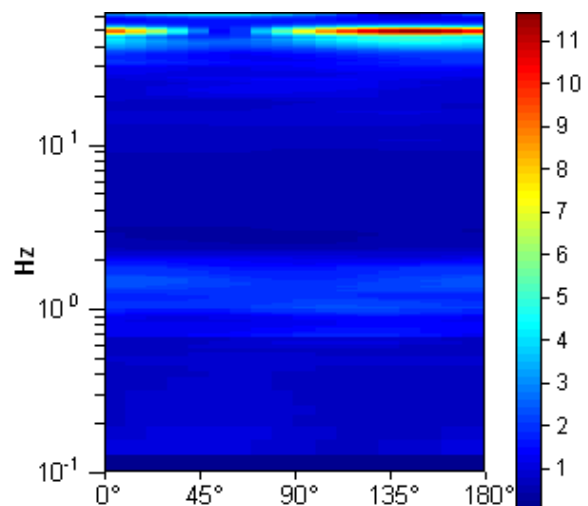
Trace length: 0h30'00".      Analyzed 90% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



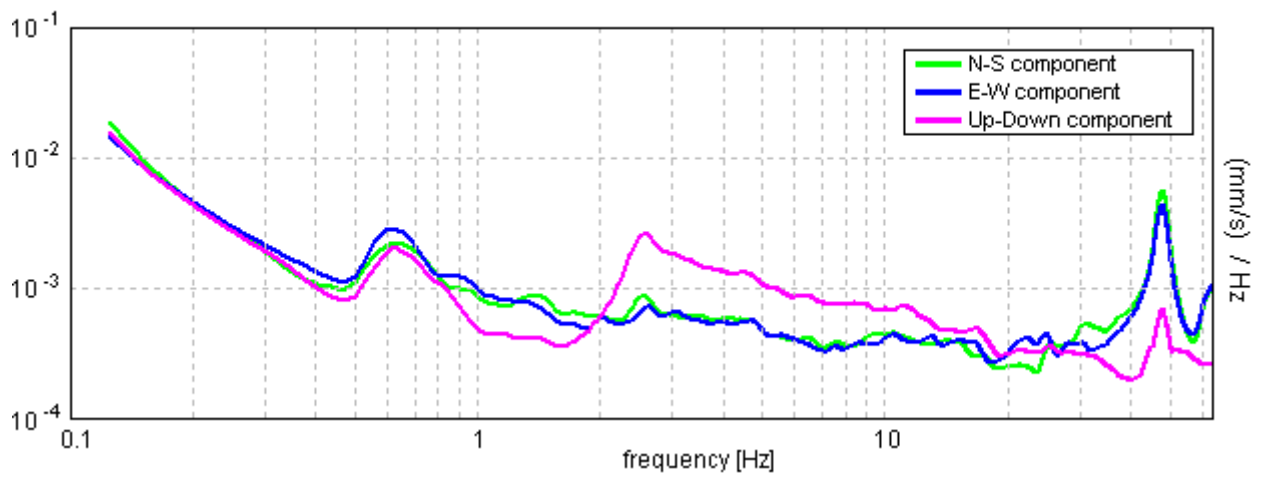
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $0.97 \pm 0.03$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.97 > 0.50$	OK	
$n_c(f_0) > 200$	$1569.4 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 48 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.313 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.0 Hz	OK	
$A_0 > 2$	$2.18 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01553  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01504 < 0.14531$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1498 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0163			
<b>Coordinate</b>	UTM	4218698.79	N	358288.30	E
	Gauss Boaga	4218697.150	N	2378283.441	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		19/05/2014, 13:34			
<b>Nome file</b>		0163			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

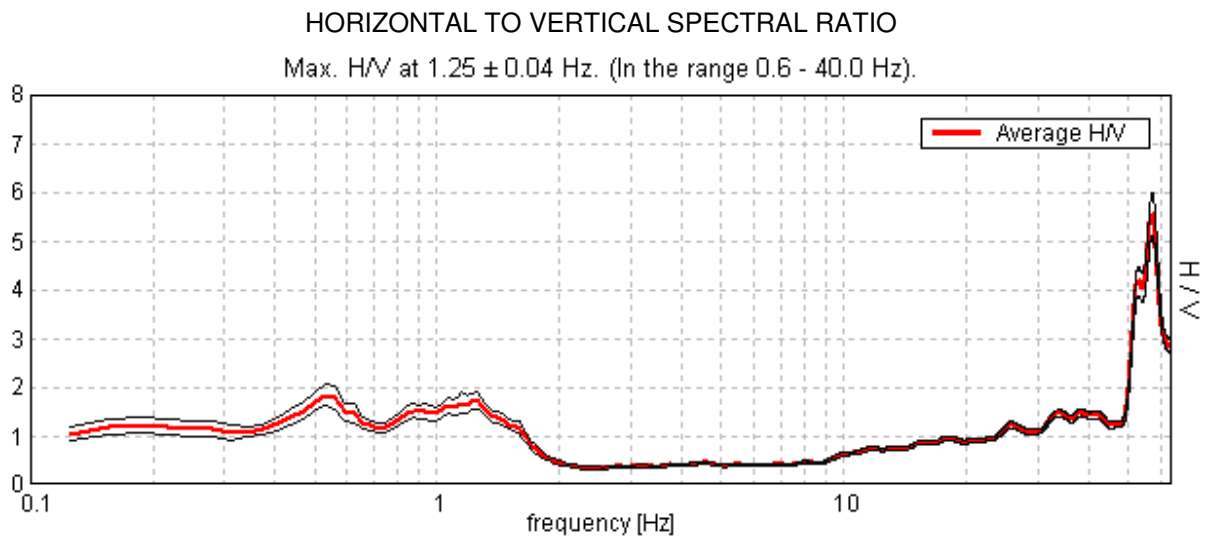
**Documentazione fotografica**



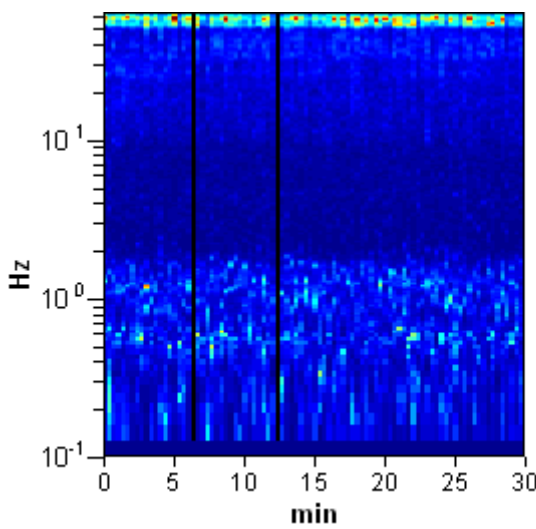
## TRIVELSICILIA PALERMO, PALERMO 0163

Start recording: 19/05/14 13:35:03      End recording: 19/05/14 14:05:04  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

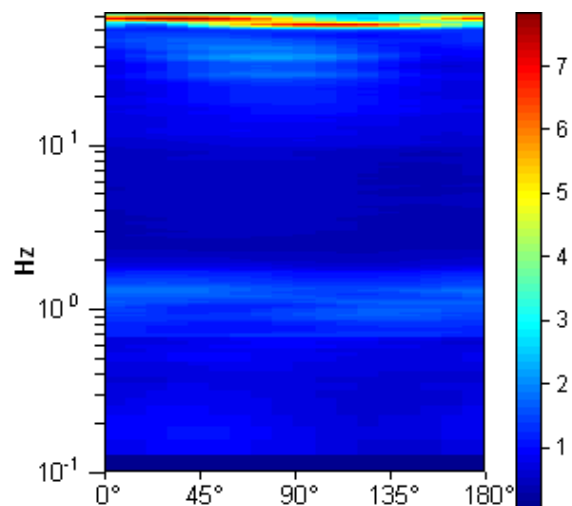
Trace length: 0h30'00".      Analyzed 98% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



H/V TIME HISTORY

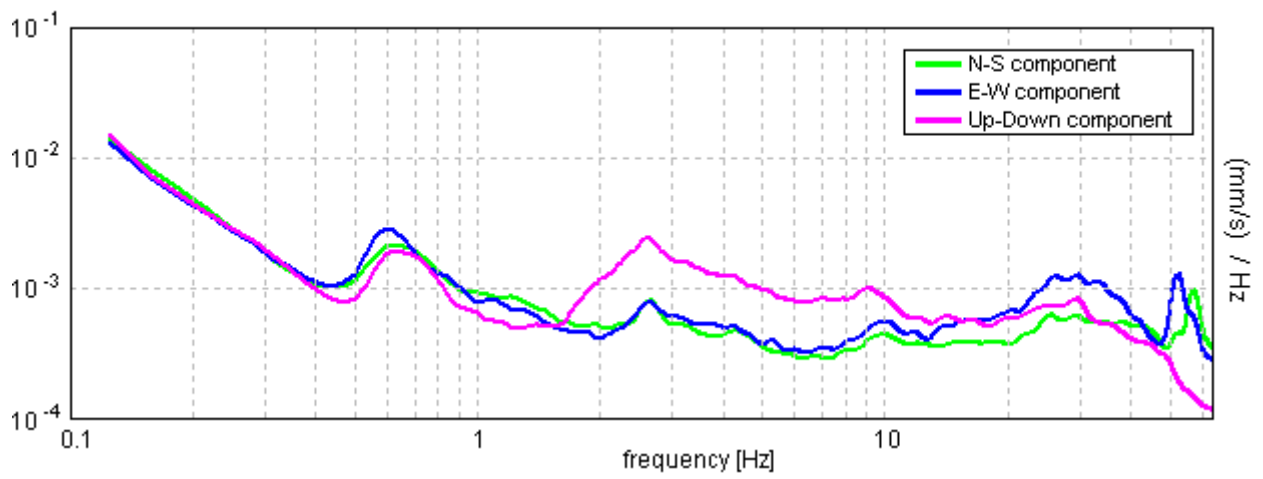


DIRECTIONAL H/V





### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $1.25 \pm 0.04$  Hz. (in the range 0.6 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.25 > 0.50$	OK	
$n_c(f_0) > 200$	$2200.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 61 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	1.688 Hz	OK	
$A_0 > 2$	$1.73 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01633  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02041 < 0.125$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.0877 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0164			
<b>Coordinate</b>	UTM	4218708.98	N	358765.99	E
	Gauss Boaga	4218707.349	N	2378761.152	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		19/05/2014, 14:25			
<b>Nome file</b>		0164			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>Si</b>		
		<b>Altro</b>	<b>No</b>		

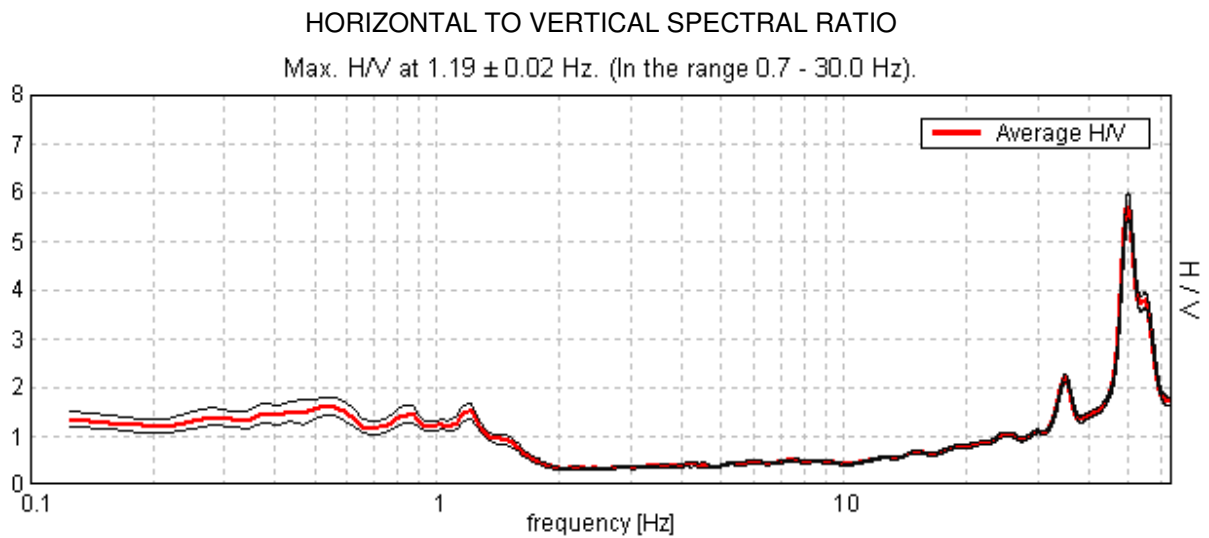
**Documentazione fotografica**



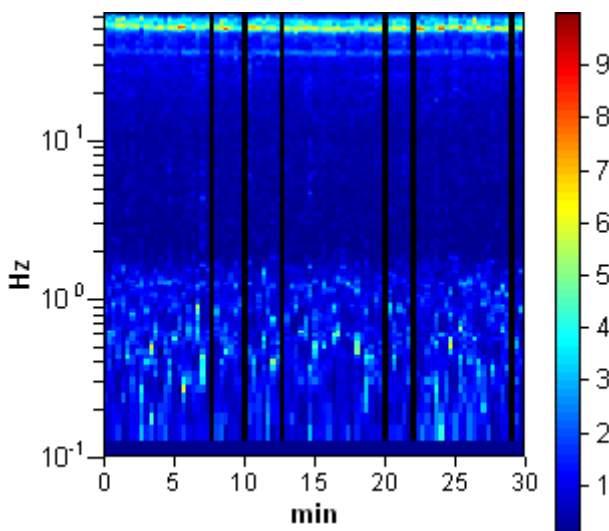
## TRIVELSICILIA PALERMO, PALERMO 0164

Start recording: 19/05/14 14:26:54      End recording: 19/05/14 14:56:54  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

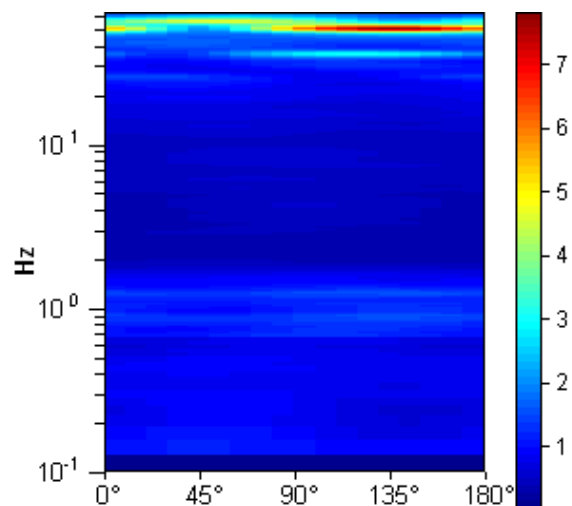
Trace length: 0h30'00".      Analyzed 93% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



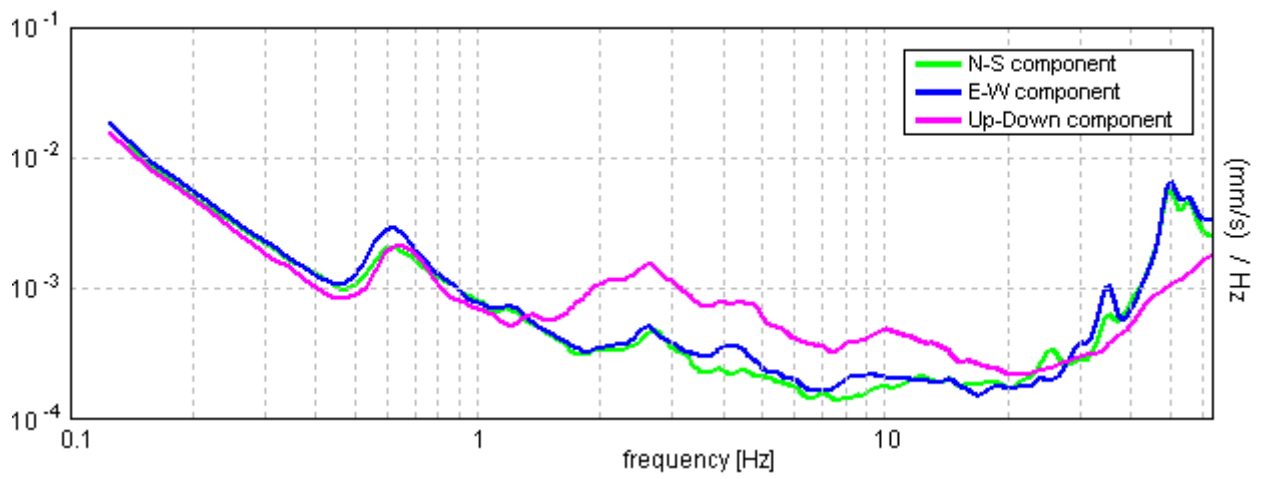
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.19 ± 0.02 Hz. (in the range 0.7 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.19 > 0.50	OK	
$n_c(f_0) > 200$	1995.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 58 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.594 Hz	OK	
$A_0 > 2$	1.51 > 2		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00991  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01176 < 0.11875$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.0797 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0165				
<b>Coordinate</b>	UTM	4218297.62	N	359553.12	E
	Gauss Boaga	4218295.985	N	2379548.325	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	27/05/2014, 09:29				
<b>Nome file</b>	0165				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



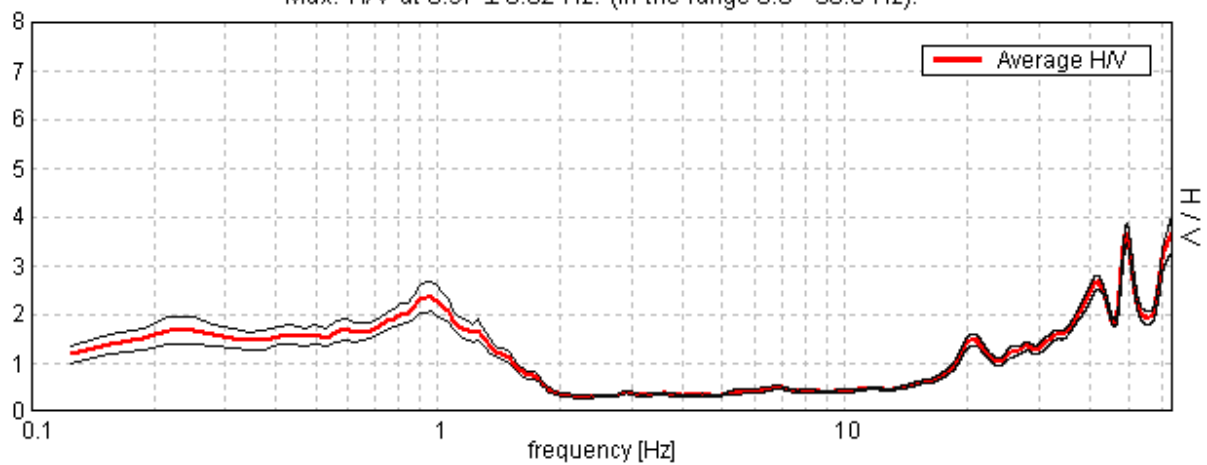
## TRIVELSICILIA PALERMO, PALERMO 0165

Start recording: 27/05/14 09:30:15      End recording: 27/05/14 10:00:15  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

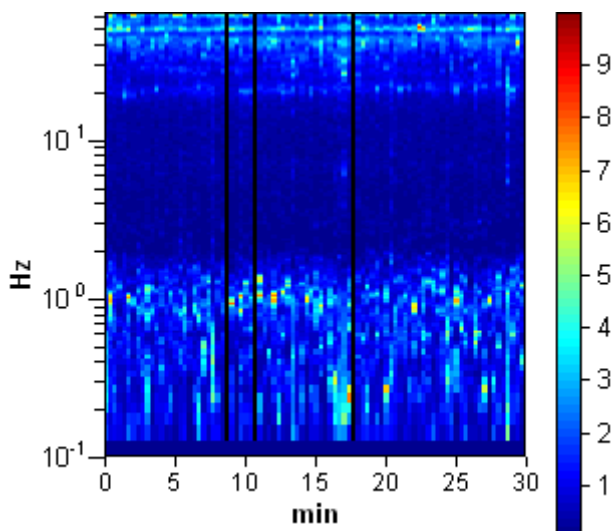
Trace length: 0h30'00".      Analyzed 97% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

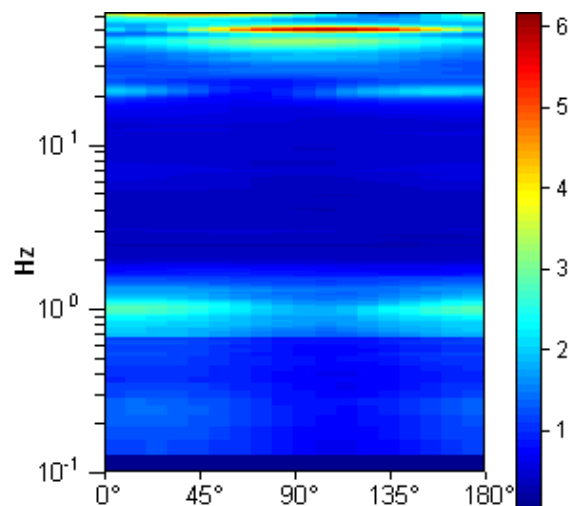
Max. H/V at  $0.97 \pm 0.02$  Hz. (In the range 0.0 - 30.0 Hz).



### H/V TIME HISTORY

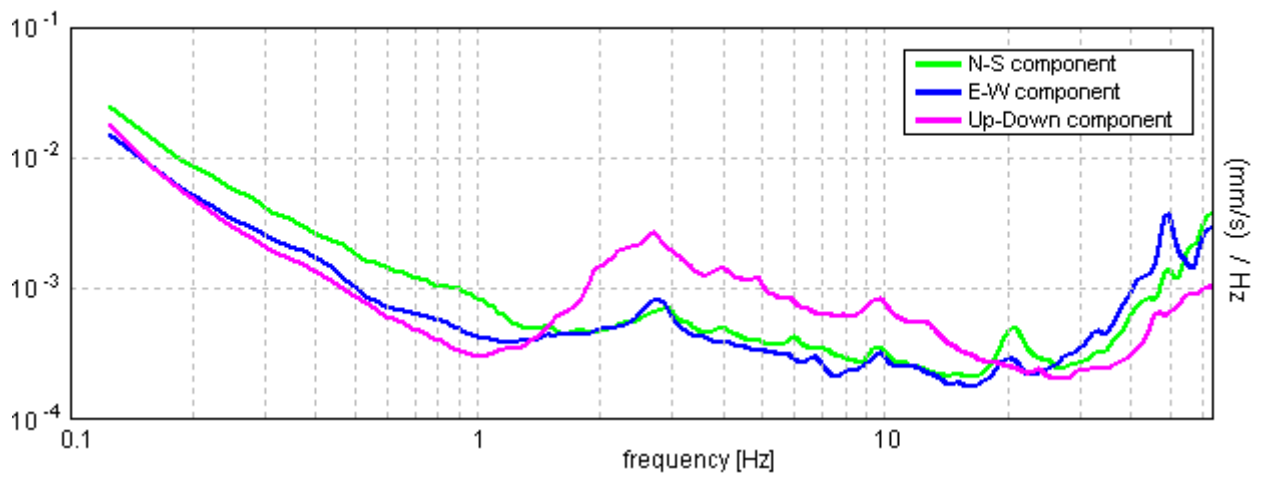


### DIRECTIONAL H/V





SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $0.97 \pm 0.02$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.97 > 0.50$	OK	
$n_c(f_0) > 200$	$1685.6 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 48 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.469 Hz	OK	
$A_0 > 2$	$2.36 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00896  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.00868 < 0.14531$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1548 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0166				
<b>Coordinate</b>	<i>UTM</i>	4218279.36	N	359182.47	E
	<i>Gauss Boaga</i>	4218277.718	N	2379177.659	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	27/05/2014, 08:52				
<b>Nome file</b>	0166				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



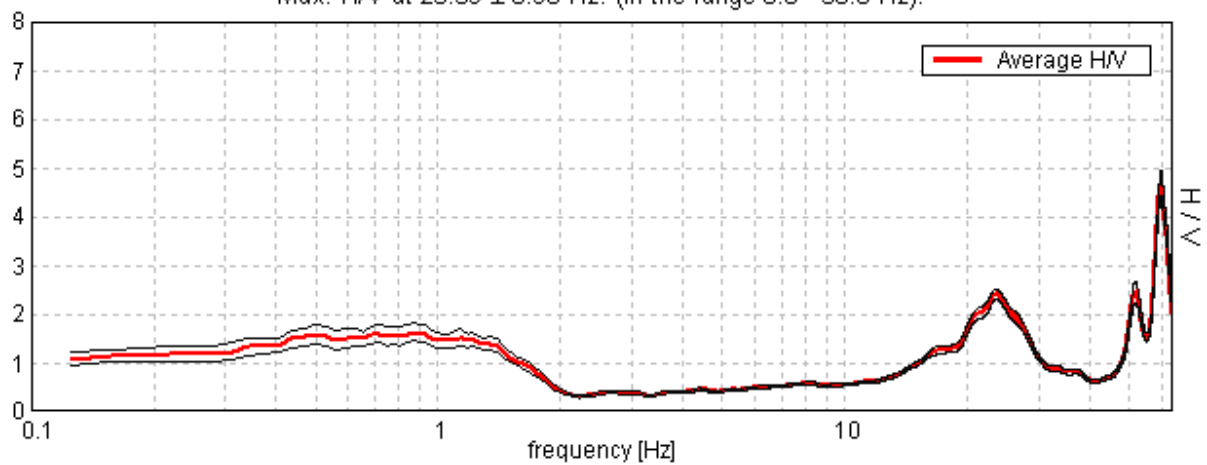
## TRIVELSICILIA PALERMO, PALERMO 0166

Start recording: 27/05/14 08:54:23      End recording: 27/05/14 09:24:24  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

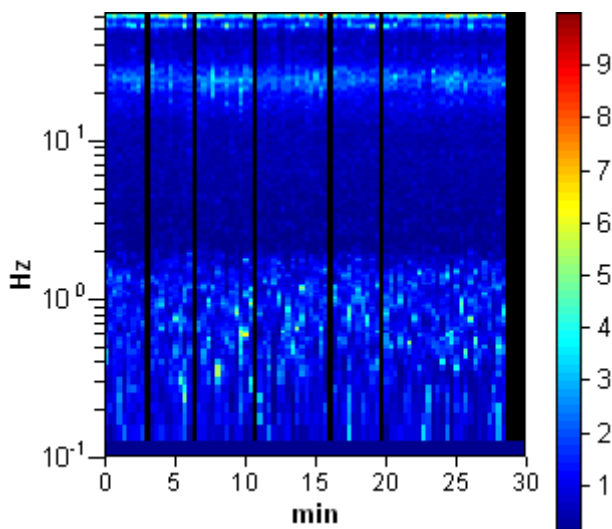
Trace length: 0h30'00".      Analyzed 90% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

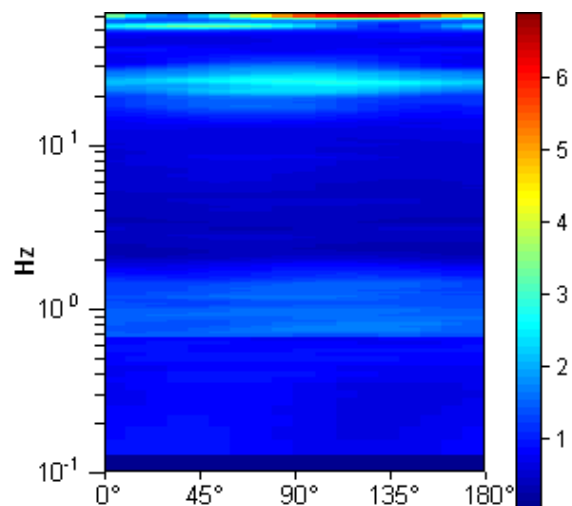
Max. H/V at  $23.59 \pm 0.98$  Hz. (In the range 0.0 - 30.0 Hz).



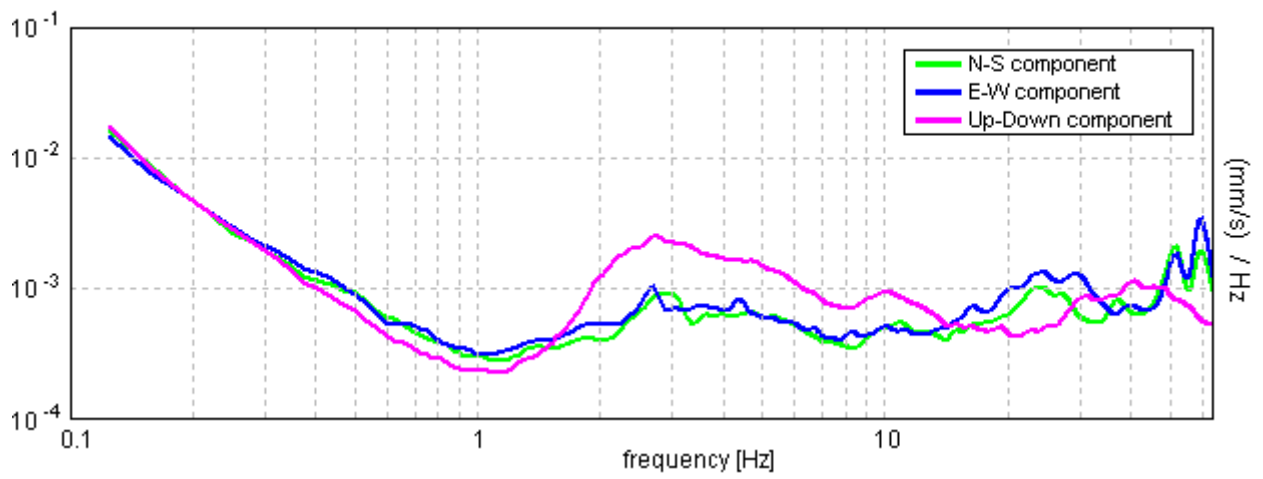
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 23.59 ± 0.98 Hz. (in the range 0.0 - 30.0 Hz).**

<b>Criteria for a reliable HVSR curve</b> [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	23.59 > 0.50	<b>OK</b>	
$n_c(f_0) > 200$	38221.9 > 200	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 1134 times	<b>OK</b>	
<b>Criteria for a clear HVSR peak</b> [At least 5 out of 6 should be fulfilled]			
<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	16.344 Hz	<b>OK</b>	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	29.438 Hz	<b>OK</b>	
$A_0 > 2$	2.41 > 2	<b>OK</b>	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02076  < 0.05$	<b>OK</b>	
$\sigma_f < \varepsilon(f_0)$	0.48985 < 1.17969	<b>OK</b>	
$\sigma_A(f_0) < \theta(f_0)$	0.0523 < 1.58	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for $\sigma_f$ and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0167				
<b>Coordinate</b>	UTM	4218230.80	N	358782.06	E
	Gauss Boaga	4218229.148	N	2378777.232	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	27/05/2014, 08:17				
<b>Nome file</b>	0167				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

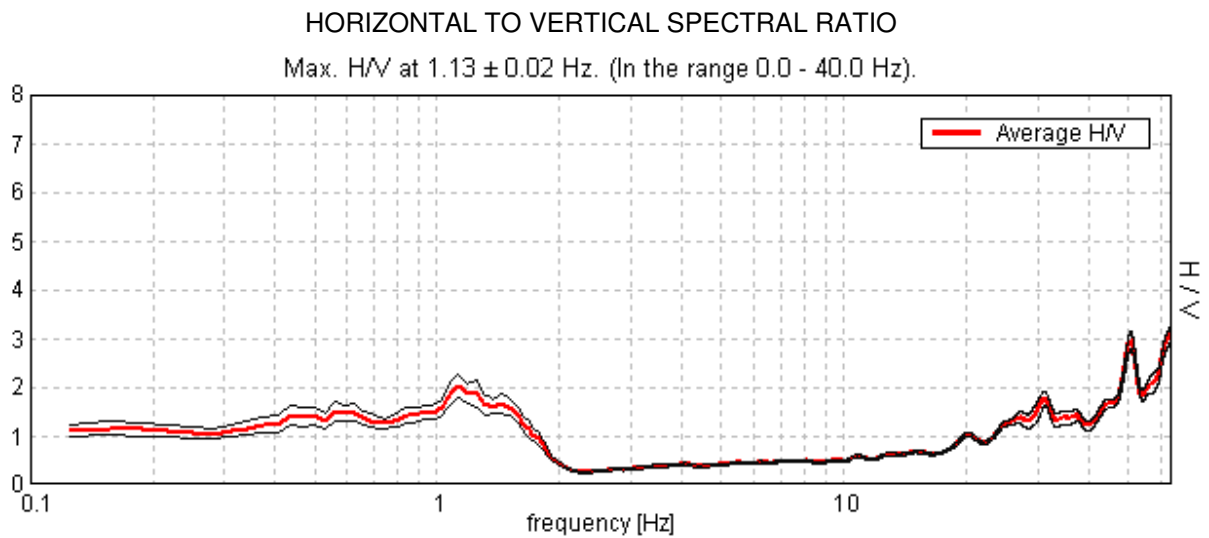
**Documentazione fotografica**



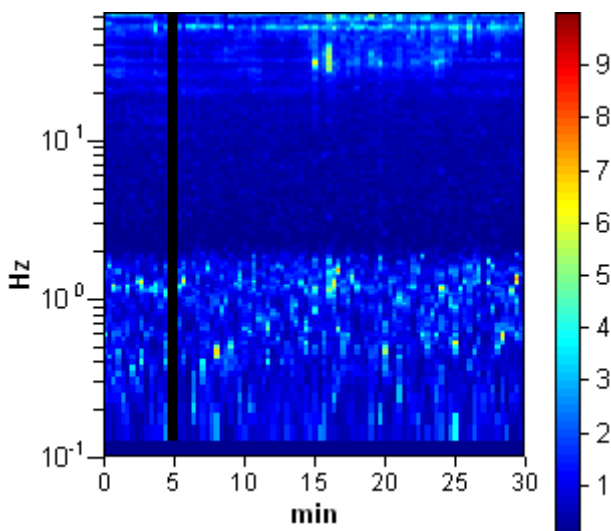
## TRIVELSICILIA PALERMO, PALERMO 0167

Start recording: 27/05/14 08:20:15      End recording: 27/05/14 08:50:16  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

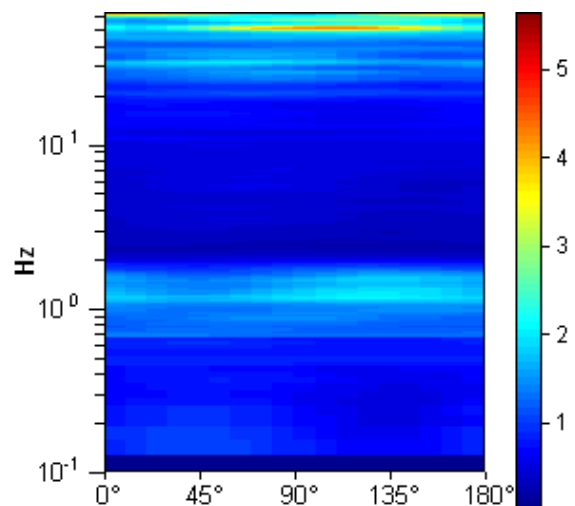
Trace length: 0h30'00".      Analyzed 98% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



H/V TIME HISTORY

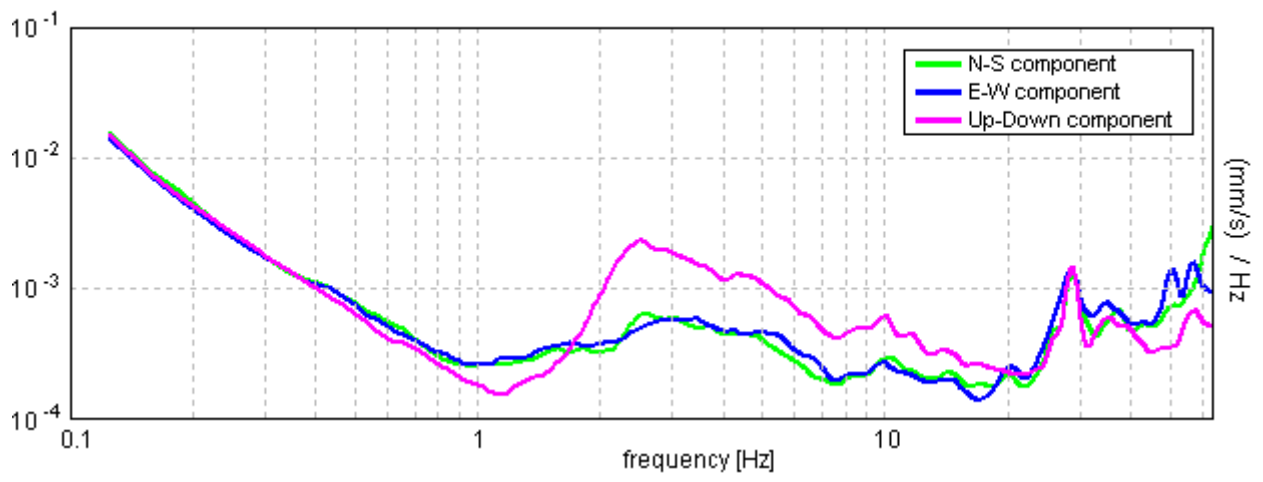


DIRECTIONAL H/V





### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.13 ± 0.02 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.13 > 0.50	OK	
$n_c(f_0) > 200$	1980.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 55 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.75 Hz	OK	
$A_0 > 2$	2.02 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00784  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.00882 < 0.1125$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1215 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0168			
<b>Coordinate</b>	UTM	4218265.69	N	358370.91	E
	Gauss Boaga	4218264.032	N	2378366.063	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		27/05/2014, 07:35			
<b>Nome file</b>		0168			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



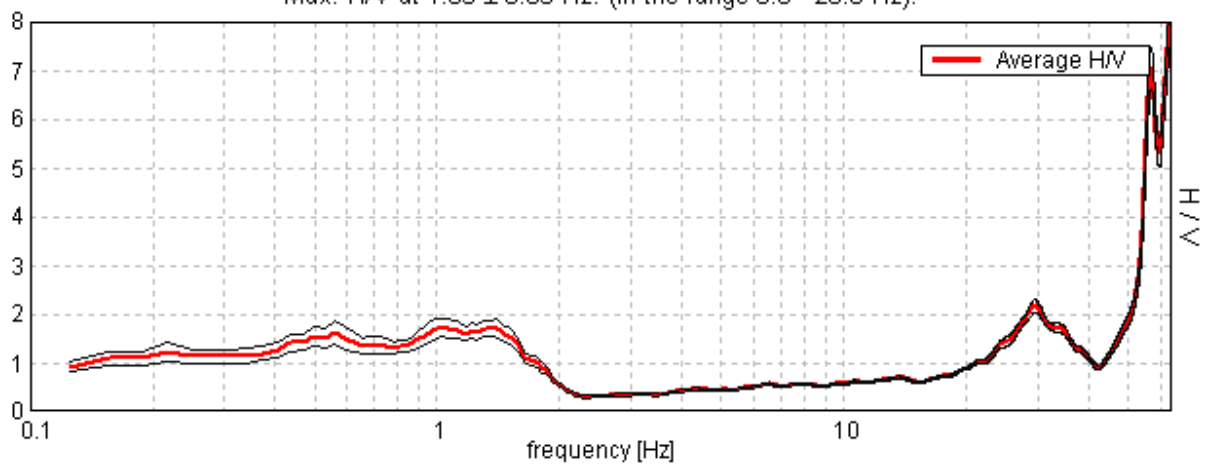
### TRIVELSICILIA PALERMO, PALERMO 0168

Start recording: 27/05/14 07:37:58      End recording: 27/05/14 08:07:58  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

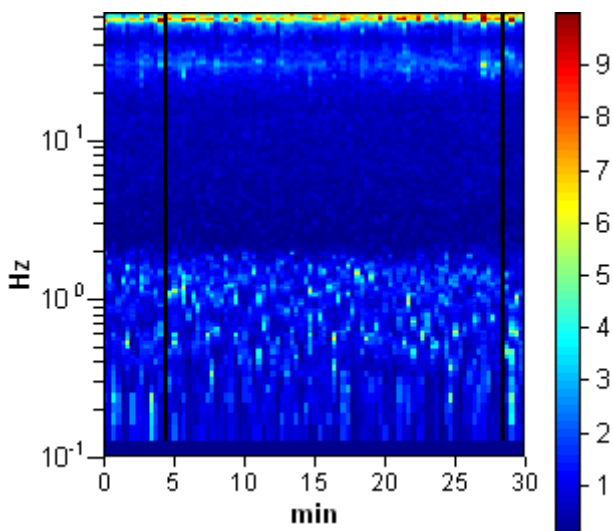
Trace length: 0h30'00".      Analyzed 98% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

#### HORIZONTAL TO VERTICAL SPECTRAL RATIO

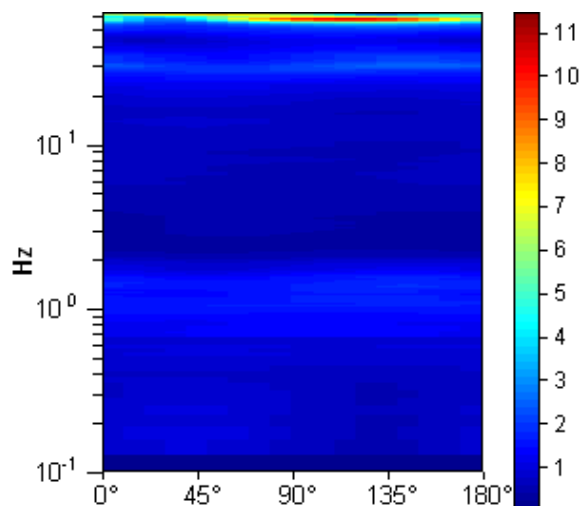
Max. H/V at  $1.03 \pm 0.05$  Hz. (In the range 0.0 - 20.0 Hz).



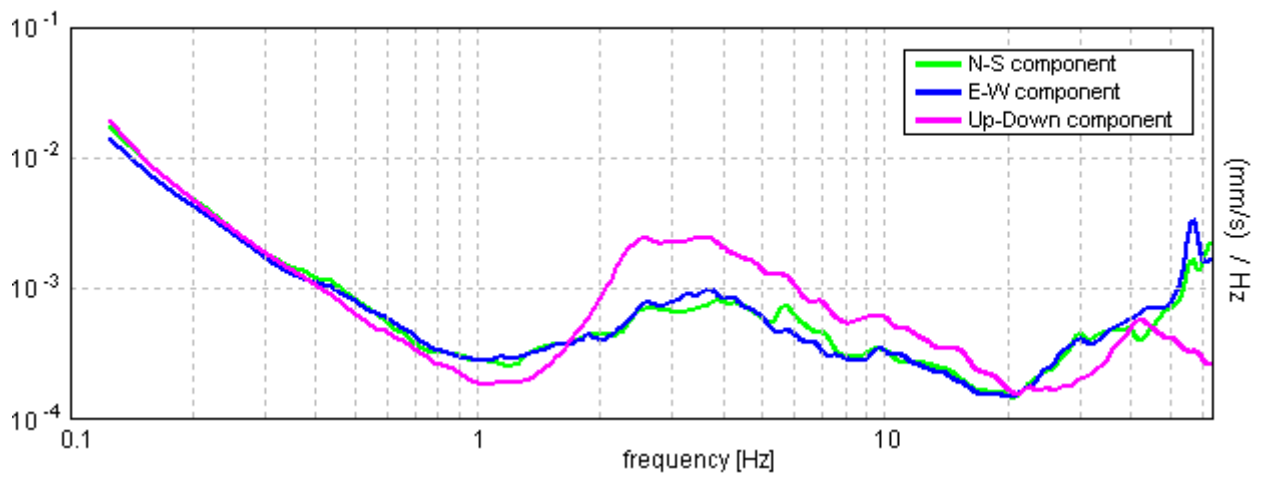
#### H/V TIME HISTORY



#### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.03 ± 0.05 Hz. (in the range 0.0 - 20.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.03 > 0.50	OK	
$n_c(f_0) > 200$	1815.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 50 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.844 Hz	OK	
<b><math>A_0 &gt; 2</math></b>	1.72 > 2		<b>NO</b>
<b><math>f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%</math></b>	$ 0.02318  < 0.05$	OK	
<b><math>\sigma_f &lt; \varepsilon(f_0)</math></b>	$0.02391 < 0.10313$	OK	
<b><math>\sigma_A(f_0) &lt; \theta(f_0)</math></b>	$0.0984 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0169			
<b>Coordinate</b>	UTM	4218272.95	N	357954.40	E
	Gauss Boaga	4218271.285	N	2377949.535	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		20/05/2014, 14:12			
<b>Nome file</b>		0169			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



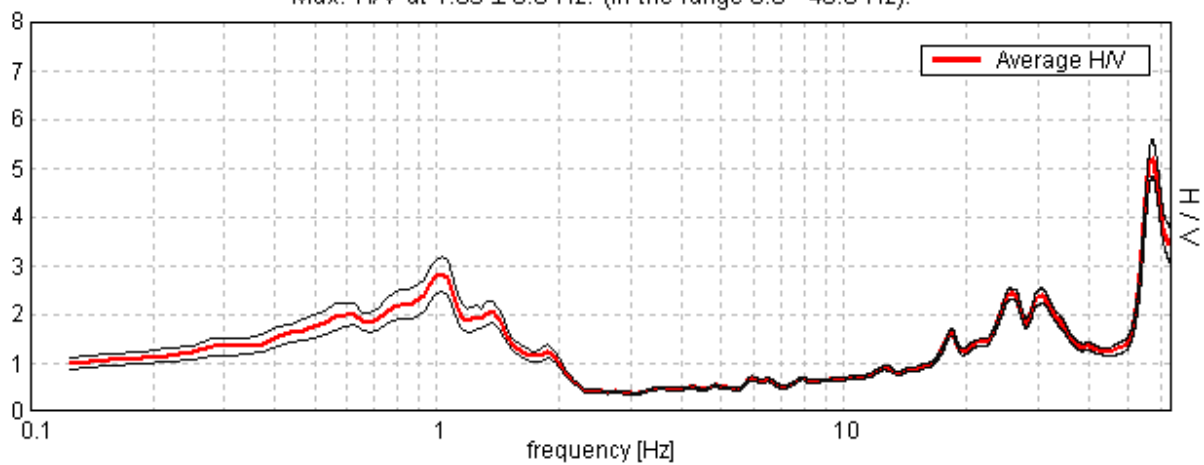
## TRIVELSICILIA PALERMO, PALERMO 0169

Start recording: 20/05/14 14:13:59      End recording: 20/05/14 14:44:00  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

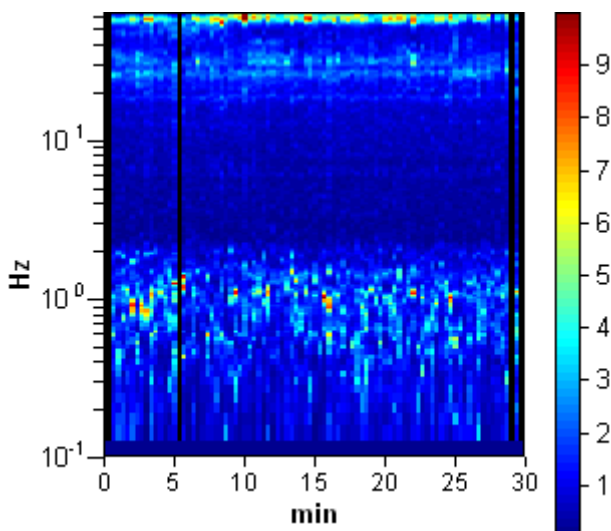
Trace length: 0h30'00".      Analyzed 94% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

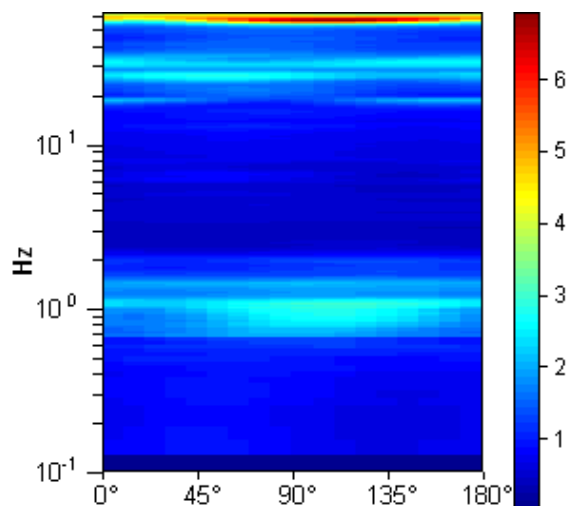
Max. H/V at  $1.03 \pm 0.8$  Hz. (In the range 0.0 - 40.0 Hz).



### H/V TIME HISTORY

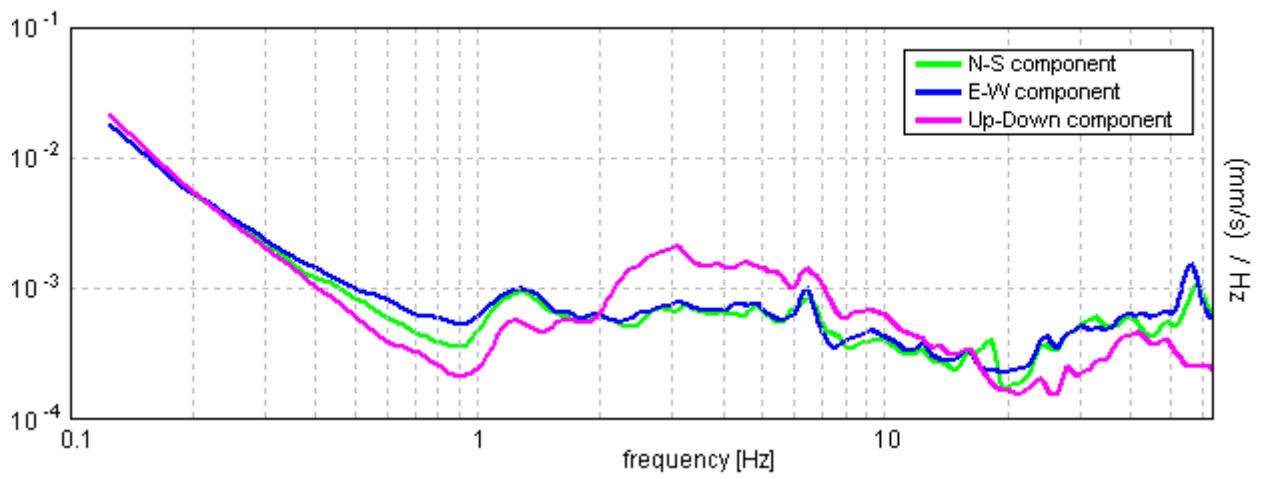


### DIRECTIONAL H/V





### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.03 ± 0.8 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.03 > 0.50	OK	
$n_c(f_0) > 200$	1753.1 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 50 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.375 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	1.531 Hz	OK	
$A_0 > 2$	2.82 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.38884  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.40099 < 0.10313$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.1836 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

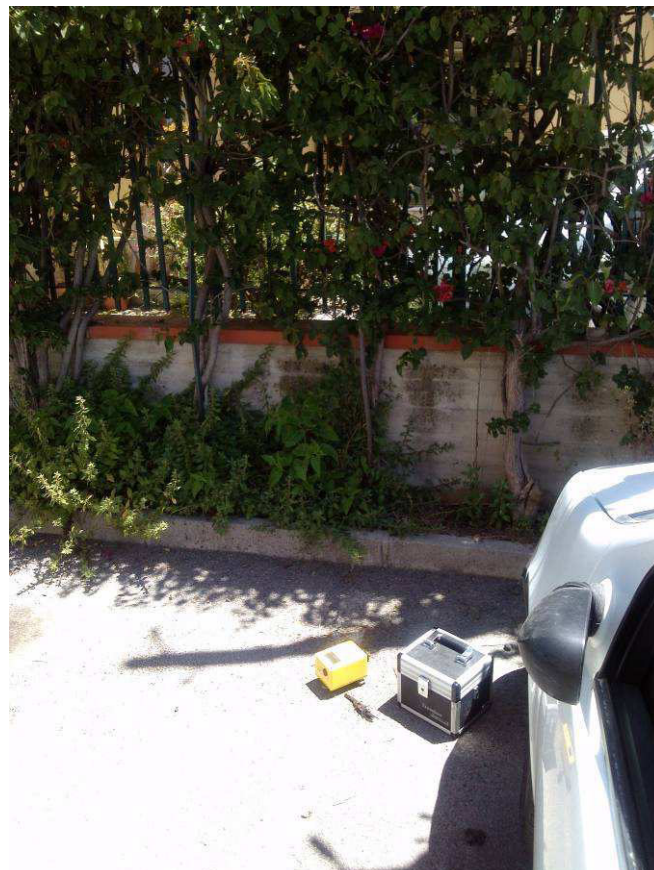


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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0170			
<b>Coordinate</b>	UTM	4218376.21	N	357515.21	E
	Gauss Boaga	4218374.540	N	2377510.323	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		26/05/2014, 13:29			
<b>Nome file</b>		0170			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

**Documentazione fotografica**



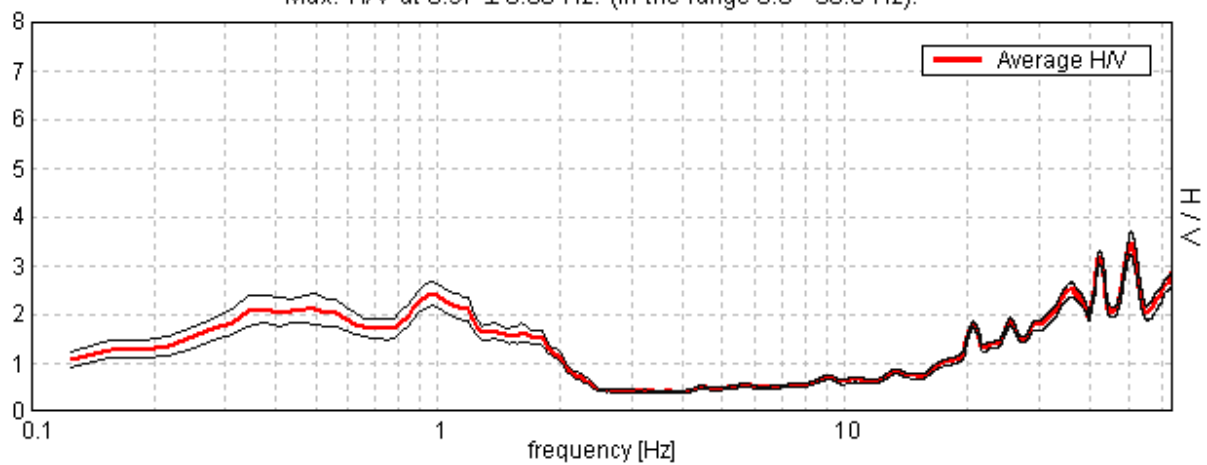
## TRIVELSICILIA PALERMO, PALERMO 0170

Start recording: 26/05/14 13:30:17      End recording: 26/05/14 14:00:18  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

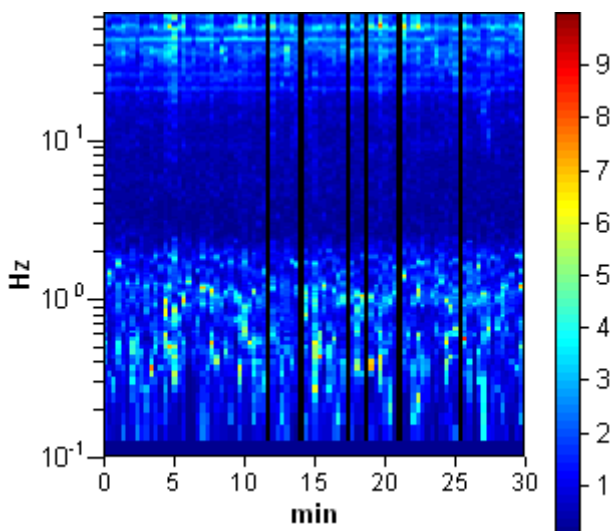
Trace length: 0h30'00".      Analyzed 93% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

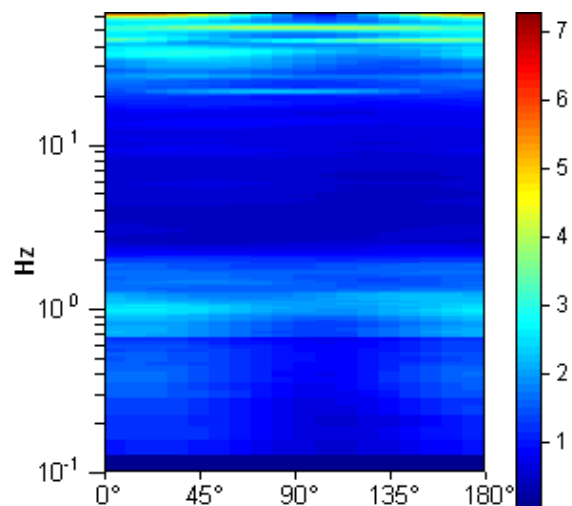
Max. H/V at  $0.97 \pm 0.08$  Hz. (In the range 0.0 - 30.0 Hz).



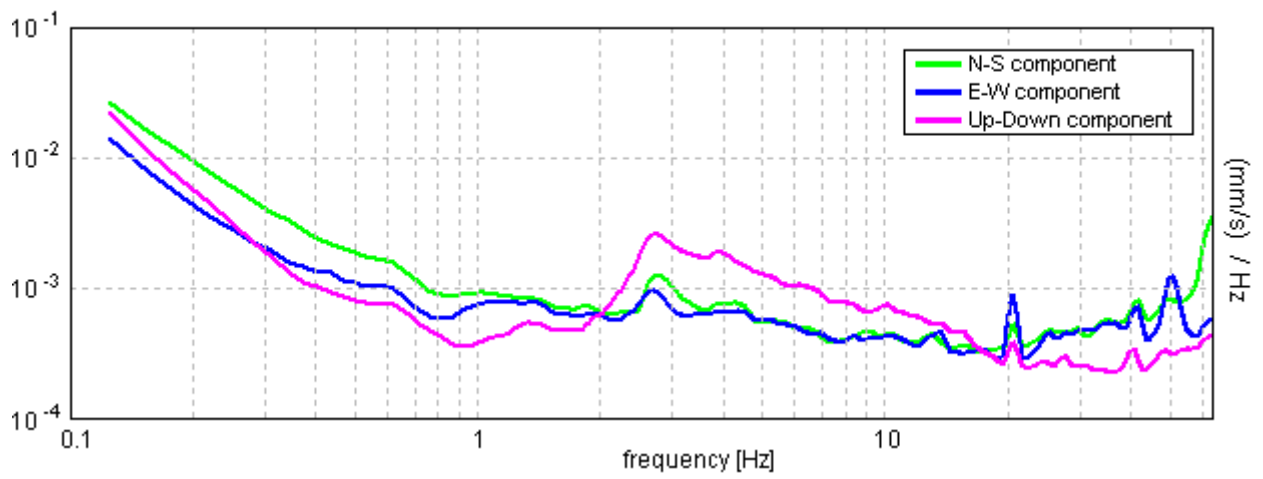
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $0.97 \pm 0.08$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.97 > 0.50$	OK	
$n_c(f_0) > 200$	$1627.5 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 48 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.938 Hz	OK	
$A_0 > 2$	$2.41 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.04226  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.04094 < 0.14531$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1204 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0171			
<b>Coordinate</b>	UTM	4218299.22	N	357158.15	E
	Gauss Boaga	4218297.540	N	2377153.248	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		26/05/2014, 12:51			
<b>Nome file</b>		0171			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

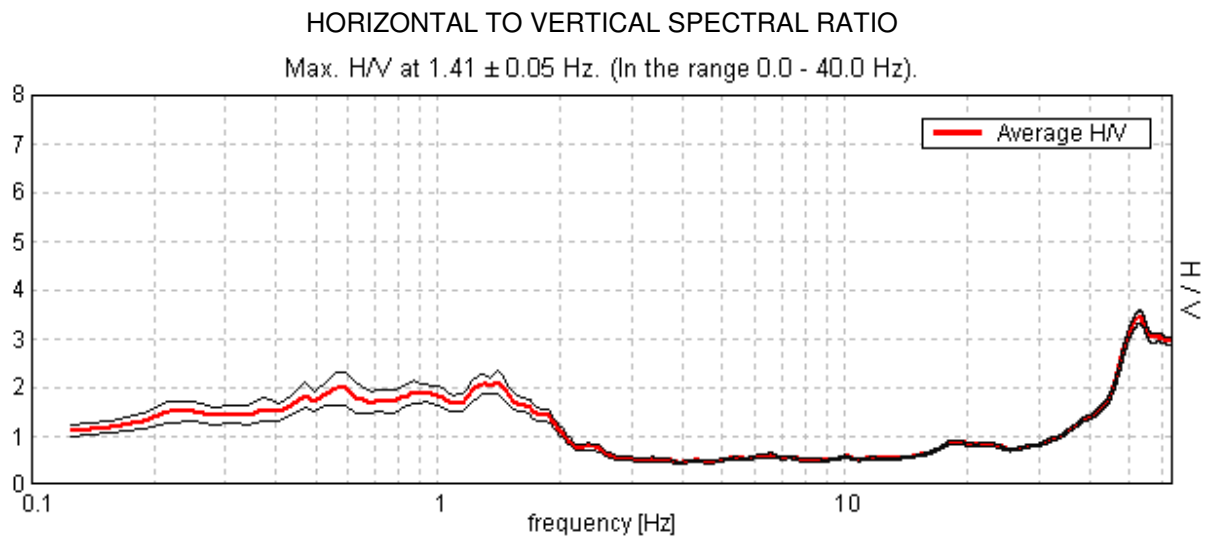
**Documentazione fotografica**



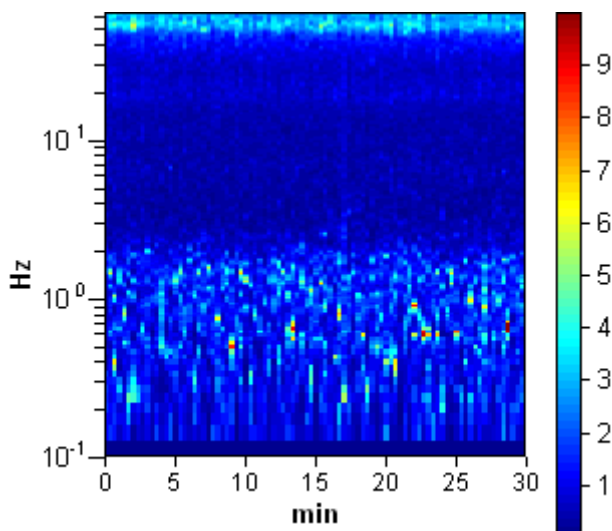
## TRIVELSICILIA PALERMO, PALERMO 0171

Start recording: 26/05/14 12:53:11      End recording: 26/05/14 13:23:12  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

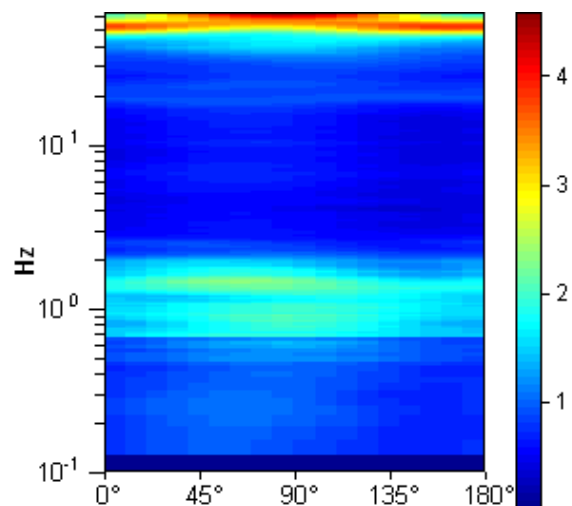
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



H/V TIME HISTORY

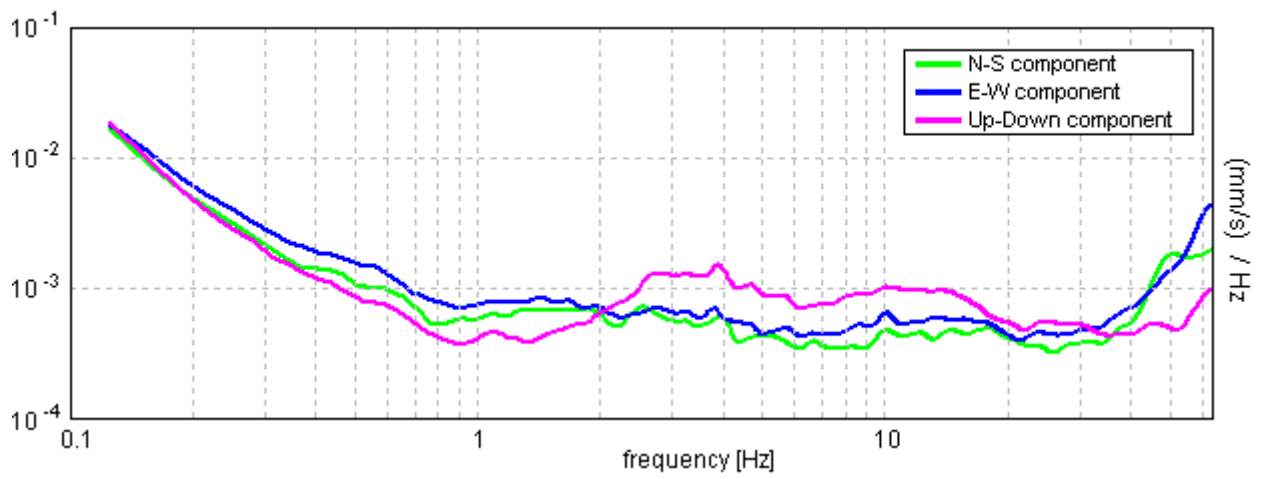


DIRECTIONAL H/V





SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.41 ± 0.05 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.41 > 0.50	OK	
$n_c(f_0) > 200$	2531.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 68 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.031 Hz	OK	
$A_0 > 2$	2.10 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01852  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02605 < 0.14063$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1239 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

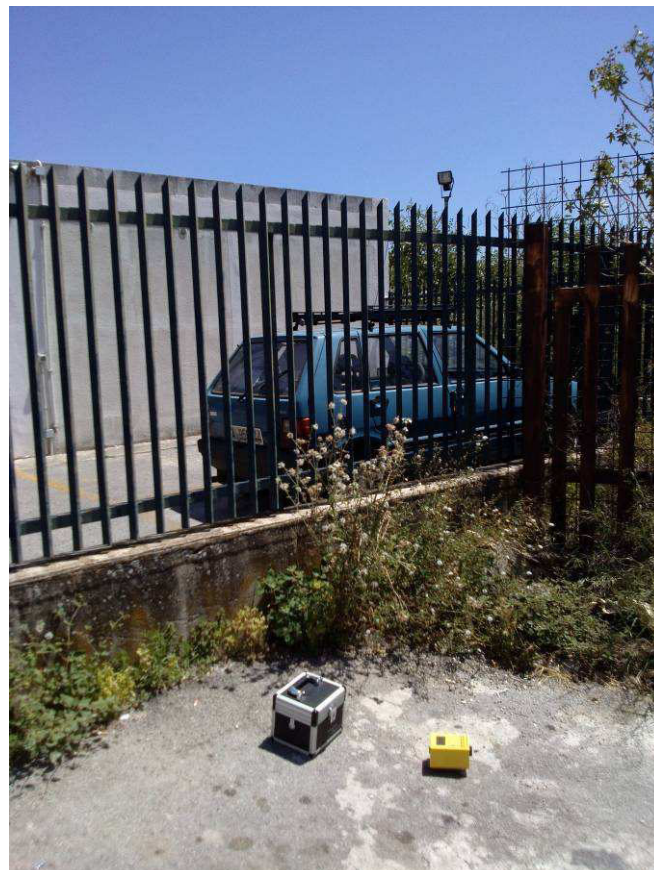


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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0172			
<b>Coordinate</b>	UTM	4218272.06	N	356755.65	E
	Gauss Boaga	4218270.374	N	2376750.729	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		26/05/2014, 12:13			
<b>Nome file</b>		0172			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



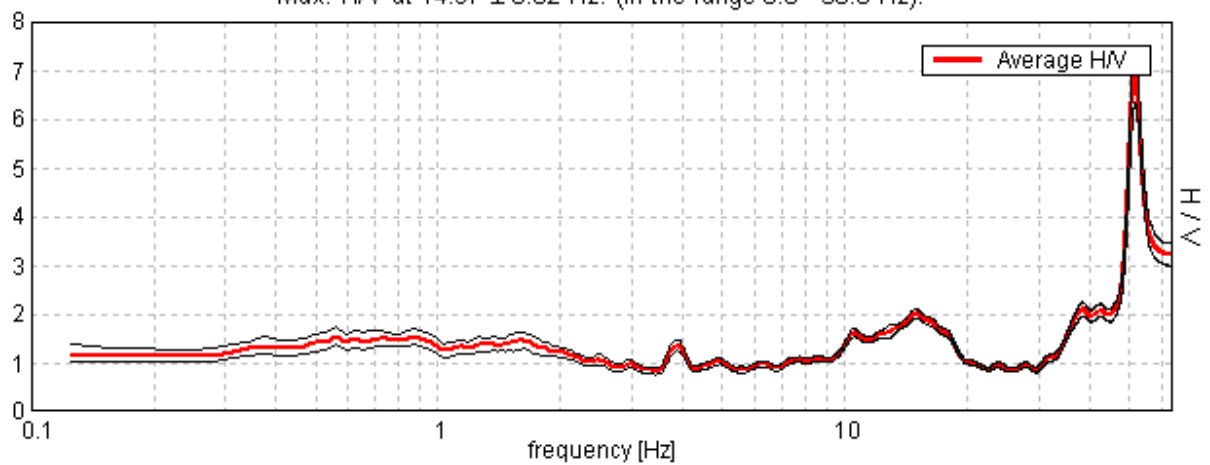
## TRIVELSICILIA PALERMO, PALERMO 0172

Start recording: 26/05/14 12:15:27      End recording: 26/05/14 12:45:28  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

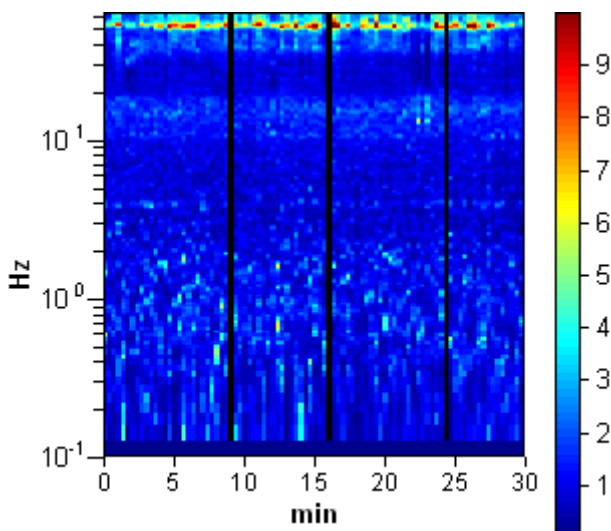
Trace length: 0h30'00".      Analyzed 97% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

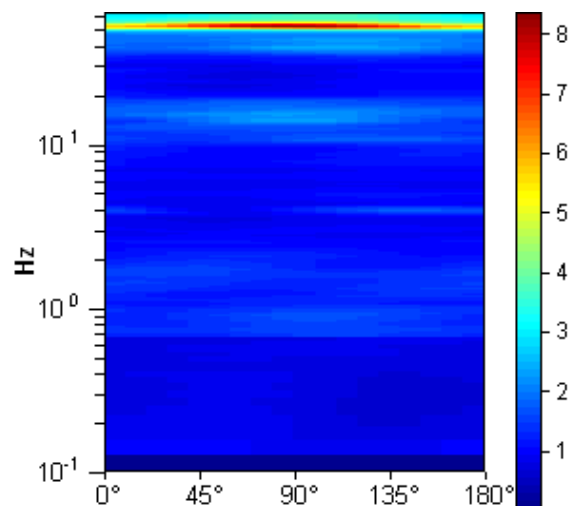
Max. H/V at  $14.97 \pm 0.82$  Hz. (In the range 0.0 - 30.0 Hz).



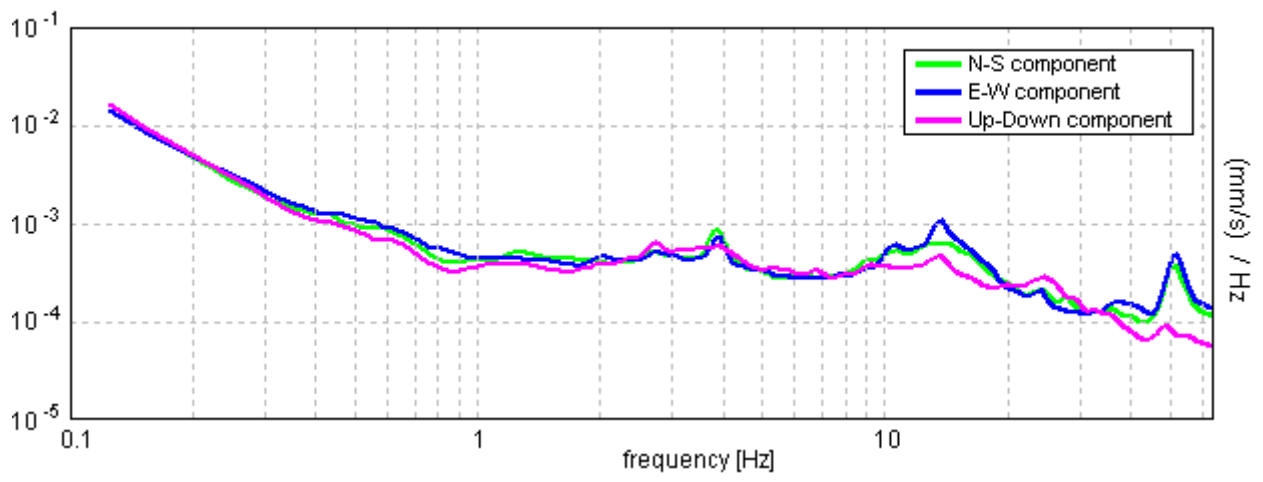
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 14.97 ± 0.82 Hz. (in the range 0.0 - 30.0 Hz).**

<b>Criteria for a reliable HVSR curve</b> [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	14.97 > 0.50	<b>OK</b>	
$n_c(f_0) > 200$	26045.6 > 200	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 720 times	<b>OK</b>	
<b>Criteria for a clear HVSR peak</b> [At least 5 out of 6 should be fulfilled]			
<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	7.219 Hz	<b>OK</b>	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	20.531 Hz	<b>OK</b>	
$A_0 > 2$	2.01 > 2	<b>OK</b>	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02724  < 0.05$	<b>OK</b>	
$\sigma_f < \varepsilon(f_0)$	0.40771 < 0.74844	<b>OK</b>	
$\sigma_A(f_0) < \theta(f_0)$	0.0458 < 1.58	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for $\sigma_f$ and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0173			
<b>Coordinate</b>	UTM	4218301.38	N	356334.66	E
	Gauss Boaga	4218299.690	N	2376329.717	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		26/05/2014, 11:35			
<b>Nome file</b>		0173			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>		<b>Vento</b>	No		
		<b>Pioggia</b>	No		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	Si		
		<b>Pedoni</b>	Si		
		<b>Altro</b>	No		

**Documentazione fotografica**



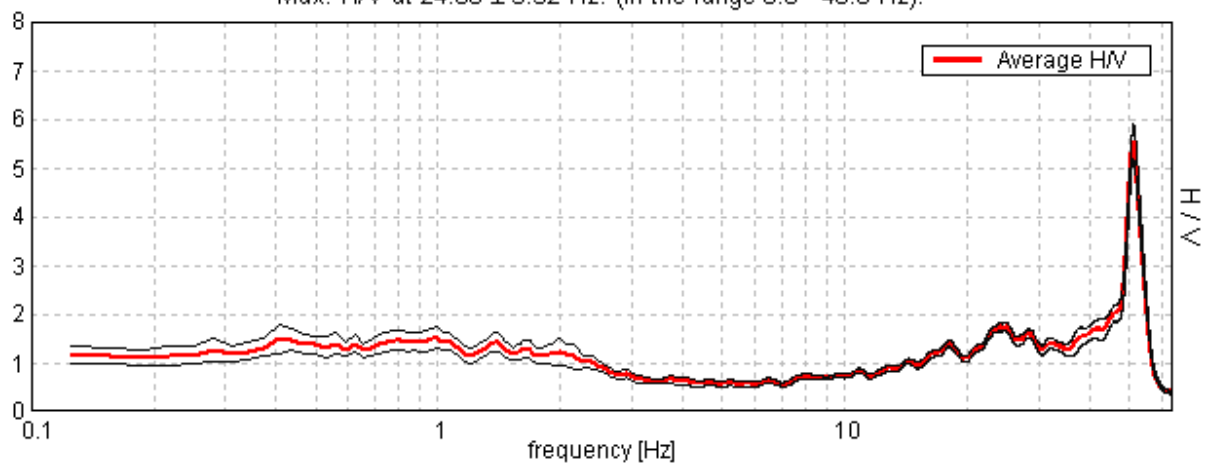
### TRIVELSICILIA PALERMO, PALERMO 0173

Start recording: 26/05/14 11:37:21      End recording: 26/05/14 12:07:22  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

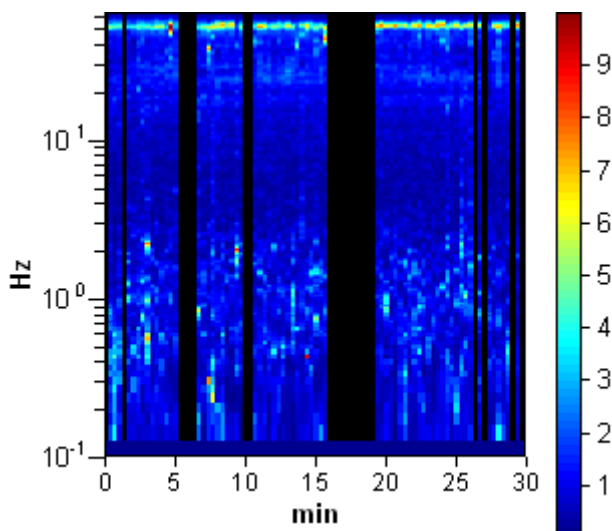
Trace length: 0h30'00".      Analyzed 76% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

#### HORIZONTAL TO VERTICAL SPECTRAL RATIO

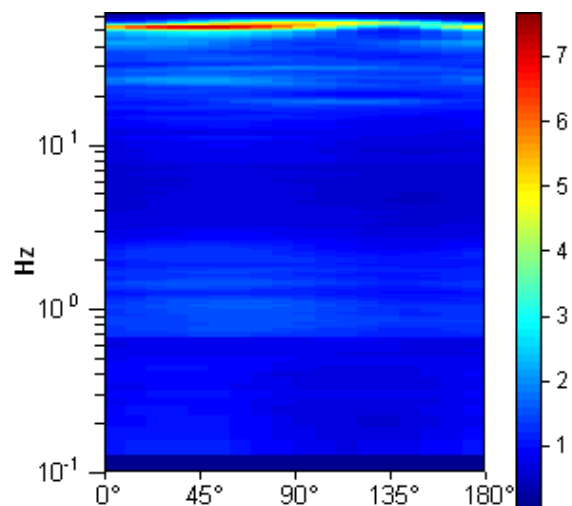
Max. H/V at  $24.06 \pm 3.52$  Hz. (In the range 0.0 - 40.0 Hz).



#### H/V TIME HISTORY

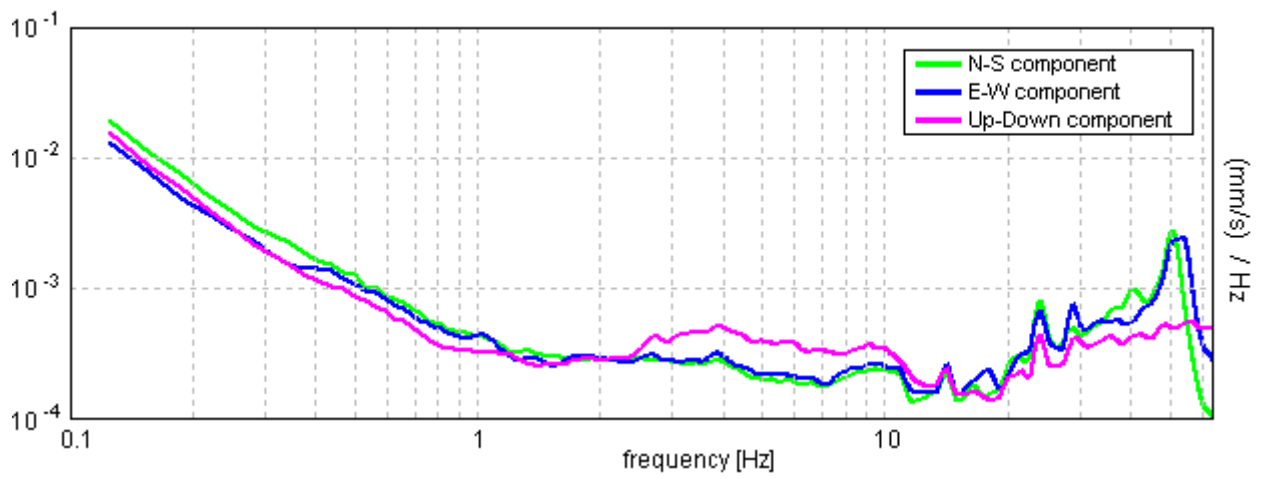


#### DIRECTIONAL H/V





### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 24.06 ± 3.52 Hz. (in the range 0.0 - 40.0 Hz).**

<b>Criteria for a reliable HVSR curve</b> [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	24.06 > 0.50	<b>OK</b>	
$n_c(f_0) > 200$	32725.0 > 200	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 1156 times	<b>OK</b>	
<b>Criteria for a clear HVSR peak</b> [At least 5 out of 6 should be fulfilled]			
<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	13.469 Hz	<b>OK</b>	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	57.5 Hz	<b>OK</b>	
$A_0 > 2$	1.75 > 2		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.07268  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	1.74897 < 1.20313		<b>NO</b>
$\sigma_A(f_0) < \theta(f_0)$	0.0449 < 1.58	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for $\sigma_f$ and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0174			
<b>Coordinate</b>	UTM	4218298.37	N	355981.32	E
	Gauss Boaga	4218296.675	N	2375976.360	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		26/05/2014, 10:50			
<b>Nome file</b>		0174			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	
<b>Nota</b>		Base sismica ripetuta per l'inattendibilità del segnale			

**Documentazione fotografica**



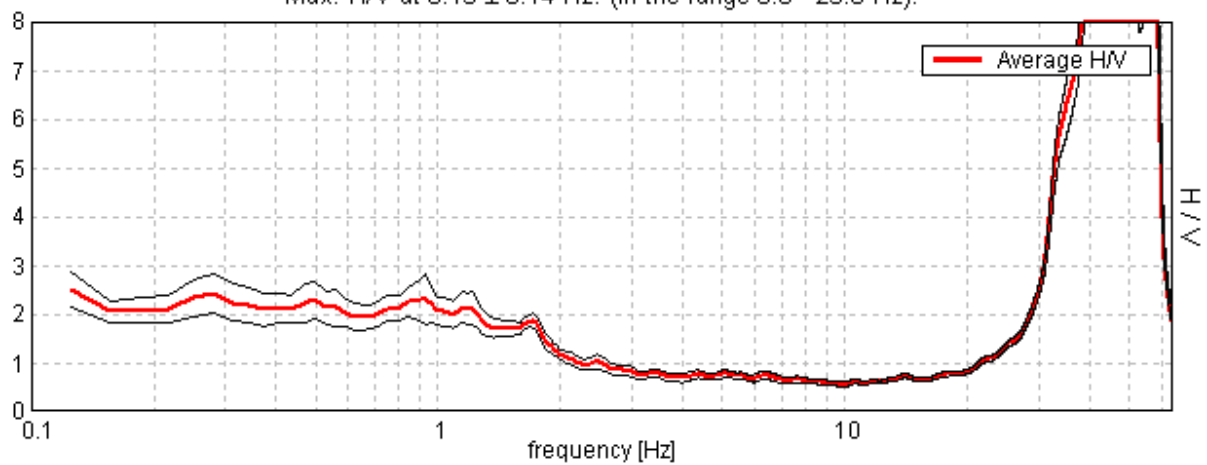
### TRIVELSICILIA PALERMO, PALERMO 0174

Start recording: 26/05/14 10:53:31      End recording: 26/05/14 11:23:32  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

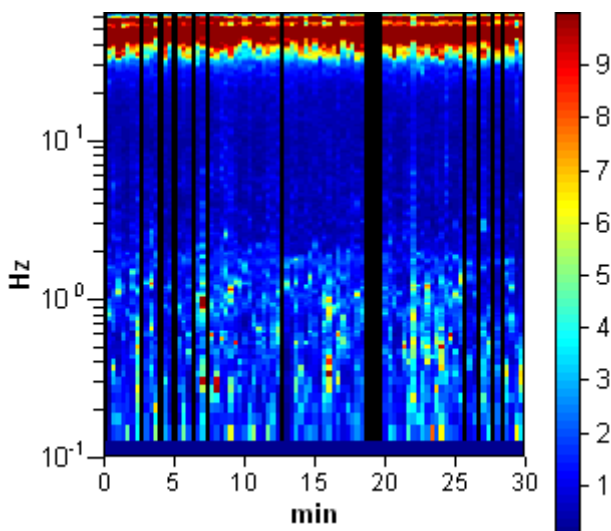
Trace length: 0h30'00".      Analyzed 83% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

#### HORIZONTAL TO VERTICAL SPECTRAL RATIO

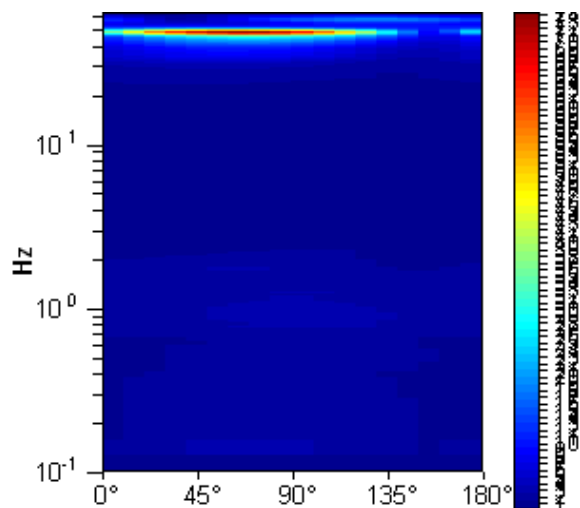
Max. H/V at  $0.13 \pm 0.14$  Hz. (In the range 0.0 - 25.0 Hz).



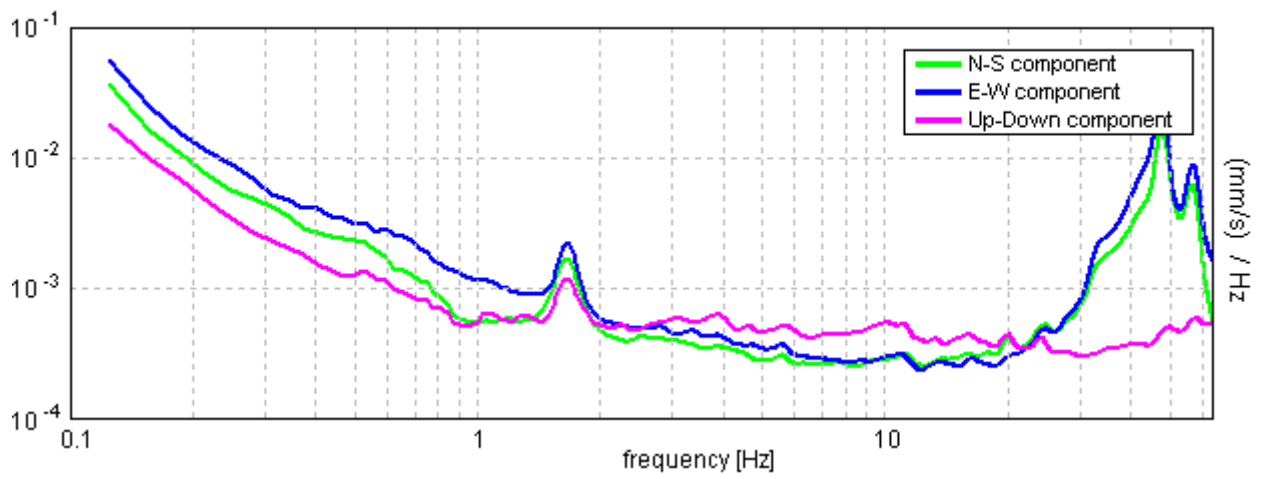
#### H/V TIME HISTORY



#### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 0.13 ± 0.14 Hz. (in the range 0.0 - 25.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.13 > 0.50		<b>NO</b>
$n_c(f_0) > 200$	187.5 > 200		<b>NO</b>
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 7 times	<b>OK</b>	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.094 Hz	<b>OK</b>	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>			<b>NO</b>
$A_0 > 2$	2.50 > 2	<b>OK</b>	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.54841  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	0.06855 < 0.03125		<b>NO</b>
$\sigma_A(f_0) < \theta(f_0)$	0.1777 < 3.0	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0174 bis			
<b>Coordinate</b>	UTM	4218324.08	N	355992.01	E
	Gauss Boaga	4218322.386	N	2375987.050	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		16/06/2014, 10:40			
<b>Nome file</b>		0174 bis			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>Si</b>		
		<b>Altro</b>	<b>No</b>		

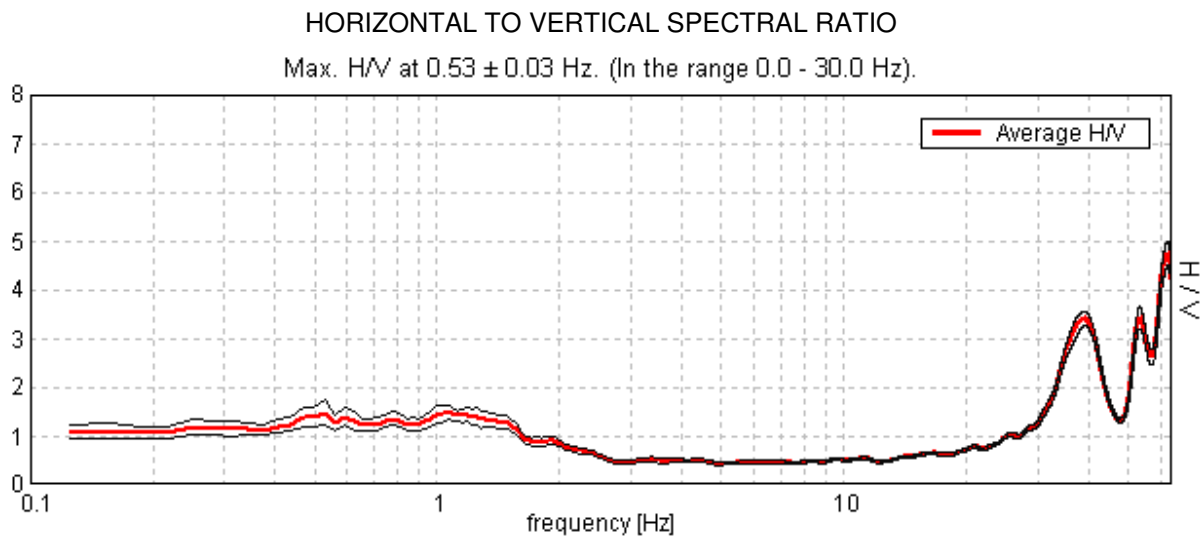
**Documentazione fotografica**



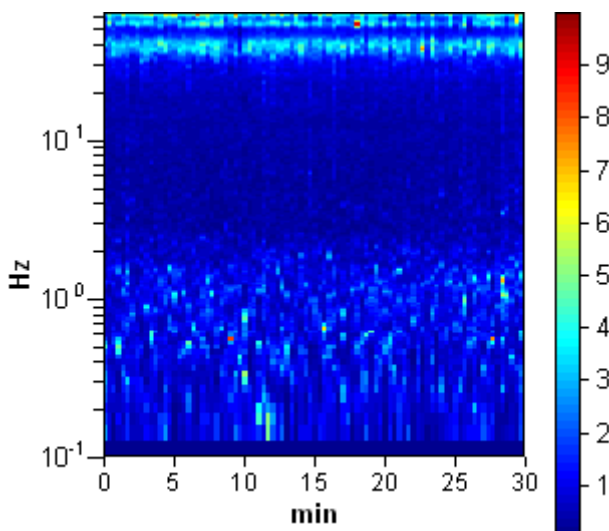
## TRIVEL SICILIA PALERMO, PALERMO 0174 BIS

Start recording: 16/06/14 10:43:38      End recording: 16/06/14 11:13:39  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

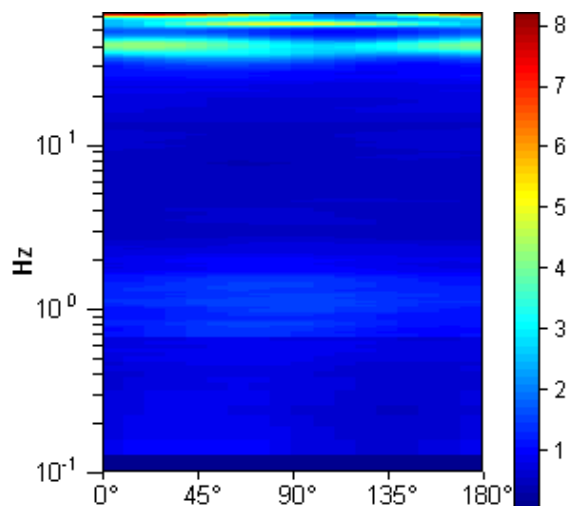
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



**H/V TIME HISTORY**

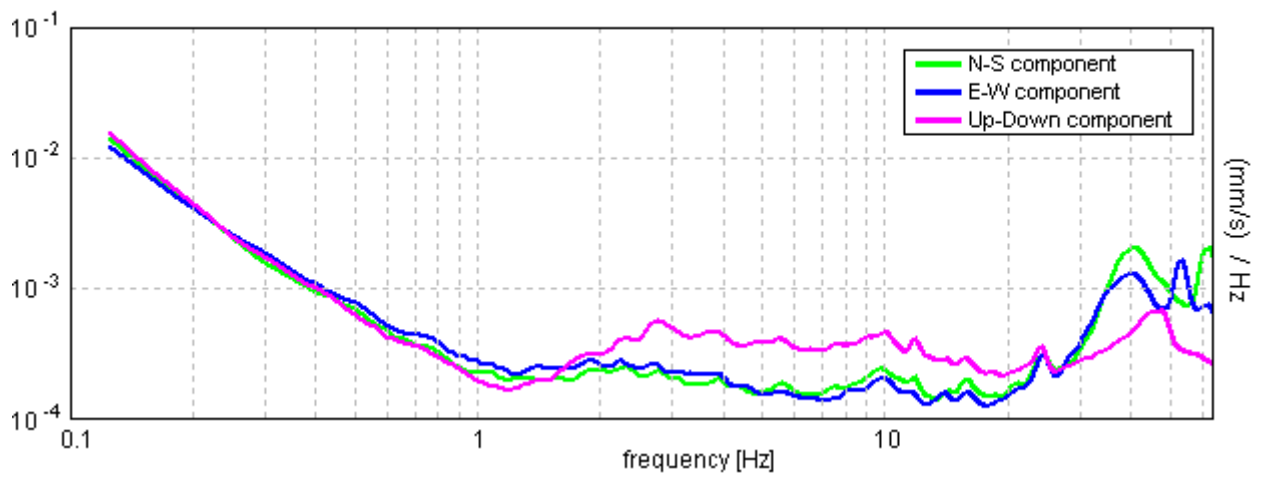


**DIRECTIONAL H/V**





### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $0.53 \pm 0.03$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.53 > 0.50$	OK	
$n_c(f_0) > 200$	$956.3 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 26 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$1.47 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03179  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01689 < 0.07969$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1297 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

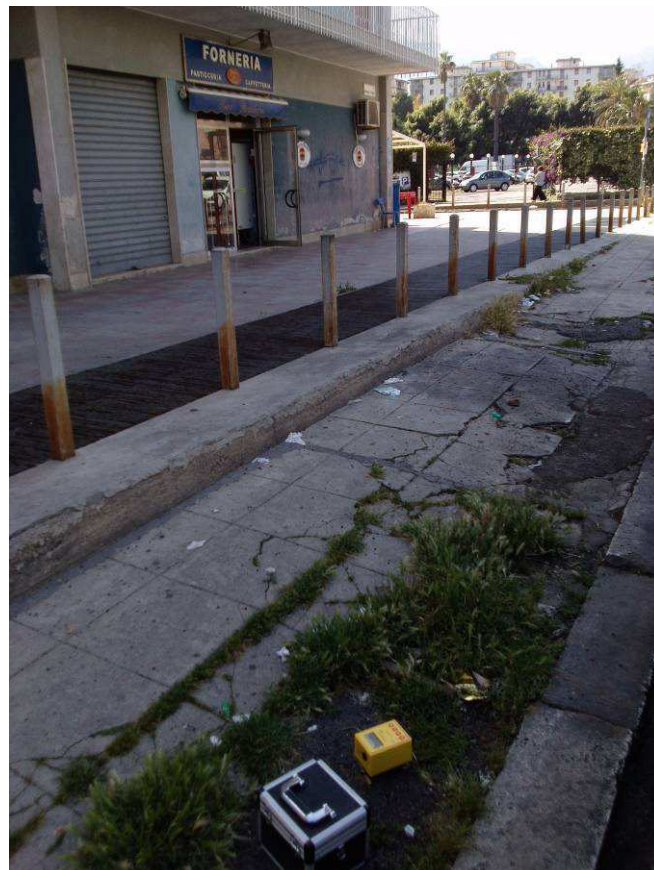


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n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0175				
<b>Coordinate</b>	<i>UTM</i>	4218265.21	N	355590.90	E
	<i>Gauss Boaga</i>	4218263.509	N	2375585.921	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	26/05/2014, 10:14				
<b>Nome file</b>	0175				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



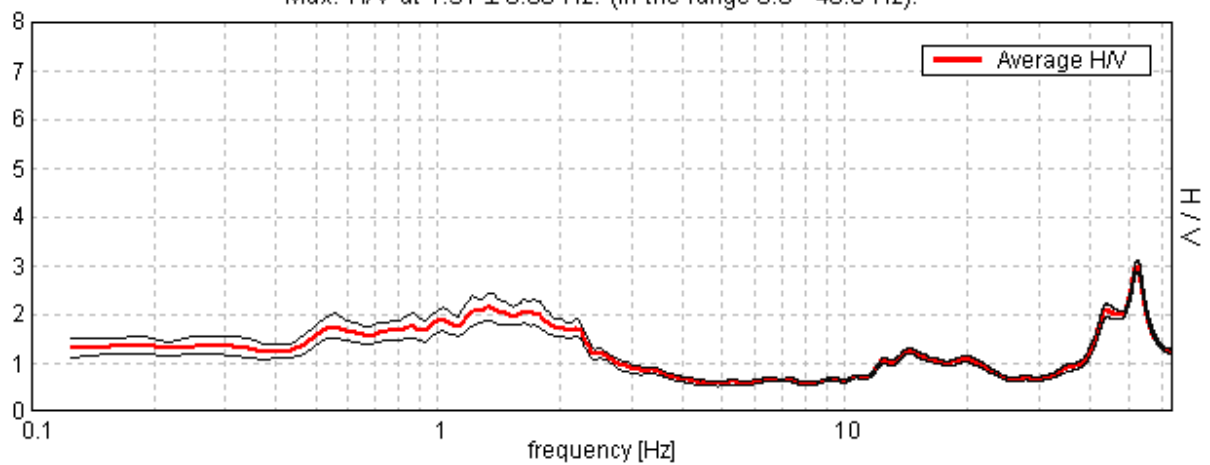
## TRIVELSICILIA PALERMO, PALERMO 0175

Start recording: 26/05/14 10:17:18      End recording: 26/05/14 10:47:19  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

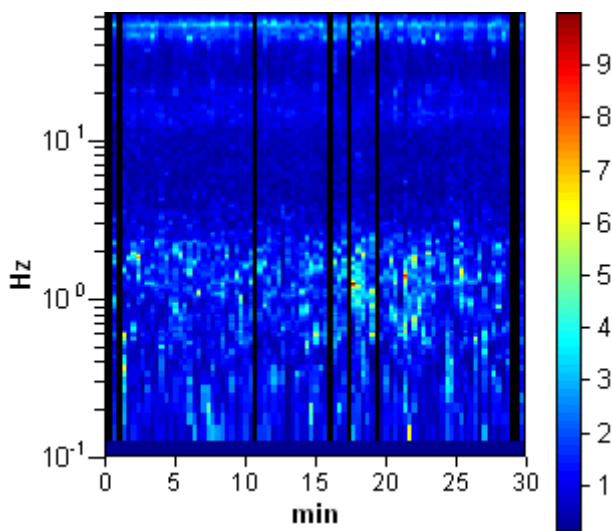
Trace length: 0h30'00".      Analyzed 90% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

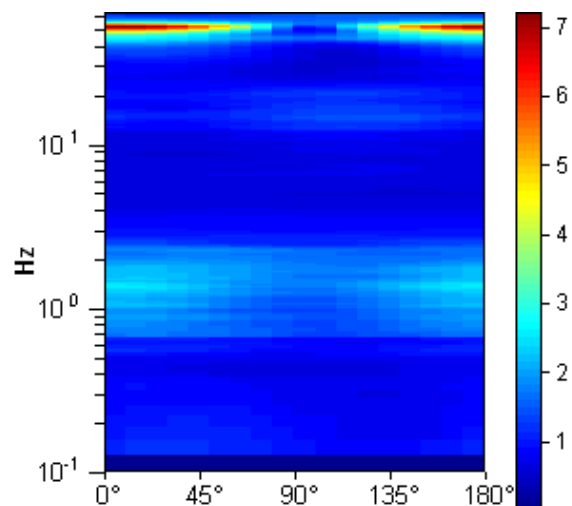
Max. H/V at  $1.31 \pm 0.08$  Hz. (In the range 0.0 - 40.0 Hz).



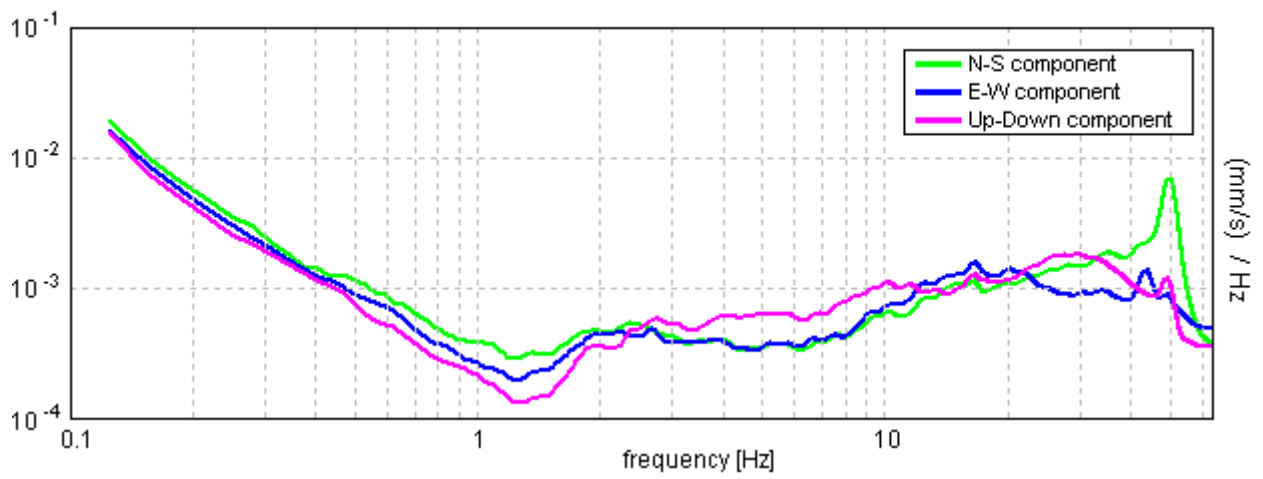
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.31 ± 0.08 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.31 > 0.50	OK	
$n_c(f_0) > 200$	2126.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 64 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.688 Hz	OK	
$A_0 > 2$	2.14 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03193  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.0419 < 0.13125	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1304 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0176			
<b>Coordinate</b>	<i>UTM</i>	4218227.41	N	355115.11	E
	<i>Gauss Boaga</i>	4218225.701	N	2375110.108	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		26/05/2014, 09:40			
<b>Nome file</b>		0176			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



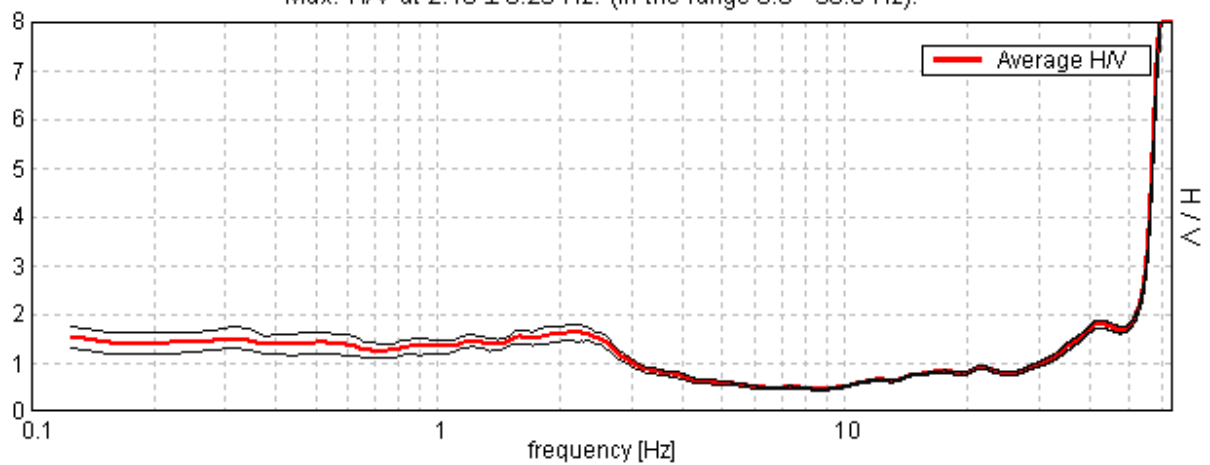
## TRIVELSICILIA PALERMO, PALERMO 0176

Start recording: 26/05/14 09:40:45      End recording: 26/05/14 10:10:46  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

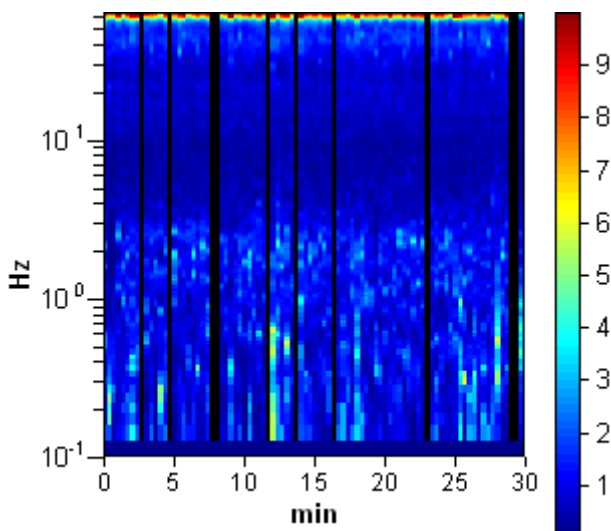
Trace length: 0h30'00".      Analyzed 89% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 9%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

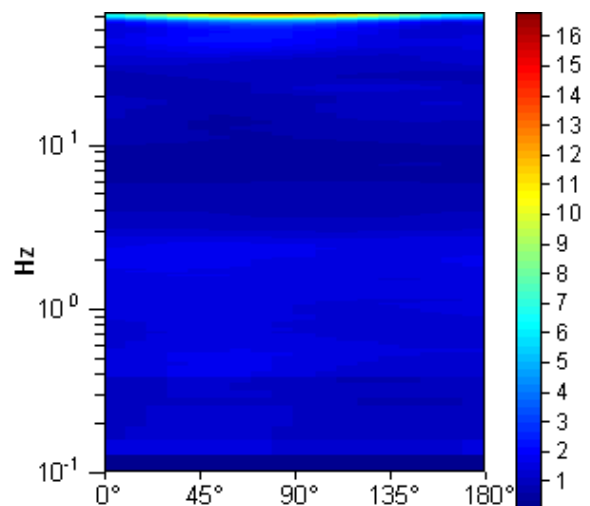
Max. H/V at  $2.16 \pm 0.23$  Hz. (In the range 0.0 - 30.0 Hz).



### H/V TIME HISTORY

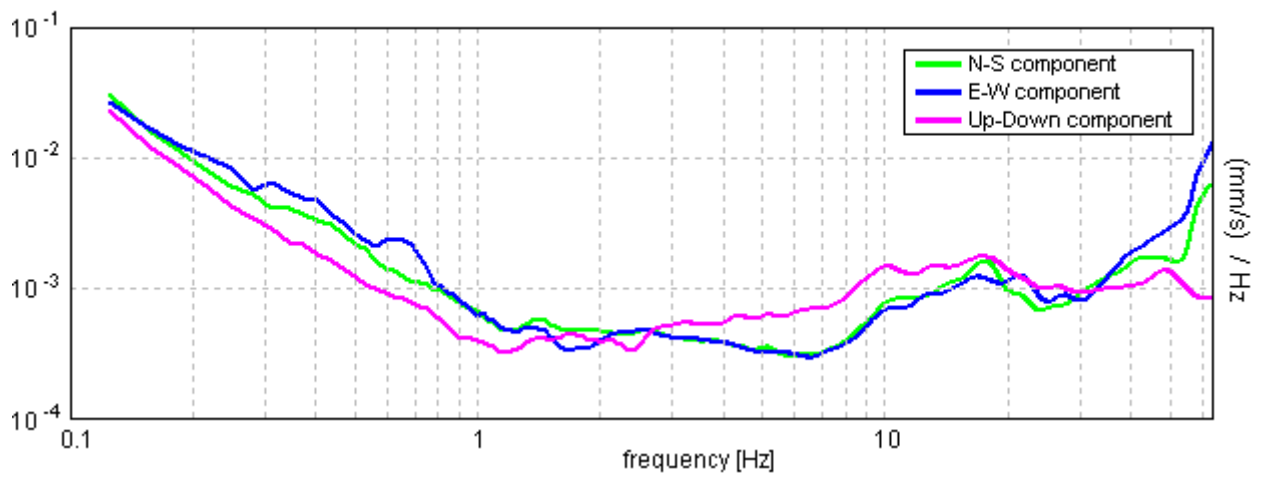


### DIRECTIONAL H/V





### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 2.16 ± 0.23 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.16 > 0.50	OK	
$n_c(f_0) > 200$	3450.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 104 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	3.5 Hz	OK	
$A_0 > 2$	1.62 > 2		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.05435  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	0.11719 < 0.10781		<b>NO</b>
$\sigma_A(f_0) < \theta(f_0)$	0.0839 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0177			
<b>Coordinate</b>	UTM	4218204.23	N	354858.86	E
	Gauss Boaga	4218202.517	N	2374853.846	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		26/05/2014, 08:27			
<b>Nome file</b>		0177			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

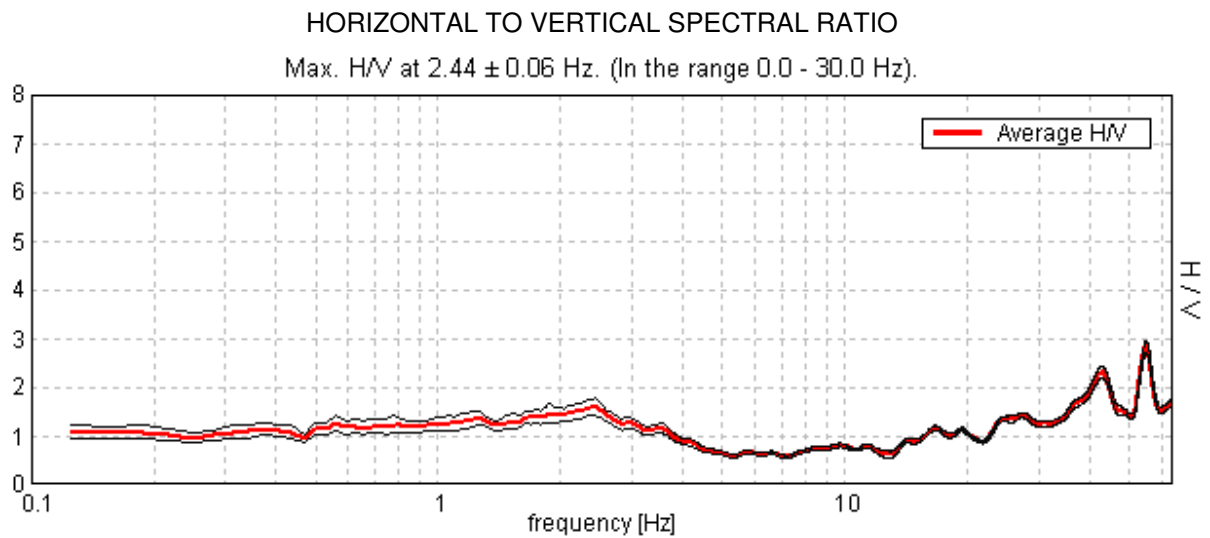
**Documentazione fotografica**



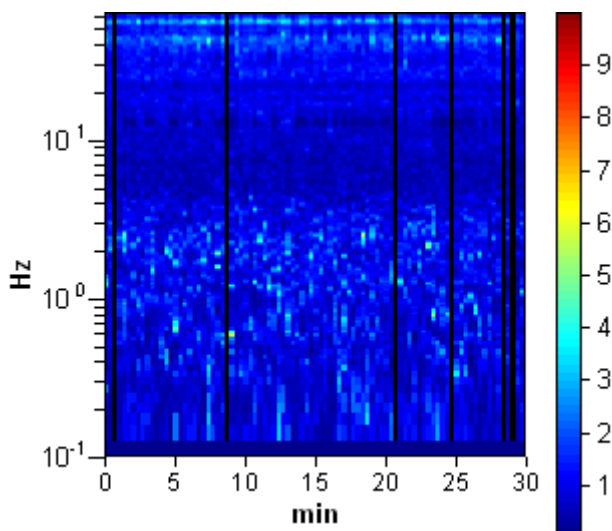
## TRIVELSICILIA PALERMO, PALERMO 0177

Start recording: 26/05/14 08:29:36      End recording: 26/05/14 08:59:37  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

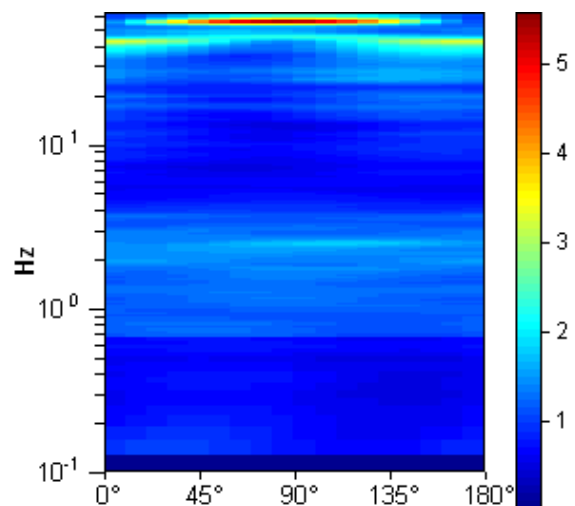
Trace length: 0h30'00".      Analyzed 93% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



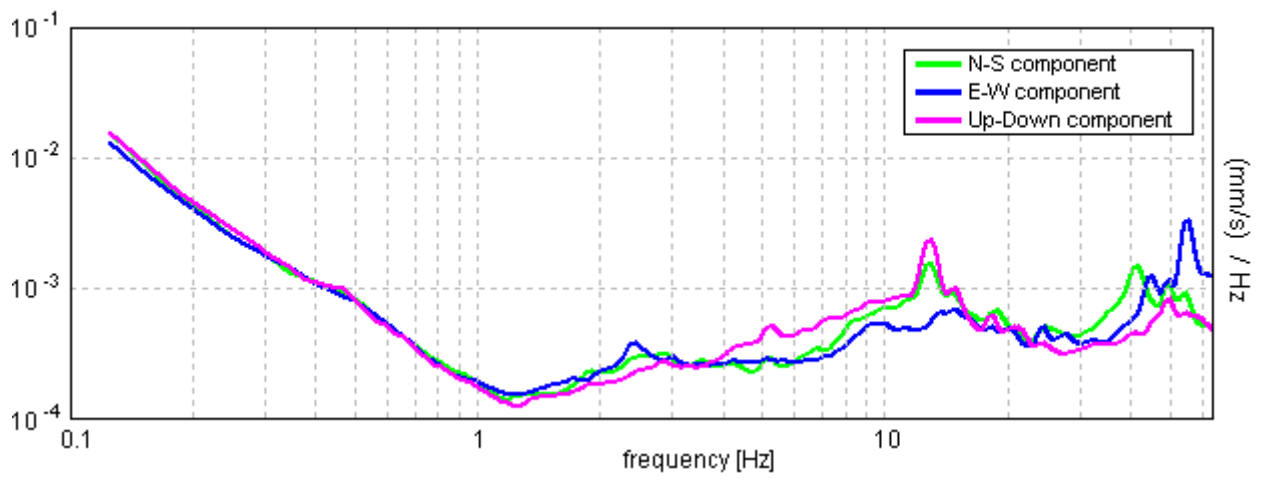
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 2.44 ± 0.06 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.44 > 0.50	OK	
$n_c(f_0) > 200$	4095.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 118 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	4.344 Hz	OK	
$A_0 > 2$	1.60 > 2		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01174  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02862 < 0.12188$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.0875 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0178			
<b>Coordinate</b>	UTM	4218303.32	N	354317.29	E
	Gauss Boaga	4218301.605	N	2374312.247	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		26/05/2014, 07:45			
<b>Nome file</b>		0178			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>		<b>Vento</b>	No		
		<b>Pioggia</b>	No		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	Si		
		<b>Pedoni</b>	Si		
		<b>Altro</b>	No		

**Documentazione fotografica**



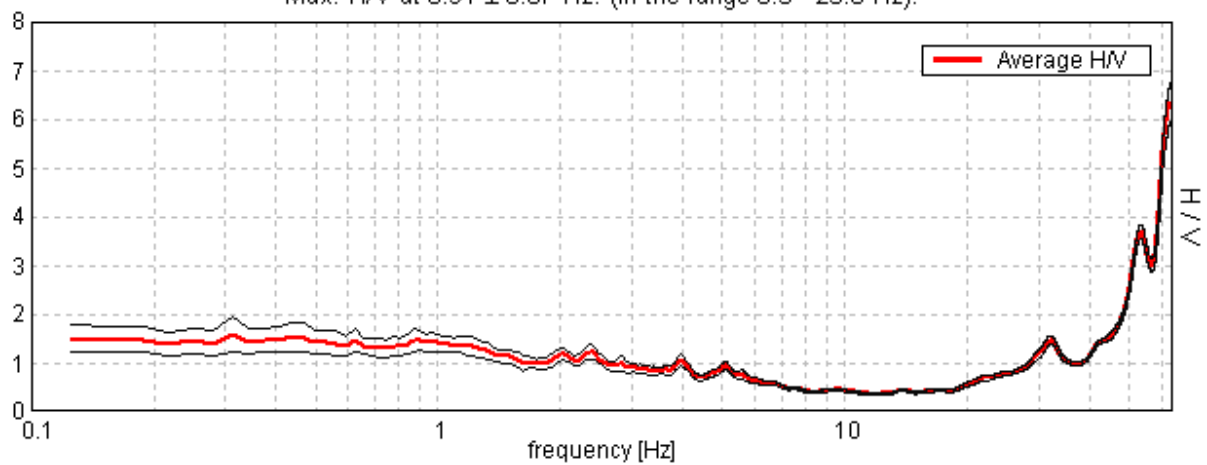
## TRIVELSICILIA PALERMO, PALERMO 0178

Start recording: 26/05/14 07:48:37      End recording: 26/05/14 08:18:38  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

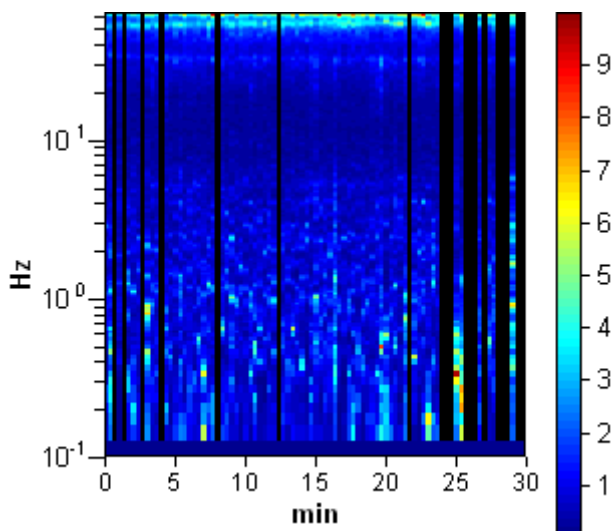
Trace length: 0h30'00".      Analyzed 79% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

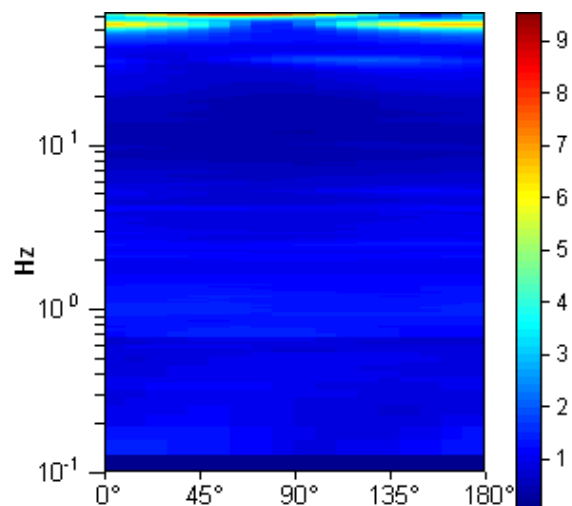
Max. H/V at  $0.91 \pm 0.07$  Hz. (In the range 0.5 - 25.0 Hz).



### H/V TIME HISTORY

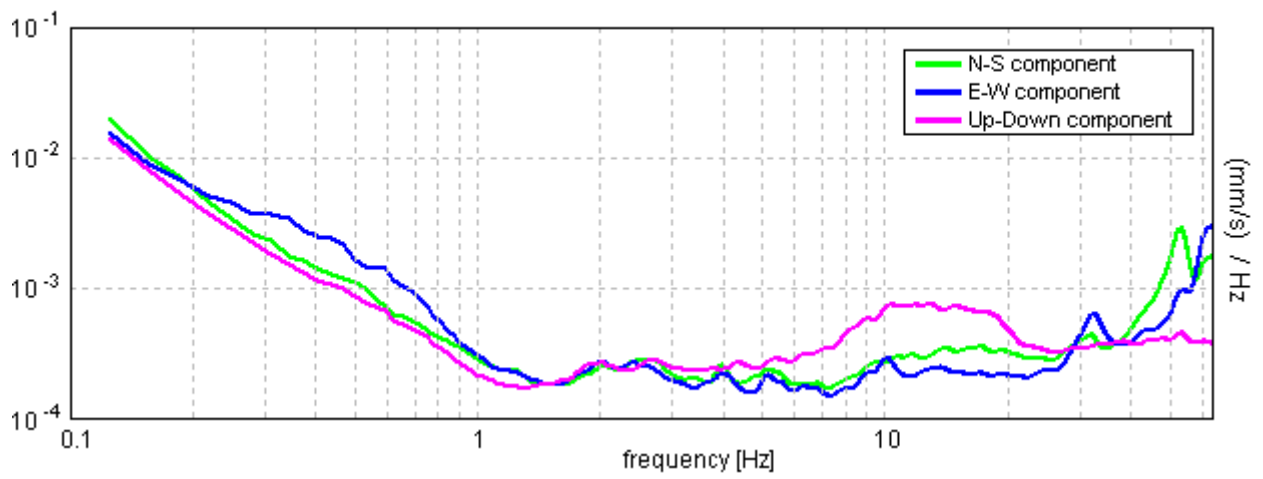


### DIRECTIONAL H/V





### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 0.91 ± 0.07 Hz. (in the range 0.5 - 25.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.91 > 0.50	OK	
$n_c(f_0) > 200$	1286.9 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 44 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	1.46 > 2		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03636  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.03295 < 0.13594	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1083 < 2.0	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0179			
<b>Coordinate</b>	UTM	4217922.34	N	354758.81	E
	Gauss Boaga	4217920.613	N	2374753.797	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		26/05/2014, 09:03			
<b>Nome file</b>		0179			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

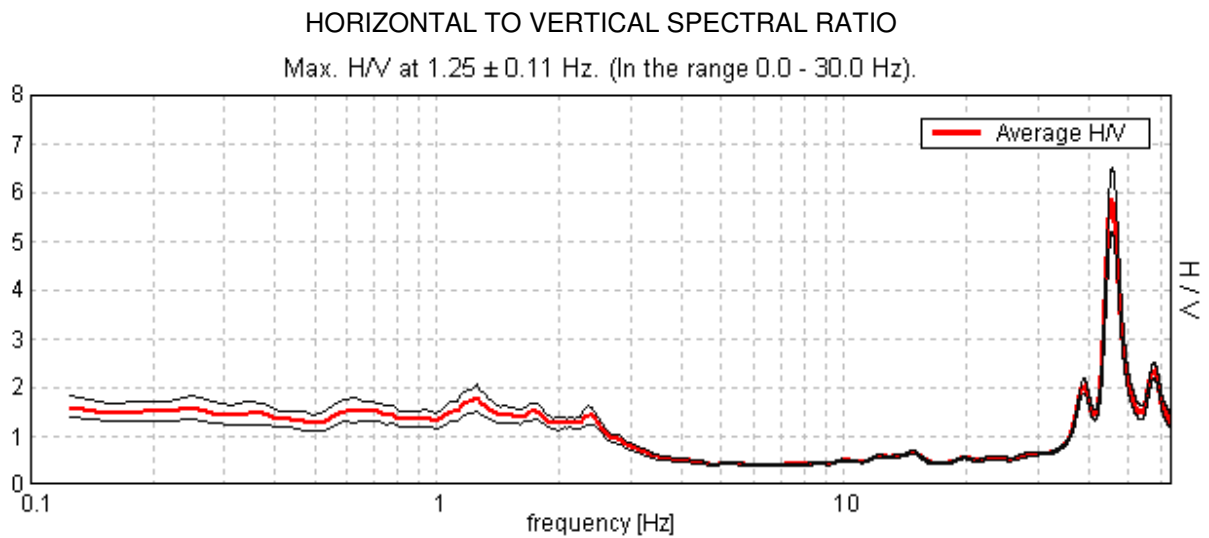
**Documentazione fotografica**



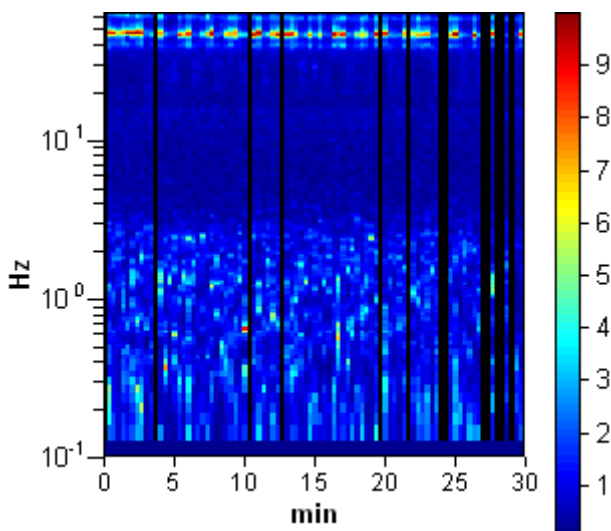
## TRIVELSICILIA PALERMO, PALERMO 0179

Start recording: 26/05/14 09:04:06      End recording: 26/05/14 09:34:07  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

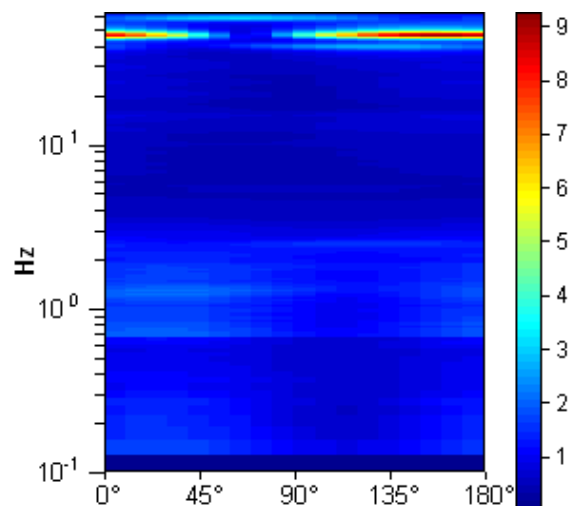
Trace length: 0h30'00".      Analyzed 86% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



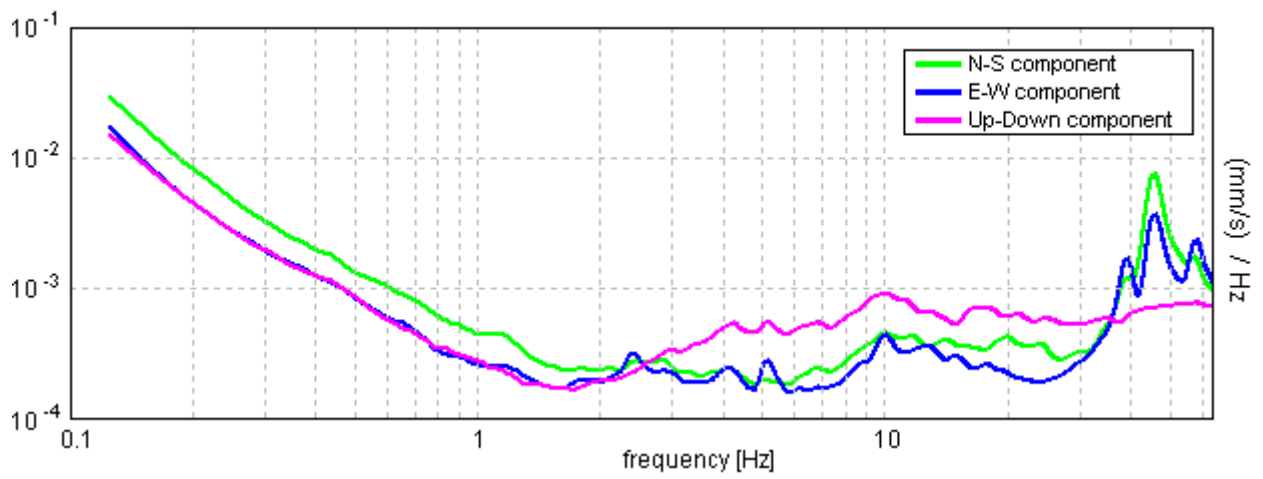
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $1.25 \pm 0.11$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.25 > 0.50$	OK	
$n_c(f_0) > 200$	$1925.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 61 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.875 Hz	OK	
$A_0 > 2$	$1.78 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.0441  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.05513 < 0.125$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.136 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0180			
<b>Coordinate</b>	UTM	4217768.70	N	355075.27	E
	Gauss Boaga	4217766.970	N	2375070.275	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		30/05/2014, 11:50			
<b>Nome file</b>		0180			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

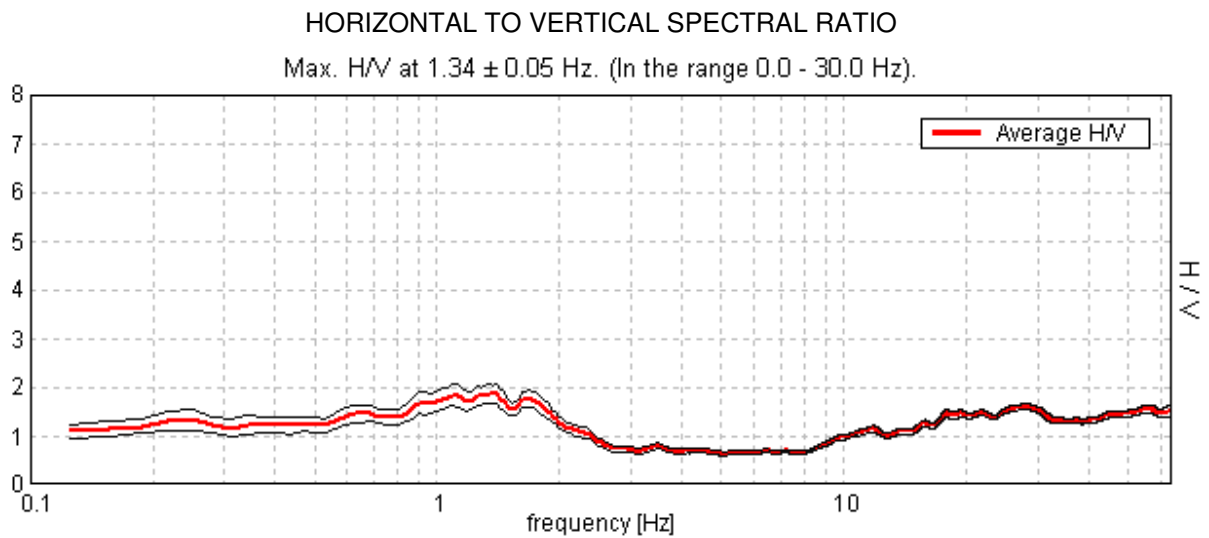
**Documentazione fotografica**



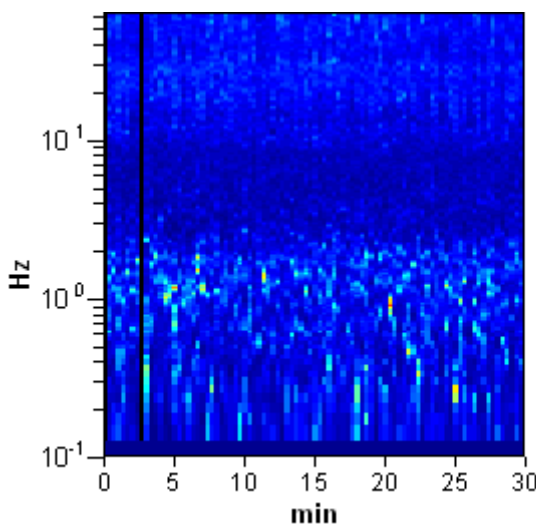
## TRIVEL SICILIA PALERMO, PALERMO TR0180

Start recording: 30/05/14 11:51:23      End recording: 30/05/14 12:21:24  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

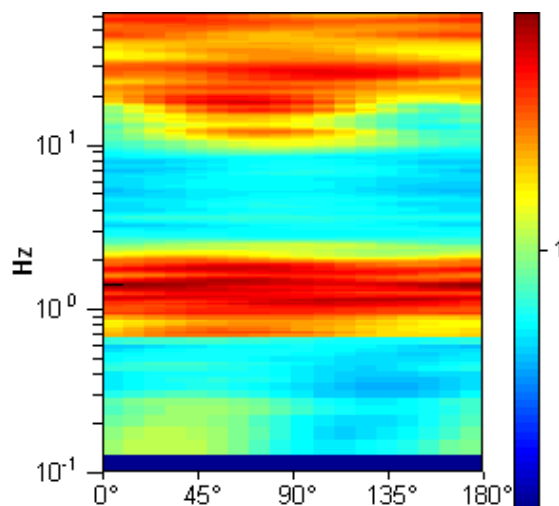
Trace length: 0h30'00".      Analyzed 98% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



H/V TIME HISTORY

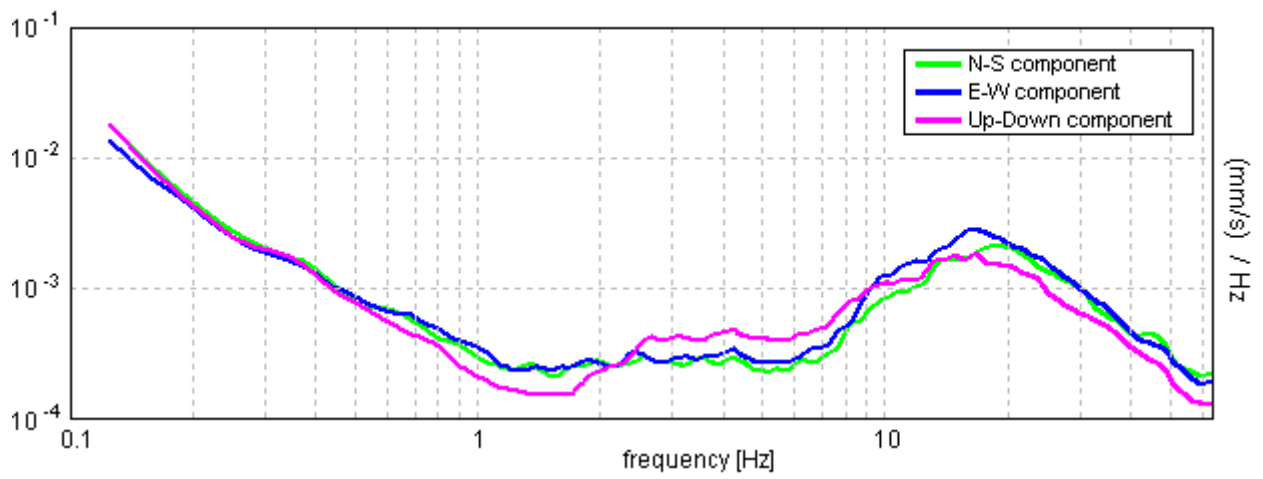


DIRECTIONAL H/V





### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.34 ± 0.05 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.34 > 0.50	OK	
$n_c(f_0) > 200$	2365.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 66 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.438 Hz	OK	
$A_0 > 2$	1.86 > 2		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01981  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02662 < 0.13438$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.0928 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>				
<b>Nome base sismica</b>	0181				
<b>Coordinate</b>	<i>UTM</i>	4217974.08	N	355663.70	E
	<i>Gauss Boaga</i>	4217972.367	N	2375658.731	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	30/05/2014, 12:32				
<b>Nome file</b>	0181				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

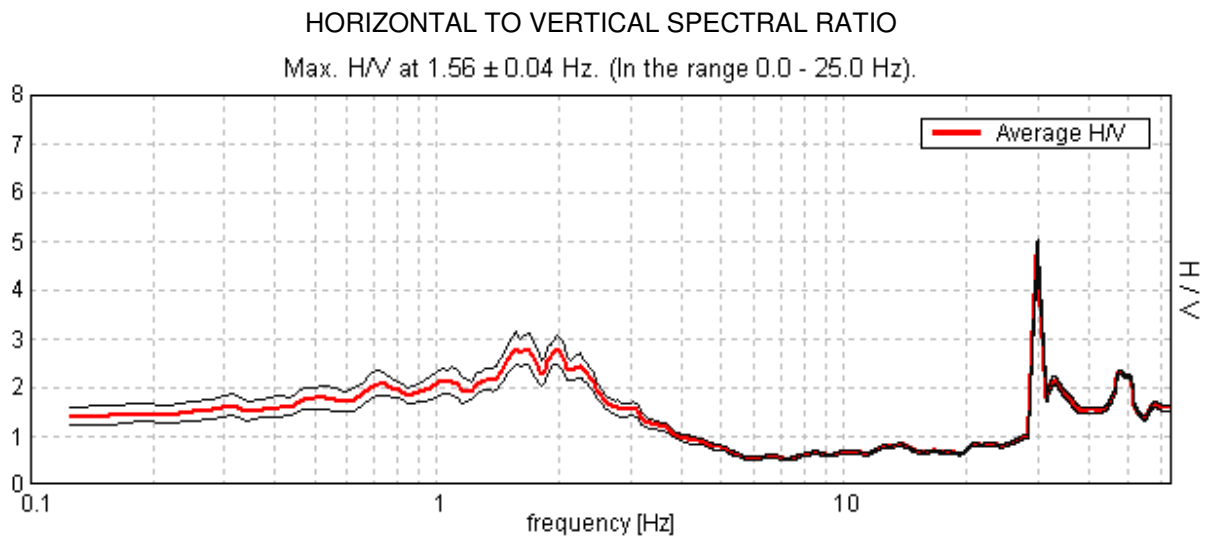
**Documentazione fotografica**



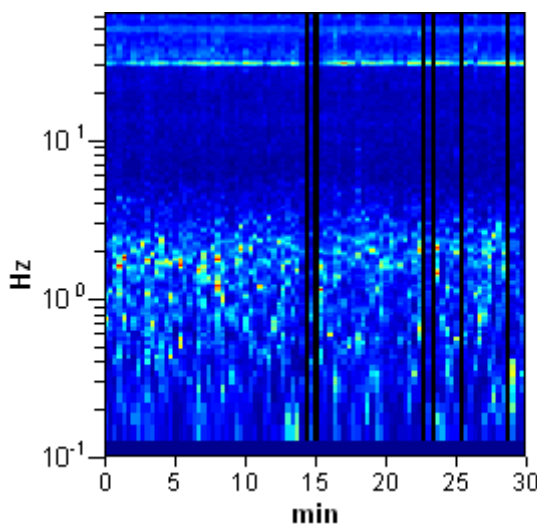
## TRIVEL SICILIA PALERMO, PALERMO TR 0181

Start recording: 30/05/14 12:33:17      End recording: 30/05/14 13:03:18  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

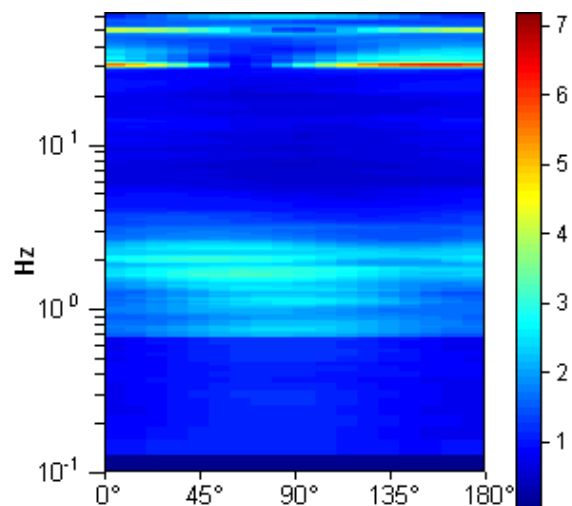
Trace length: 0h30'00".      Analyzed 93% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



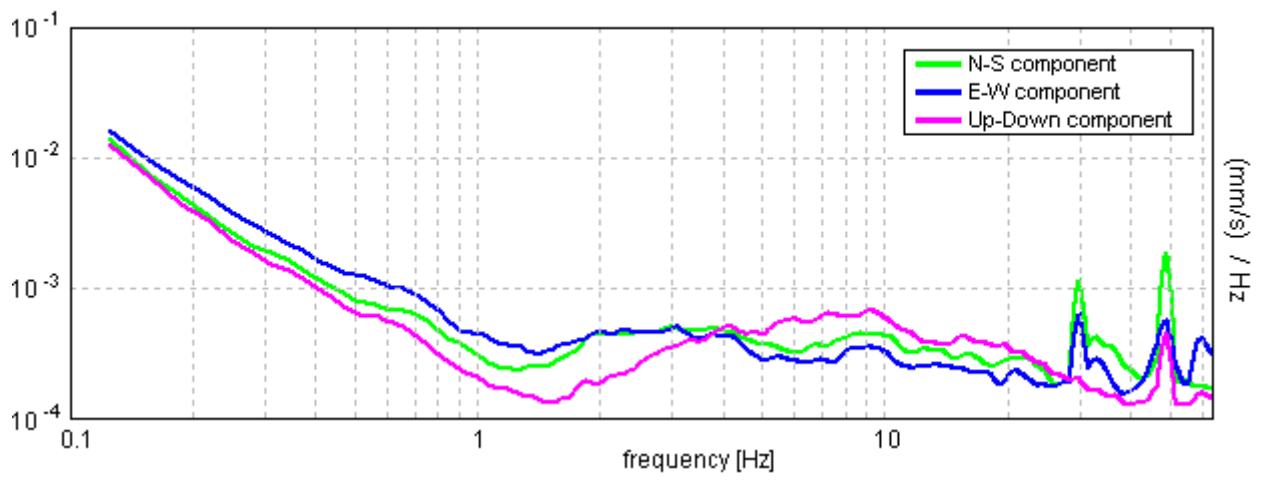
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.56 ± 0.04 Hz. (in the range 0.0 - 25.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.56 > 0.50	OK	
$n_c(f_0) > 200$	2625.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 76 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	3.188 Hz	OK	
$A_0 > 2$	2.80 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01373  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02146 < 0.15625$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1711 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0182			
<b>Coordinate</b>	UTM	4217938.08	N	355955.46	E
	Gauss Boaga	4217936.369	N	2375950.506	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		30/05/2014, 12:33			
<b>Nome file</b>		0182			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



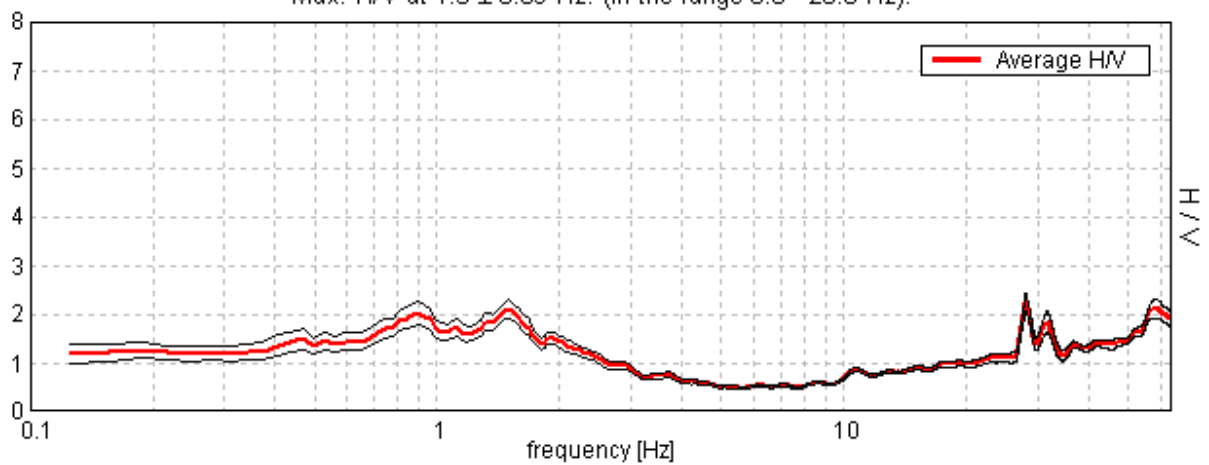
## TRIVEL SICILIA PALERMO, PALERMO TR0182

Start recording: 30/05/14 12:34:36      End recording: 30/05/14 13:04:37  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

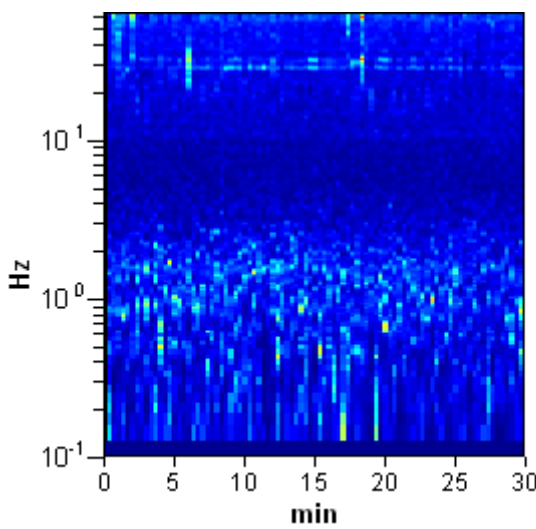
Trace length: 0h30'00".      Analyzed 99% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

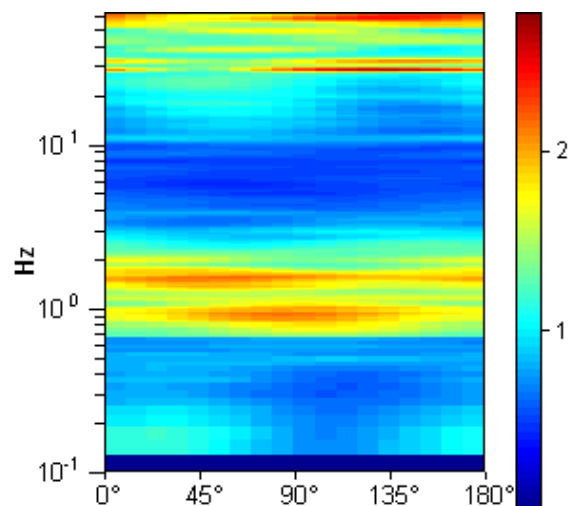
Max. H/V at  $1.5 \pm 0.09$  Hz. (In the range 0.0 - 20.0 Hz).



### H/V TIME HISTORY

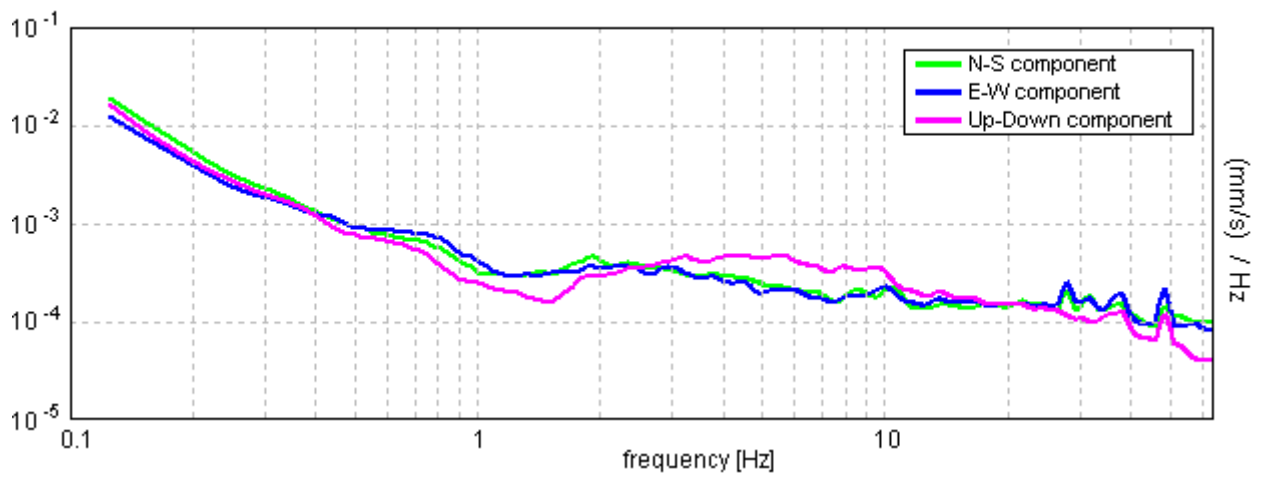


### DIRECTIONAL H/V





SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $1.5 \pm 0.09$  Hz. (in the range 0.0 - 20.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.50 > 0.50$	OK	
$n_c(f_0) > 200$	$2670.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 73 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.531 Hz	OK	
$A_0 > 2$	$2.10 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02933  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.04399 < 0.15$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.0938 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

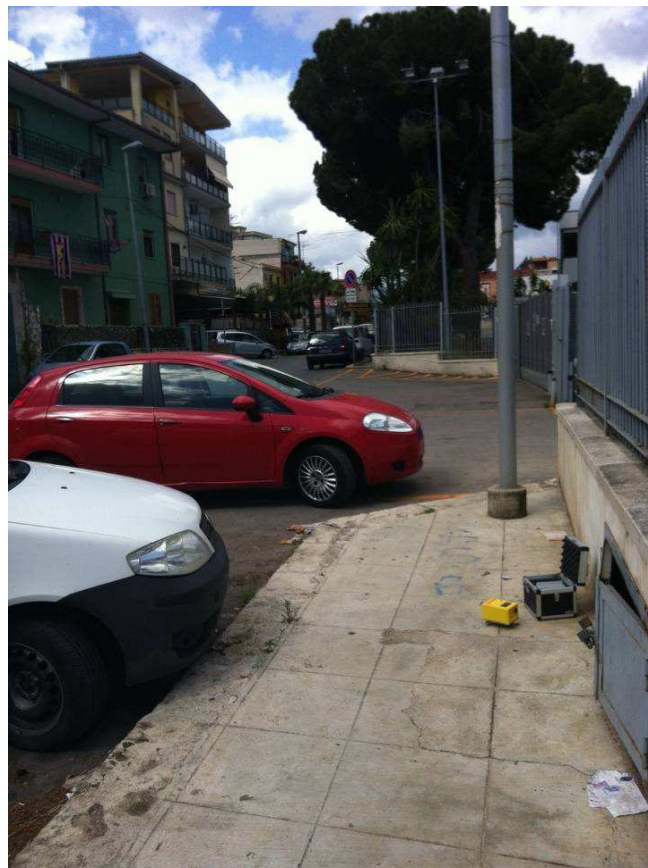


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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>			
<b>Nome base sismica</b>		0183			
<b>Coordinate</b>	<i>UTM</i>	4217651.63	N	356462.08	E
	<i>Gauss Boaga</i>	4217649.912	N	2376457.156	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		30/05/2014, 10:04			
<b>Nome file</b>		0183			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

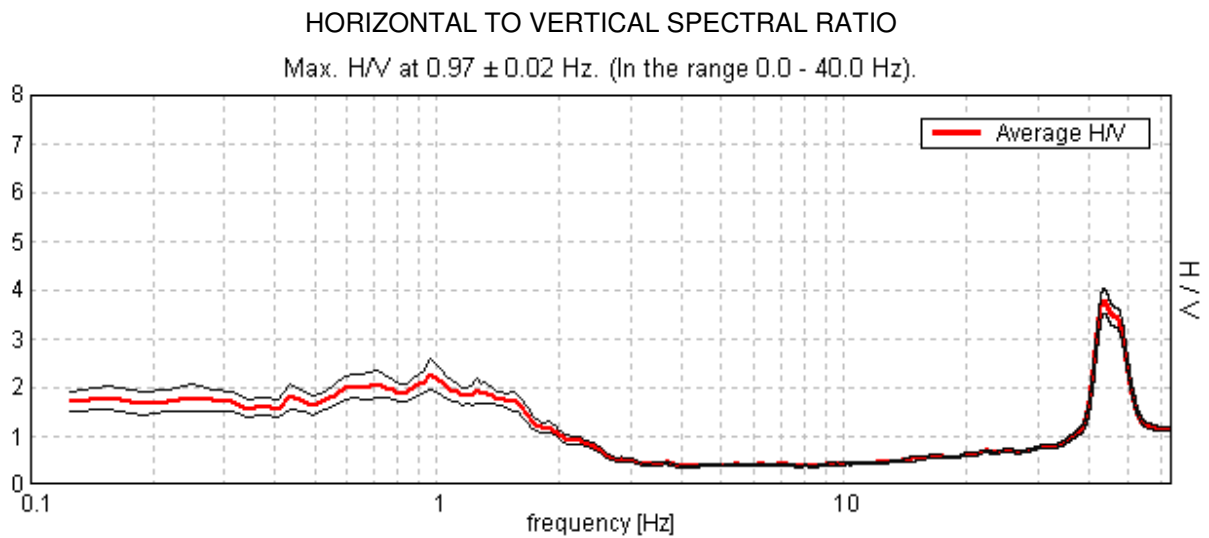
**Documentazione fotografica**



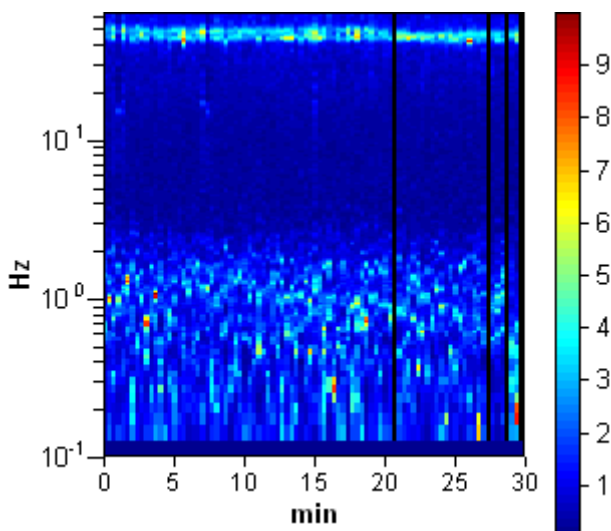
## TRIVEL SICILIA PALERMO, PALERMO TR 0183

Start recording: 30/05/14 10:12:39      End recording: 30/05/14 10:42:40  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

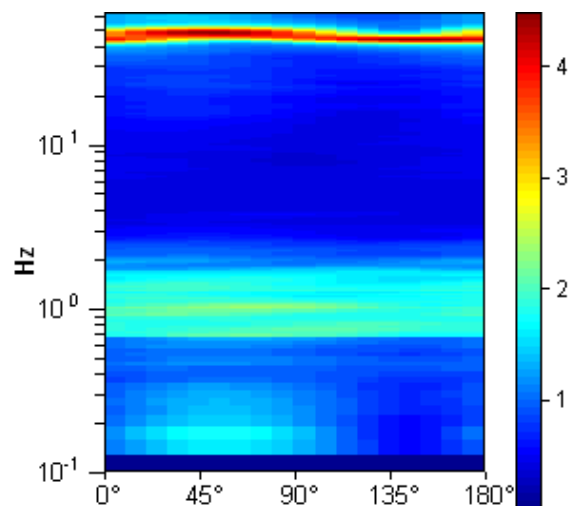
Trace length: 0h30'00".      Analyzed 96% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



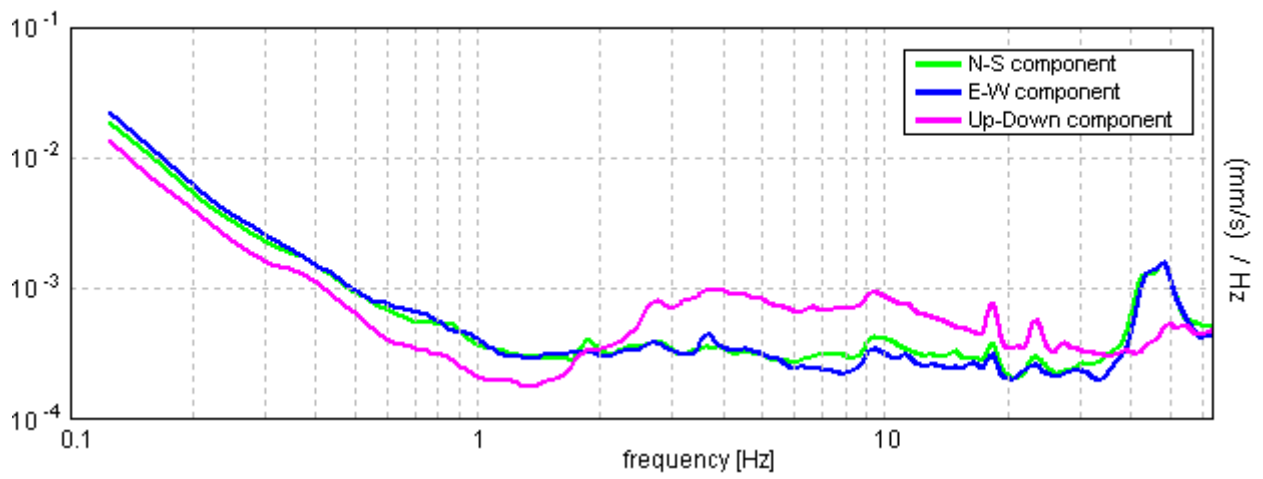
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $0.97 \pm 0.02$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.97 > 0.50$	OK	
$n_c(f_0) > 200$	$1666.3 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 48 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	1.938 Hz	OK	
$A_0 > 2$	$2.27 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00876  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.00848 < 0.14531$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1561 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0184			
<b>Coordinate</b>	<i>UTM</i>	4217831.42	N	356757.65	E
	<i>Gauss Boaga</i>	4217829.714	N	2376752.738	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		30/05/2014, 09:28			
<b>Nome file</b>		0184			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



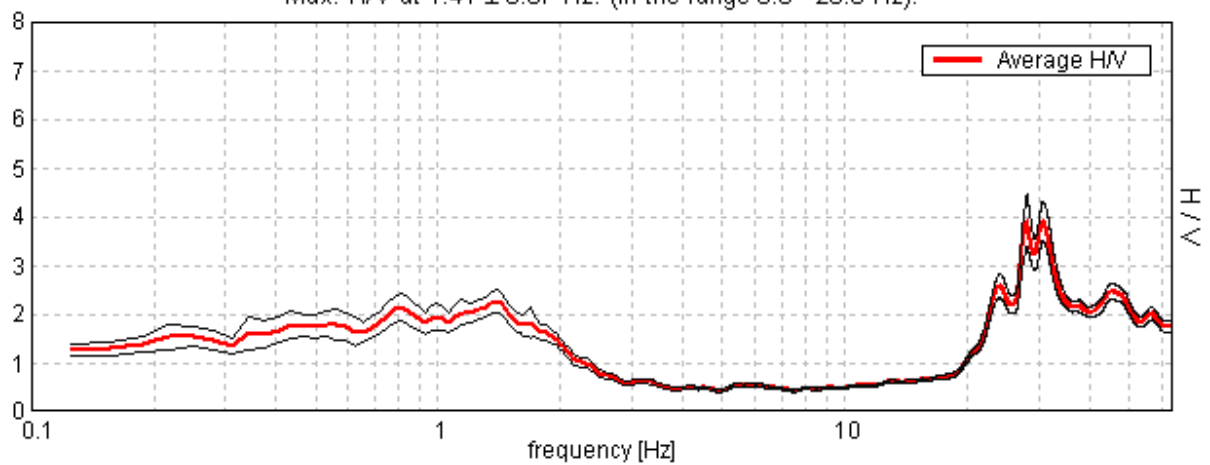
## TRIVEL SICILIA PALERMO, PALERMO TR 0184

Start recording: 30/05/14 09:37:11      End recording: 30/05/14 10:07:12  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

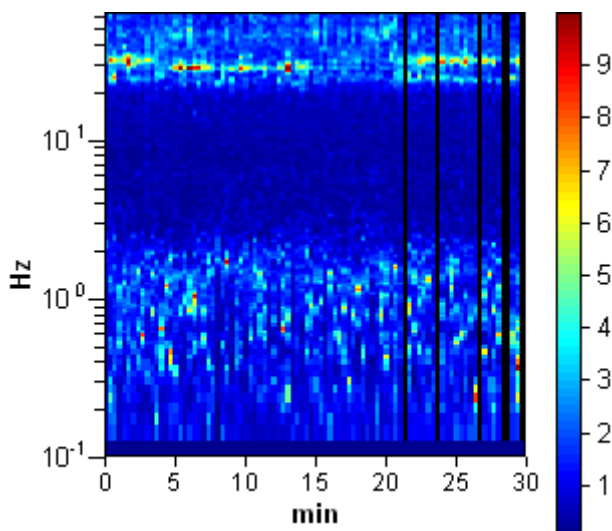
Trace length: 0h30'00".      Analyzed 93% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

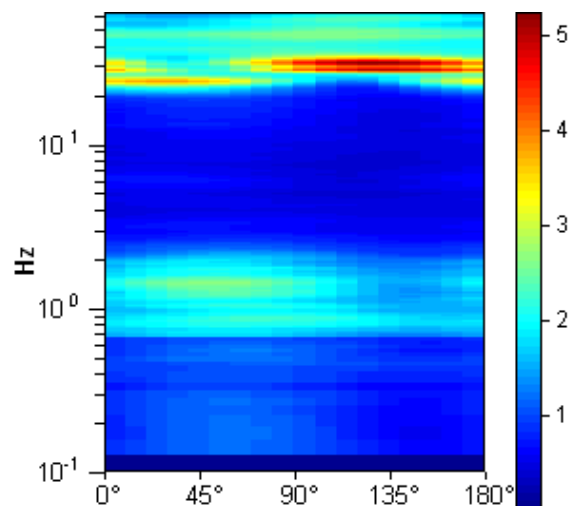
Max. H/V at  $1.41 \pm 0.07$  Hz. (In the range 0.0 - 20.0 Hz).



### H/V TIME HISTORY

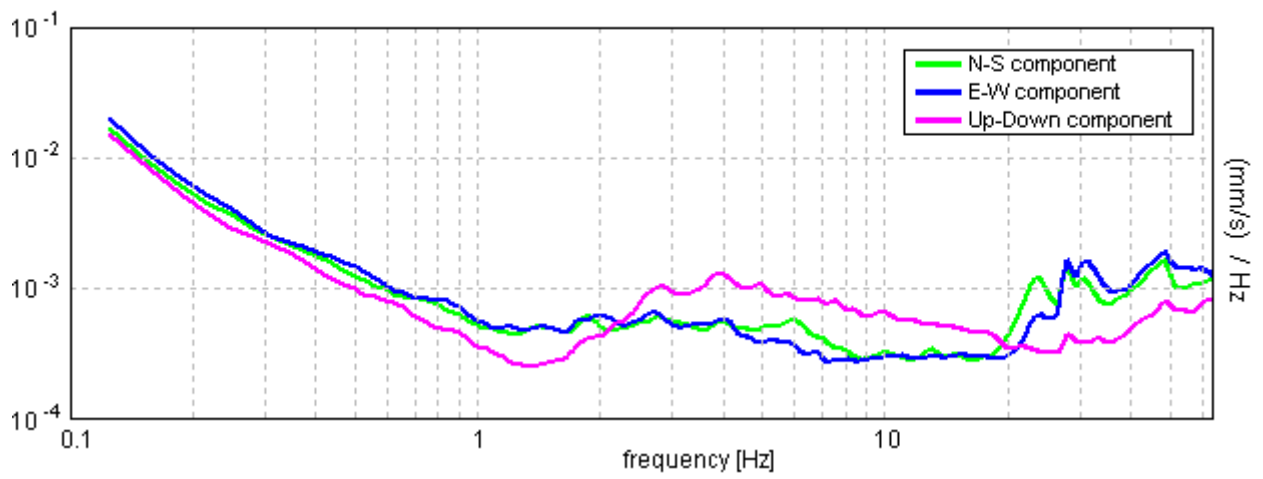


### DIRECTIONAL H/V





SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.41 ± 0.07 Hz. (in the range 0.0 - 20.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.41 > 0.50	OK	
$n_c(f_0) > 200$	2362.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 68 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.156 Hz	OK	
$A_0 > 2$	2.25 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02423  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.03407 < 0.14063	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1184 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0185			
<b>Coordinate</b>	UTM	4217855.83	N	357123.56	E
	Gauss Boaga	4217854.129	N	2377118.665	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		30/05/2014, 08:51			
<b>Nome file</b>		0185			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>Si</b>		
		<b>Altro</b>	<b>No</b>		

**Documentazione fotografica**



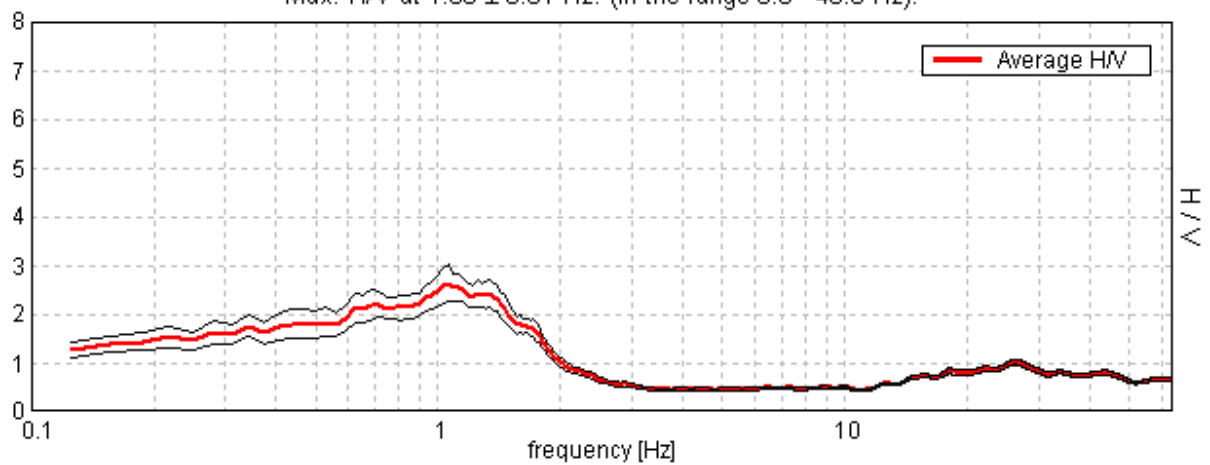
## TRIVEL SICILIA PALERMO, PALERMO TR 0185

Start recording: 30/05/14 08:59:58      End recording: 30/05/14 09:29:59  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

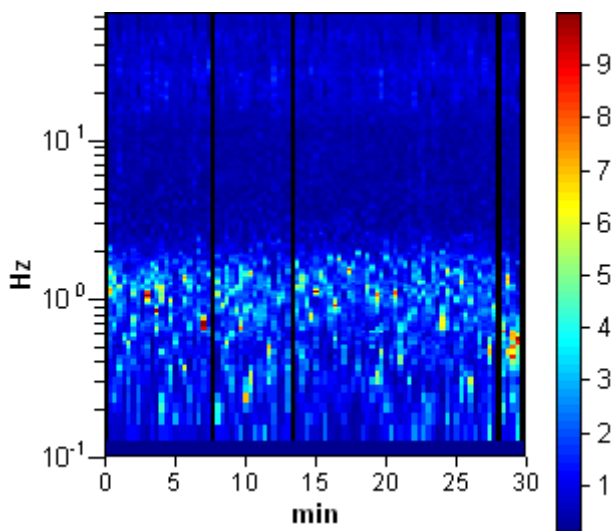
Trace length: 0h30'00".      Analyzed 94% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

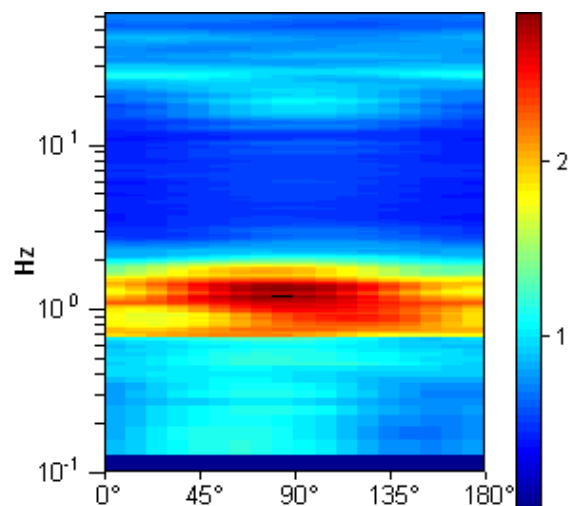
Max. H/V at  $1.06 \pm 0.01$  Hz. (In the range 0.0 - 40.0 Hz).



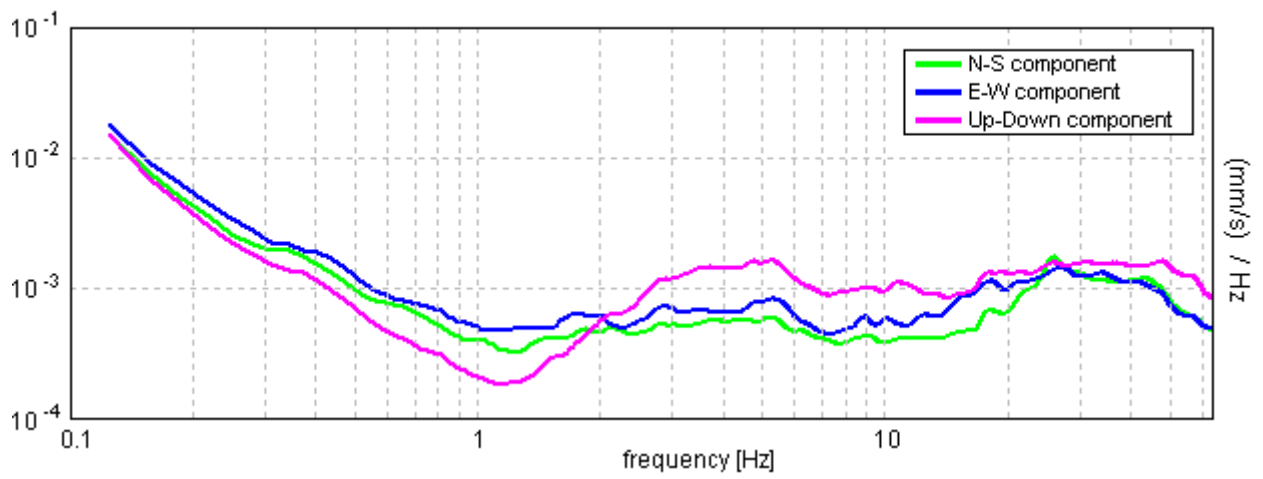
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.06 ± 0.01 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.06 > 0.50	OK	
$n_c(f_0) > 200$	1806.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 52 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.875 Hz	OK	
$A_0 > 2$	2.64 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00489  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.0052 < 0.10625$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1817 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0186				
<b>Coordinate</b>	<i>UTM</i>	4217909.79	N	357563.09	E
	<i>Gauss Boaga</i>	4217908.100	N	2377558.214	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	30/05/2014, 08:40				
<b>Nome file</b>	0186				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

**Documentazione fotografica**



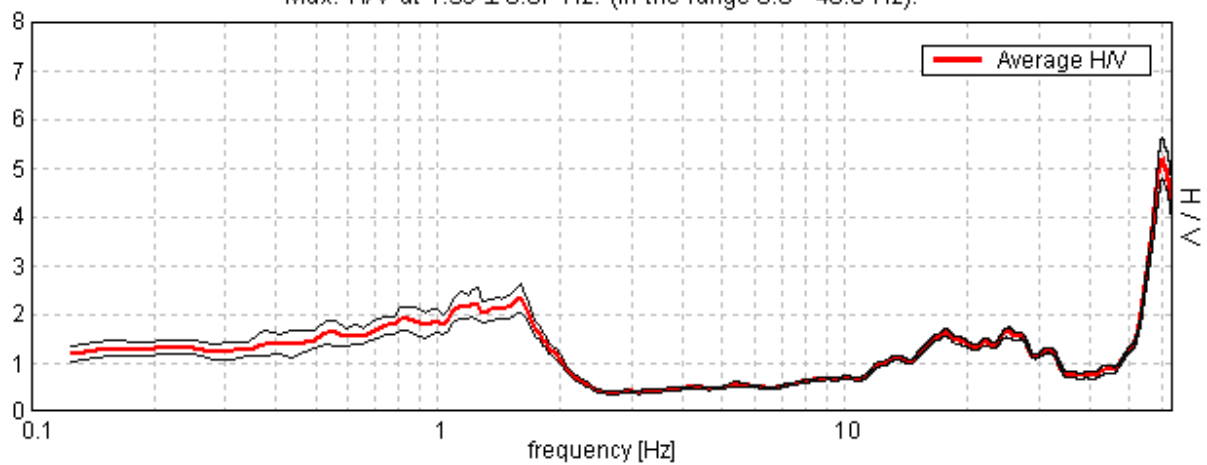
## TRIVEL SICILIA PALERMO, PALERMO TR0186

Start recording: 30/05/14 08:42:11      End recording: 30/05/14 09:12:12  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

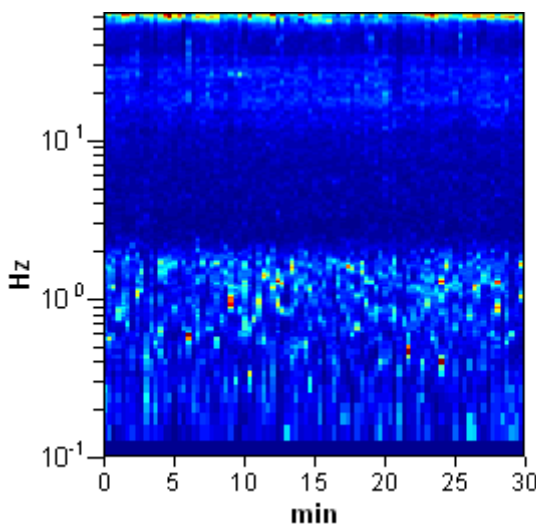
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

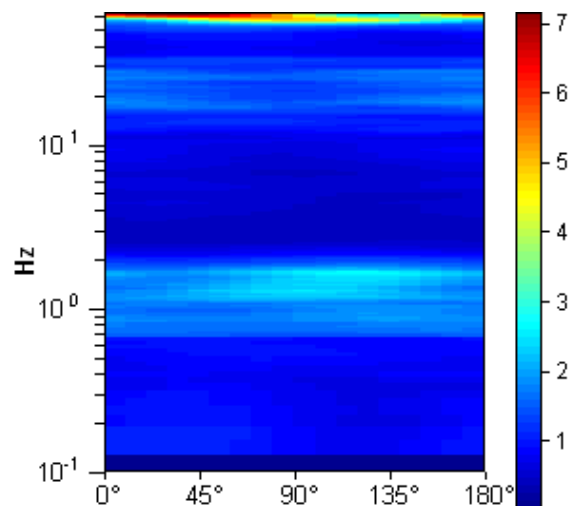
Max. H/V at  $1.59 \pm 0.07$  Hz. (In the range 0.0 - 40.0 Hz).



### H/V TIME HISTORY

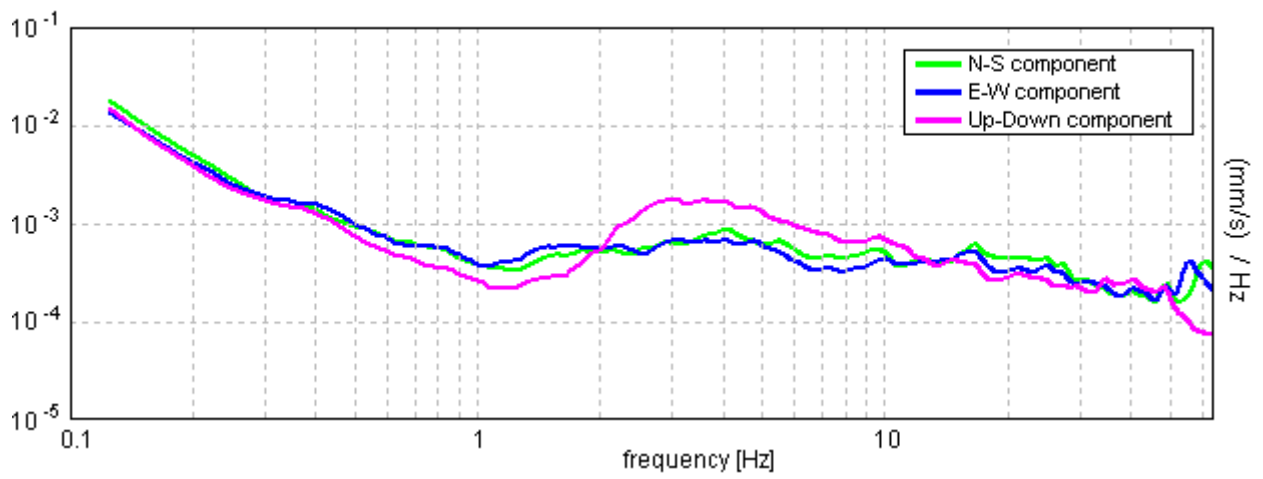


### DIRECTIONAL H/V





### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.59 ± 0.07 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.59 > 0.50	OK	
$n_c(f_0) > 200$	2868.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 78 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.969 Hz	OK	
$A_0 > 2$	2.32 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02304  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.03671 < 0.15938$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1446 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0187			
<b>Coordinate</b>	UTM	4217899.98	N	357947.89	E
	Gauss Boaga	4217898.298	N	2377943.032	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		28/05/2014, 12:51			
<b>Nome file</b>		0187			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

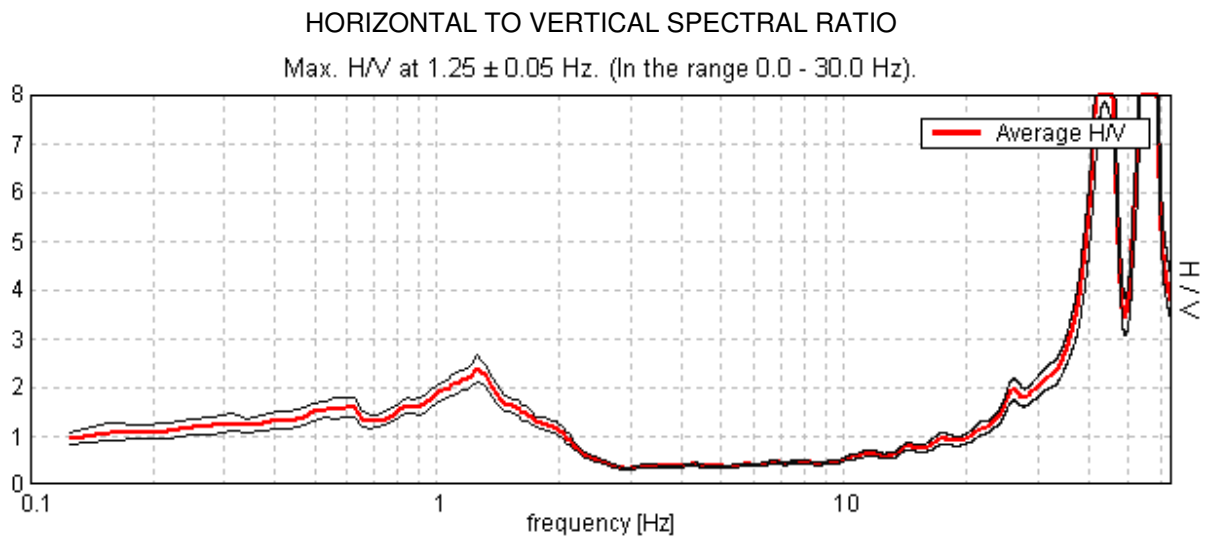
**Documentazione fotografica**



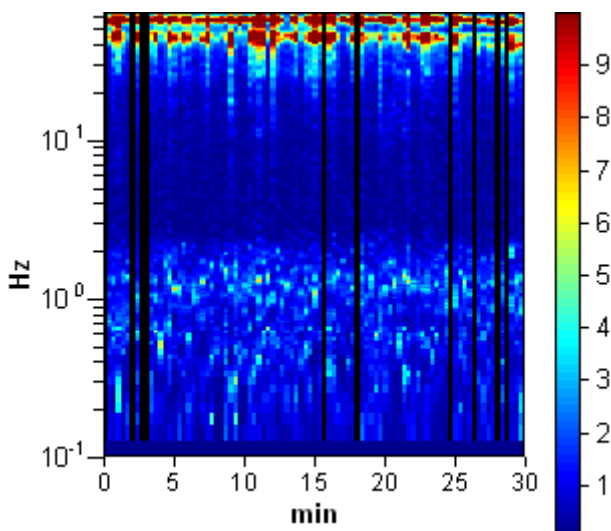
## TRIVELSICILIA PALERMO, PALERMO 0187

Start recording: 28/05/14 12:53:56      End recording: 28/05/14 13:23:57  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

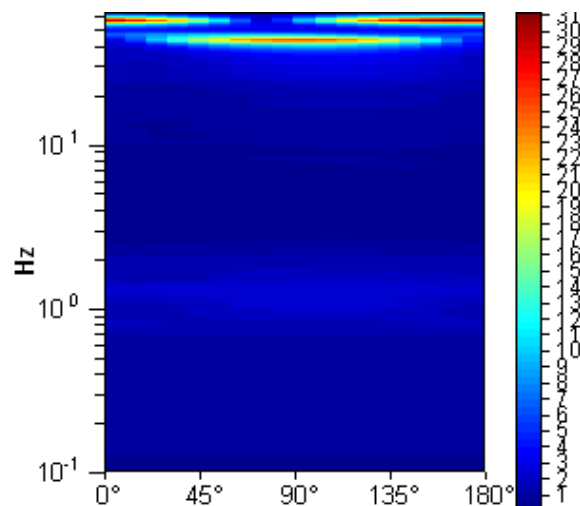
Trace length: 0h30'00".      Analyzed 89% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



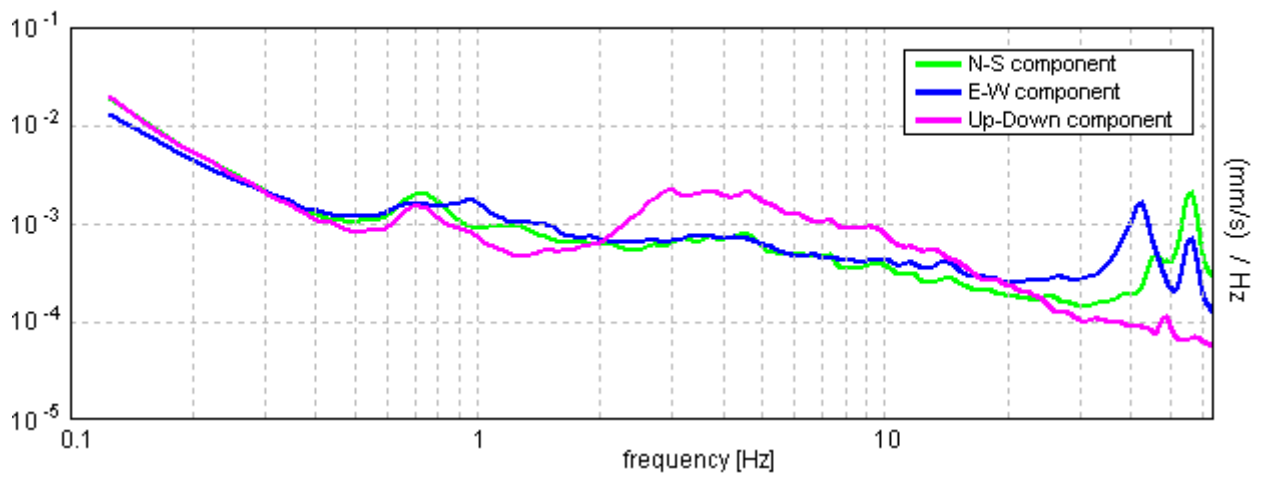
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $1.25 \pm 0.05$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.25 > 0.50$	OK	
$n_c(f_0) > 200$	$2000.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 61 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			<b>NO</b>
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	1.906 Hz	OK	
$A_0 > 2$	$2.39 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01864  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02329 < 0.125$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1349 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0188			
<b>Coordinate</b>	UTM	4217822.38	N	357947.89	E
	Gauss Boaga	4217820.702	N	2378326.681	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		28/05/2014, 12:17			
<b>Nome file</b>		0188			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



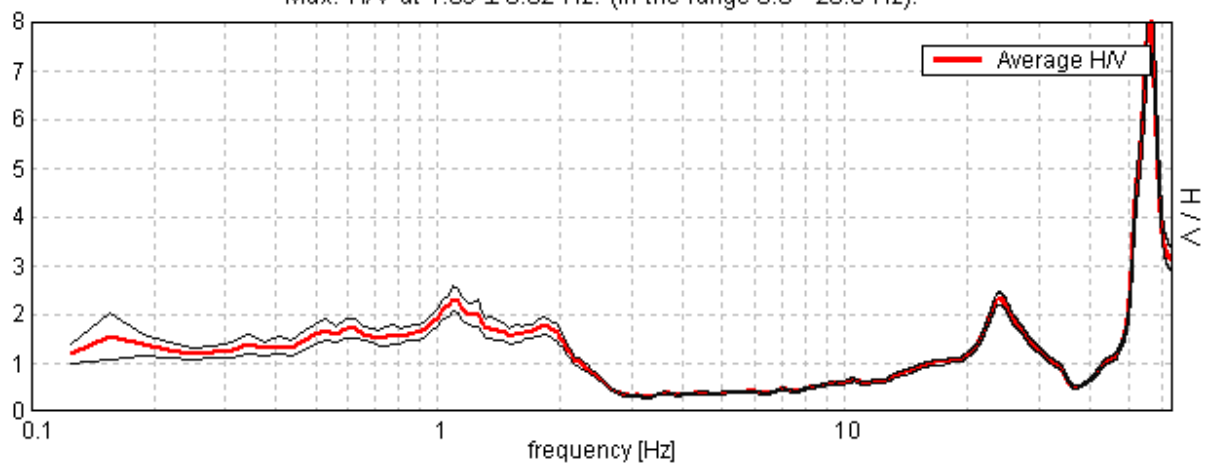
## TRIVELSICILIA PALERMO, PALERMO 0188

Start recording: 28/05/14 12:19:14      End recording: 28/05/14 12:49:15  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

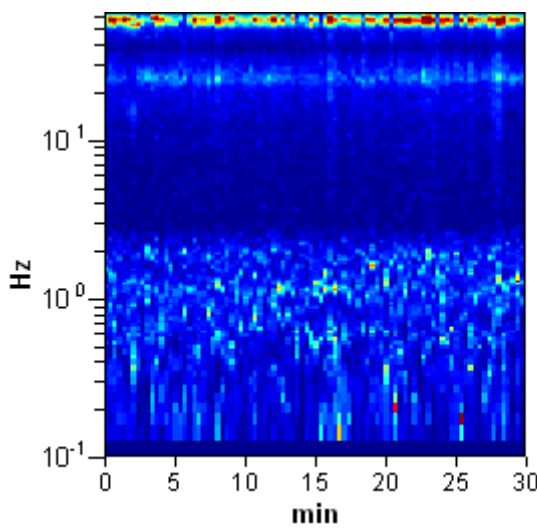
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

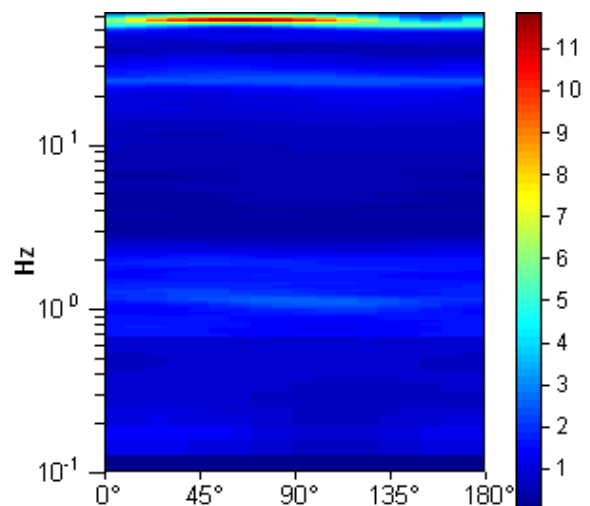
Max. H/V at  $1.09 \pm 0.02$  Hz. (In the range 0.0 - 20.0 Hz).



### H/V TIME HISTORY

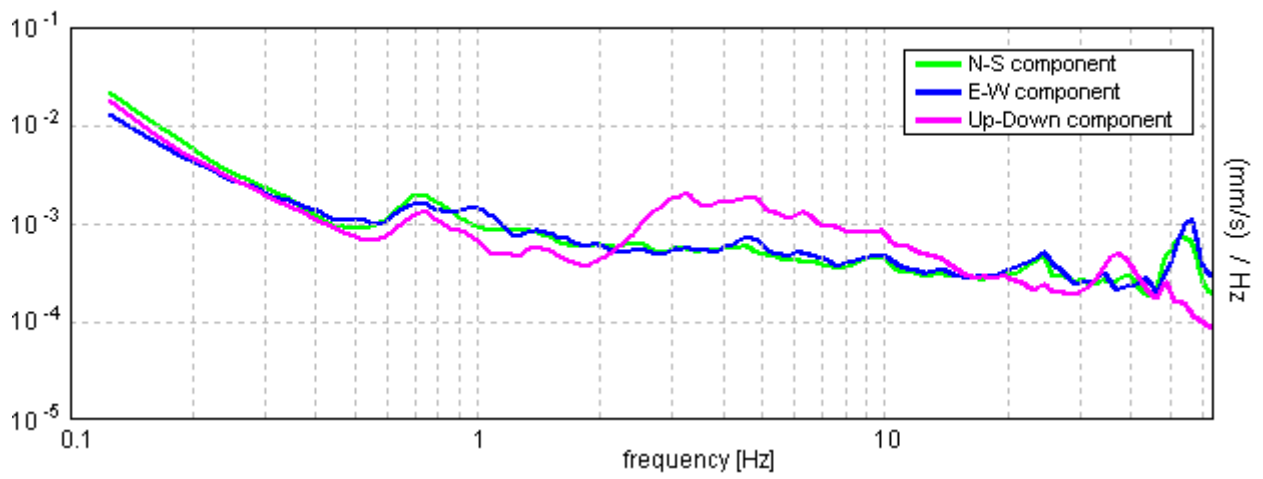


### DIRECTIONAL H/V





### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.09 ± 0.02 Hz. (in the range 0.0 - 20.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.09 > 0.50	OK	
$n_c(f_0) > 200$	1968.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 54 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.156 Hz	OK	
$A_0 > 2$	2.31 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.0103  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01127 < 0.10938$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1302 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0189			
<b>Coordinate</b>	UTM	4217864.17	N	358765.95	E
	Gauss Boaga	4217862.502	N	2378761.129	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		27/05/2014, 13:14			
<b>Nome file</b>		0189			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

**Documentazione fotografica**



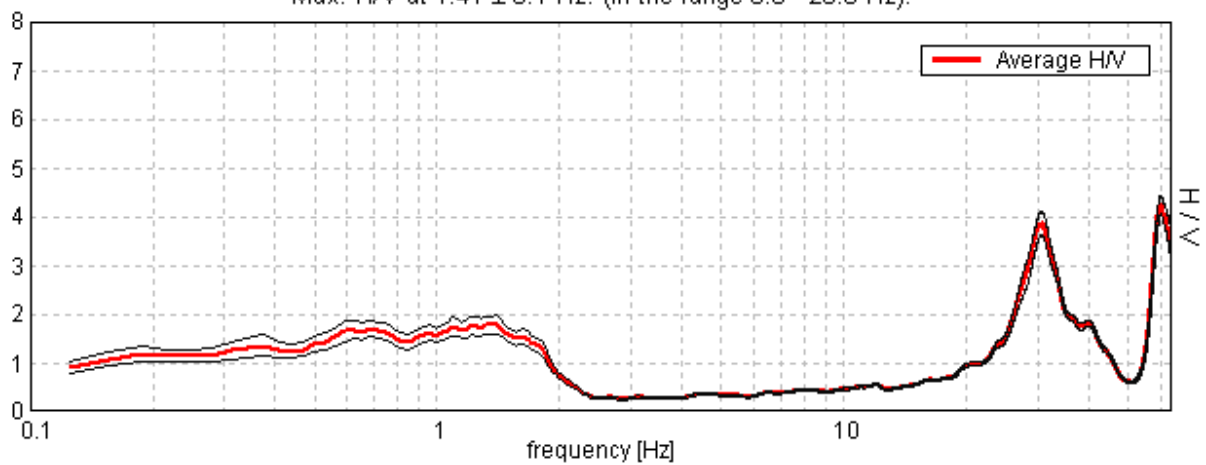
## TRIVELSICILIA PALERMO, PALERMO 0189

Start recording: 27/05/14 13:16:02      End recording: 27/05/14 13:46:03  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

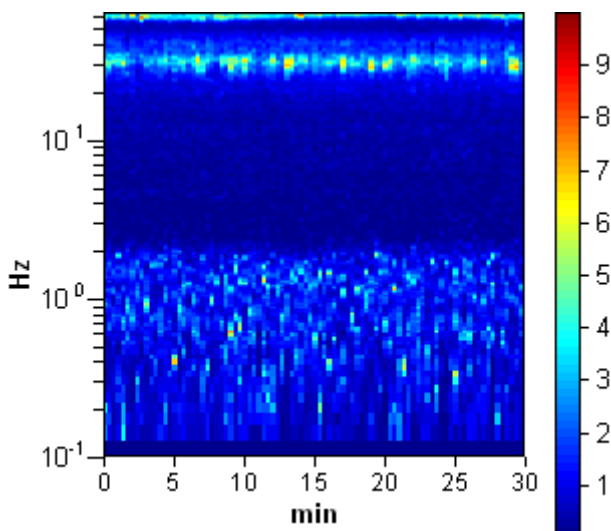
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

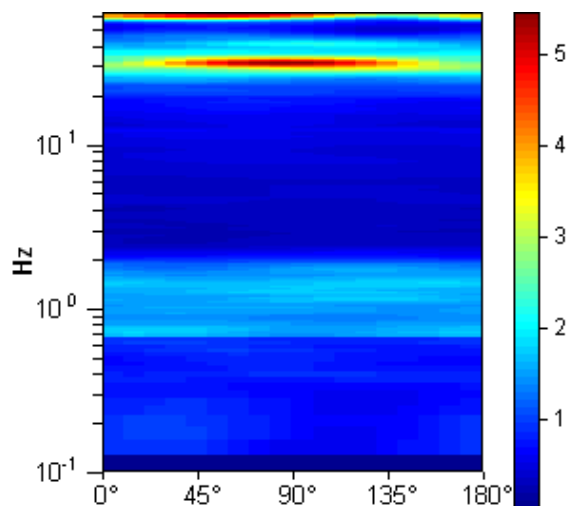
Max. H/V at  $1.41 \pm 0.1$  Hz. (In the range 0.0 - 20.0 Hz).



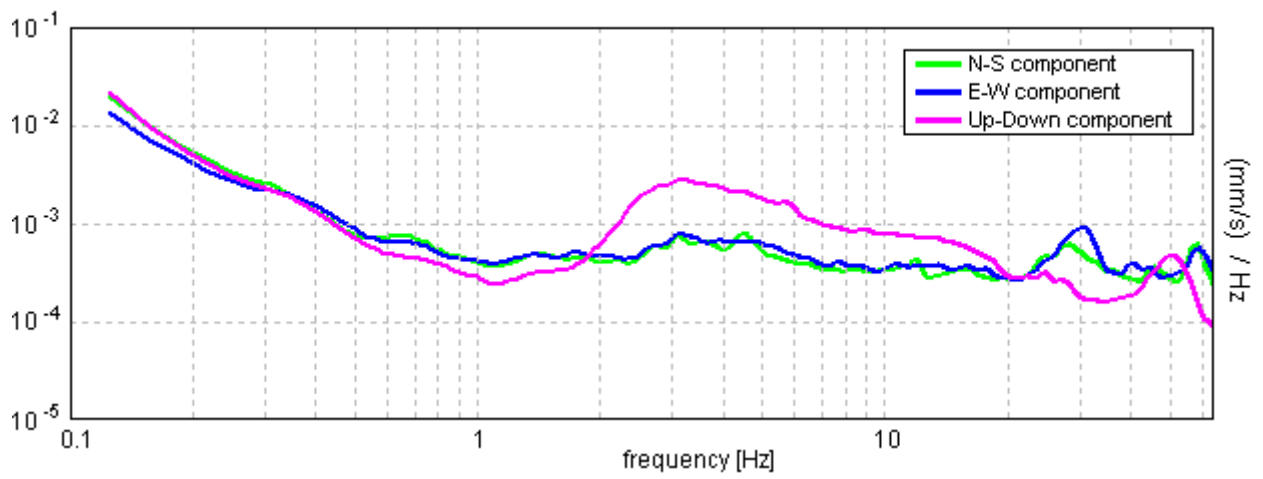
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.41 ± 0.1 Hz. (in the range 0.0 - 20.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.41 > 0.50	OK	
$n_c(f_0) > 200$	2531.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 68 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.938 Hz	OK	
<b><math>A_0 &gt; 2</math></b>	1.78 > 2		<b>NO</b>
<b><math>f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%</math></b>	$ 0.03621  < 0.05$	OK	
<b><math>\sigma_f &lt; \varepsilon(f_0)</math></b>	$0.05091 < 0.14063$	OK	
<b><math>\sigma_A(f_0) &lt; \theta(f_0)</math></b>	$0.0978 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0190			
<b>Coordinate</b>	UTM	4217897.10	N	359178.30	E
	Gauss Boaga	4217895.441	N	2379173.496	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		27/05/2014, 12:35			
<b>Nome file</b>		0190			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



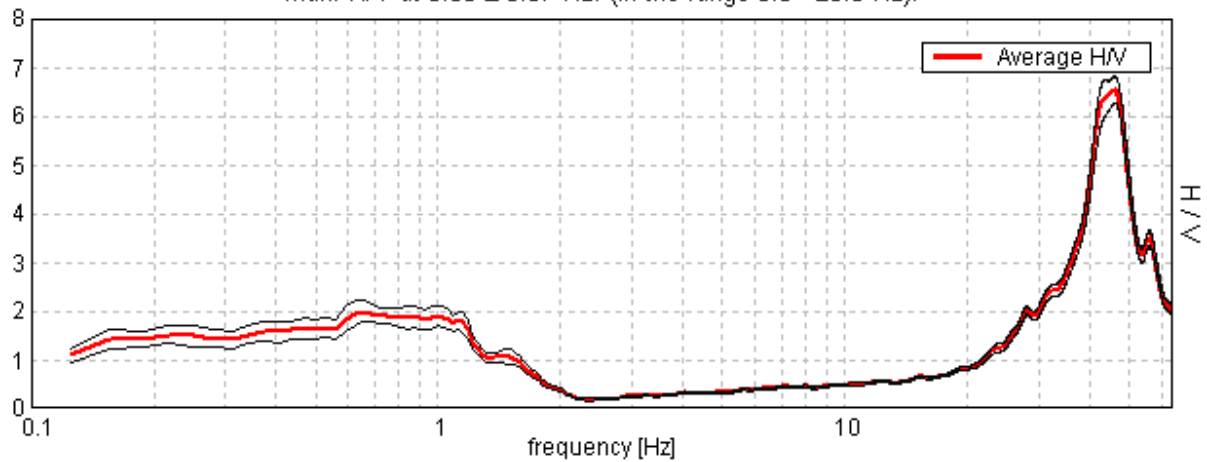
## TRIVELSICILIA PALERMO, PALERMO 0190

Start recording: 27/05/14 12:37:26      End recording: 27/05/14 13:07:27  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

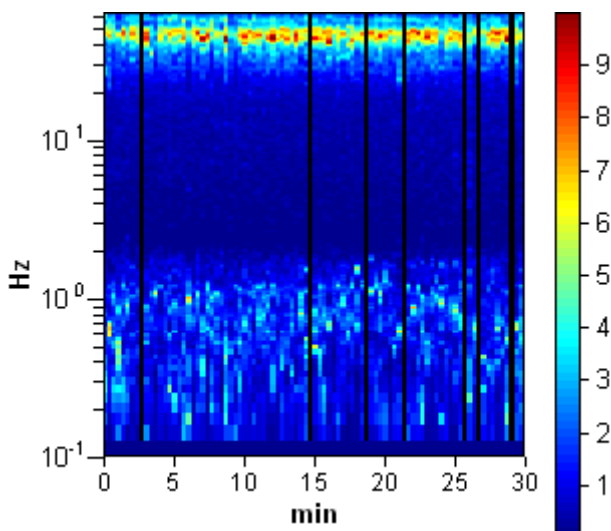
Trace length: 0h30'00".      Analyzed 92% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

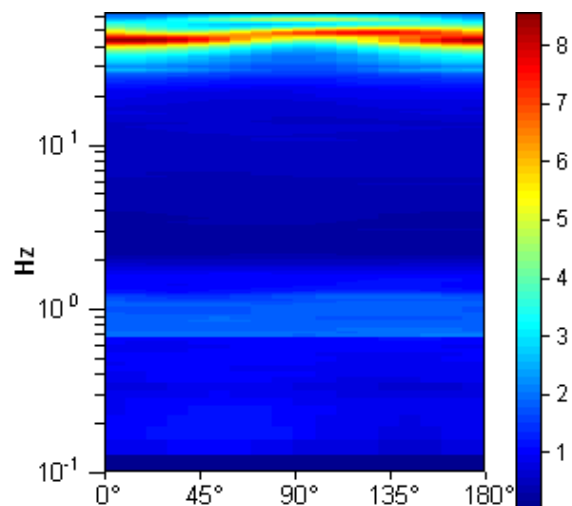
Max. H/V at  $0.66 \pm 0.07$  Hz. (In the range 0.0 - 20.0 Hz).



### H/V TIME HISTORY

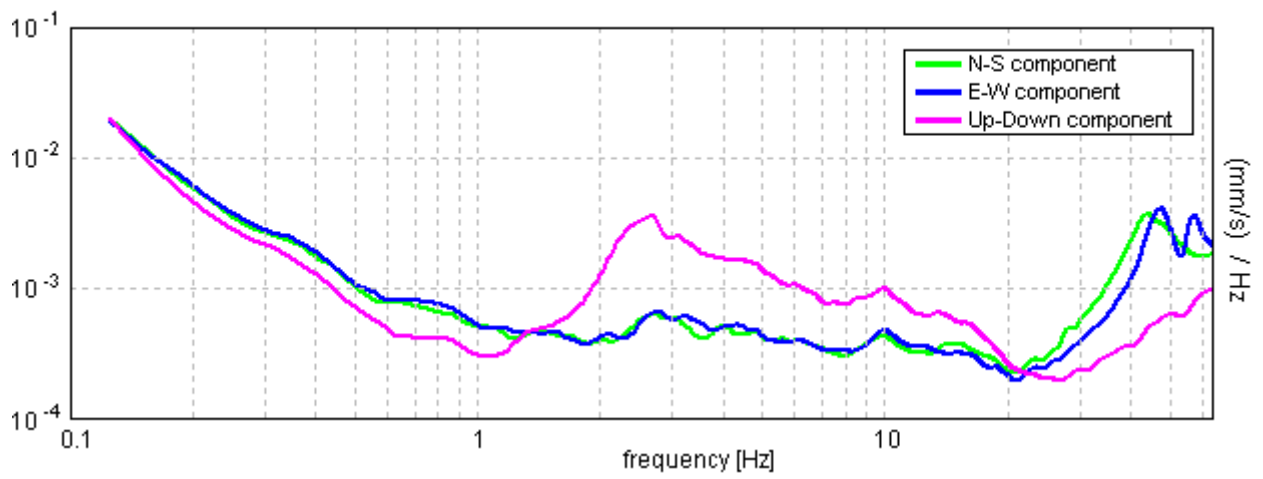


### DIRECTIONAL H/V





### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $0.66 \pm 0.07$  Hz. (in the range 0.0 - 20.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.66 > 0.50$	OK	
$n_c(f_0) > 200$	$1089.4 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 32 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	1.563 Hz	OK	
$A_0 > 2$	$2.00 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.05622  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.03689 < 0.09844$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1152 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

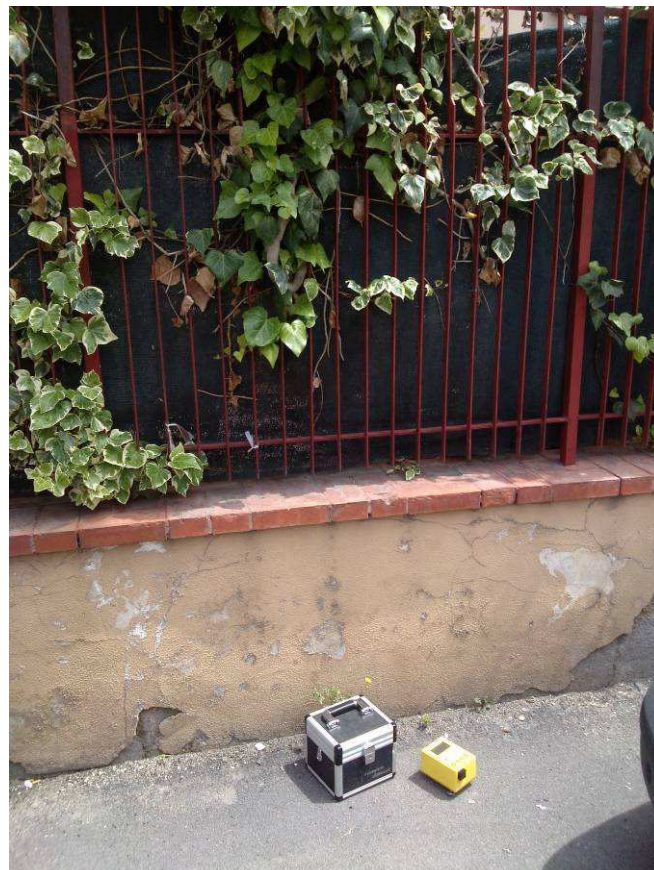


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n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0191				
<b>Coordinate</b>	<i>UTM</i>	4217868.88	N	359562.78	E
	<i>Gauss Boaga</i>	4217867.227	N	2379557.994	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	27/05/2014, 11:59				
<b>Nome file</b>	0191				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



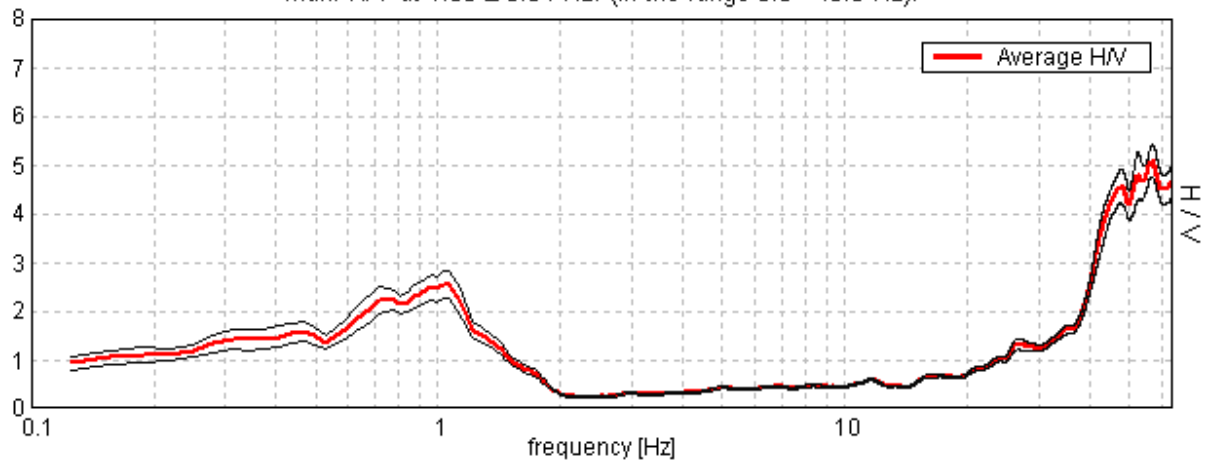
## TRIVELSICILIA PALERMO, PALERMO 0191

Start recording: 27/05/14 12:00:17      End recording: 27/05/14 12:30:18  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

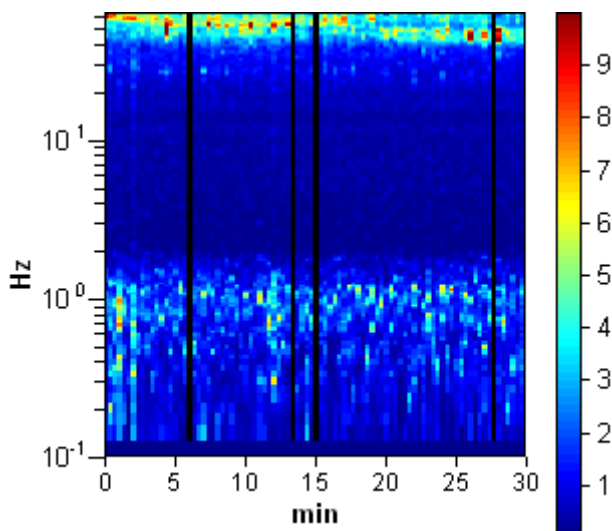
Trace length: 0h30'00".      Analyzed 96% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

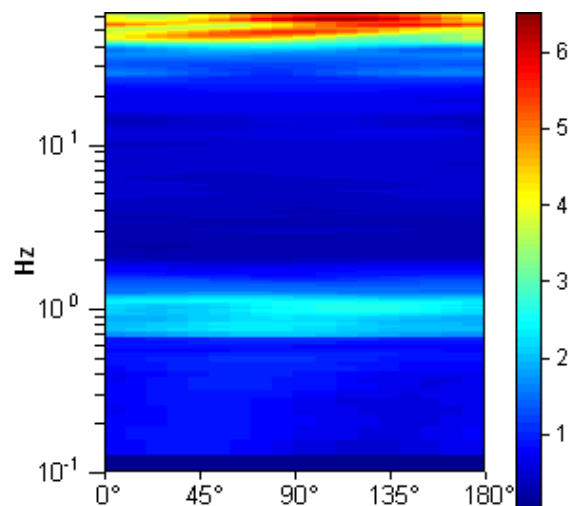
Max. H/V at  $1.06 \pm 0.04$  Hz. (In the range 0.0 - 40.0 Hz).



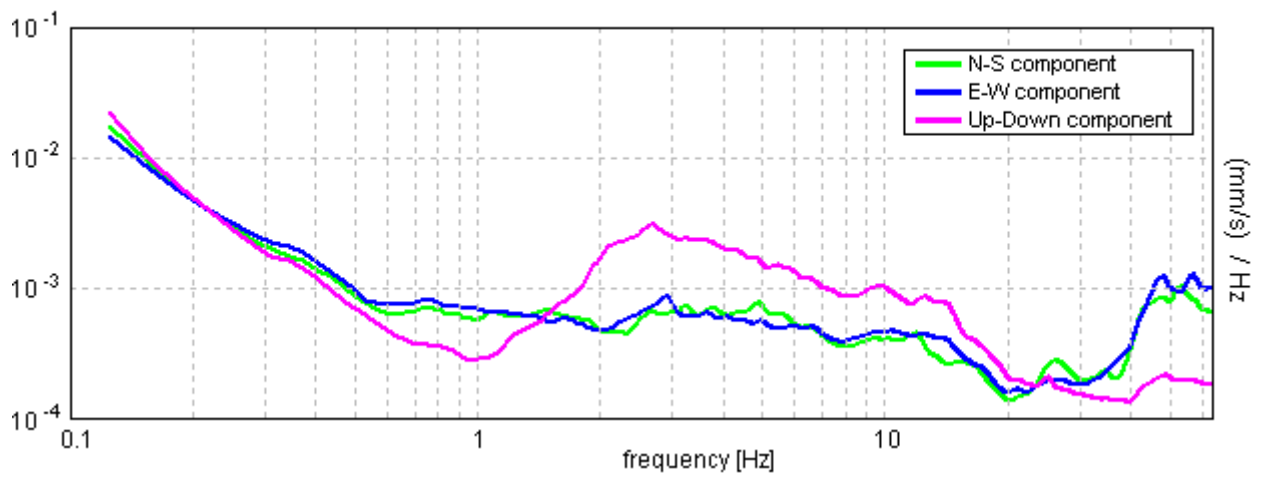
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.06 ± 0.04 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.06 > 0.50	OK	
$n_c(f_0) > 200$	1827.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 52 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.25 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.438 Hz	OK	
$A_0 > 2$	2.55 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01848  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.01964 < 0.10625	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1387 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0192			
<b>Coordinate</b>	UTM	4217834.30	N	359959.34	E
	Gauss Boaga	4217832.652	N	2379954.572	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		27/05/2014, 11:22			
<b>Nome file</b>		0192			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

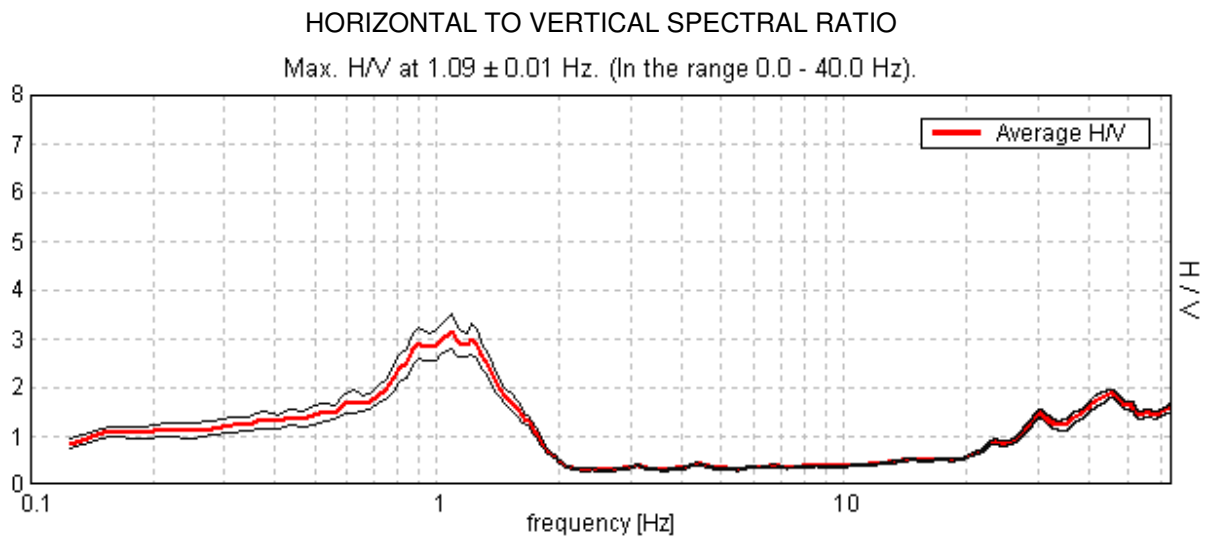
**Documentazione fotografica**



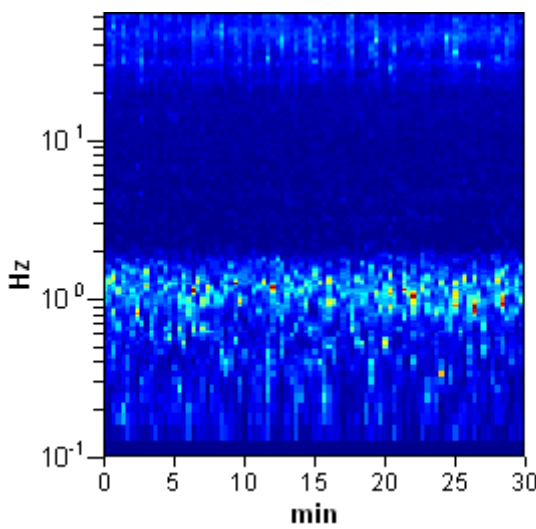
## TRIVELSICILIA PALERMO, PALERMO 0192

Start recording: 27/05/14 11:23:25      End recording: 27/05/14 11:53:26  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

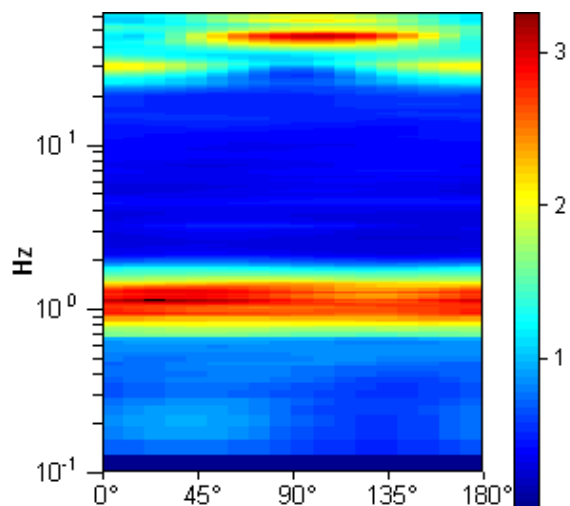
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



H/V TIME HISTORY

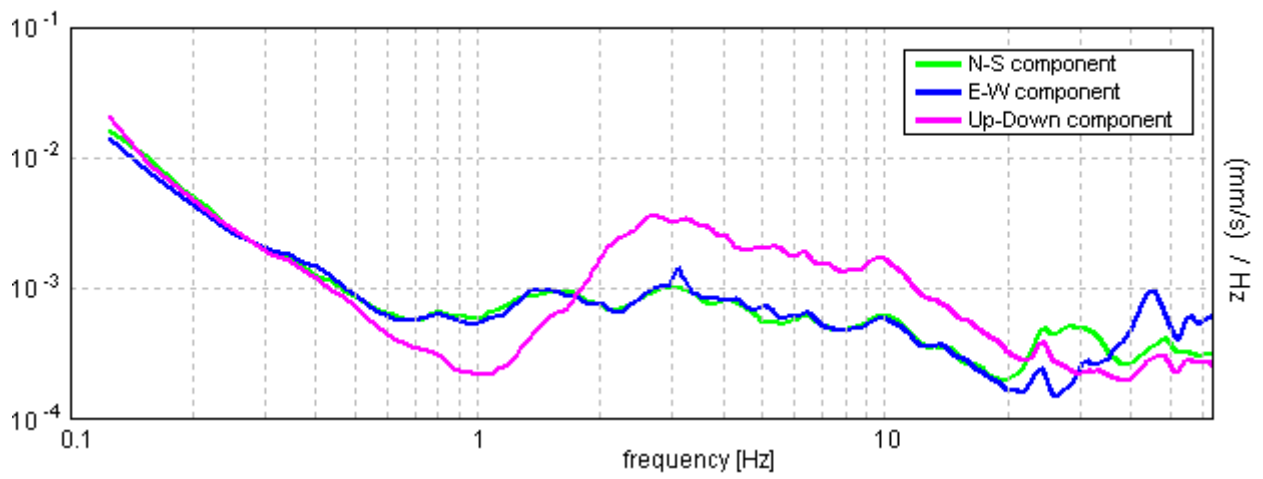


DIRECTIONAL H/V





### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.09 ± 0.01 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.09 > 0.50	OK	
$n_c(f_0) > 200$	1968.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 54 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.563 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.594 Hz	OK	
$A_0 > 2$	3.14 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.0051  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.00558 < 0.10938	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1857 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0193				
<b>Coordinate</b>	<i>UTM</i>	4217876.79	N	360357.22	E
	<i>Gauss Boaga</i>	4217875.152	N	2380352.469	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	27/05/2014, 10:45				
<b>Nome file</b>	0193				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

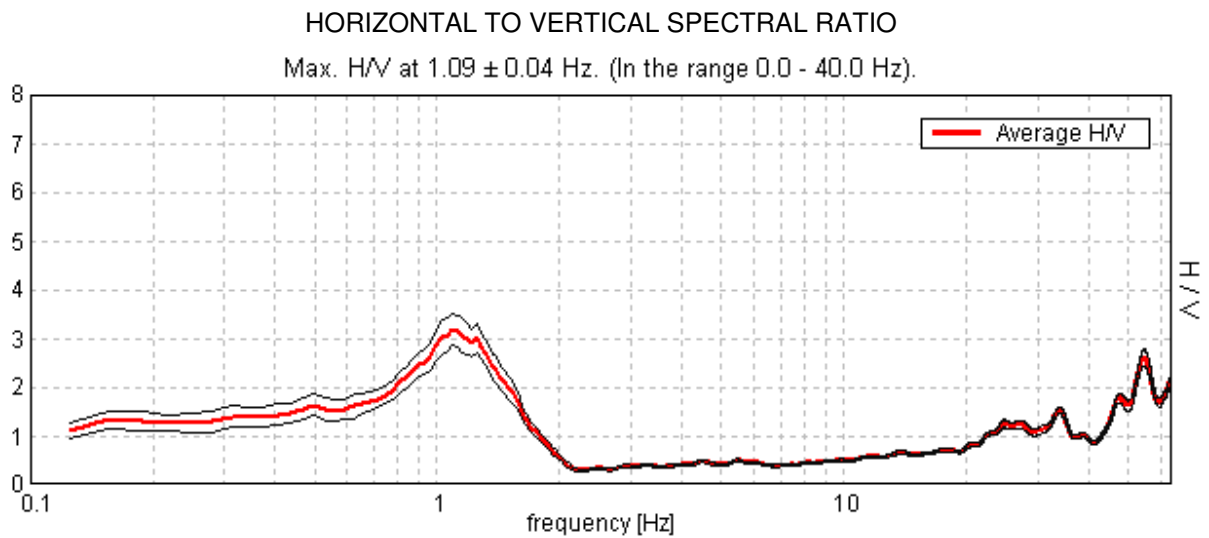
**Documentazione fotografica**



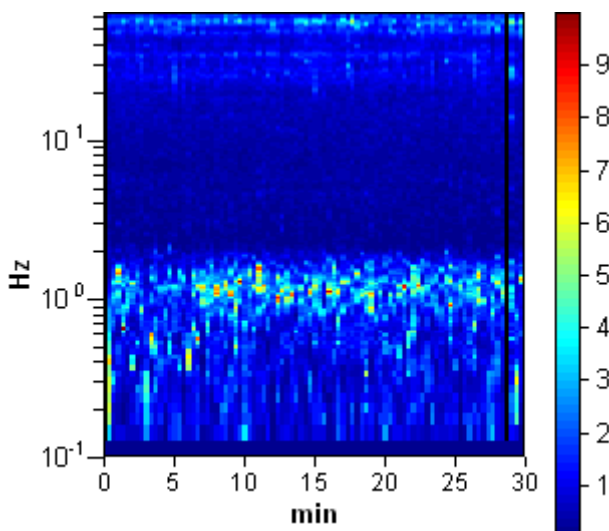
## TRIVELSICILIA PALERMO, PALERMO 0193

Start recording: 27/05/14 10:48:19      End recording: 27/05/14 11:18:20  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

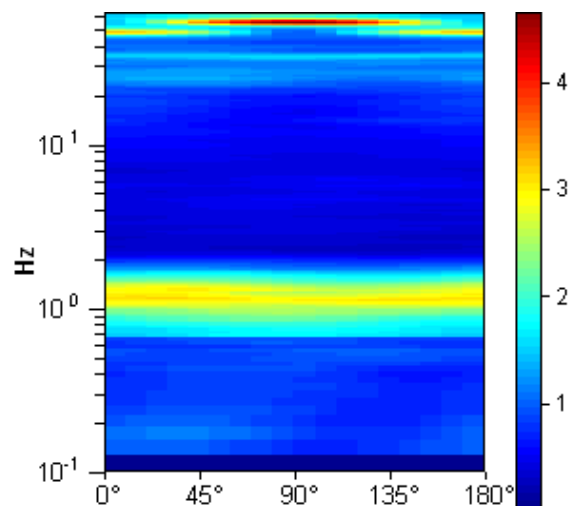
Trace length: 0h30'00".      Analyzed 98% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



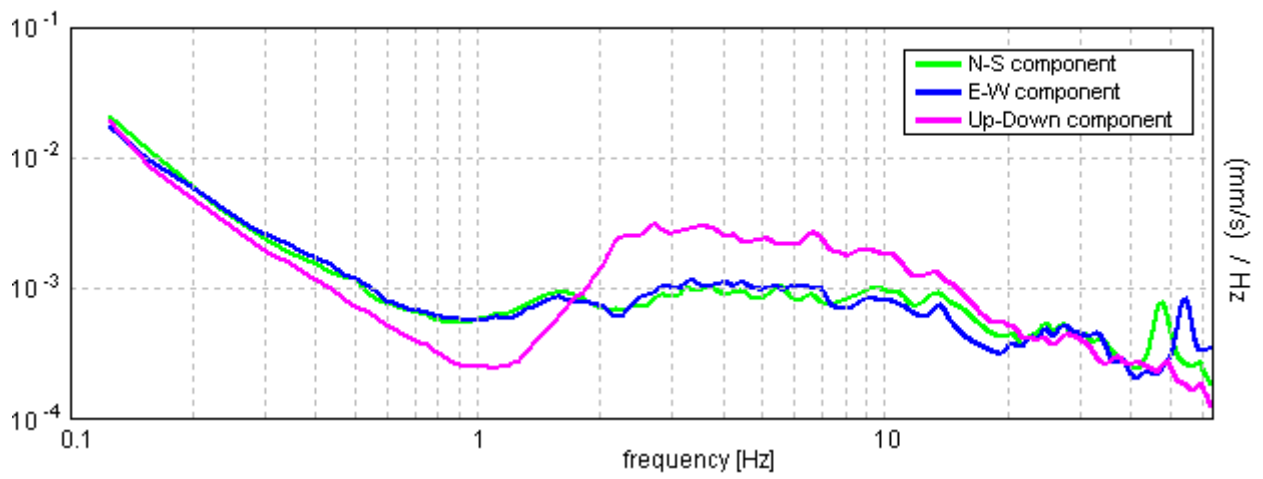
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.09 ± 0.04 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.09 > 0.50	OK	
$n_c(f_0) > 200$	1925.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 54 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.594 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.625 Hz	OK	
$A_0 > 2$	3.17 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01675  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.01832 < 0.10938	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1571 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0194			
<b>Coordinate</b>	UTM	4217884.91	N	360783.75	E
	Gauss Boaga	4217883.280	N	2380779.017	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		27/05/2014, 10:05			
<b>Nome file</b>		0194			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

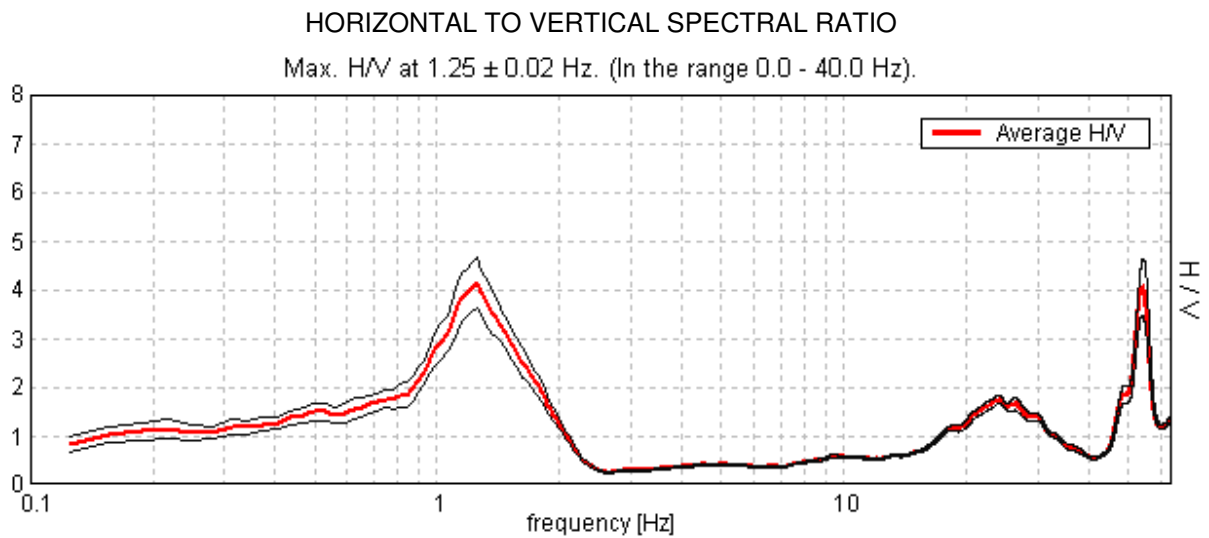
**Documentazione fotografica**



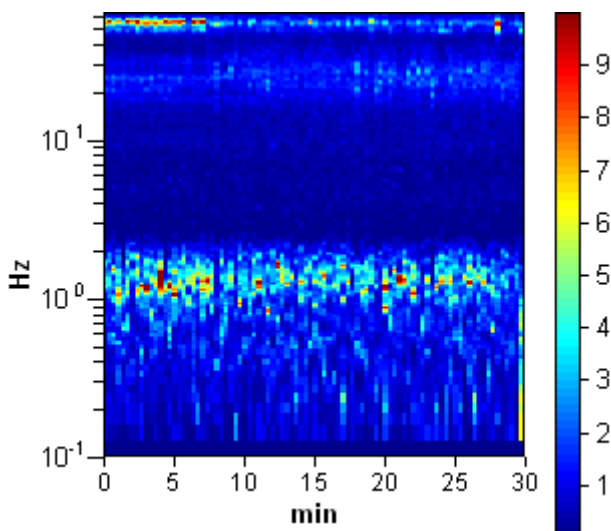
## TRIVELSICILIA PALERMO, PALERMO 0194

Start recording: 27/05/14 10:07:16      End recording: 27/05/14 10:37:16  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

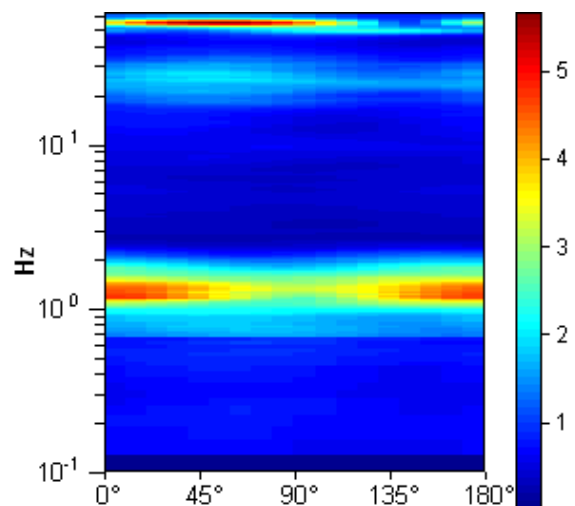
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



H/V TIME HISTORY

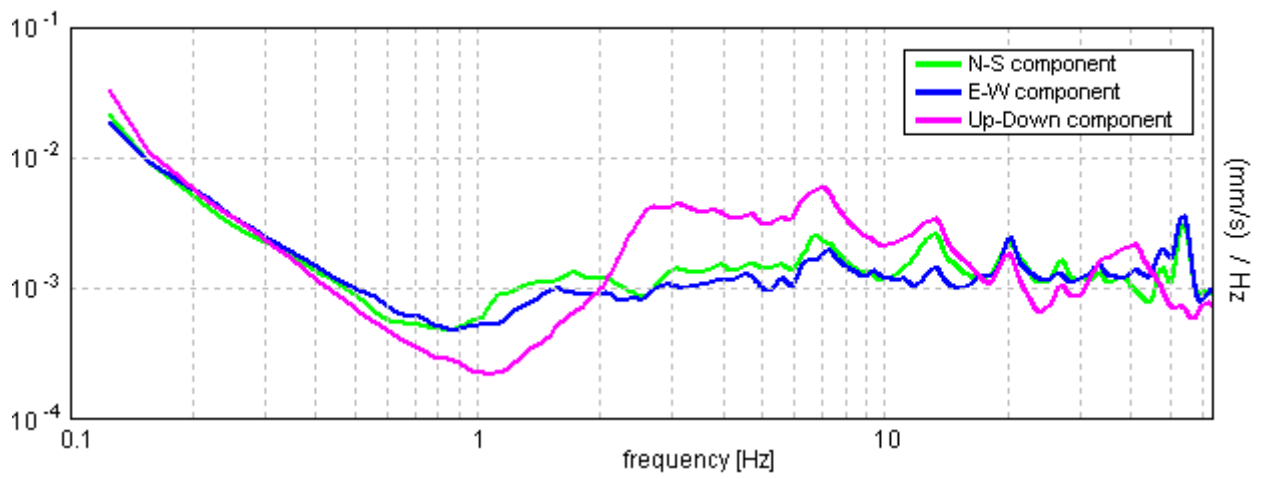


DIRECTIONAL H/V





SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $1.25 \pm 0.02$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.25 > 0.50$	OK	
$n_c(f_0) > 200$	$2250.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 61 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.875 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	1.781 Hz	OK	
$A_0 > 2$	$4.14 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.0081  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01012 < 0.125$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2622 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

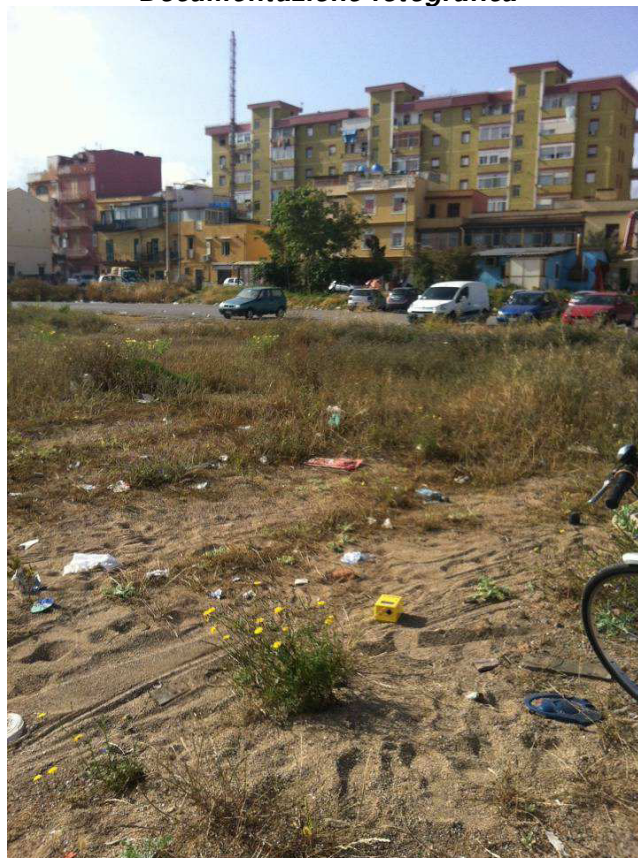


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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0195			
<b>Coordinate</b>	UTM	4217878.33	N	361168.60	E
	Gauss Boaga	4217876.707	N	2381163.884	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		28/05/2014, 08:42			
<b>Nome file</b>		0195			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

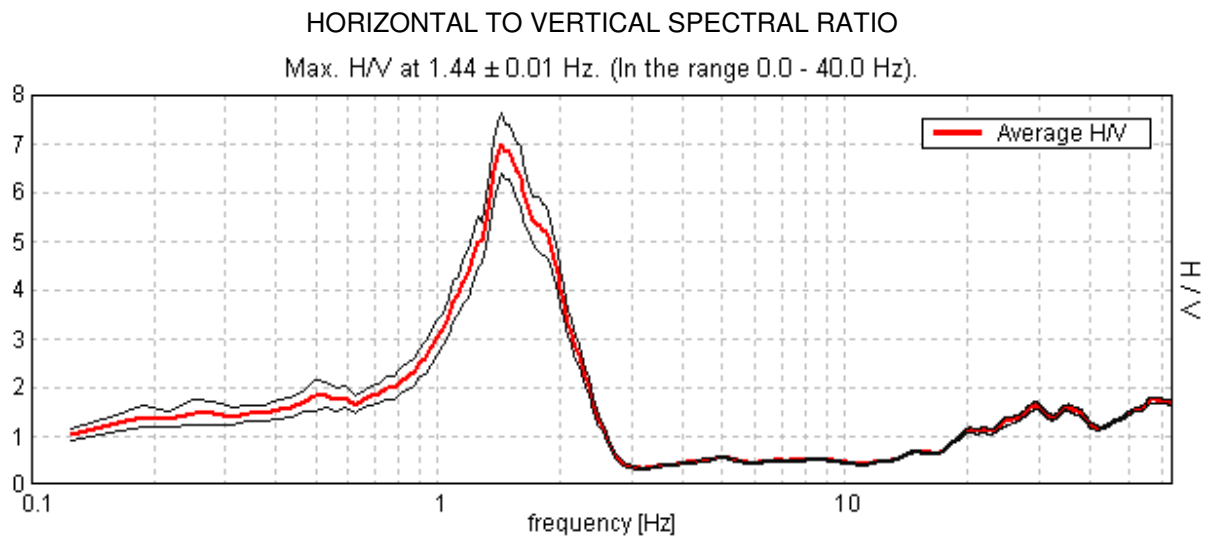
**Documentazione fotografica**



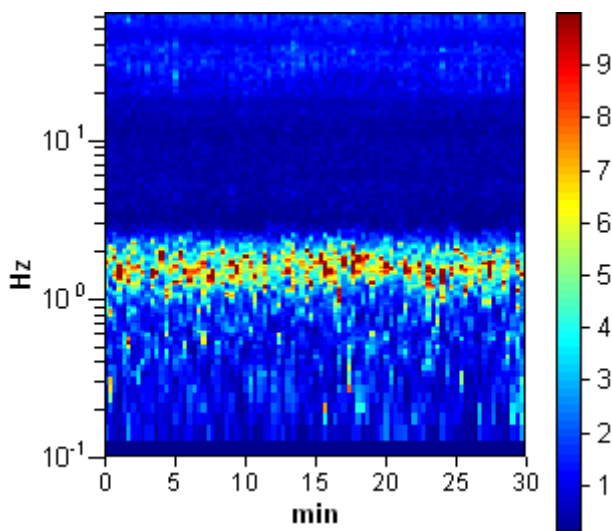
## TRIVELSICILIA PALERMO, PALERMO 0195

Start recording: 28/05/14 08:50:14      End recording: 28/05/14 09:20:15  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

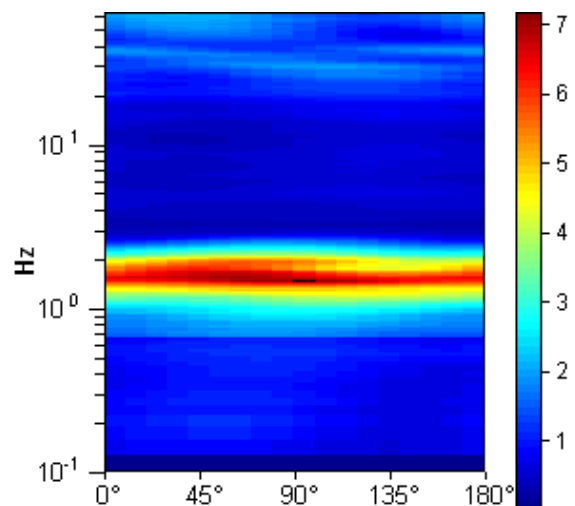
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



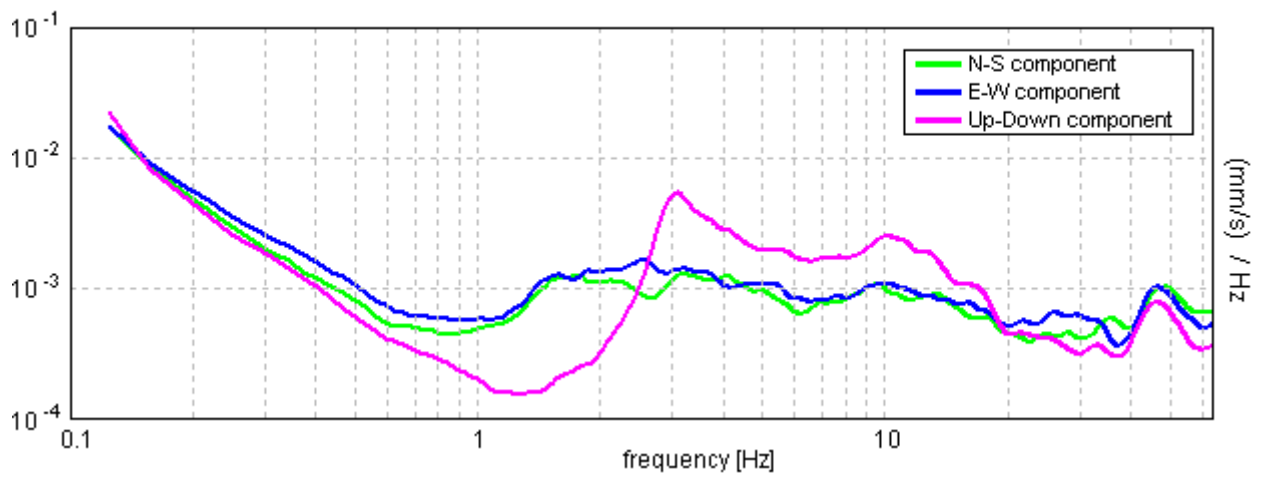
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.44 ± 0.01 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.44 > 0.50	OK	
$n_c(f_0) > 200$	2587.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 70 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	1.063 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.094 Hz	OK	
$A_0 > 2$	7.00 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00346  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.00497 < 0.14375	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.313 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0196				
<b>Coordinate</b>	<i>UTM</i>	4217748.71	N	361556.24	E
	<i>Gauss Boaga</i>	4217747.088	N	2381551.544	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	28/05/2014, 09:30				
<b>Nome file</b>	0196				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



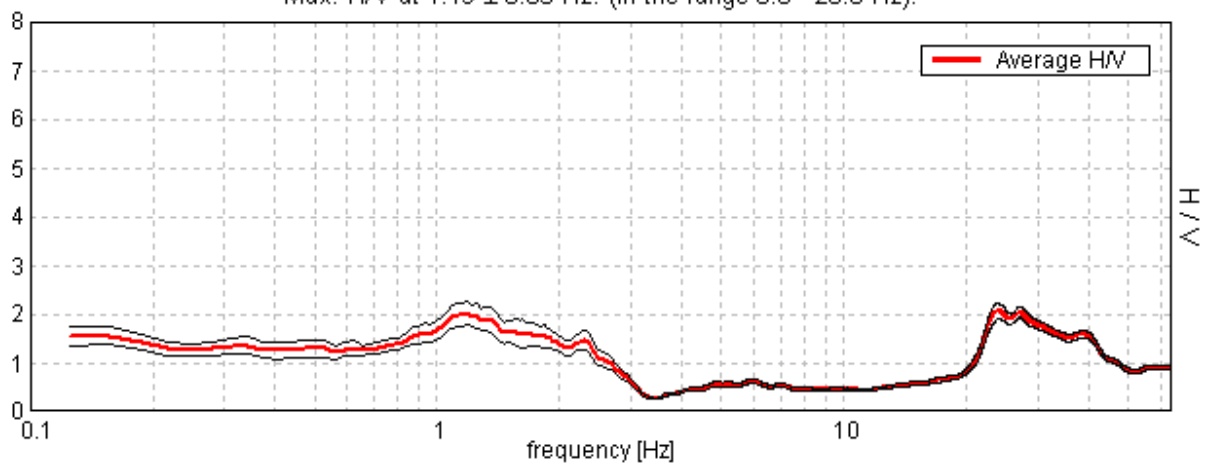
## TRIVELSICILIA PALERMO, PALERMO 0196

Start recording: 28/05/14 09:38:43      End recording: 28/05/14 10:08:44  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

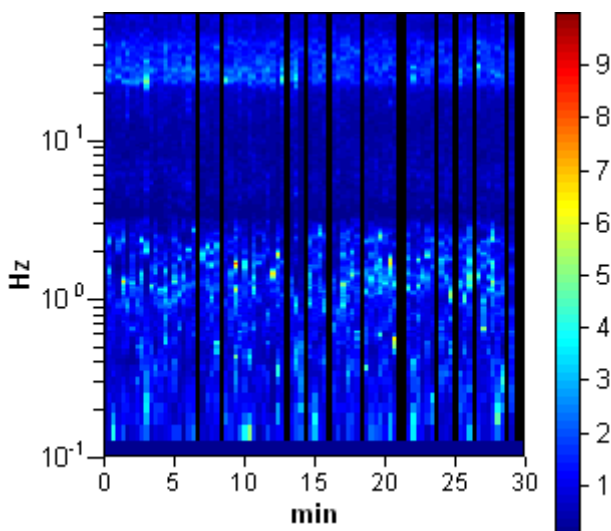
Trace length: 0h30'00".      Analyzed 84% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

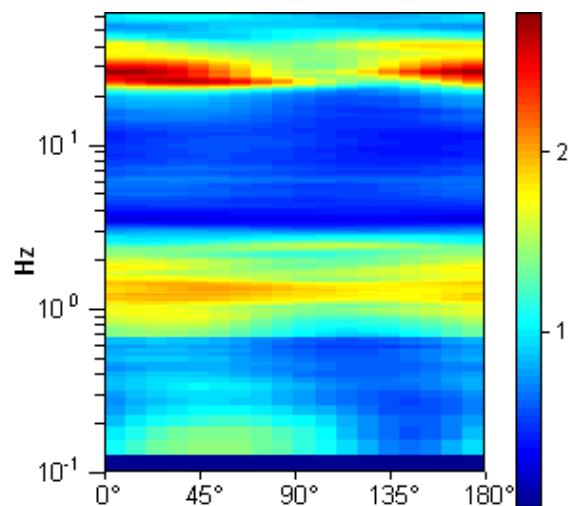
Max. H/V at  $1.19 \pm 0.05$  Hz. (In the range 0.0 - 20.0 Hz).



### H/V TIME HISTORY

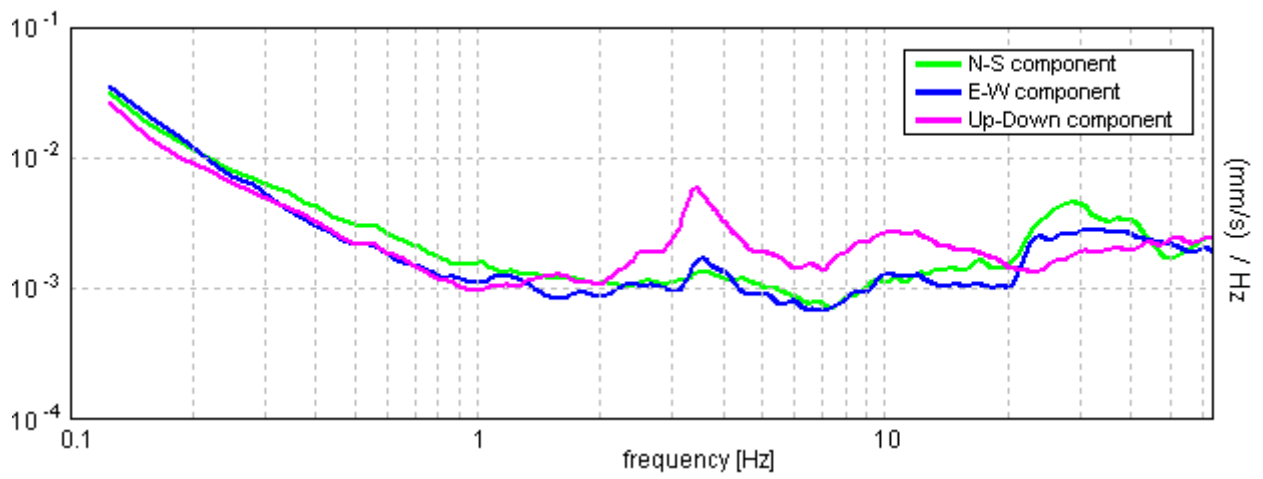


### DIRECTIONAL H/V





### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.19 ± 0.05 Hz. (in the range 0.0 - 20.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.19 > 0.50	OK	
$n_c(f_0) > 200$	1805.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 58 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.656 Hz	OK	
$A_0 > 2$	2.03 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02297  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02727 < 0.11875$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1188 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0197				
<b>Coordinate</b>	<i>UTM</i>	4217895.49	N	361972.94	E
	<i>Gauss Boaga</i>	4217893.882	N	2381968.259	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	28/05/2014, 10:45				
<b>Nome file</b>	0197				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Strada sterrata				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>No</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>Moto ondoso</b>			

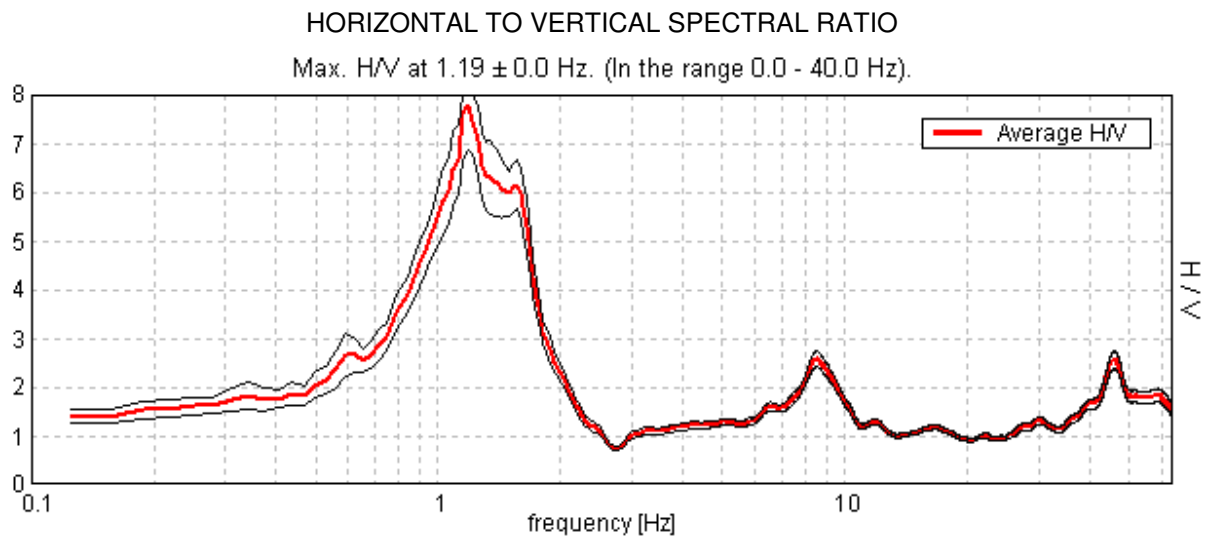
**Documentazione fotografica**



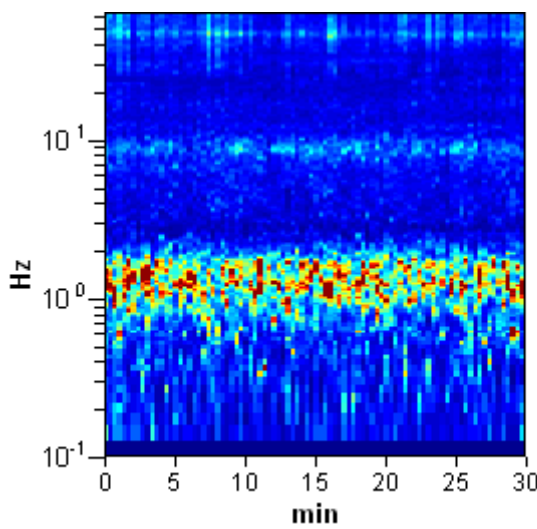
## TRIVELSICILIA PALERMO, PALERMO 0197

Start recording: 28/05/14 10:53:16      End recording: 28/05/14 11:23:17  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

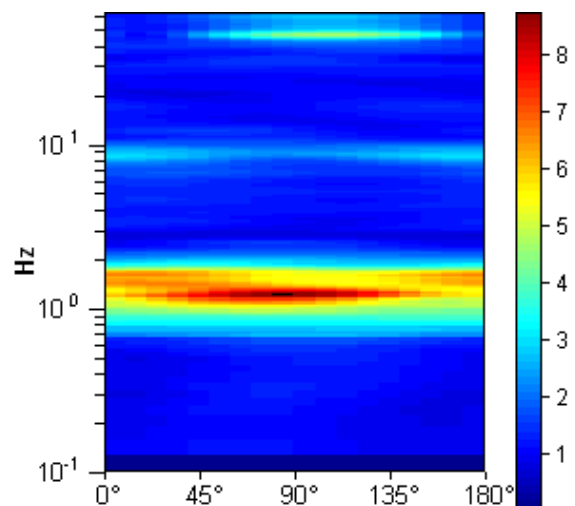
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



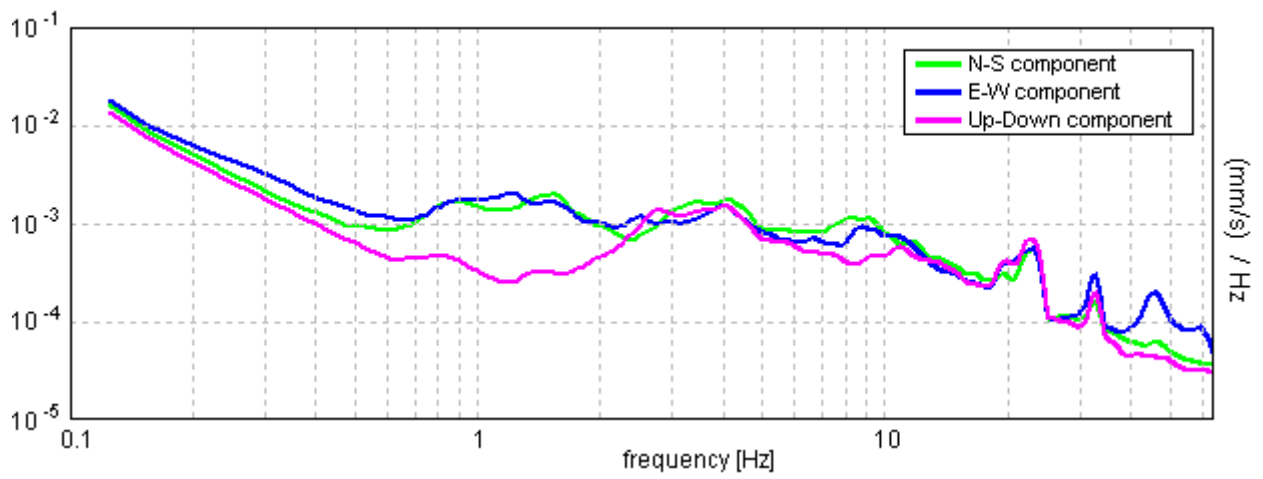
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.19 ± 0.0 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.19 > 0.50	OK	
$n_c(f_0) > 200$	2137.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 58 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.813 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	1.75 Hz	OK	
$A_0 > 2$	7.78 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00113  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.00134 < 0.11875$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.4606 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>				
<b>Nome base sismica</b>	0198				
<b>Coordinate</b>	<i>UTM</i>	4217828.06	N	362312.90	E
	<i>Gauss Boaga</i>	4217826.456	N	2382308.236	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	28/05/2014, 10:10				
<b>Nome file</b>	0198				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Strada sterrata				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>No</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>Moto ondoso</b>			

**Documentazione fotografica**



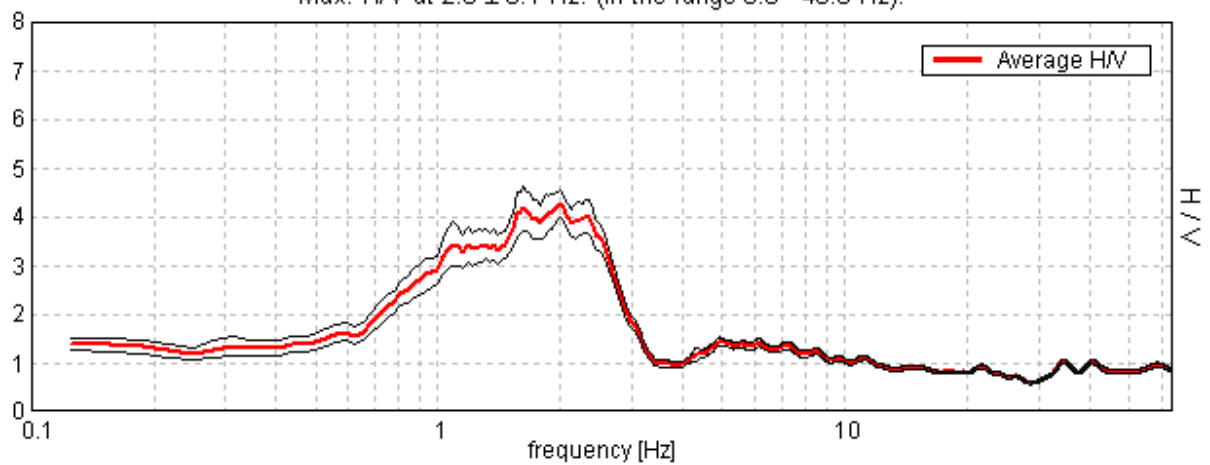
## TRIVELSICILIA PALERMO, PALERMO 0198

Start recording: 28/05/14 10:17:57      End recording: 28/05/14 10:47:58  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

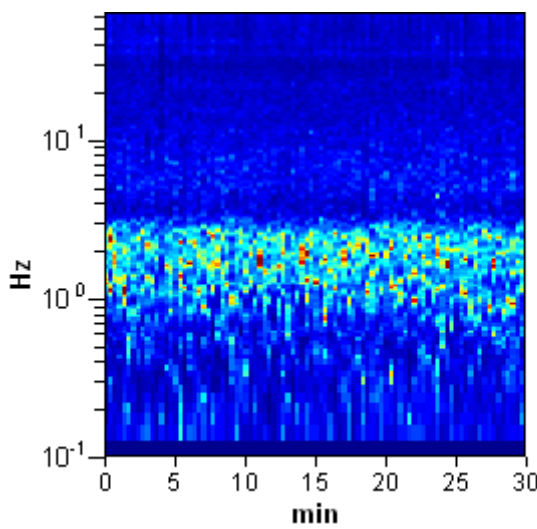
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

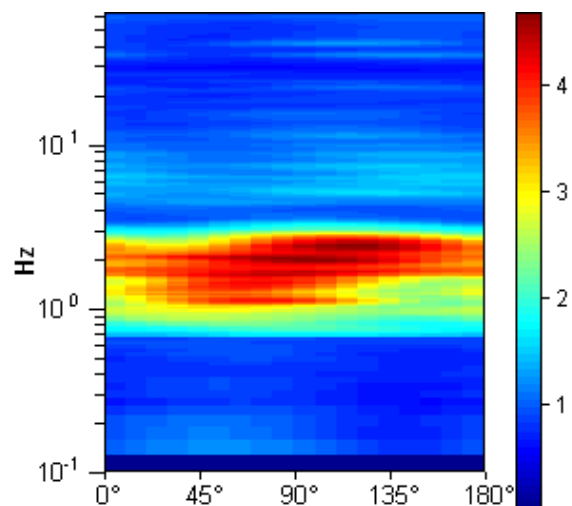
Max. H/V at  $2.0 \pm 0.1$  Hz. (In the range 0.0 - 40.0 Hz).



### H/V TIME HISTORY

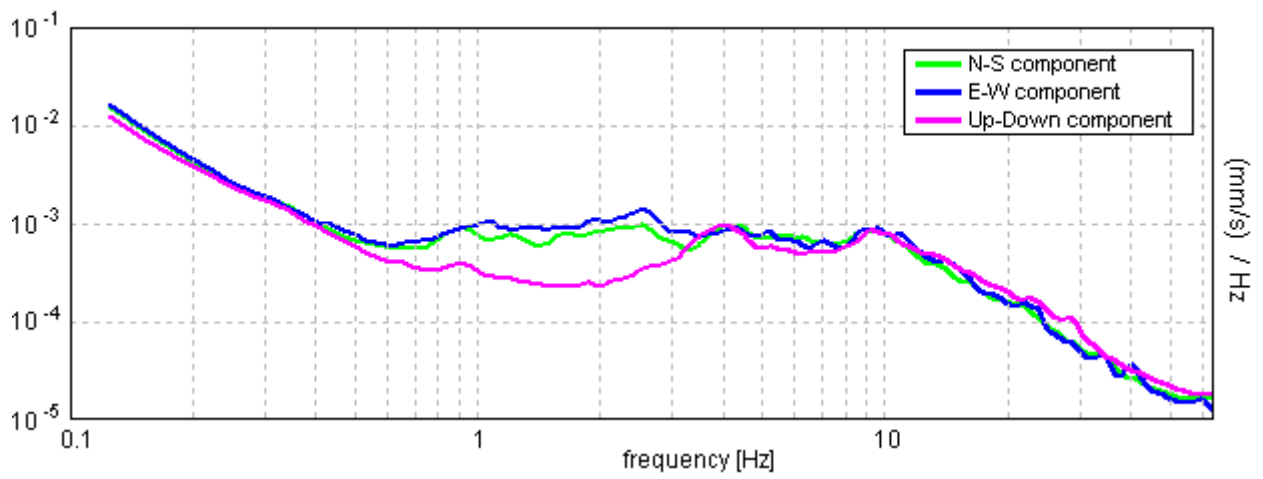


### DIRECTIONAL H/V





SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $2.0 \pm 0.1$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$2.00 > 0.50$	OK	
$n_c(f_0) > 200$	$3600.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 97 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.719 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.906 Hz	OK	
$A_0 > 2$	$4.25 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02429  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.04858 < 0.1$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1437 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0199				
<b>Coordinate</b>	<i>UTM</i>	4217493.61	N	363866.66	E
	<i>Gauss Boaga</i>	4217492.020	N	2383862.071	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	28/05/2014, 13:55				
<b>Nome file</b>	0199				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Spiaggia				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>No</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>Moto ondoso</b>			

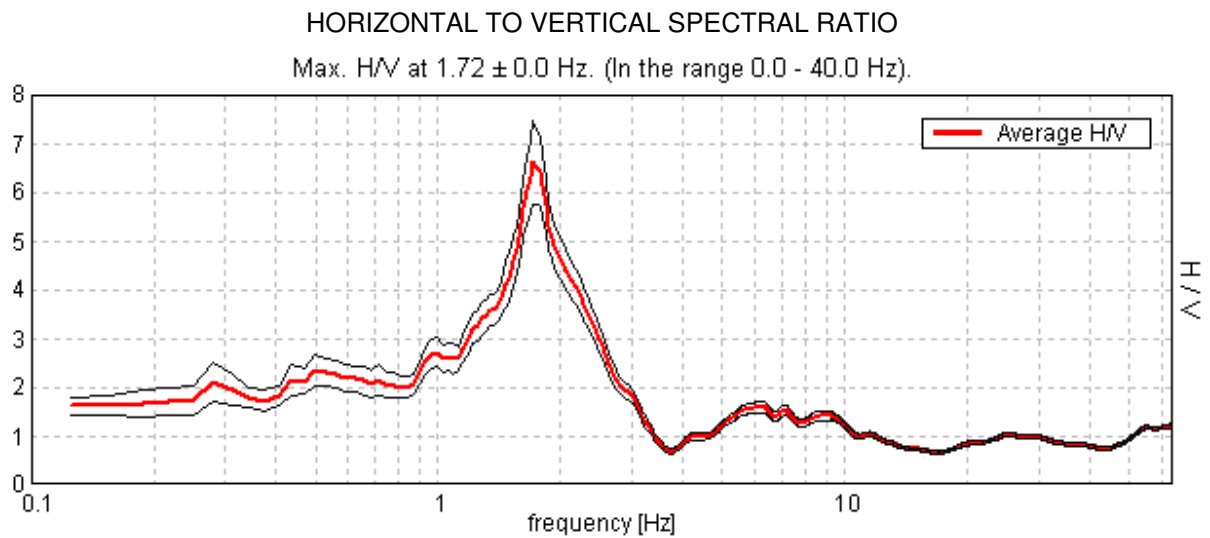
**Documentazione fotografica**



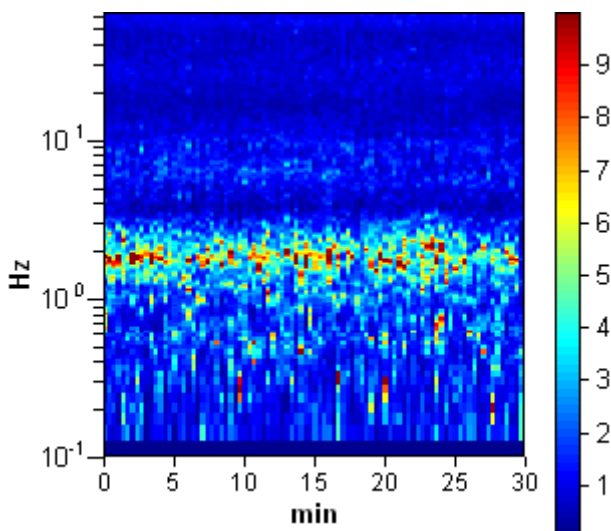
## TRIVELSICILIA PALERMO, PALERMO 0199

Start recording: 28/05/14 14:02:42      End recording: 28/05/14 14:32:43  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

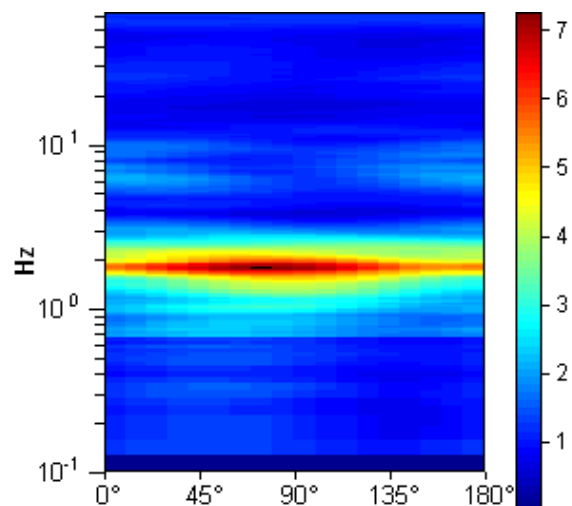
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



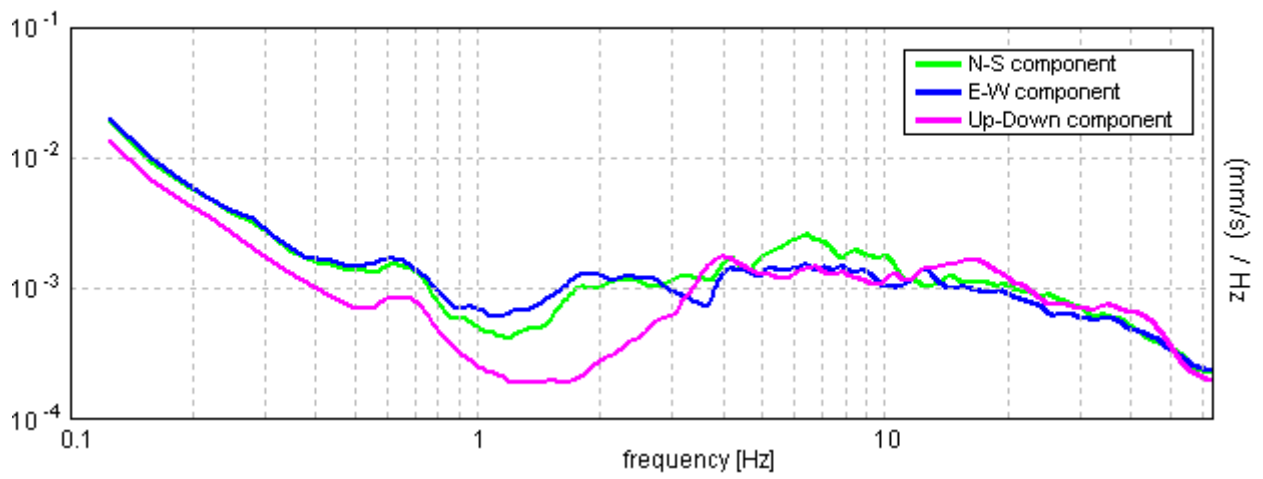
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.72 ± 0.0 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.72 > 0.50	OK	
$n_c(f_0) > 200$	3093.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 84 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	1.25 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.406 Hz	OK	
$A_0 > 2$	6.61 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00086  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.00147 < 0.17188$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.4307 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0200				
<b>Coordinate</b>	<i>UTM</i>	4217470.36	N	363598.24	E
	<i>Gauss Boaga</i>	4217468.764	N	2383593.639	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	28/05/2014, 12:39				
<b>Nome file</b>	0200				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Spiaggia				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>No</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>Moto ondoso</b>			

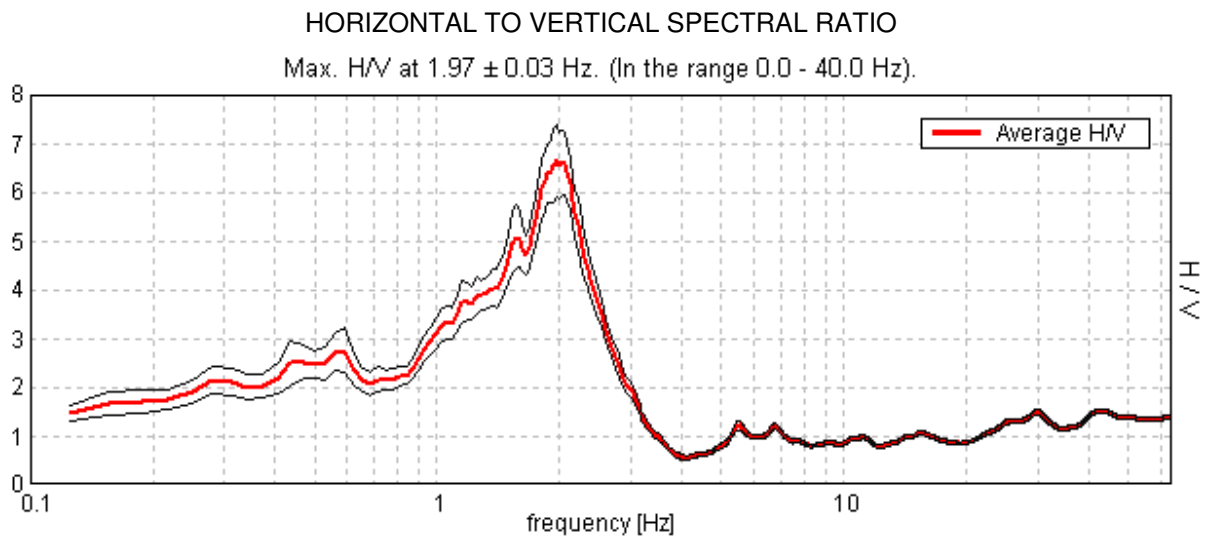
**Documentazione fotografica**



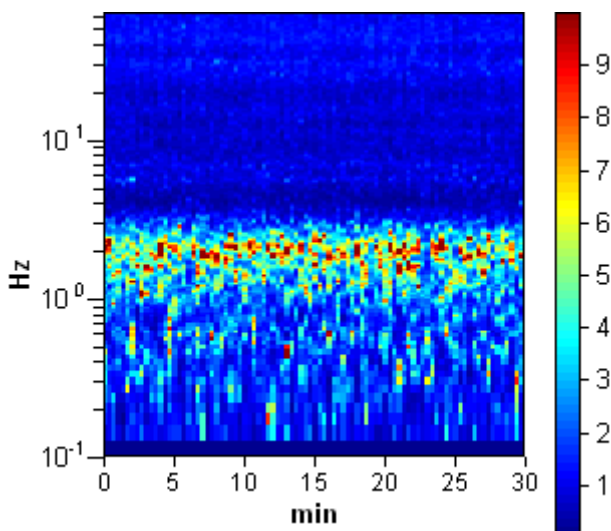
## TRIVELSICILIA PALERMO, PALERMO 0200

Start recording: 28/05/14 12:46:52      End recording: 28/05/14 13:16:53  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

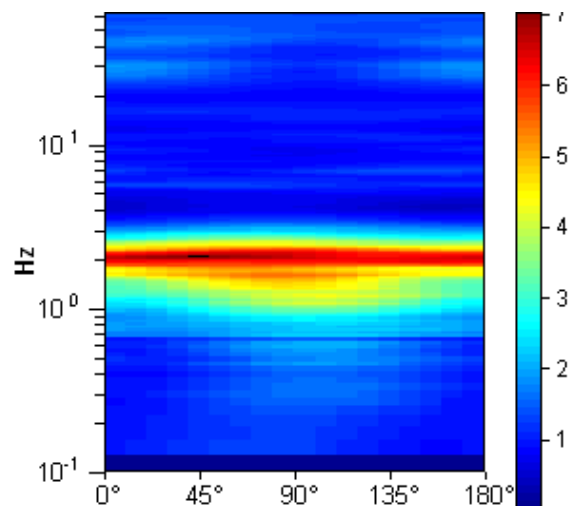
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



H/V TIME HISTORY

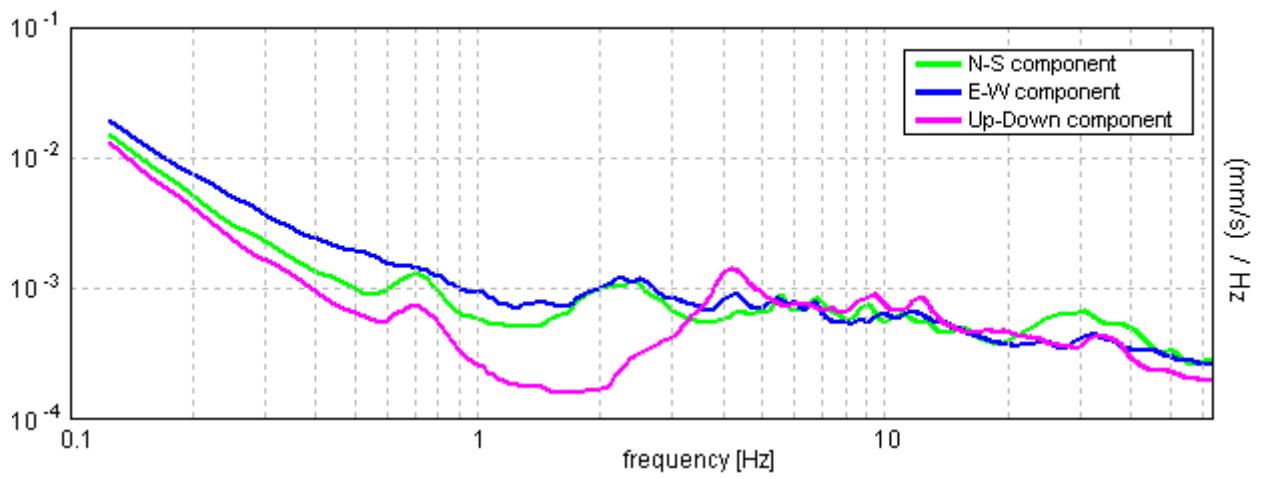


DIRECTIONAL H/V





### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.97 ± 0.03 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.97 > 0.50	OK	
$n_c(f_0) > 200$	3543.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 96 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	1.094 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.594 Hz	OK	
$A_0 > 2$	6.64 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00719  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.01416 < 0.19688	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.3721 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0201				
<b>Coordinate</b>	<i>UTM</i>	4217471.34	N	363355.82	E
	<i>Gauss Boaga</i>	4217469.739	N	2383351.209	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	28/05/2014, 13:15				
<b>Nome file</b>	0201				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Spiaggia				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>No</b>			
	<b>Pedoni</b>	<b>No</b>			
	<b>Altro</b>	<b>Moto ondoso</b>			

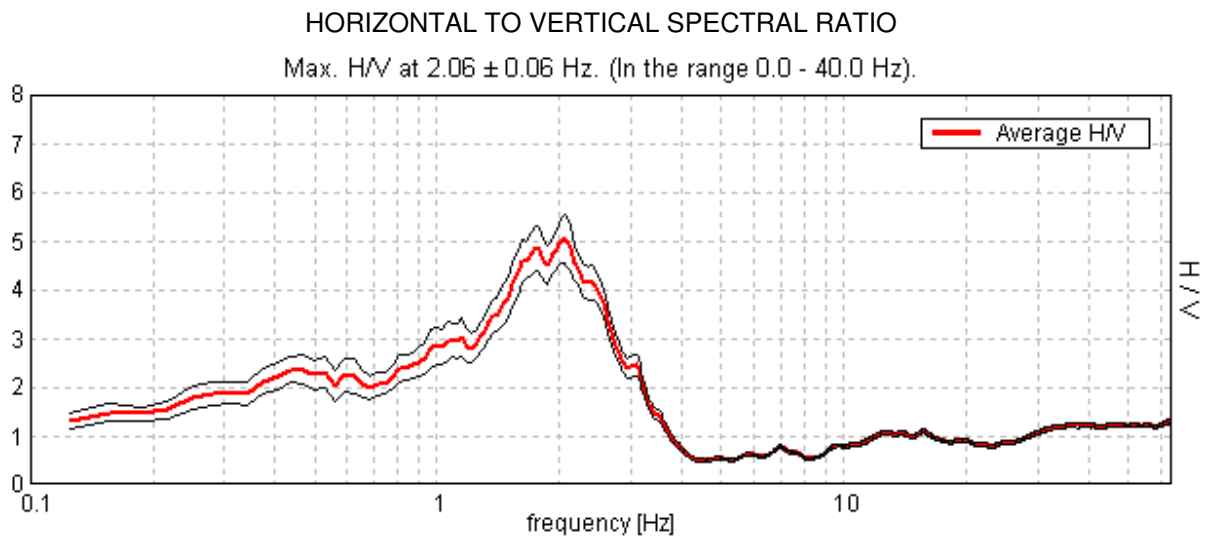
**Documentazione fotografica**



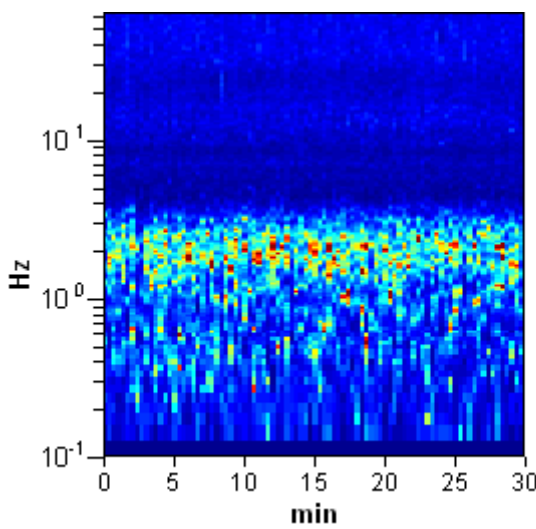
## TRIVELSICILIA PALERMO, PALERMO 0201

Start recording: 28/05/14 13:23:35      End recording: 28/05/14 13:53:36  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

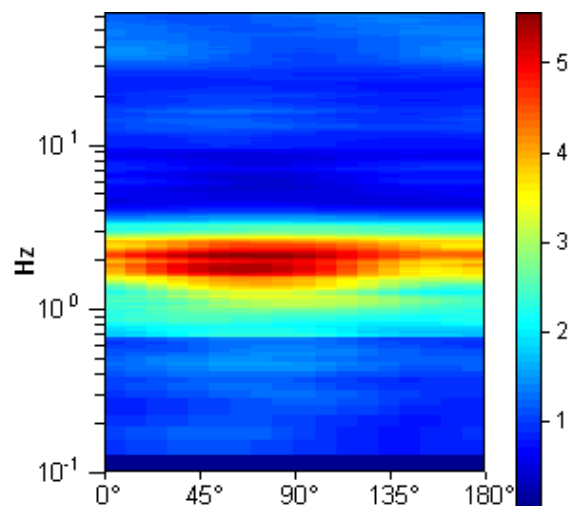
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



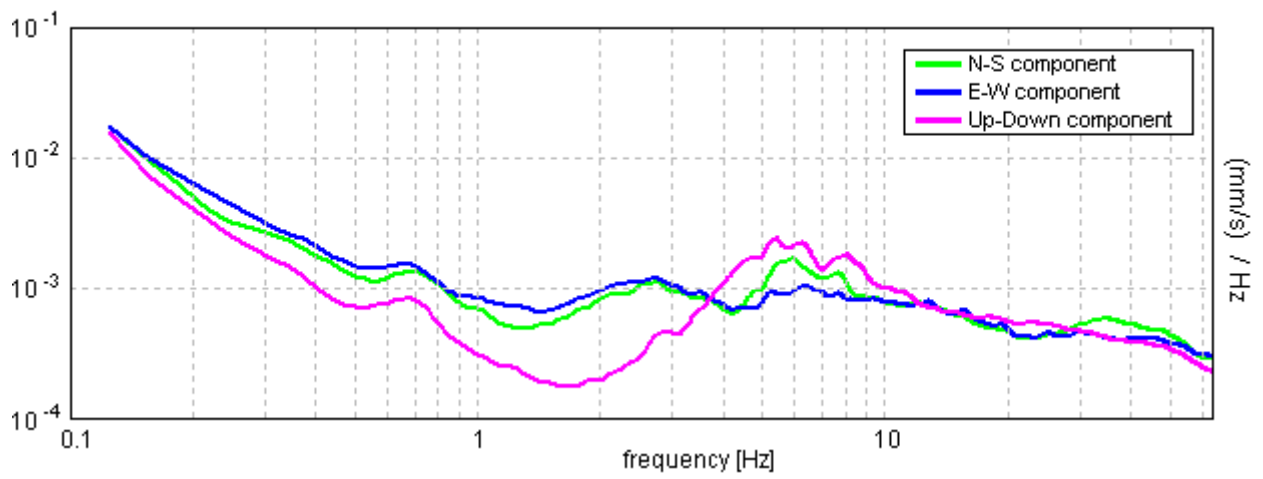
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 2.06 ± 0.06 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.06 > 0.50	OK	
$n_c(f_0) > 200$	3712.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 100 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.906 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.875 Hz	OK	
$A_0 > 2$	5.05 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01353  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.0279 < 0.10313	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.2537 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0202				
<b>Coordinate</b>	<i>UTM</i>	4217452.01	N	362672.03	E
	<i>Gauss Boaga</i>	4217450.396	N	2382667.389	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	28/05/2014, 11:24				
<b>Nome file</b>	0202				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

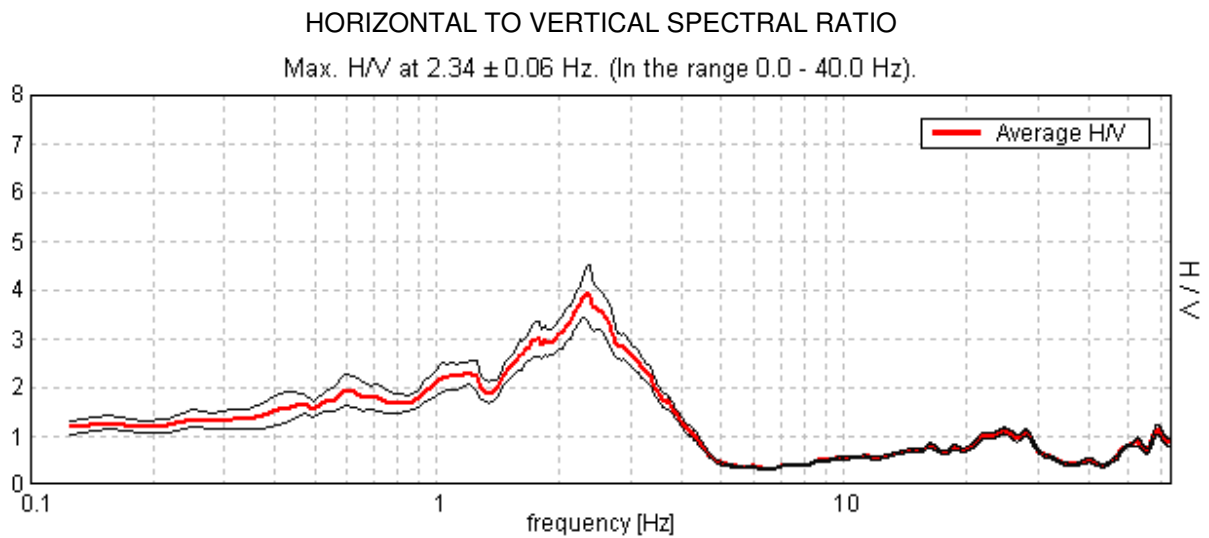
**Documentazione fotografica**



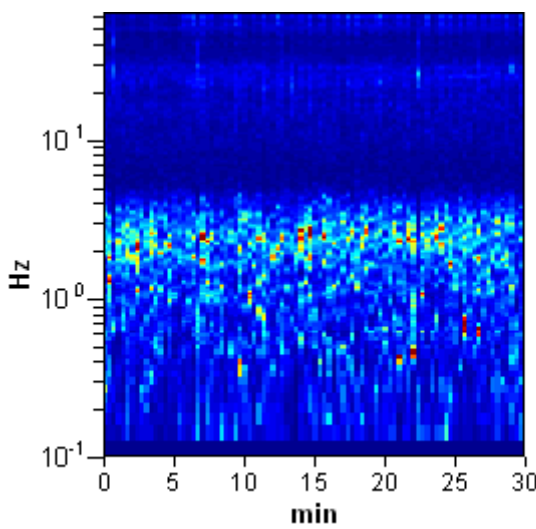
## TRIVELSICILIA PALERMO, PALERMO 0202

Start recording: 28/05/14 11:32:03      End recording: 28/05/14 12:02:04  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

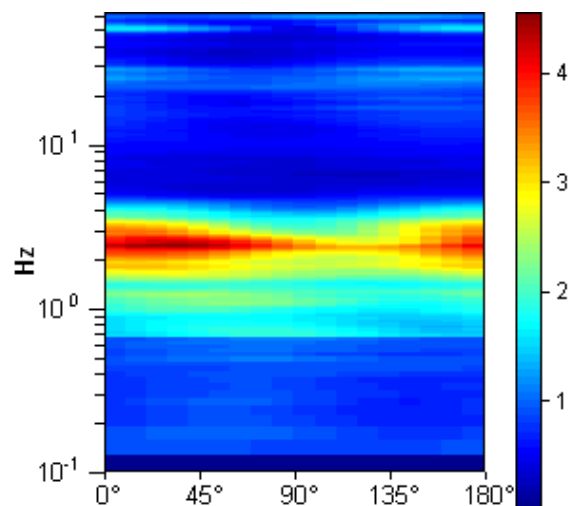
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



H/V TIME HISTORY

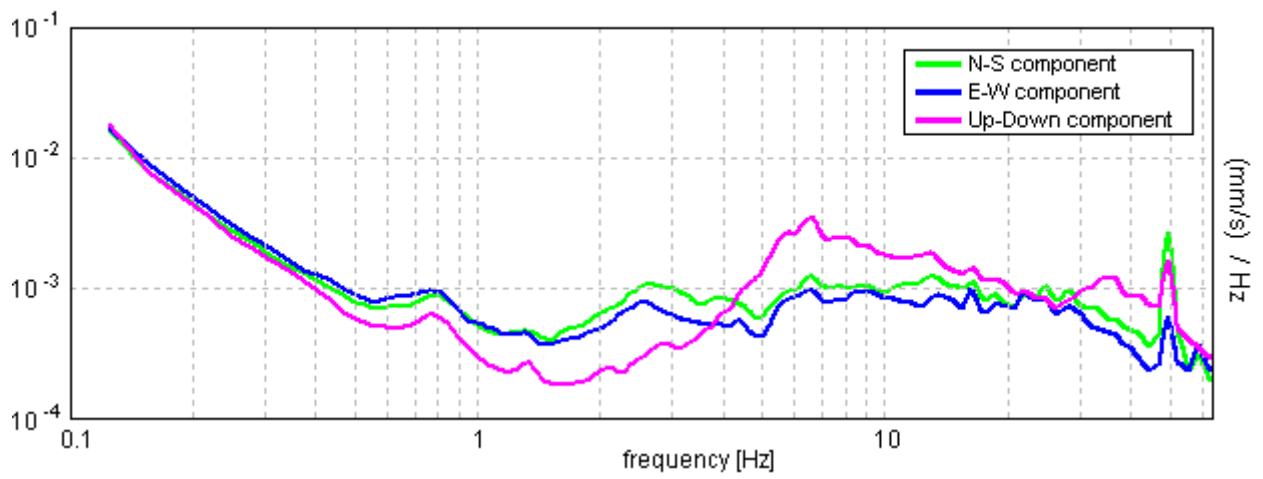


DIRECTIONAL H/V





SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 2.34 ± 0.06 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.34 > 0.50	OK	
$n_c(f_0) > 200$	4218.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 114 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	1.375 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	3.469 Hz	OK	
$A_0 > 2$	3.93 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01262  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02959 < 0.11719$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2932 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0203				
<b>Coordinate</b>	<i>UTM</i>	4217396.54	N	362305.60	E
	<i>Gauss Boaga</i>	4217394.916	N	2382300.944	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	28/05/2014, 14:52				
<b>Nome file</b>	0203				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



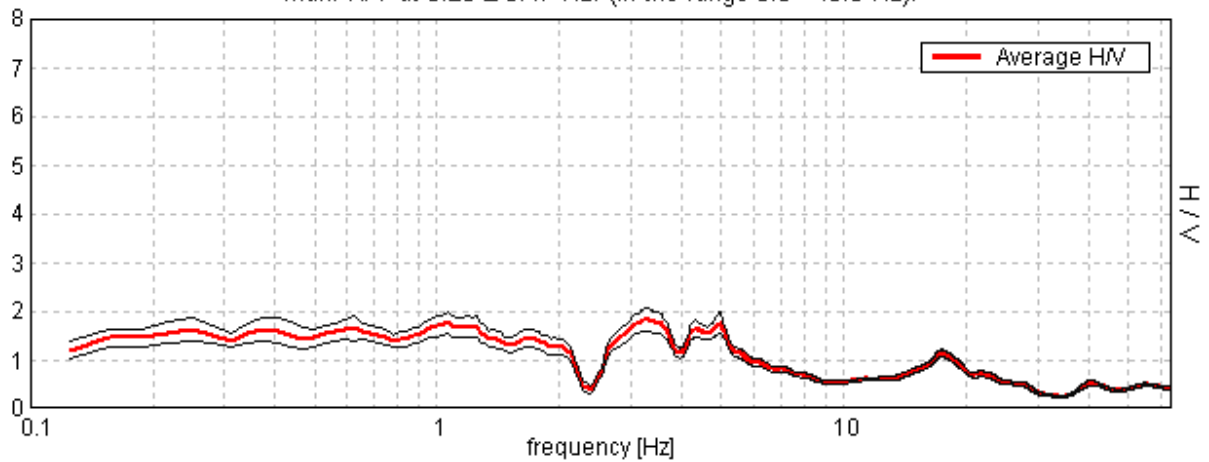
## TRIVELSICILIA PALERMO, PALERMO 0203

Start recording: 28/05/14 15:00:31      End recording: 28/05/14 15:30:32  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

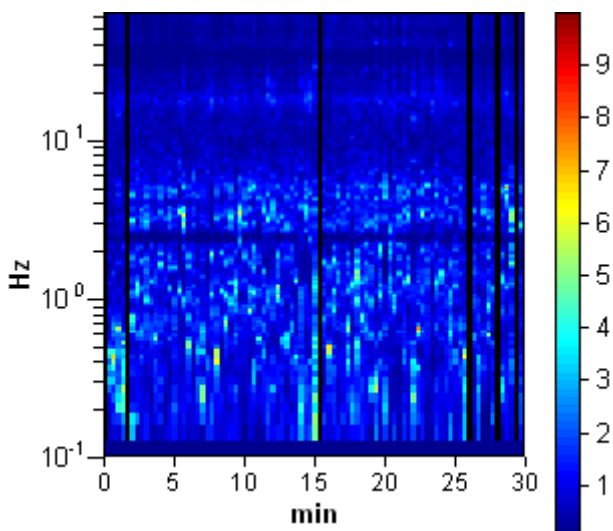
Trace length: 0h30'00".      Analyzed 93% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

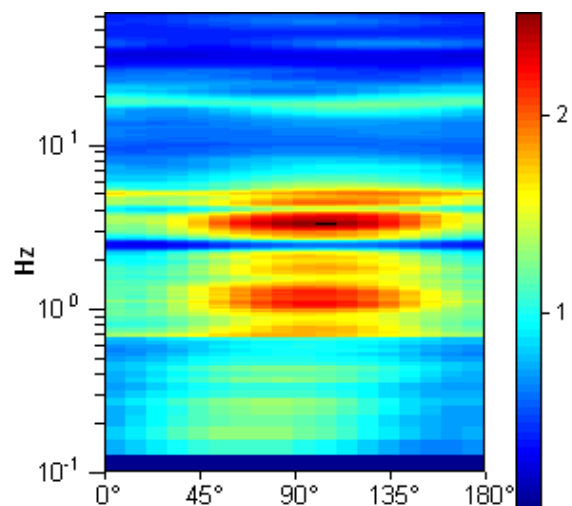
Max. H/V at  $3.28 \pm 0.47$  Hz. (In the range 0.0 - 40.0 Hz).



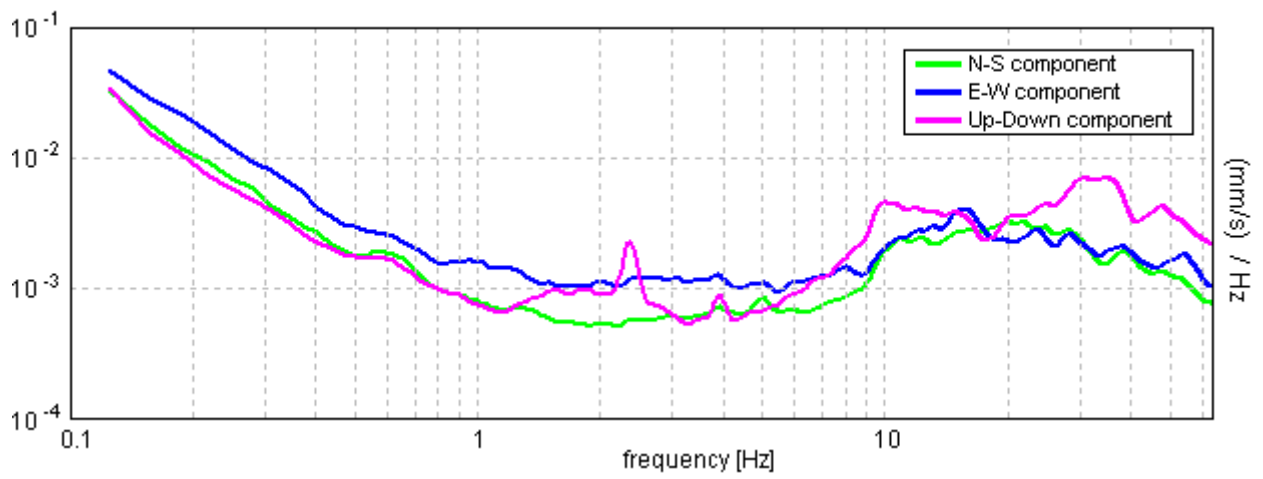
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $3.28 \pm 0.47$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$3.28 > 0.50$	OK	
$n_c(f_0) > 200$	$5512.5 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 158 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	2.563 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	6.344 Hz	OK	
$A_0 > 2$	$1.83 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.07182  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.23566 < 0.16406$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.1168 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Nome base sismica</b>		0204			
<b>Coordinate</b>	<i>UTM</i>	4217557.26	N	361918.47	E
	<i>Gauss Boaga</i>	4217555.636	N	2381913.794	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		29/05/2014, 14:38			
<b>Nome file</b>		0204			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

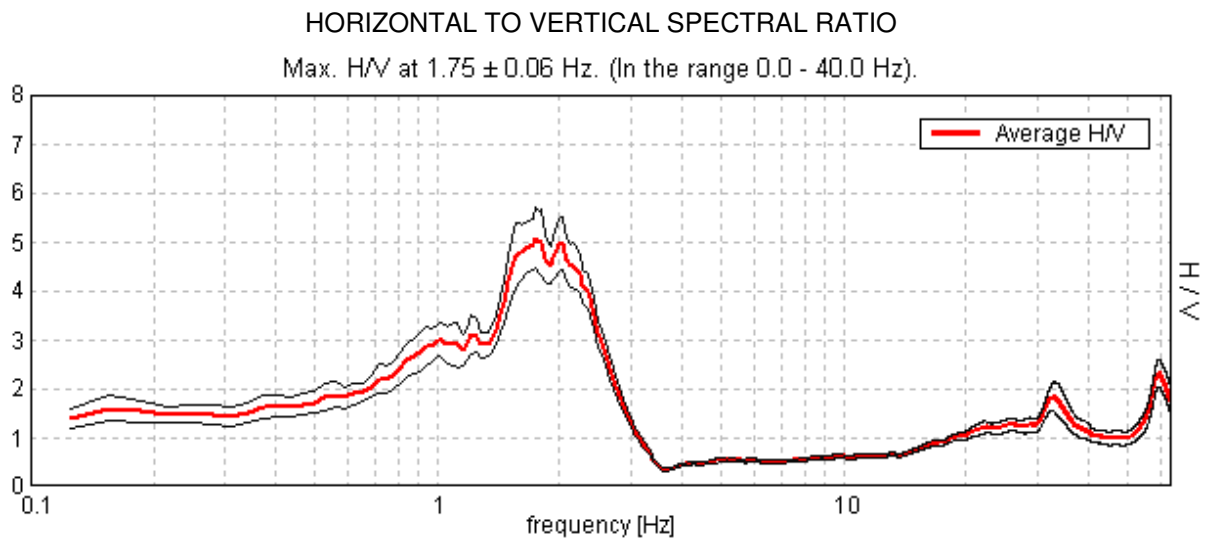
**Documentazione fotografica**



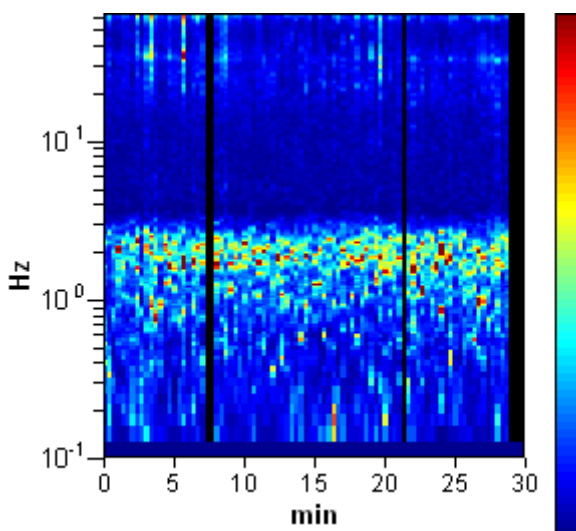
## TRIVEL SICILIA PALERMO, PALERMO TR 0204

Start recording: 29/05/14 14:46:34      End recording: 29/05/14 15:16:35  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

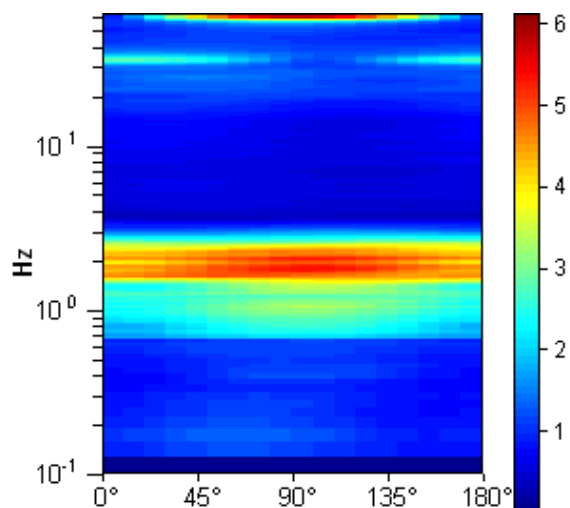
Trace length: 0h30'00".      Analyzed 93% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



H/V TIME HISTORY

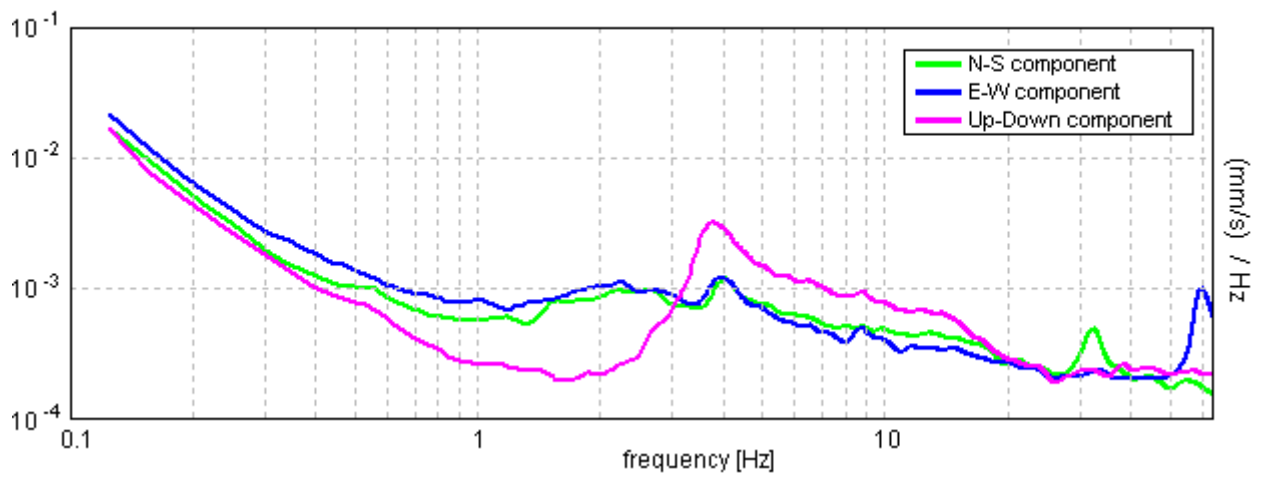


DIRECTIONAL H/V





SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.75 ± 0.06 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.75 > 0.50	OK	
$n_c(f_0) > 200$	2940.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 85 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.813 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.656 Hz	OK	
$A_0 > 2$	5.07 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.0183  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.03202 < 0.175	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.3063 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0205			
<b>Coordinate</b>	UTM	4217532.64	N	361552.56	E
	Gauss Boaga	4217531.009	N	2381547.868	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		29/05/2014, 15:16			
<b>Nome file</b>		0205			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



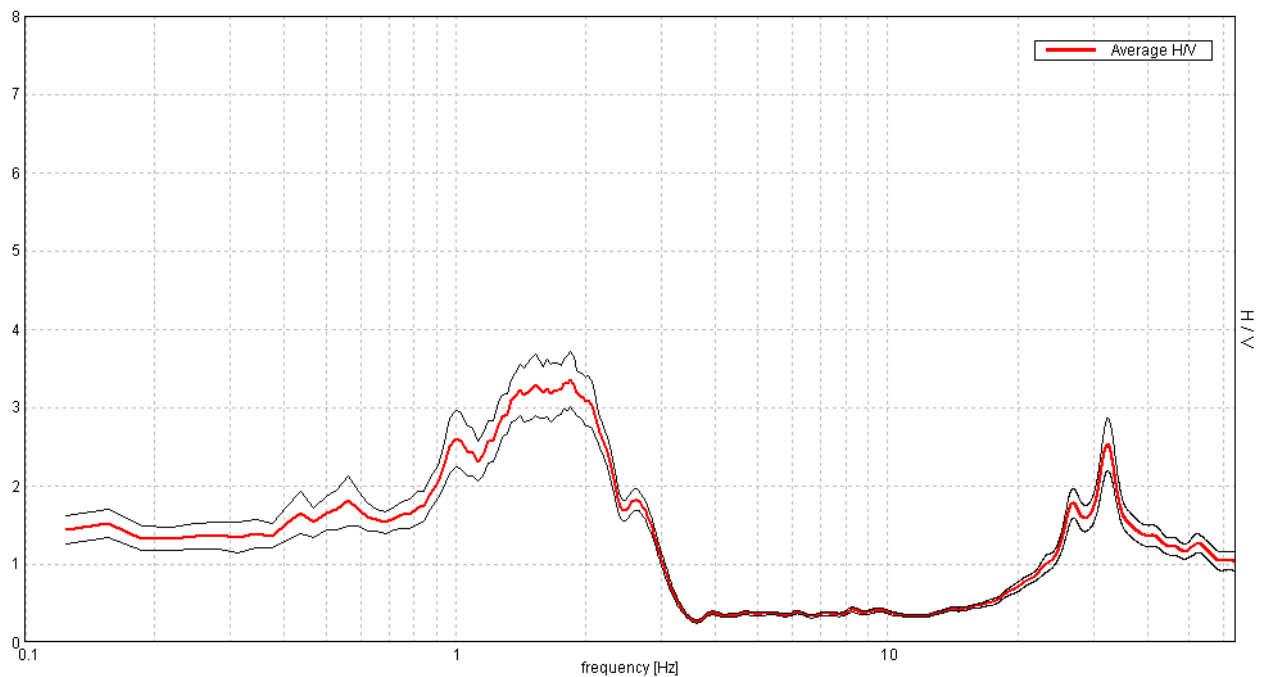
## TRIVEL SICILIA PALERMO, PALERMO TR 0205

Start recording: 29/05/14 15:24:46      End recording: 29/05/14 15:54:47  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

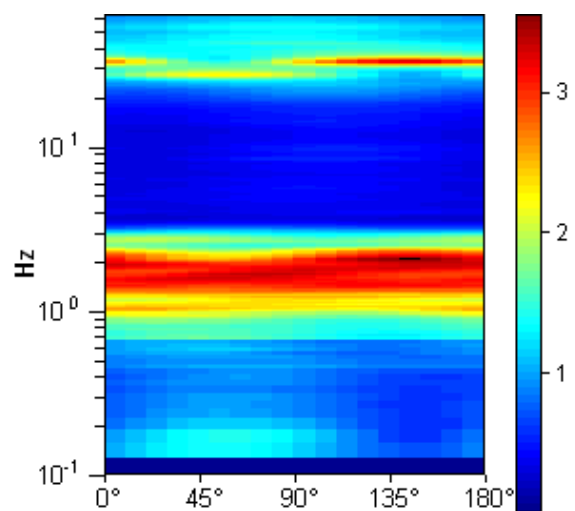
### HORIZONTAL TO VERTICAL SPECTRAL RATIO

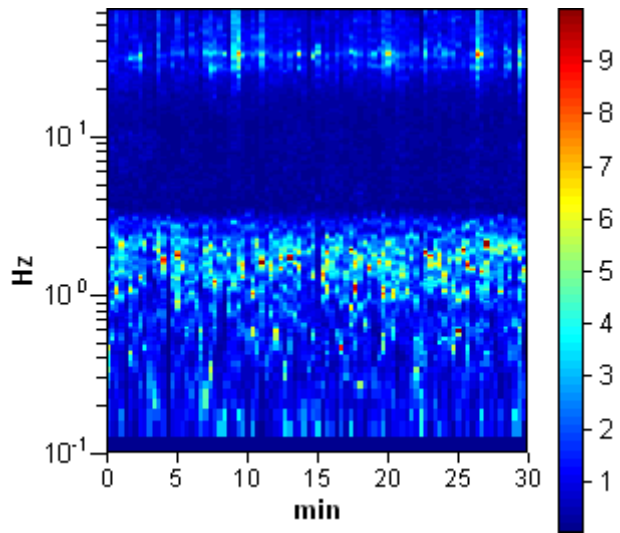
Max. H/V at  $1.84 \pm 0.08$  Hz. (In the range 0.0 - 40.0 Hz).



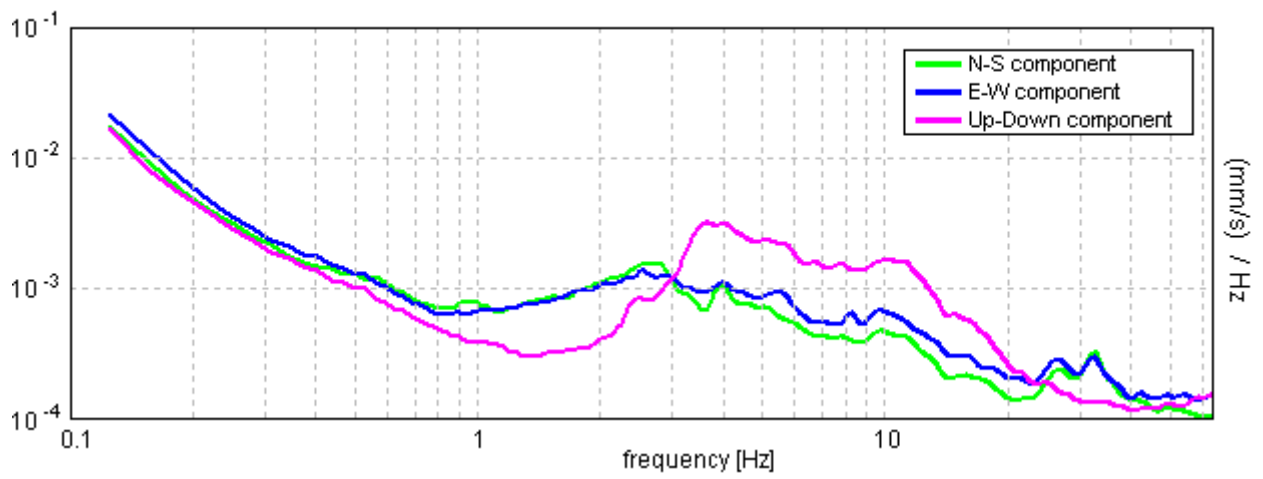
### H/V TIME HISTORY

### DIRECTIONAL H/V





### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.84 ± 0.08 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.84 > 0.50	OK	
$n_c(f_0) > 200$	3318.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 90 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.781 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.438 Hz	OK	
$A_0 > 2$	3.36 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02102  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.03876 < 0.18438	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.175 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0206			
<b>Coordinate</b>	UTM	4217547.73	N	361209.26	E
	Gauss Boaga	4217546.093	N	2381204.553	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		29/05/2014, 15:33			
<b>Nome file</b>		0206			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**

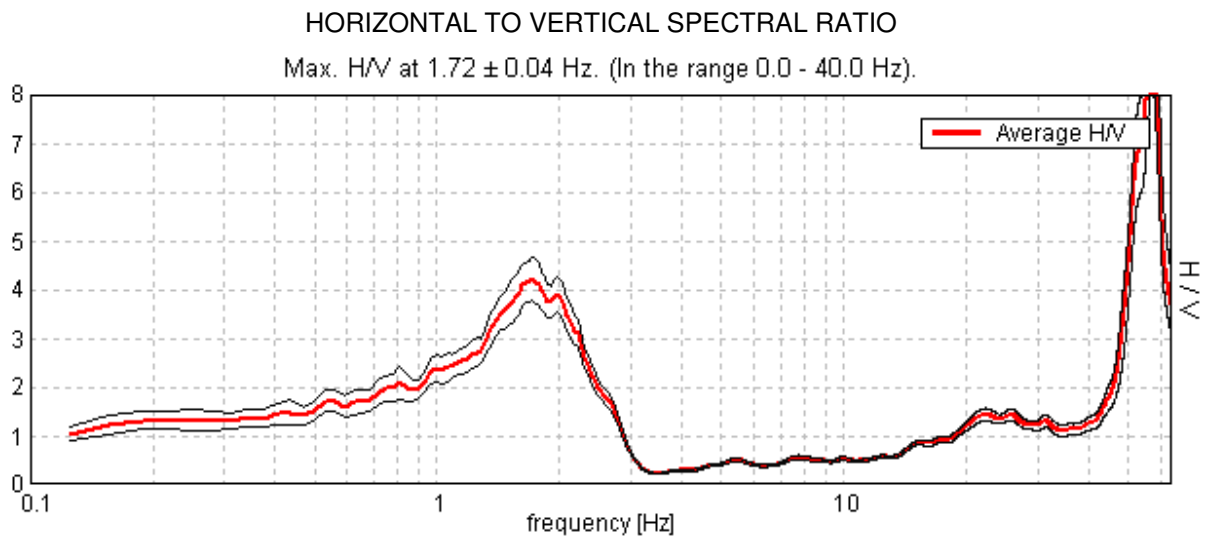




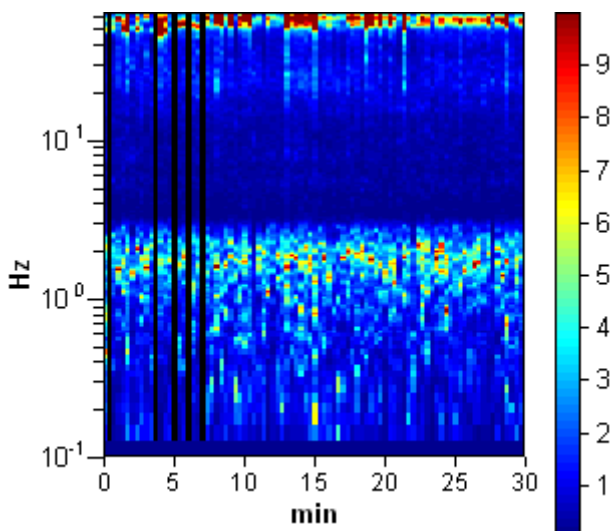
## TRIVELSICILIA PALERMO, PALERMO 0206

Start recording: 29/05/14 15:35:02      End recording: 29/05/14 16:05:03  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

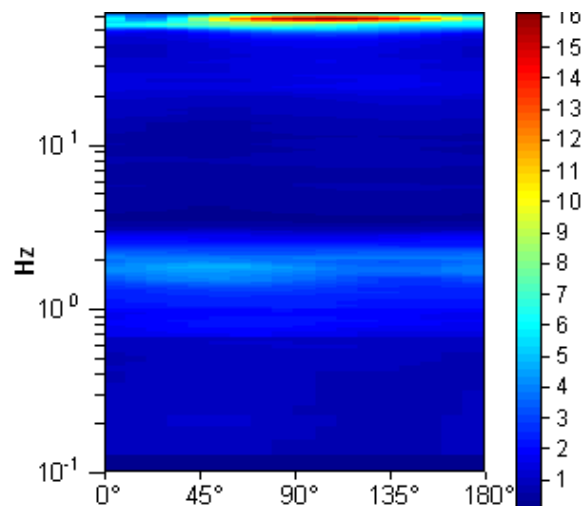
Trace length: 0h30'00".      Analyzed 94% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



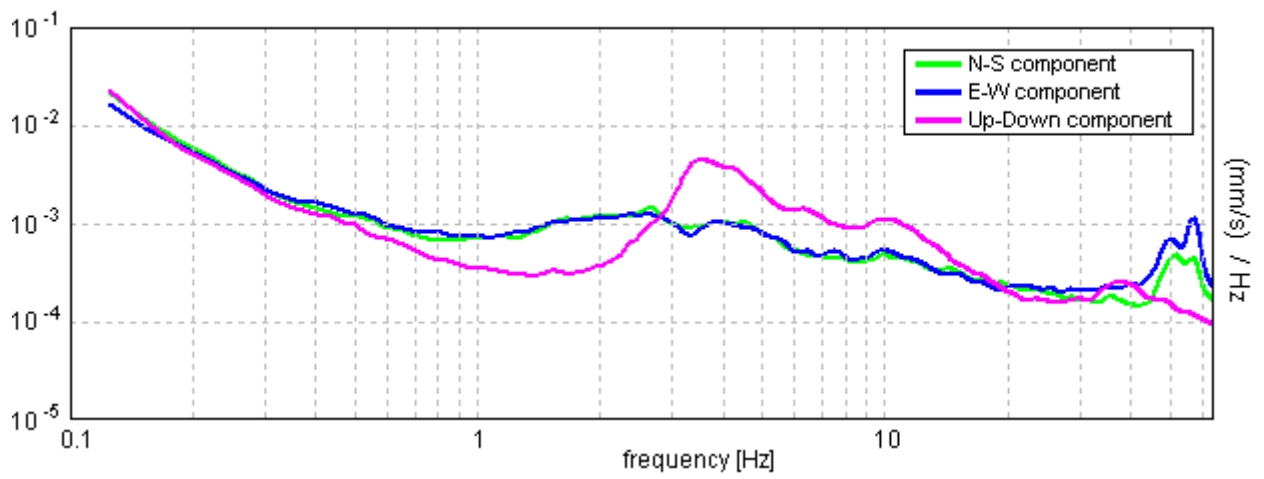
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.72 ± 0.04 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.72 > 0.50	OK	
$n_c(f_0) > 200$	2921.9 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 84 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.938 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.469 Hz	OK	
$A_0 > 2$	4.23 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01238  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.02128 < 0.17188	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.2246 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>				
<b>Nome base sismica</b>	0207				
<b>Coordinate</b>	<i>UTM</i>	4217497.70	N	360708.90	E
	<i>Gauss Boaga</i>	4217496.051	N	2380704.172	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	28/05/2014, 08:41				
<b>Nome file</b>	0207				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

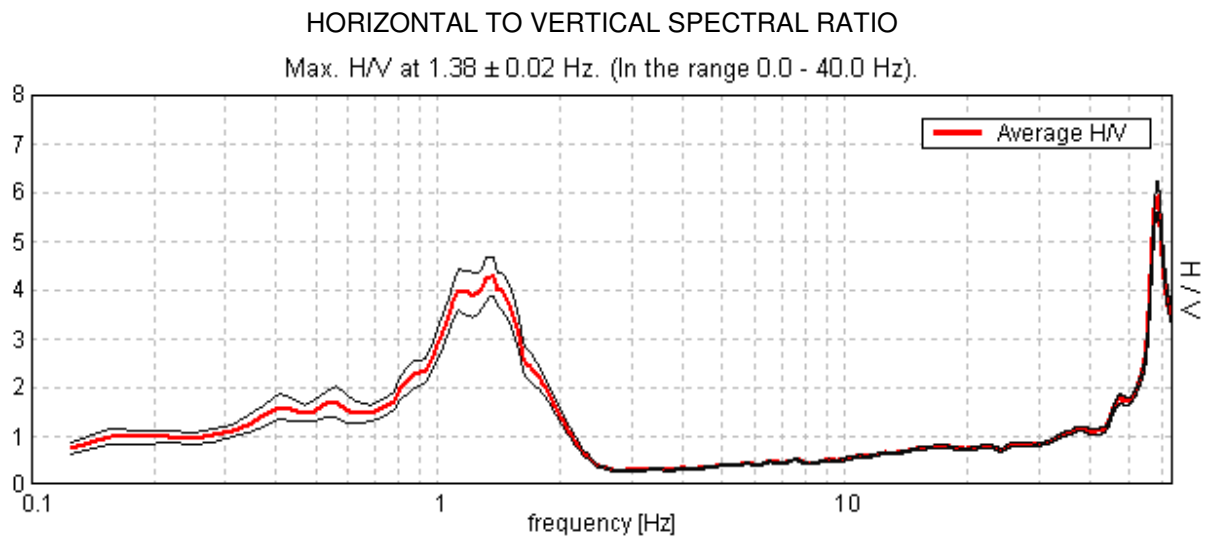
**Documentazione fotografica**



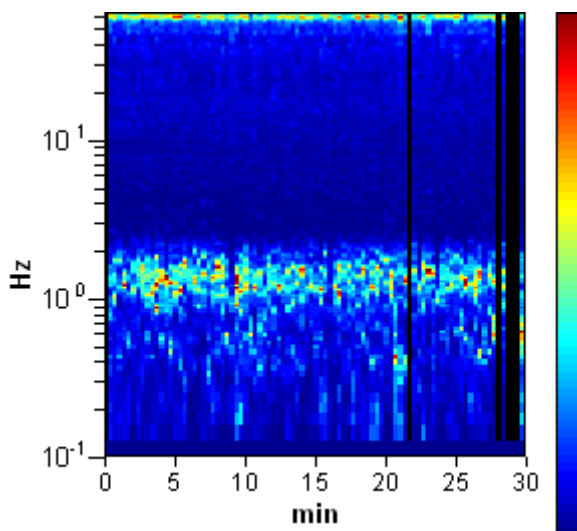
## TRIVELSICILIA PALERMO, PALERMO 0207

Start recording: 28/05/14 08:42:46      End recording: 28/05/14 09:12:47  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

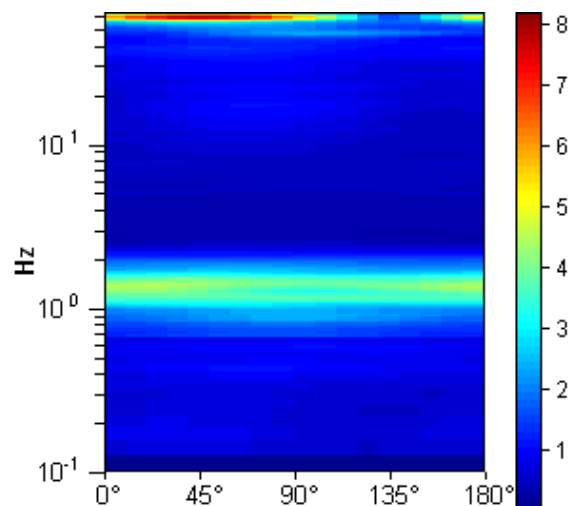
Trace length: 0h30'00".      Analyzed 93% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



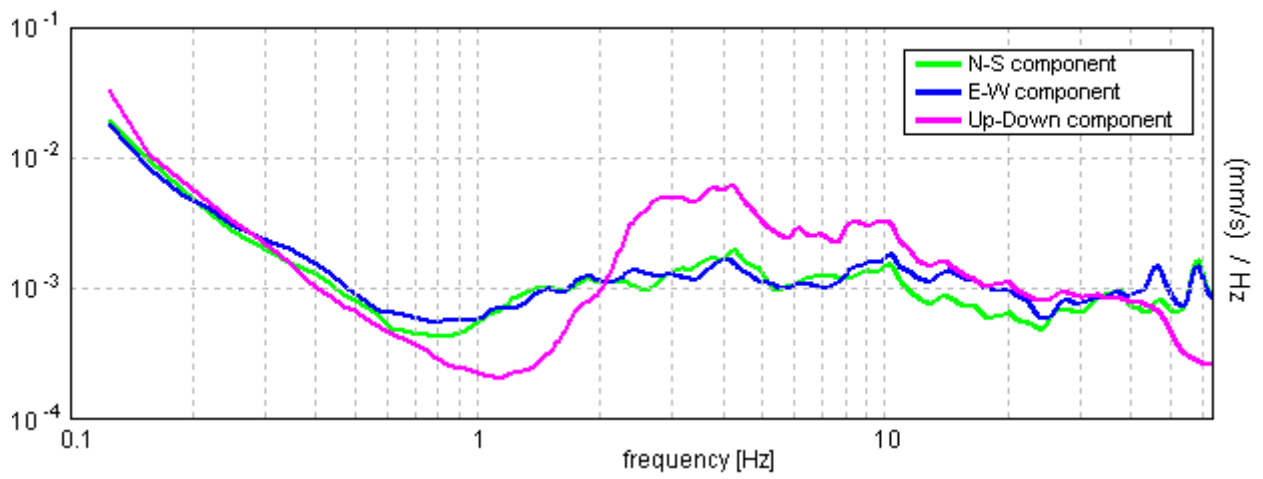
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.38 ± 0.02 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.38 > 0.50	OK	
$n_c(f_0) > 200$	2310.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 67 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.813 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	1.813 Hz	OK	
$A_0 > 2$	4.26 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.0084  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01156 < 0.1375$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2016 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0208				
<b>Coordinate</b>	<i>UTM</i>	4217482.00	N	360365.07	E
	<i>Gauss Boaga</i>	4217480.344	N	2380360.327	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	28/05/2014, 09:18				
<b>Nome file</b>	0208				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Terreno				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**

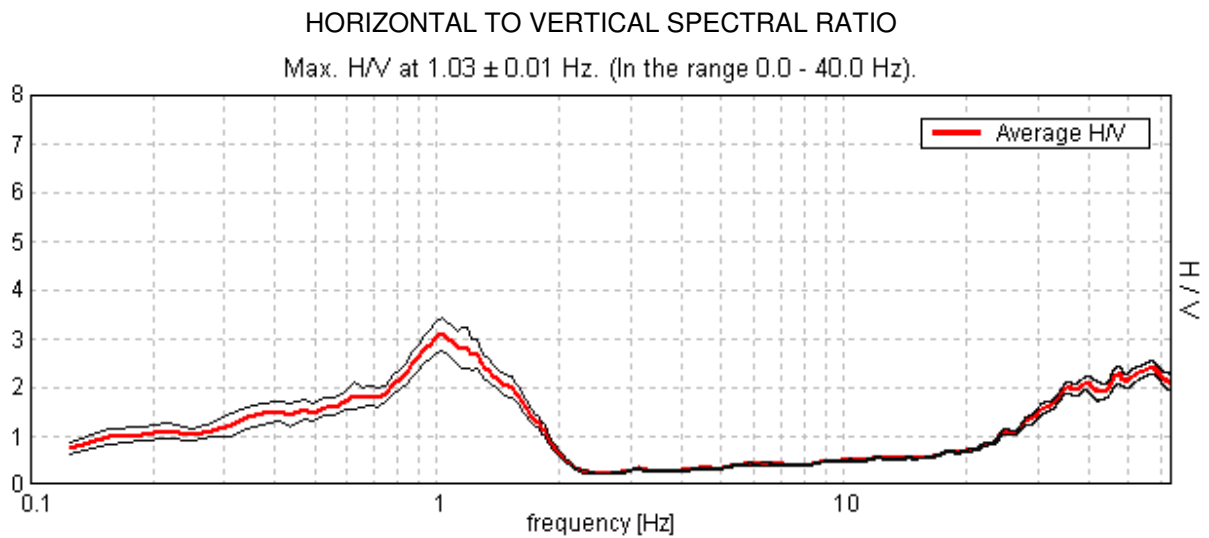




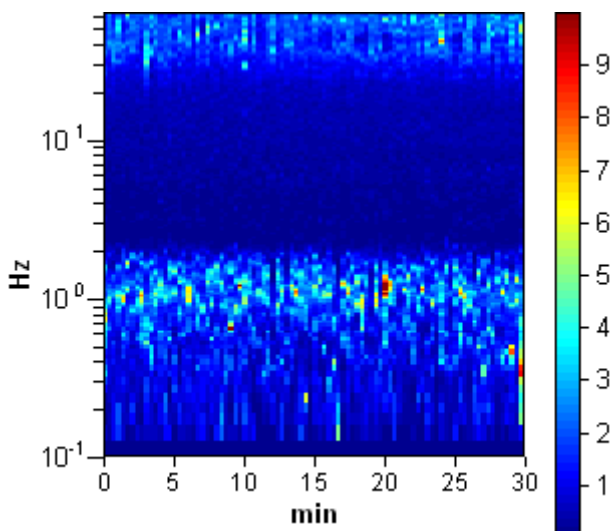
## TRIVELSICILIA PALERMO, PALERMO 0208

Start recording: 28/05/14 09:20:27      End recording: 28/05/14 09:50:28  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

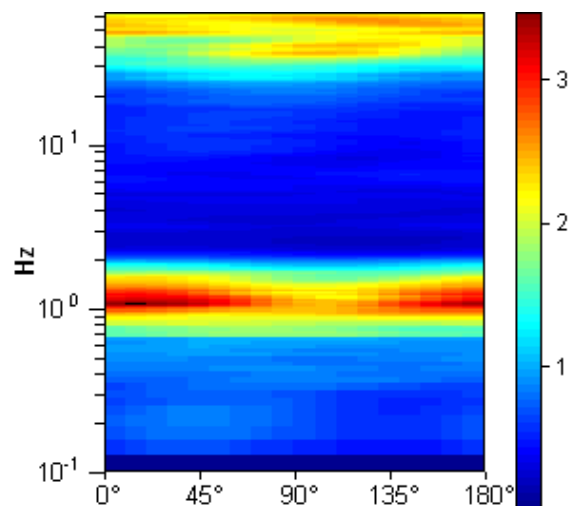
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



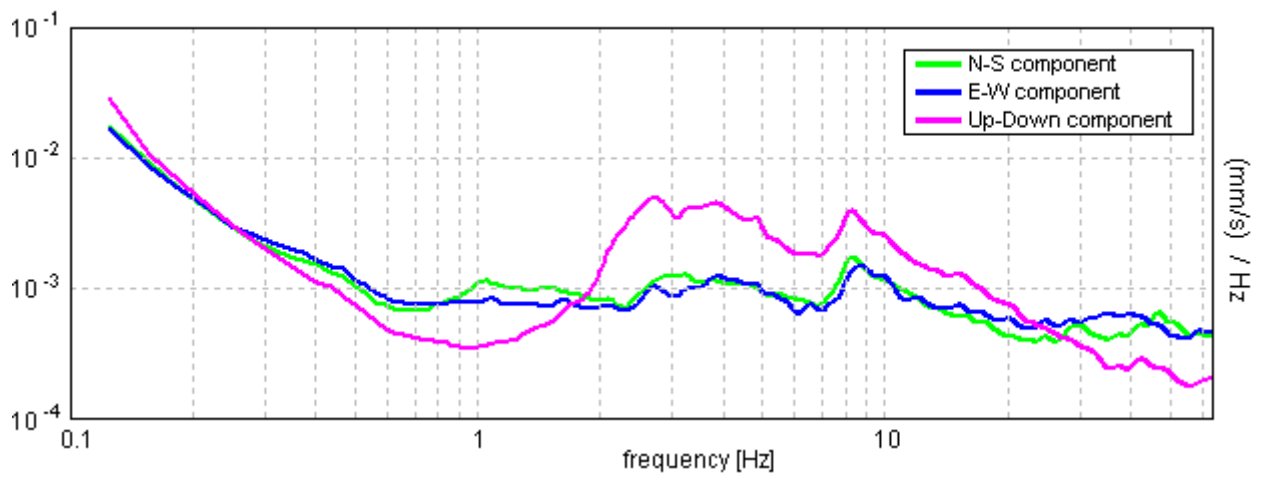
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.03 ± 0.01 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.03 > 0.50	OK	
$n_c(f_0) > 200$	1856.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 50 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.5 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.688 Hz	OK	
$A_0 > 2$	3.08 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00569  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.00587 < 0.10313$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1789 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

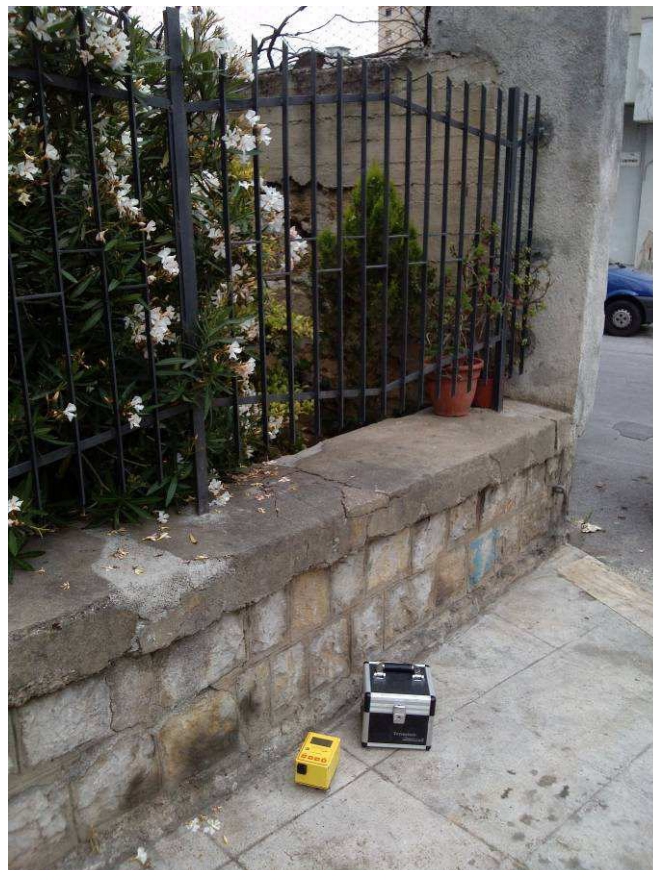


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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0209			
<b>Coordinate</b>	UTM	4217476.79	N	359950.75	E
	Gauss Boaga	4217475.127	N	2379945.989	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		28/05/2014, 09:55			
<b>Nome file</b>		0209			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>Si</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>Si</b>		
		<b>Altro</b>	<b>No</b>		

**Documentazione fotografica**



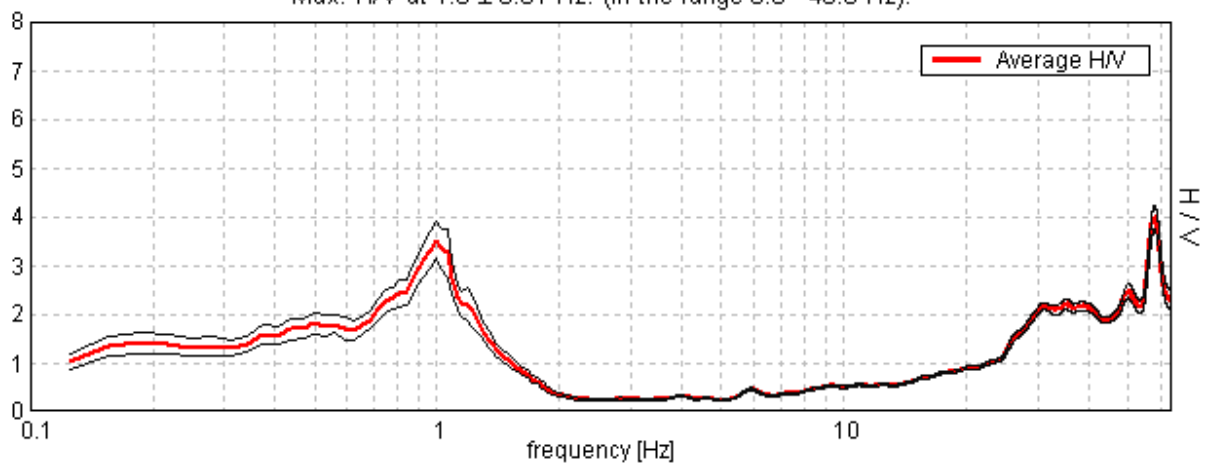
## TRIVELSICILIA PALERMO, PALERMO 0209

Start recording: 28/05/14 09:56:51      End recording: 28/05/14 10:26:52  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

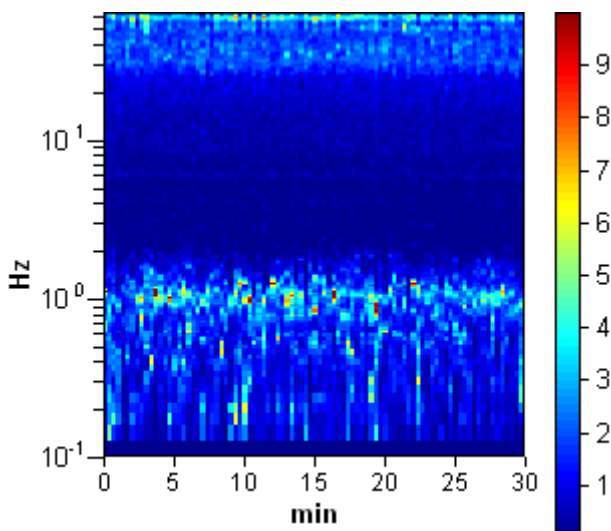
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

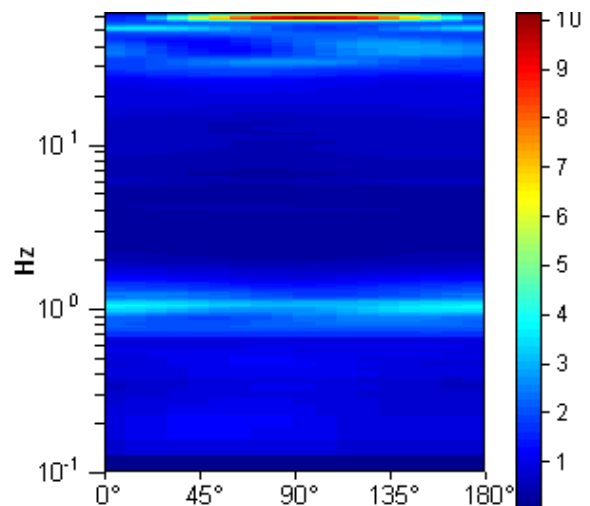
Max. H/V at  $1.0 \pm 0.01$  Hz. (In the range 0.0 - 40.0 Hz).



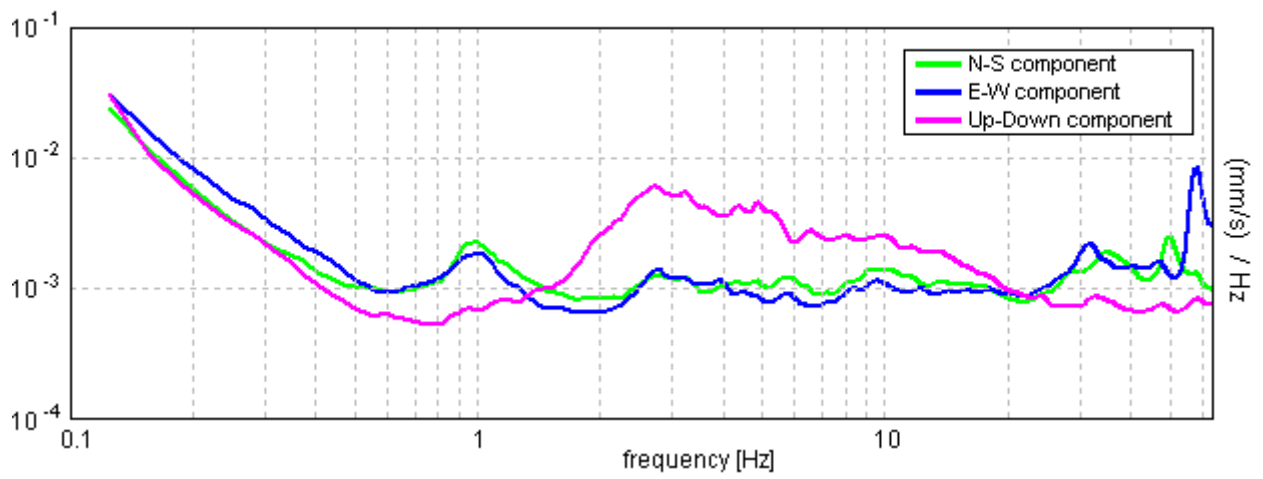
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.0 ± 0.01 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.00 > 0.50	OK	
$n_c(f_0) > 200$	1800.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 49 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.625 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.281 Hz	OK	
$A_0 > 2$	3.52 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00388  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.00388 < 0.1	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1868 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

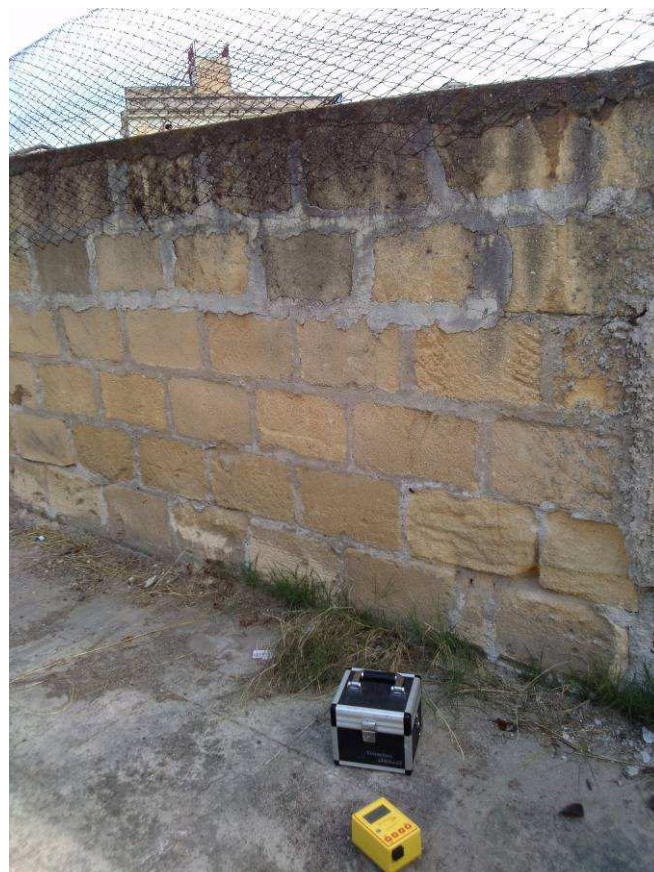


Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0210			
<b>Coordinate</b>	UTM	4217406.91	N	359532.88	E
	Gauss Boaga	4217405.236	N	2379528.102	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		28/05/2014, 10:28			
<b>Nome file</b>		0210			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**

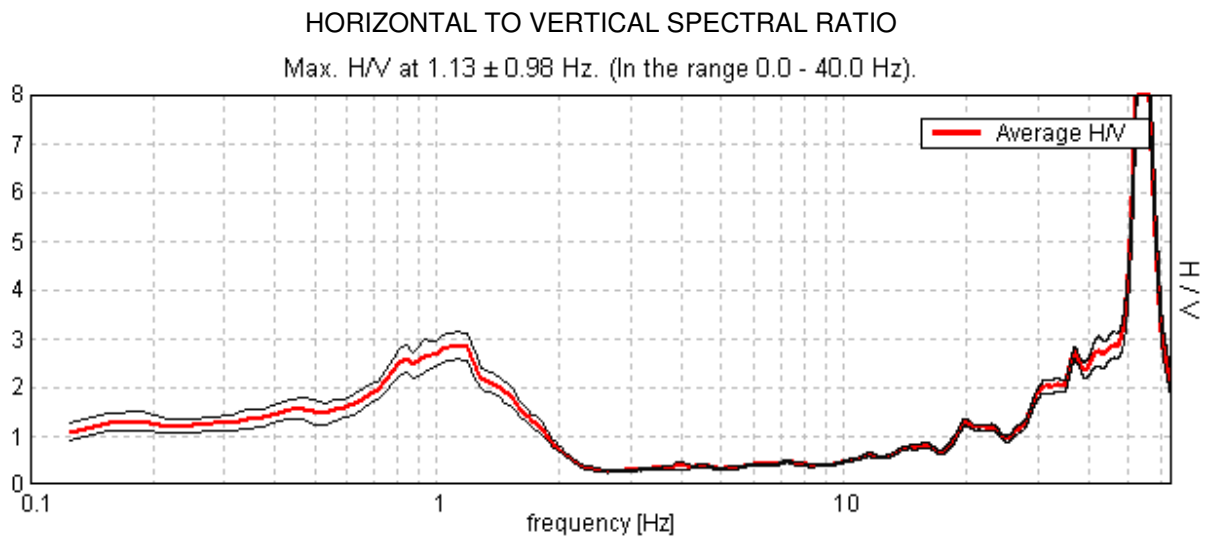




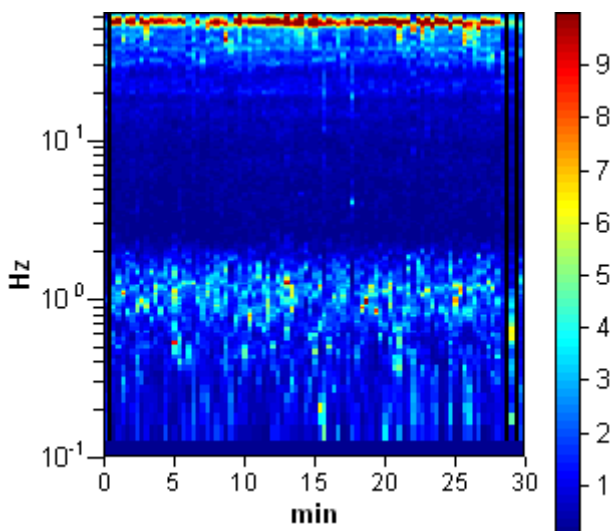
## TRIVELSICILIA PALERMO, PALERMO 0210

Start recording: 28/05/14 10:31:18      End recording: 28/05/14 11:01:19  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

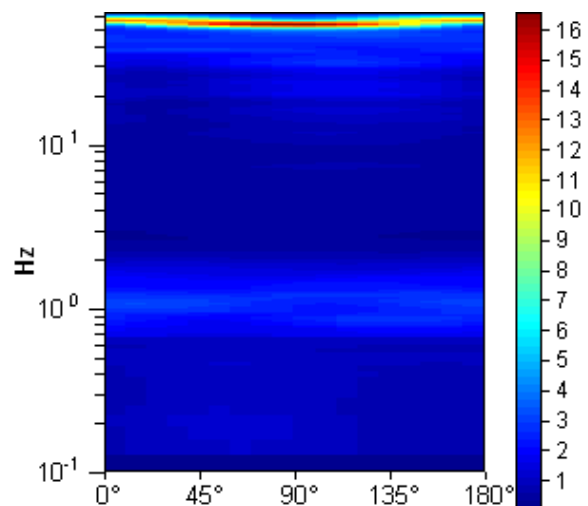
Trace length: 0h30'00".      Analyzed 97% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



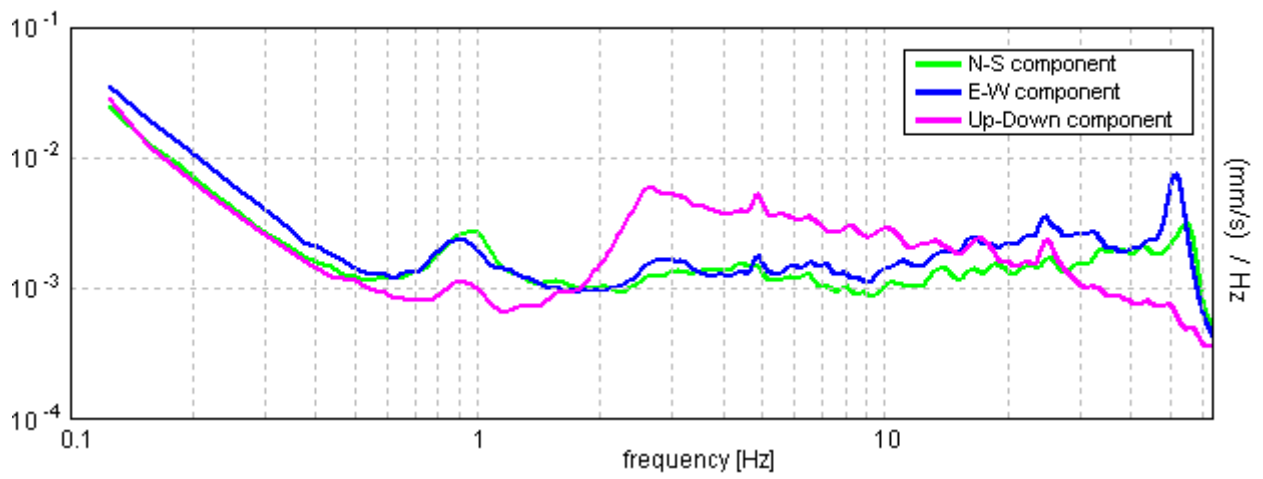
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.13 ± 0.98 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.13 > 0.50	OK	
$n_c(f_0) > 200$	1957.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 55 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.375 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.688 Hz	OK	
$A_0 > 2$	2.85 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.43787  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	0.49261 < 0.1125		NO
$\sigma_A(f_0) < \theta(f_0)$	0.1448 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

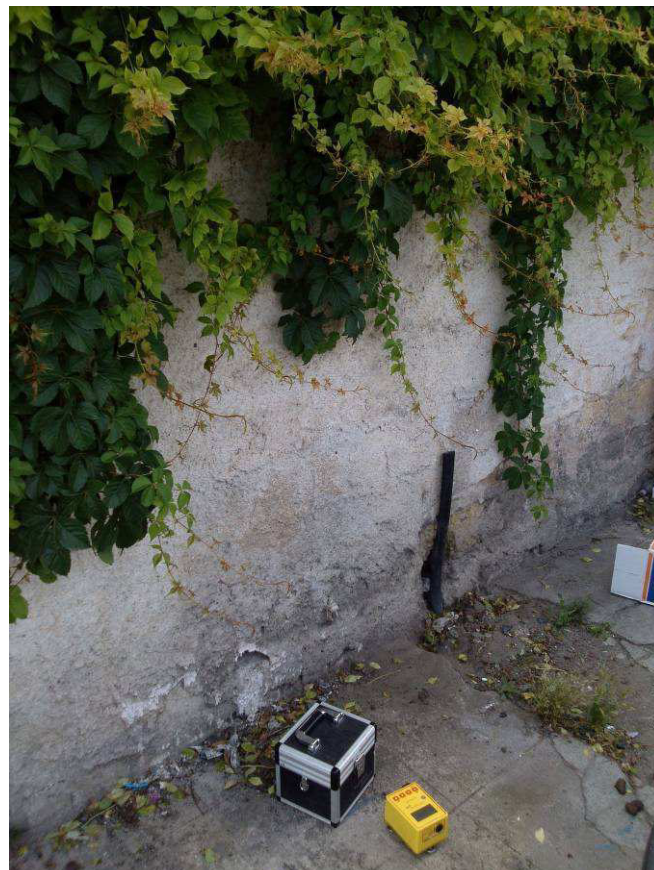


Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0211			
<b>Coordinate</b>	UTM	4217517.64	N	359191.23	E
	Gauss Boaga	4217515.964	N	2379186.435	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		28/05/2014, 11:03			
<b>Nome file</b>		0211			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

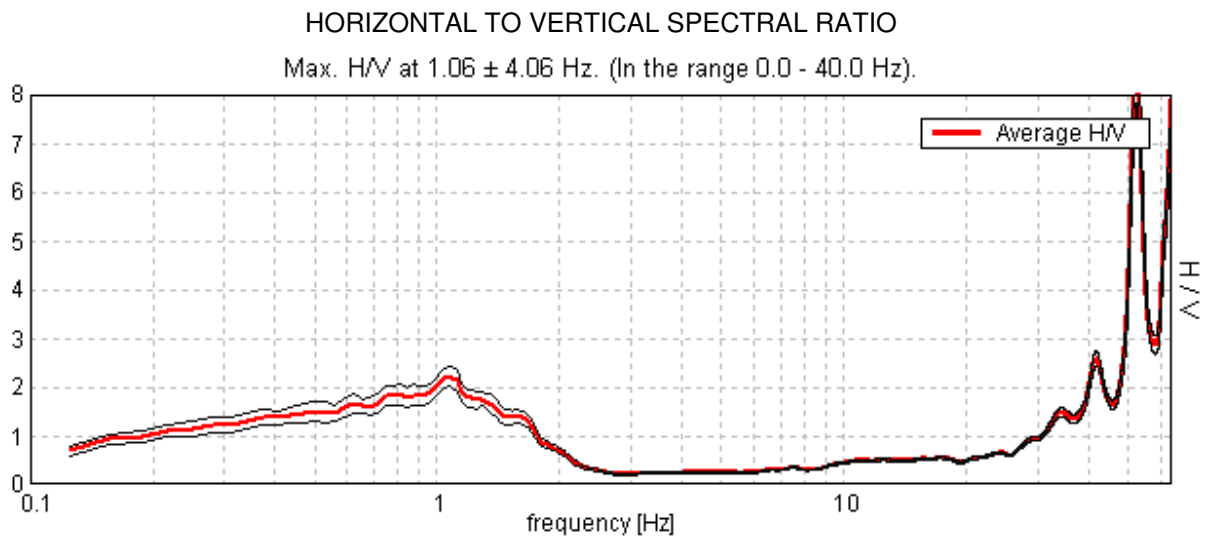
**Documentazione fotografica**



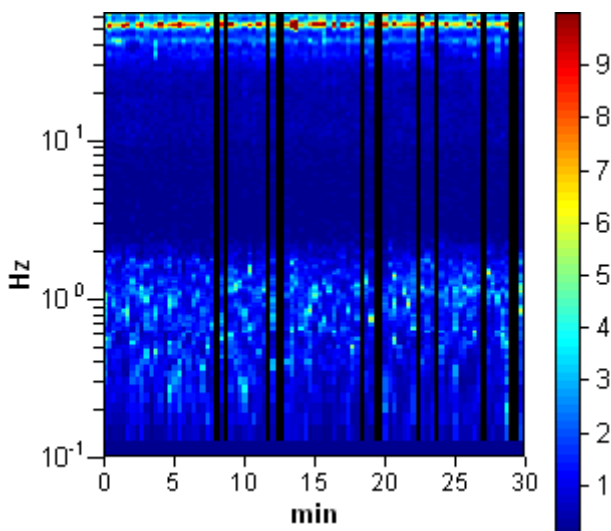
## TRIVELSICILIA PALERMO, PALERMO 0211

Start recording: 28/05/14 11:05:55      End recording: 28/05/14 11:35:56  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

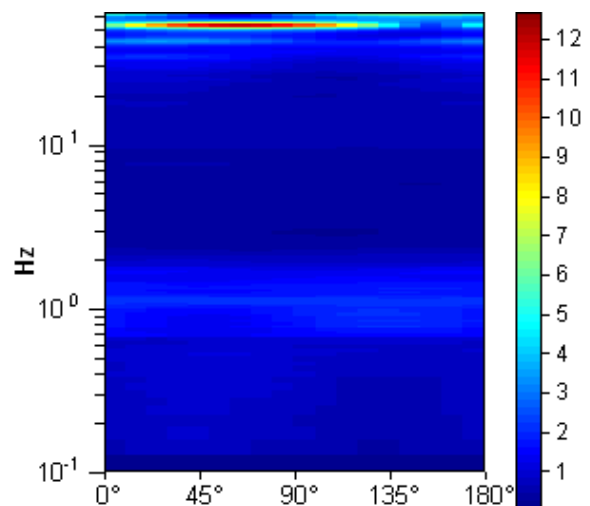
Trace length: 0h30'00".      Analyzed 86% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



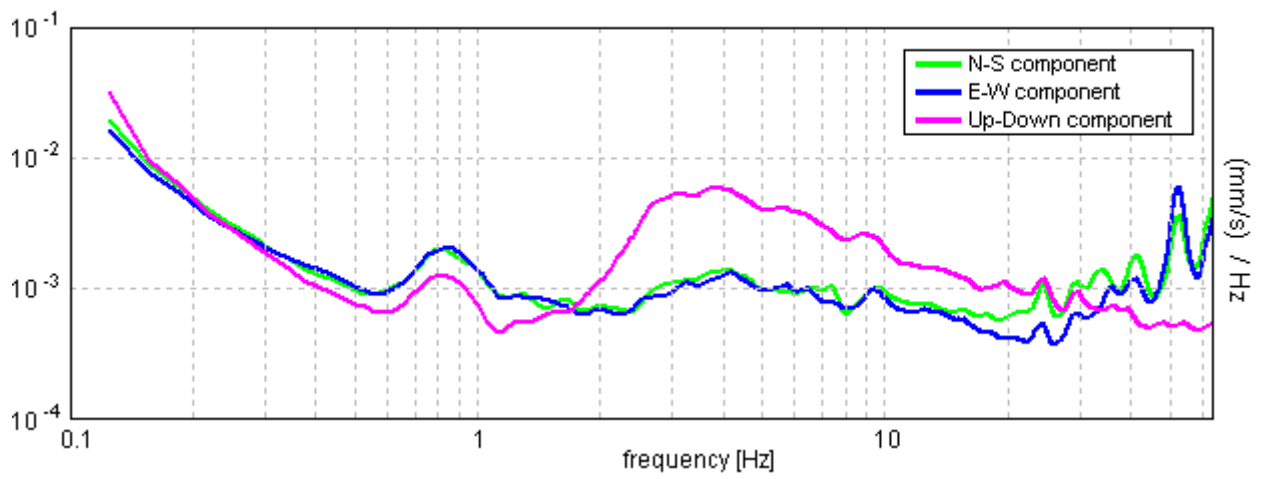
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.06 ± 4.06 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.06 > 0.50	OK	
$n_c(f_0) > 200$	1636.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 52 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.75 Hz	OK	
$A_0 > 2$	2.21 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 1.90377  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	2.02275 < 0.10625		<b>NO</b>
$\sigma_A(f_0) < \theta(f_0)$	0.1018 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0212				
<b>Coordinate</b>	<i>UTM</i>	4217469.88	N	358744.49	E
	<i>Gauss Boaga</i>	4217468.194	N	2378739.676	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	28/05/2014, 11:42				
<b>Nome file</b>	0212				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**





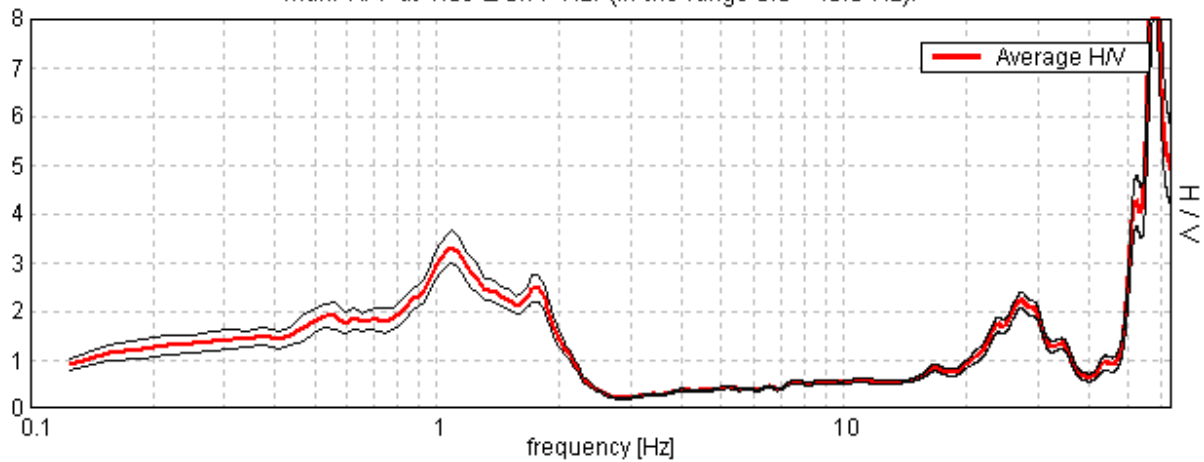
## TRIVELSICILIA PALERMO, PALERMO 0212

Start recording: 28/05/14 11:44:26      End recording: 28/05/14 12:14:27  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

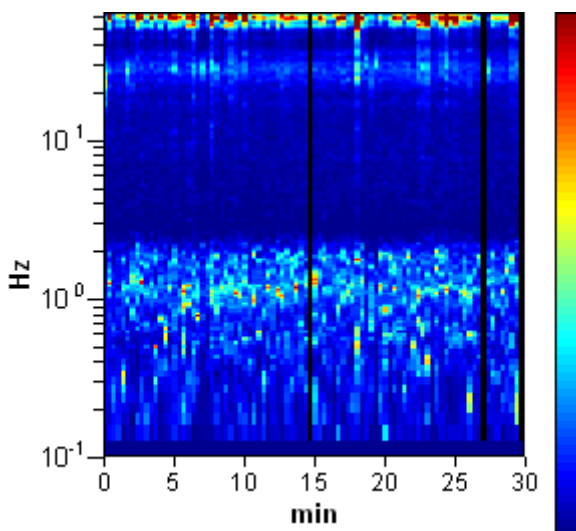
Trace length: 0h30'00".      Analyzed 97% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

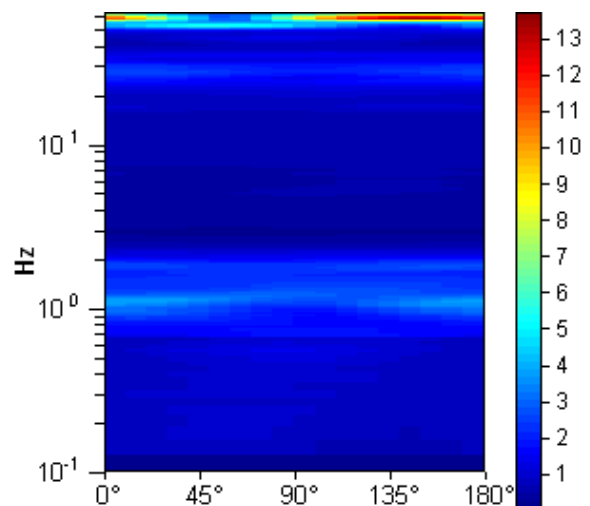
Max. H/V at  $1.09 \pm 0.77$  Hz. (In the range 0.0 - 40.0 Hz).



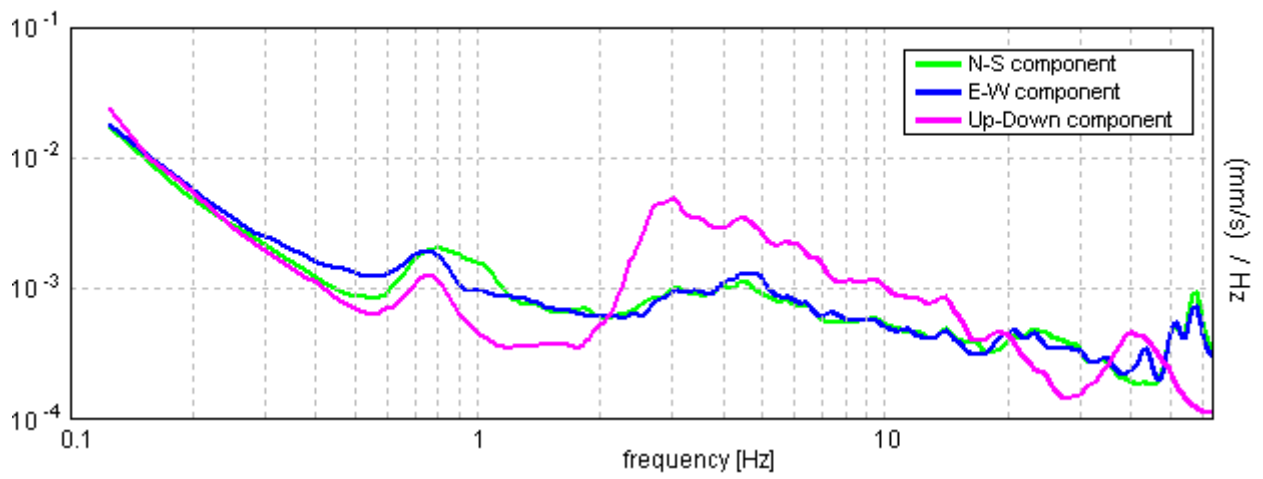
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.09 ± 0.77 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.09 > 0.50	OK	
$n_c(f_0) > 200$	1903.1 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 54 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.438 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.969 Hz	OK	
$A_0 > 2$	3.31 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.3522  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	0.38521 < 0.10938		NO
$\sigma_A(f_0) < \theta(f_0)$	0.1667 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

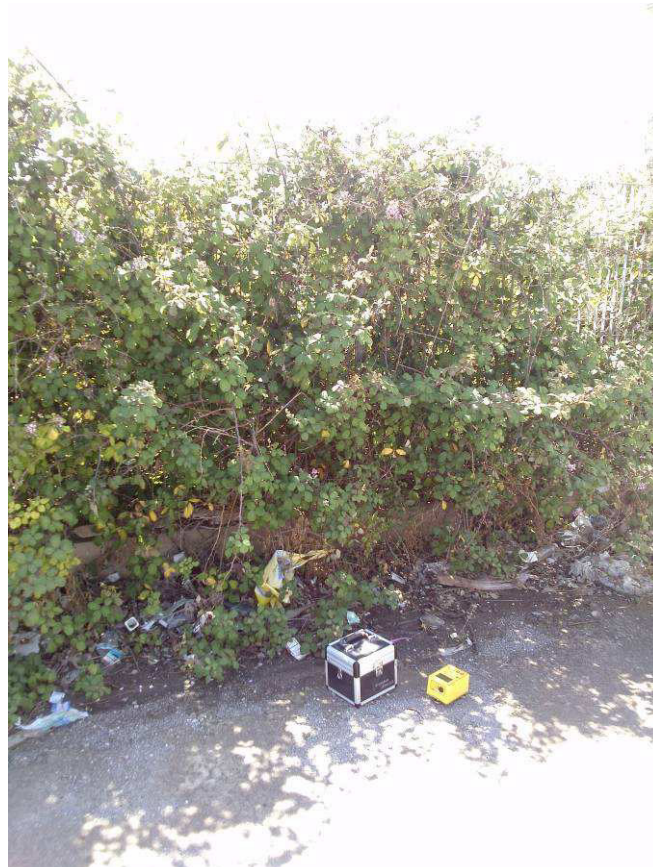


Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0213				
<b>Coordinate</b>	<i>UTM</i>	4217134.45	N	360315.25	E
	<i>Gauss Boaga</i>	4217132.778	N	2380310.512	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	29/05/2014, 10:41				
<b>Nome file</b>	0213				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



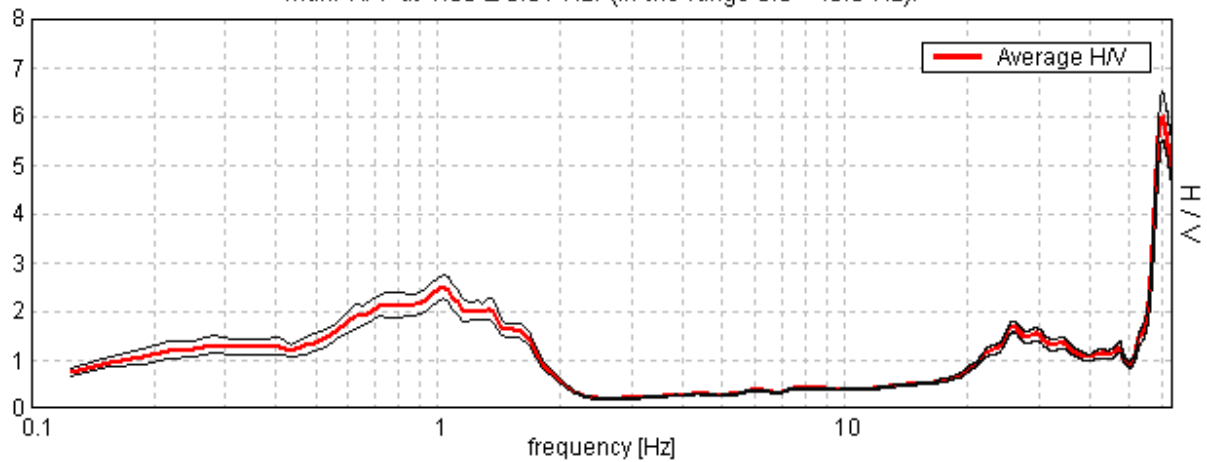
## TRIVELSICILIA PALERMO, PALERMO 0213

Start recording: 29/05/14 10:43:15      End recording: 29/05/14 11:13:16  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

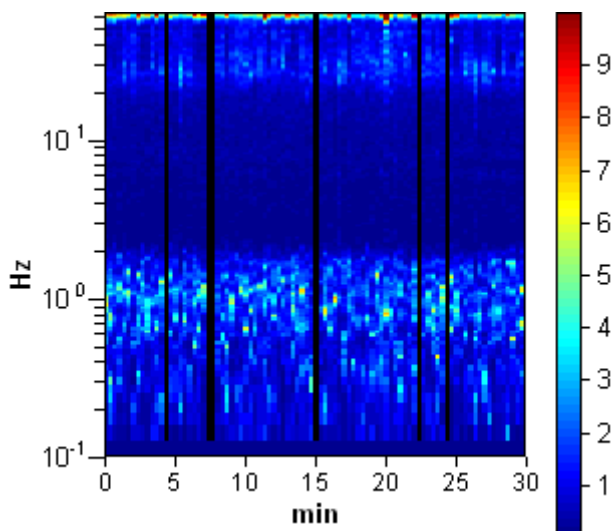
Trace length: 0h30'00".      Analyzed 93% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

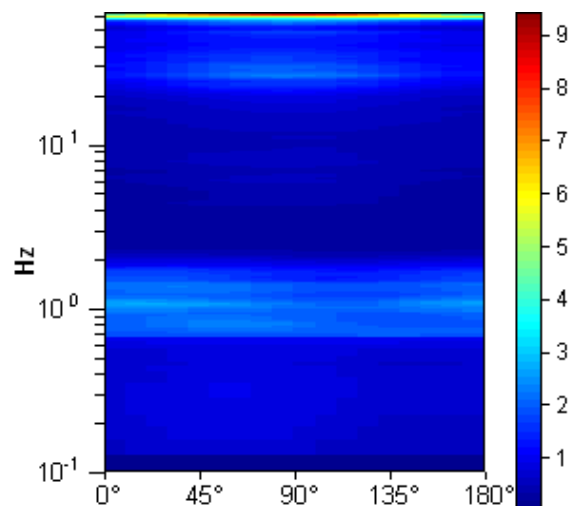
Max. H/V at  $1.03 \pm 0.01$  Hz. (In the range 0.0 - 40.0 Hz).



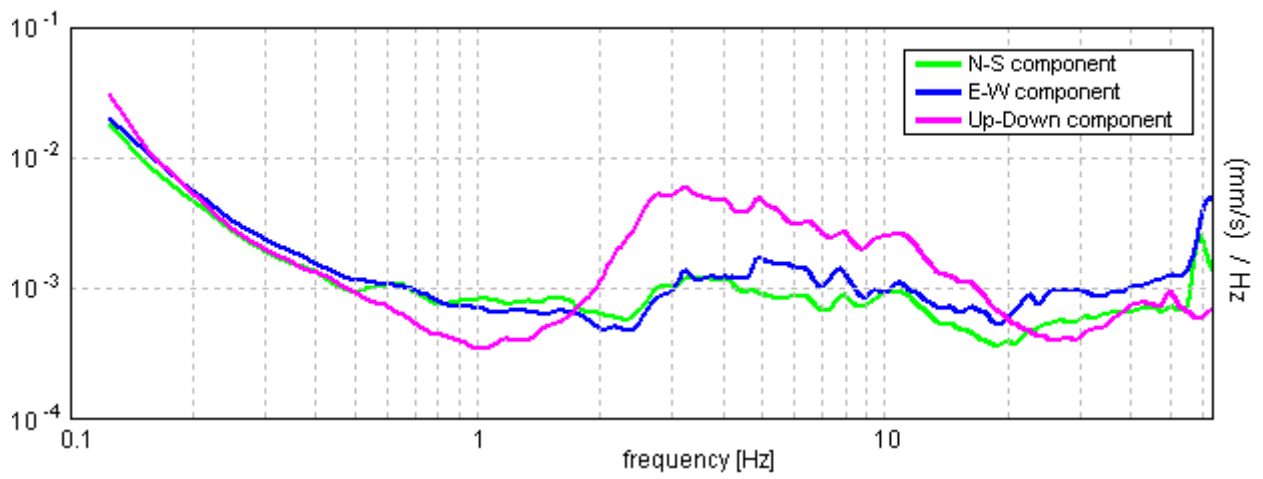
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.03 ± 0.01 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.03 > 0.50	OK	
$n_c(f_0) > 200$	1732.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 50 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.438 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	1.75 Hz	OK	
$A_0 > 2$	2.48 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00293  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.00302 < 0.10313	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1185 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0214				
<b>Coordinate</b>	<i>UTM</i>	4217113.99	N	360790.06	E
	<i>Gauss Boaga</i>	4217112.326	N	2380785.343	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	29/05/2014, 10:07				
<b>Nome file</b>	0214				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**

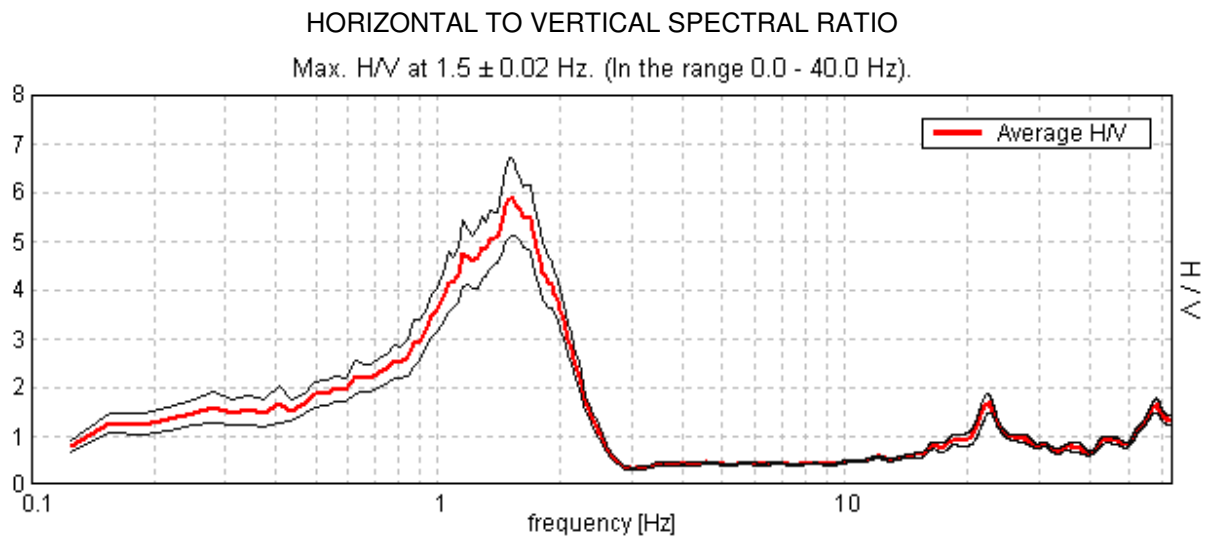




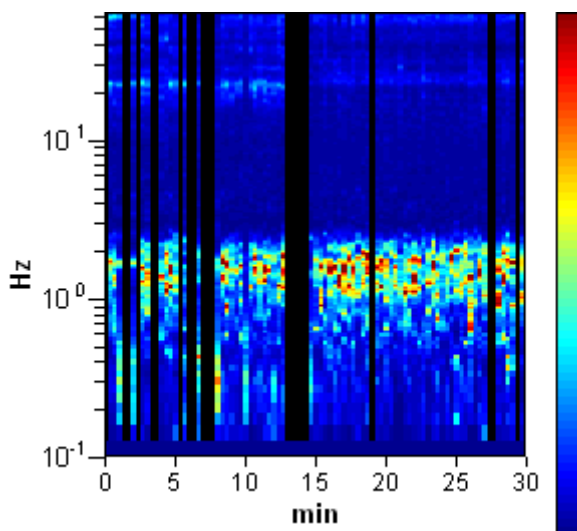
## TRIVEL SICILIA PALERMO, PALERMO TR 0214

Start recording: 29/05/14 10:14:43      End recording: 29/05/14 10:44:43  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

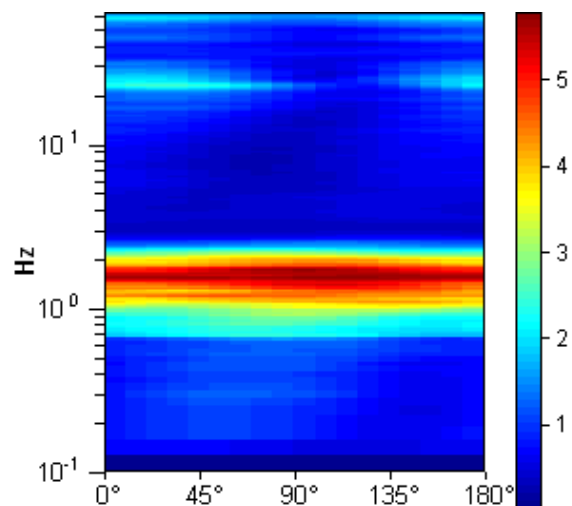
Trace length: 0h30'00".      Analyzed 77% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



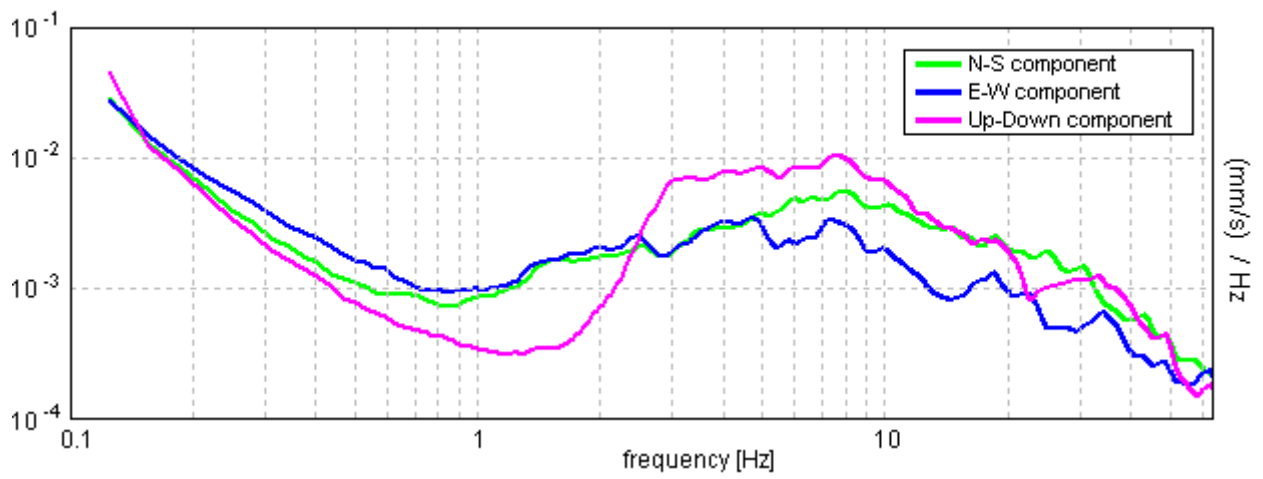
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $1.5 \pm 0.02$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.50 > 0.50$	OK	
$n_c(f_0) > 200$	$2070.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 73 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.875 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.125 Hz	OK	
$A_0 > 2$	$5.88 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00558  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.00838 < 0.15$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.4078 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>				
<b>Nome base sismica</b>	0215				
<b>Coordinate</b>	<i>UTM</i>	4217014.86	N	361178.25	E
	<i>Gauss Boaga</i>	4217013.199	N	2381173.552	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	29/05/2014, 10:45				
<b>Nome file</b>	0215				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

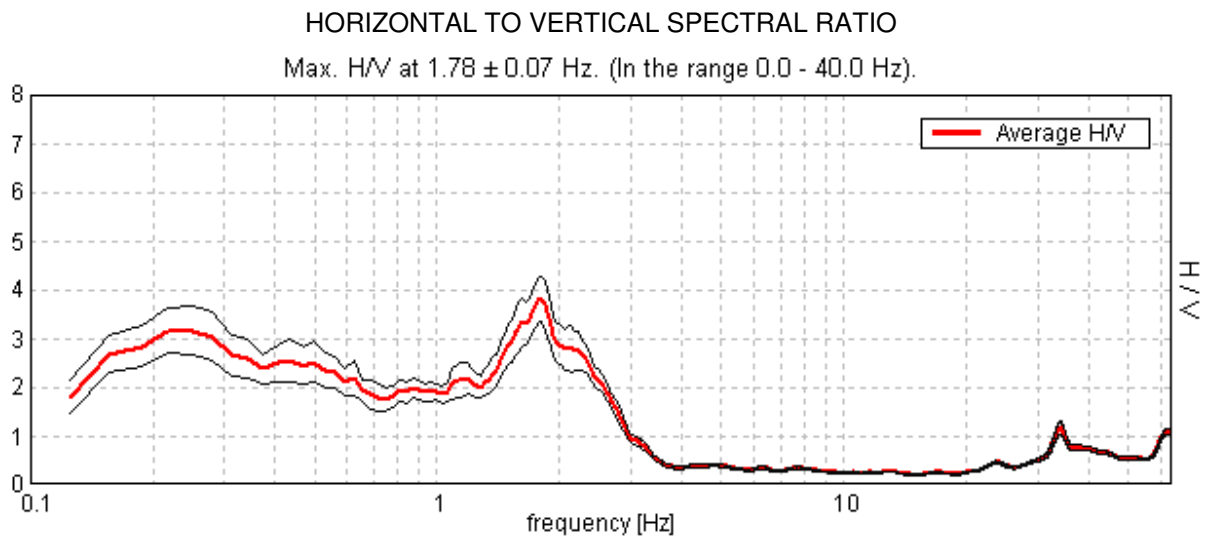
**Documentazione fotografica**



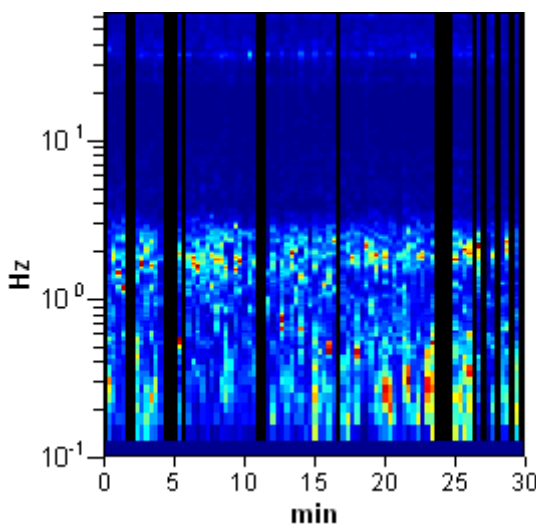
## TRIVEL SICILIA PALERMO, PALERMO TR 0215

Start recording: 29/05/14 10:53:38      End recording: 29/05/14 11:23:39  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

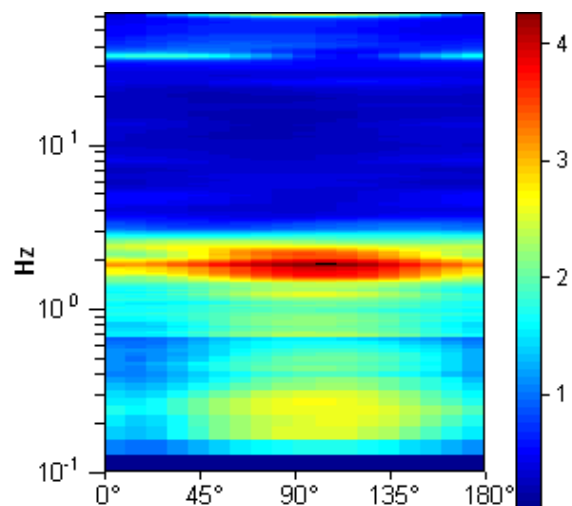
Trace length: 0h30'00".      Analyzed 79% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



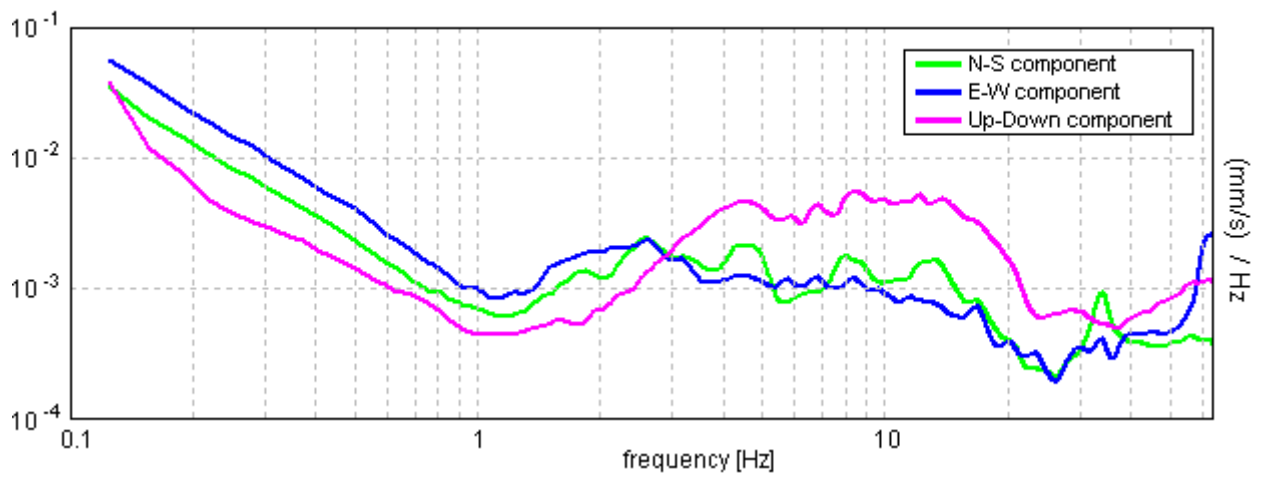
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $1.78 \pm 0.07$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.78 > 0.50$	OK	
$n_c(f_0) > 200$	$2529.4 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 86 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	1.031 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.625 Hz	OK	
$A_0 > 2$	$3.80 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02018  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.03594 < 0.17813$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2383 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0216				
<b>Coordinate</b>	<i>UTM</i>	4217107.94	N	361506.36	E
	<i>Gauss Boaga</i>	4217106.289	N	2381501.675	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	29/05/2014, 11:23				
<b>Nome file</b>	0216				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**





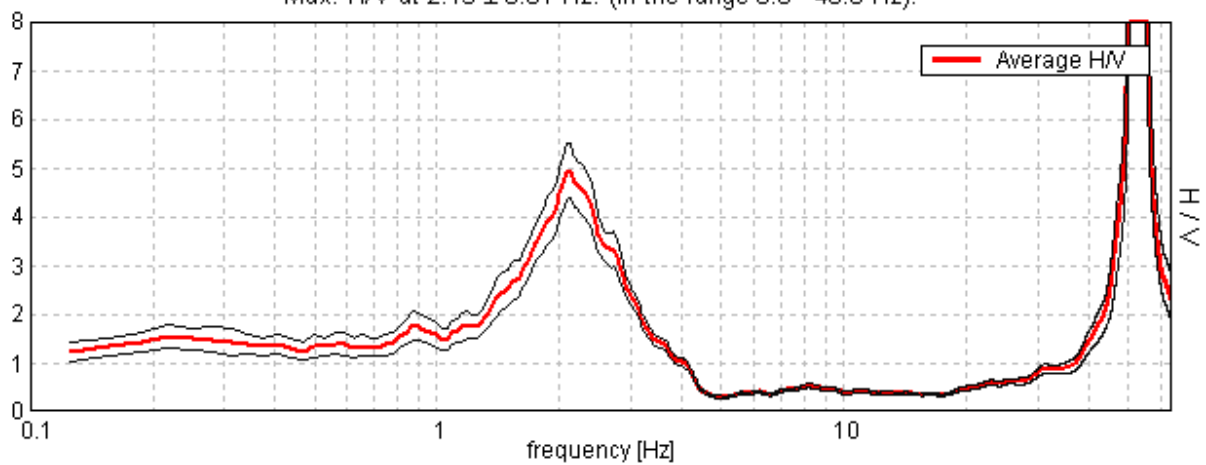
## TRIVELSICILIA PALERMO, PALERMO 0216

Start recording: 29/05/14 11:25:09      End recording: 29/05/14 11:55:10  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

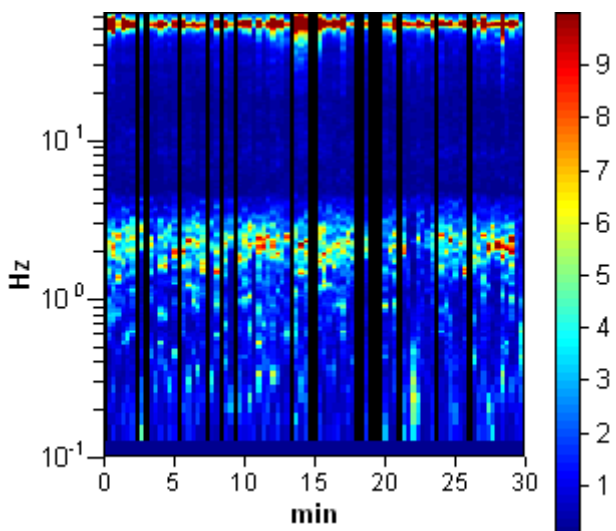
Trace length: 0h30'00".      Analyzed 80% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

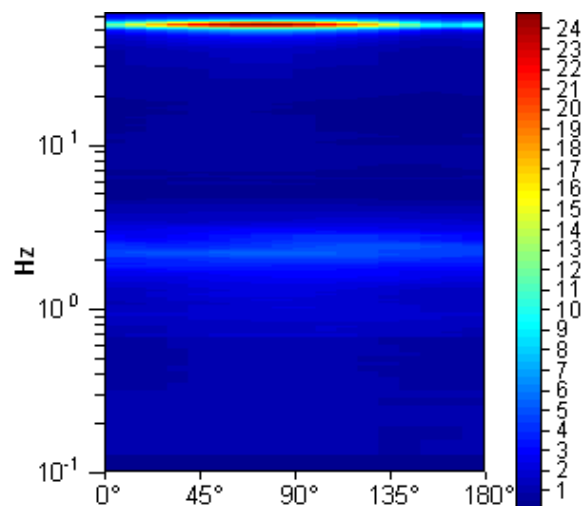
Max. H/V at  $2.13 \pm 0.01$  Hz. (In the range 0.0 - 40.0 Hz).



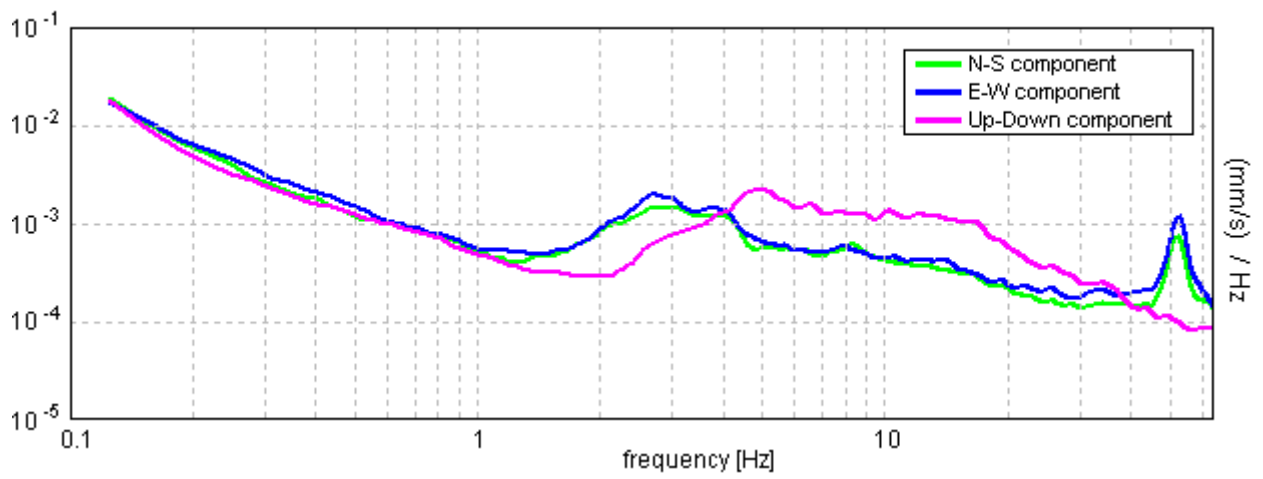
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 2.13 ± 0.01 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.13 > 0.50	OK	
$n_c(f_0) > 200$	3060.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 103 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	1.438 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.969 Hz	OK	
$A_0 > 2$	4.93 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00345  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.00733 < 0.10625$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.277 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>	<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>			
<b>Nome base sismica</b>	0217			
<b>Coordinate</b>	<i>UTM</i>	4217163.38	<i>N</i>	361872.80 <i>E</i>
	<i>Gauss Boaga</i>	4217161.738	<i>N</i>	2381868.130 <i>E</i>
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®			
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>	29/05/2014, 14:46			
<b>Nome file</b>	0217			
<b>Durata</b>	30 min			
<b>Frequenza campionamento</b>	128 Hz			
<b>Accoppiamento strumento-suolo</b>	Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>	<i>Si</i>		
	<b>Pioggia</b>	<i>No</i>		
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<i>Si</i>		
	<b>Pedoni</b>	<i>Si</i>		
	<b>Altro</b>	<i>No</i>		

**Documentazione fotografica**



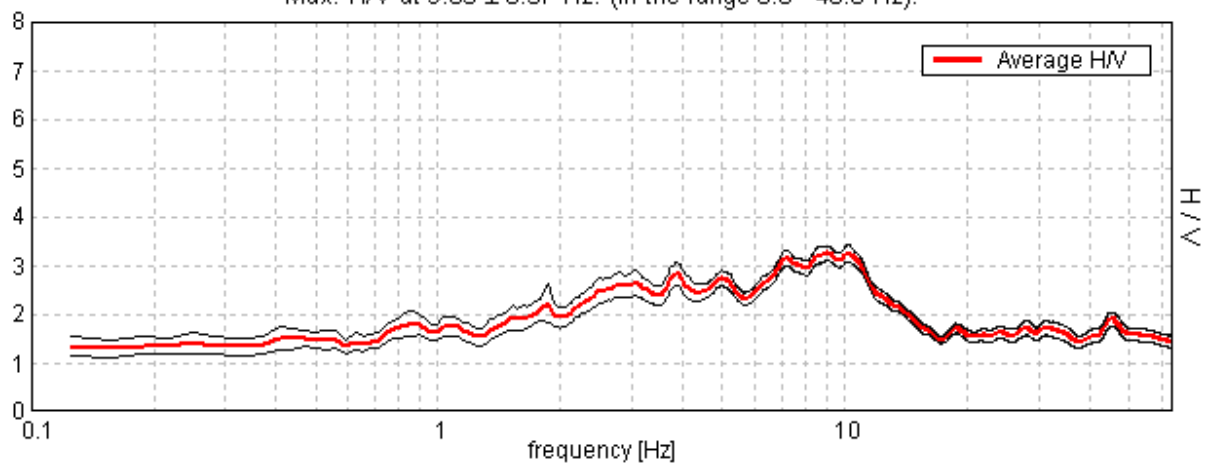
## TRIVELSICILIA PALERMO, PALERMO 0217

Start recording: 29/05/14 14:48:33      End recording: 29/05/14 15:18:34  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

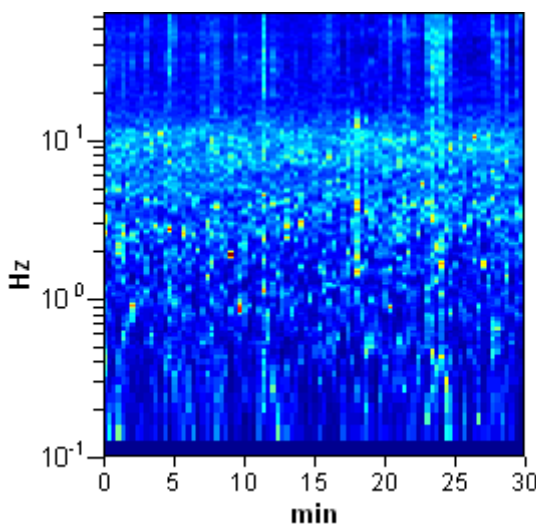
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

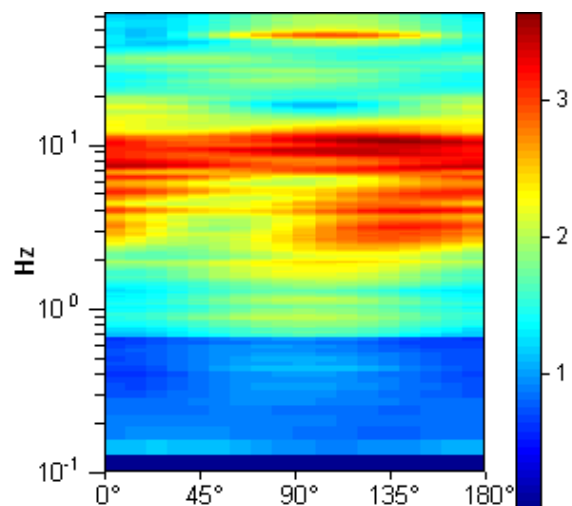
Max. H/V at  $9.03 \pm 0.37$  Hz. (In the range 0.0 - 40.0 Hz).



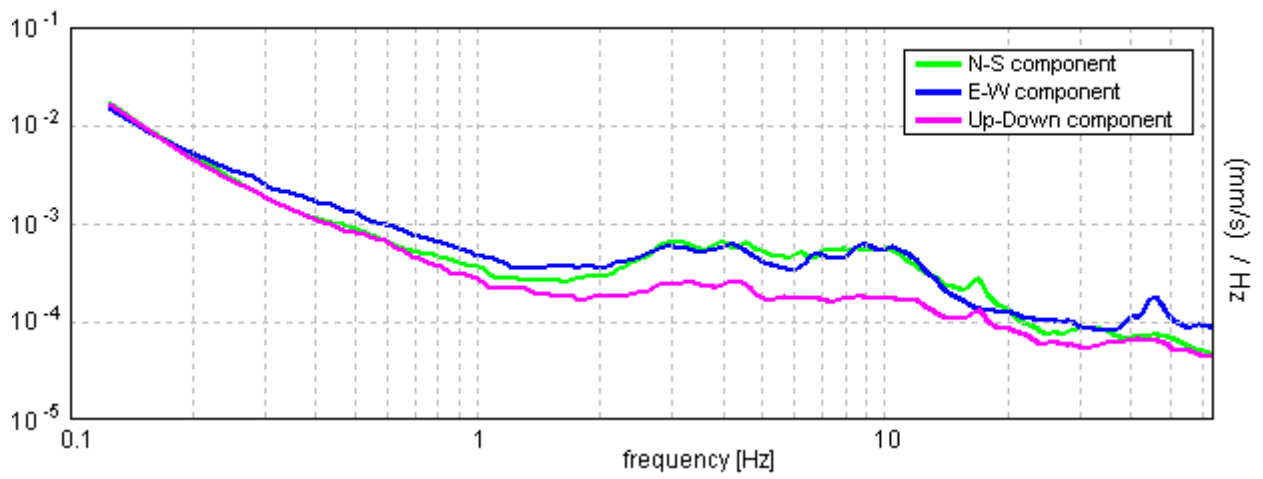
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 9.03 ± 0.37 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	9.03 > 0.50	OK	
$n_c(f_0) > 200$	16256.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 434 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	16.344 Hz	OK	
$A_0 > 2$	3.24 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02041  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.18433 < 0.45156	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.0764 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0218			
<b>Coordinate</b>	UTM	4217022.42	N	362367.51	E
	Gauss Boaga	4217020.781	N	2382362.864	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		29/05/2014, 12:58			
<b>Nome file</b>		0218			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Cemento			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**

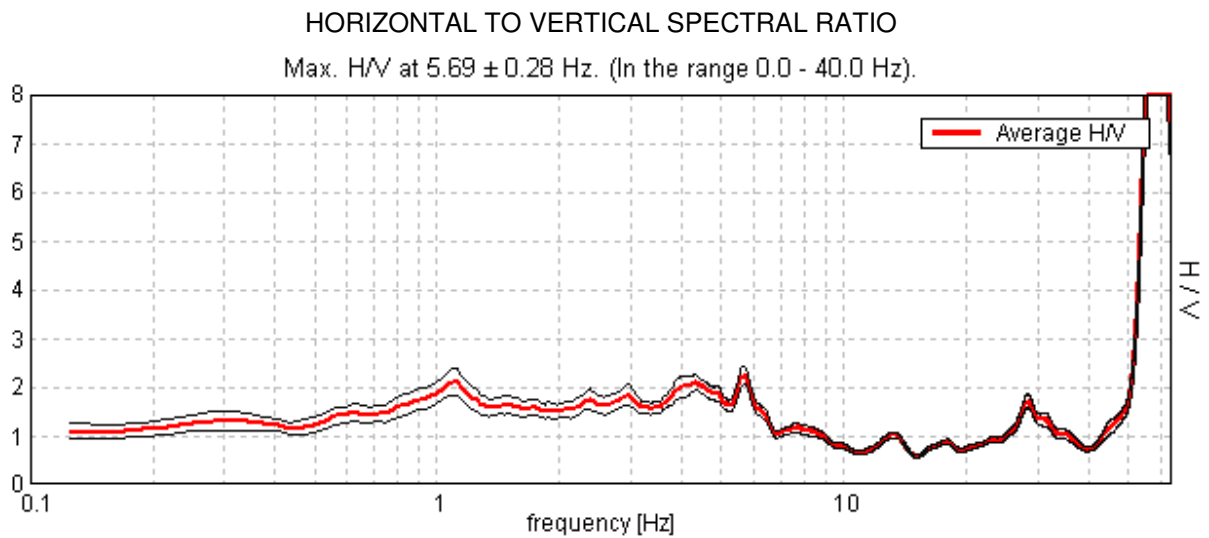




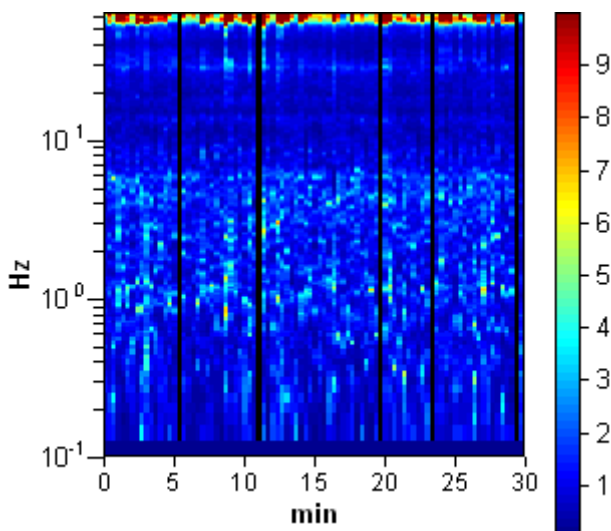
## TRIVELSICILIA PALERMO, PALERMO 0218

Start recording: 29/05/14 13:00:16      End recording: 29/05/14 13:30:17  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

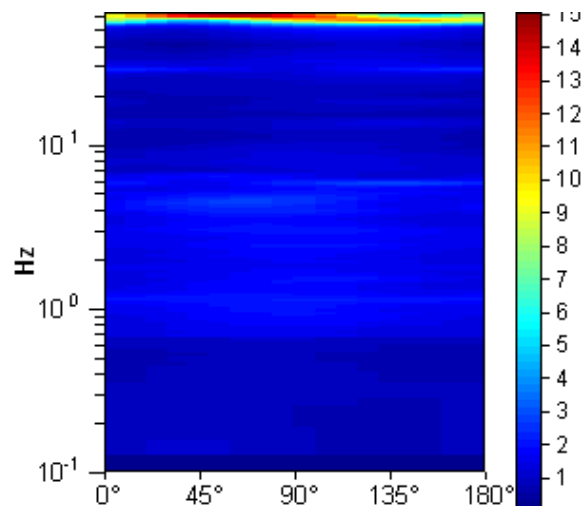
Trace length: 0h30'00".      Analyzed 94% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



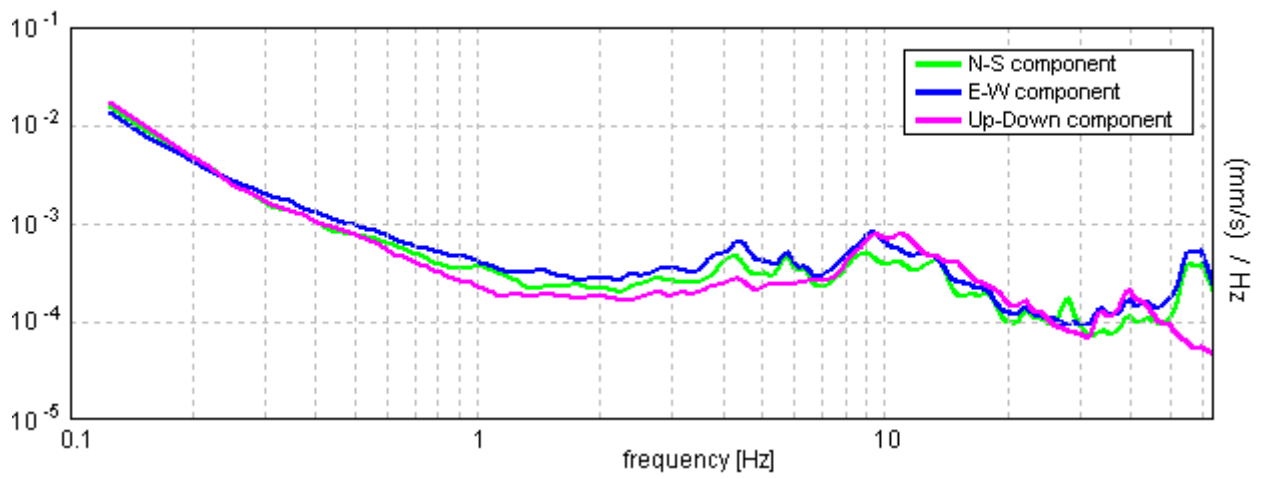
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 5.69 ± 0.28 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	5.69 > 0.50	OK	
$n_c(f_0) > 200$	9668.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 274 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	6.688 Hz	OK	
$A_0 > 2$	2.23 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02444  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.139 < 0.28438	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.0905 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0219				
<b>Coordinate</b>	<i>UTM</i>	4217018.84	N	362762.20	E
	<i>Gauss Boaga</i>	4217017.208	N	2382757.572	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	29/05/2014, 13:42				
<b>Nome file</b>	0219				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Cemento				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

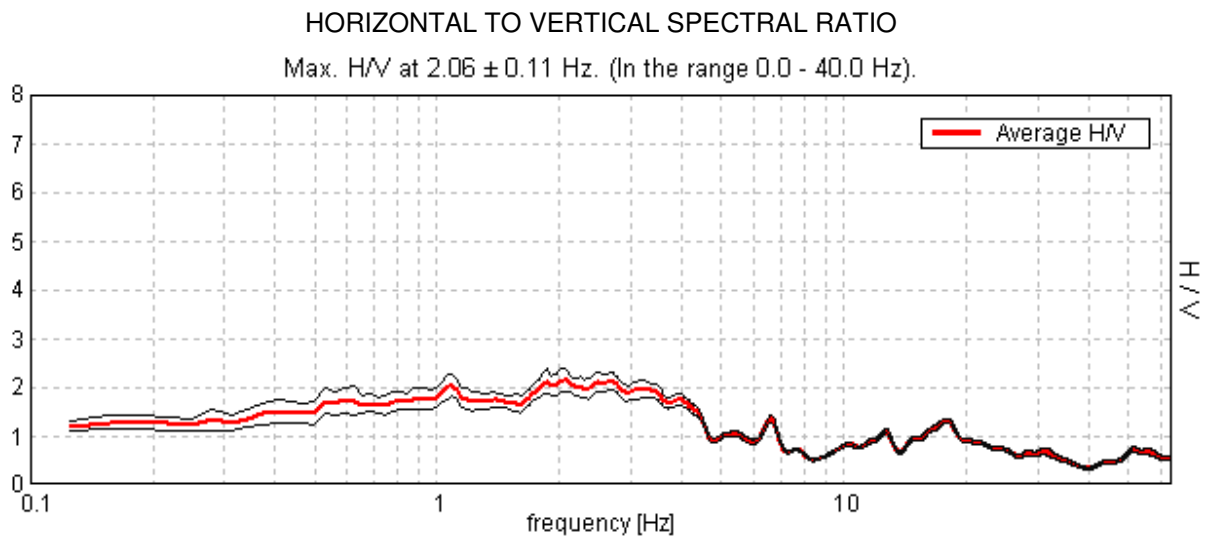
**Documentazione fotografica**



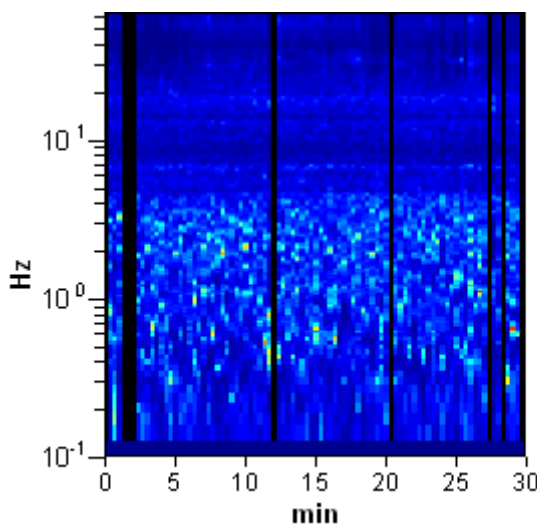
## TRIVEL SICILIA PALERMO, PALERMO TR 0219

Start recording: 29/05/14 13:50:38      End recording: 29/05/14 14:20:39  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

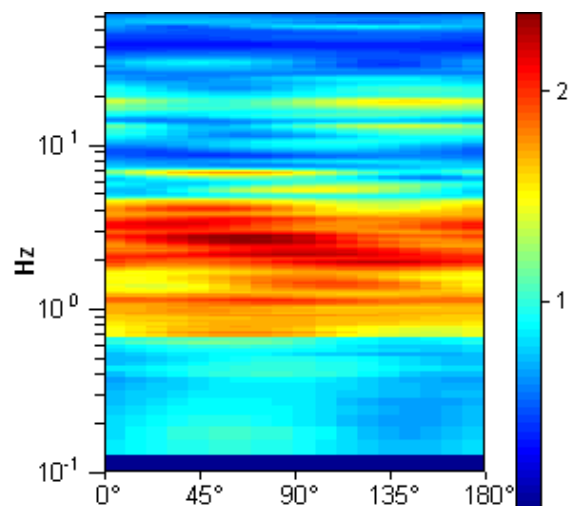
Trace length: 0h30'00".      Analyzed 90% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



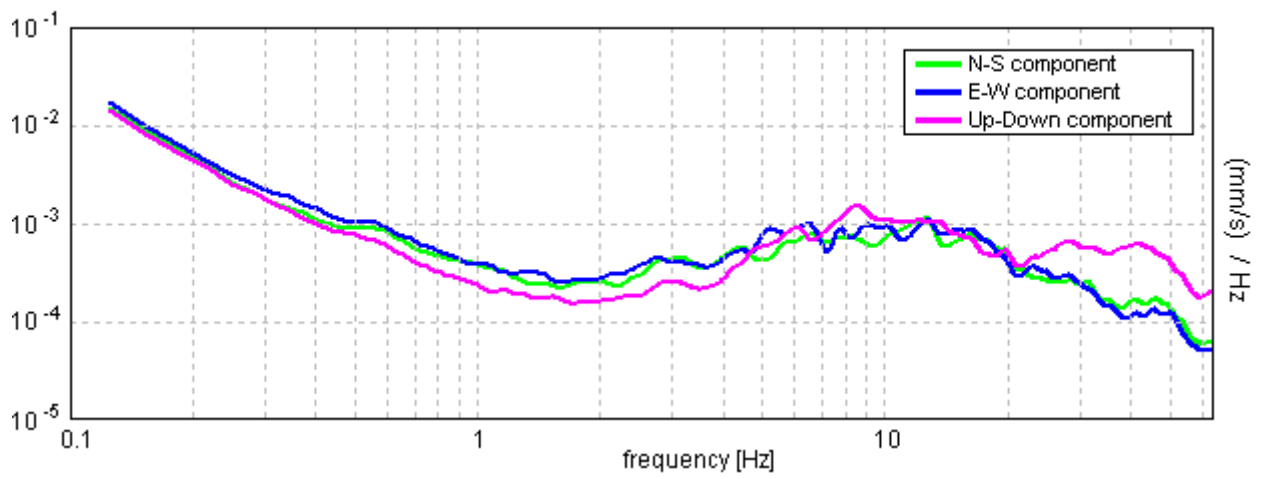
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 2.06 ± 0.11 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.06 > 0.50	OK	
$n_c(f_0) > 200$	3341.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 100 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	4.625 Hz	OK	
$A_0 > 2$	2.14 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02584  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.05329 < 0.10313$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1175 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0220				
<b>Coordinate</b>	<i>UTM</i>	4216734.88	N	363147.30	E
	<i>Gauss Boaga</i>	4216733.243	N	2383142.694	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	28/05/2014, 11:58				
<b>Nome file</b>	0220				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Cemento				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**

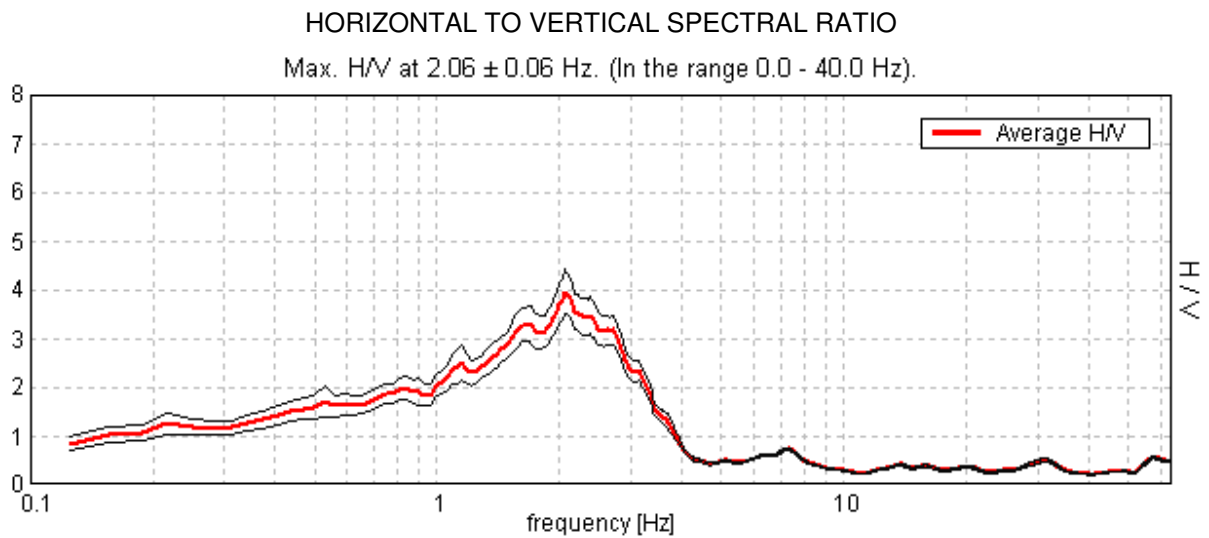




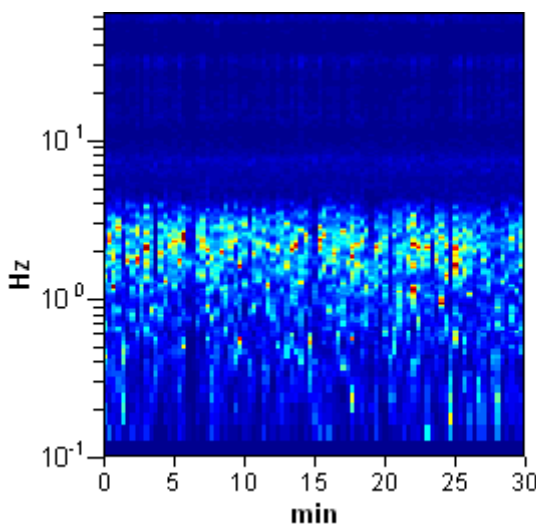
## TRIVELSICILIA PALERMO, PALERMO 0220

Start recording: 28/05/14 12:06:13      End recording: 28/05/14 12:36:14  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

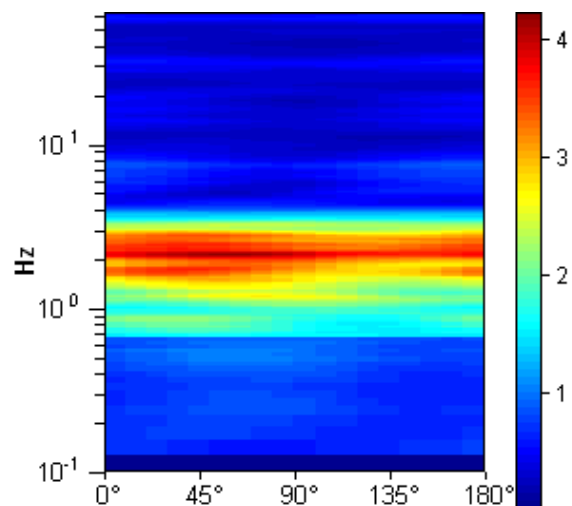
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



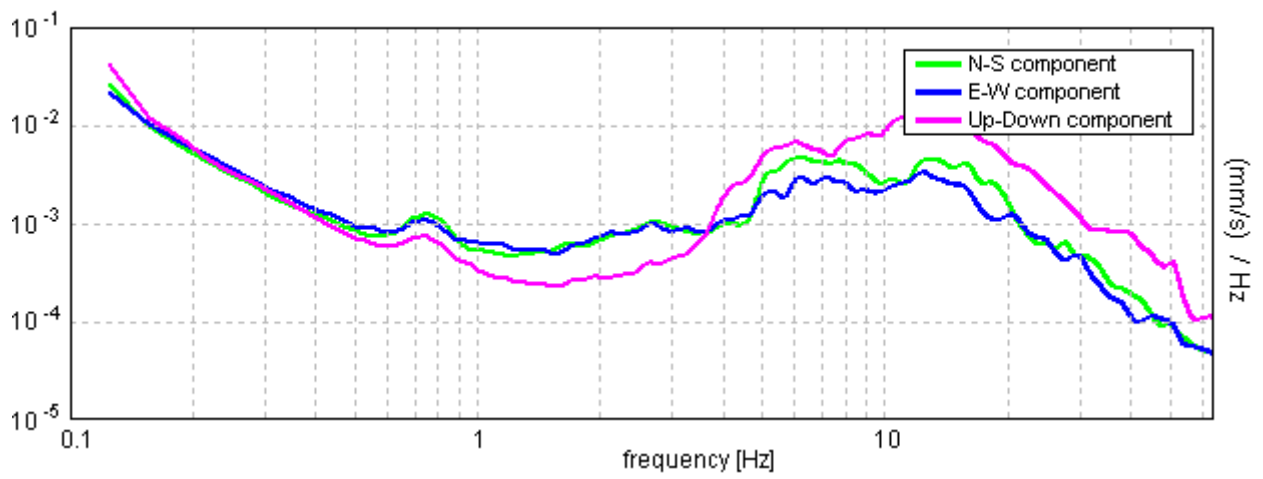
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 2.06 ± 0.06 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.06 > 0.50	OK	
$n_c(f_0) > 200$	3712.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 100 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.969 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	3.313 Hz	OK	
$A_0 > 2$	3.95 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01563  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.03223 < 0.10313	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.2279 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0221				
<b>Coordinate</b>	<i>UTM</i>	4216859.78	N	363973.02	E
	<i>Gauss Boaga</i>	4216858.164	N	2383968.448	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	29/05/2014, 16:25				
<b>Nome file</b>	0221				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



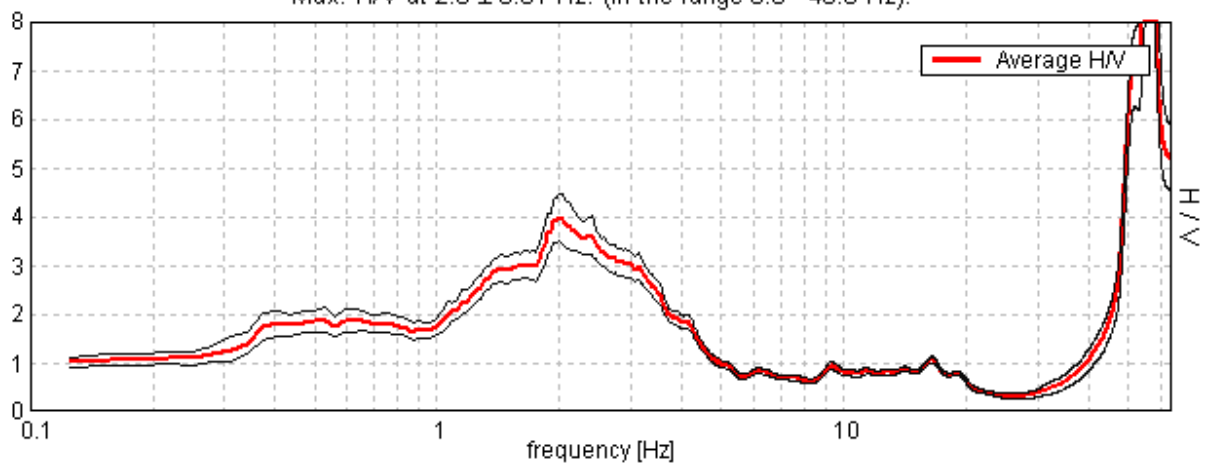
## TRIVELSICILIA PALERMO, PALERMO 0221

Start recording: 29/05/14 16:26:58      End recording: 29/05/14 16:56:59  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

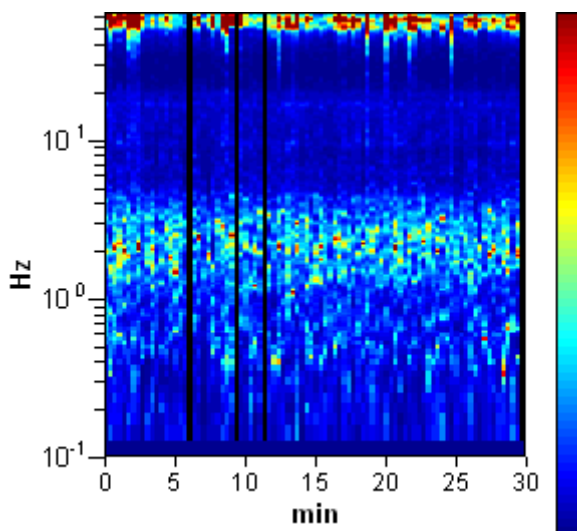
Trace length: 0h30'00".      Analyzed 96% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

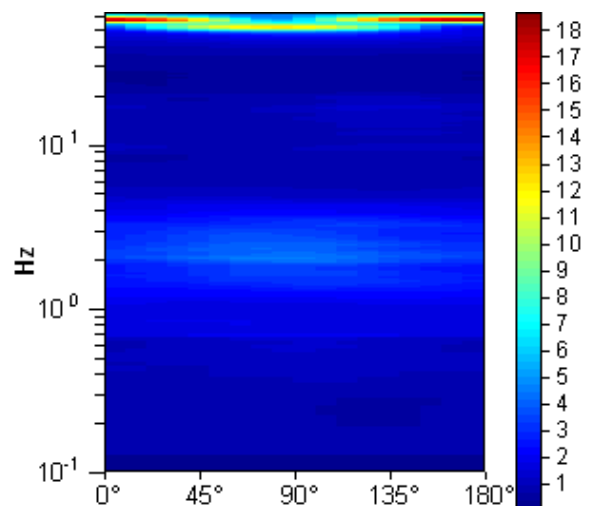
Max. H/V at  $2.0 \pm 0.01$  Hz. (in the range 0.0 - 40.0 Hz).



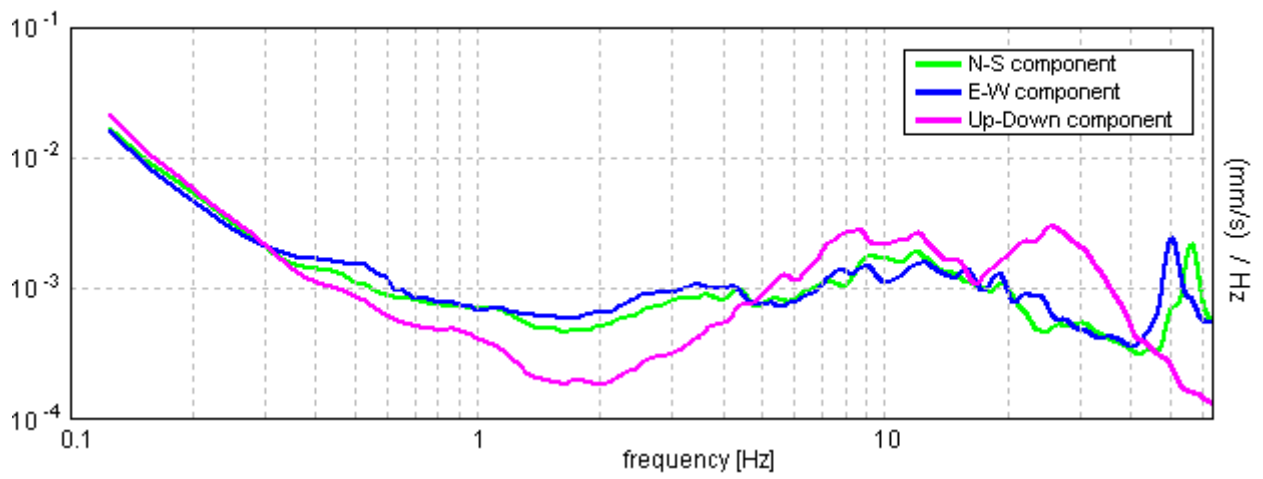
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $2.0 \pm 0.01$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$2.00 > 0.50$	OK	
$n_c(f_0) > 200$	$3440.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 97 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	1.031 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	3.719 Hz	OK	
$A_0 > 2$	$3.97 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.002  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.004 < 0.1$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2415 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0222			
<b>Coordinate</b>	UTM	4217635.89	N	355608.97	E
	Gauss Boaga	4217634.161	N	2375604.004	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		30/05/2014, 13:20			
<b>Nome file</b>		0222			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**

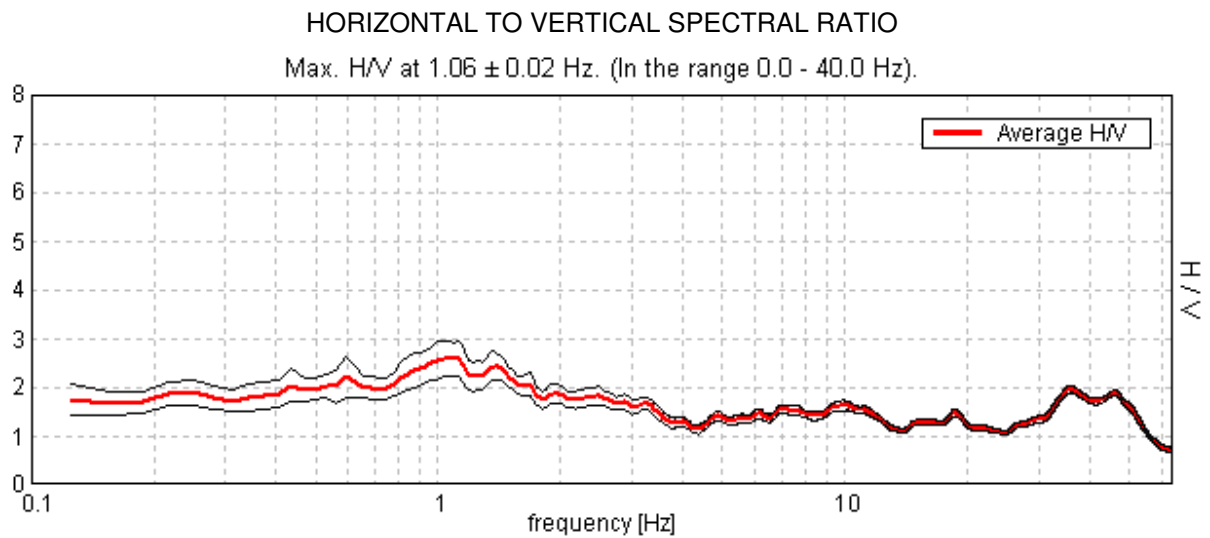




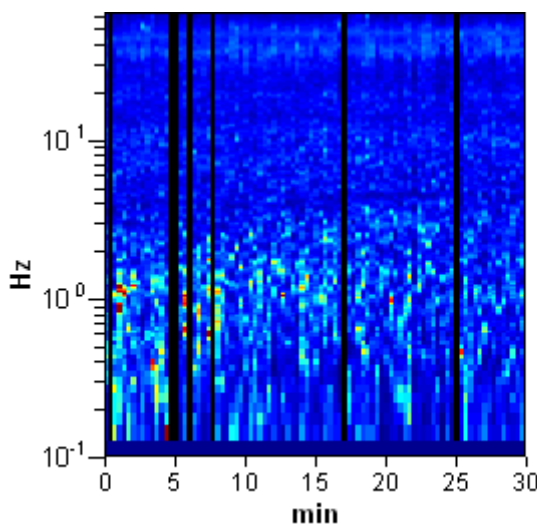
## TRIVEL SICILIA PALERMO, TR0222

Start recording: 30/05/14 13:22:14      End recording: 30/05/14 13:52:15  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

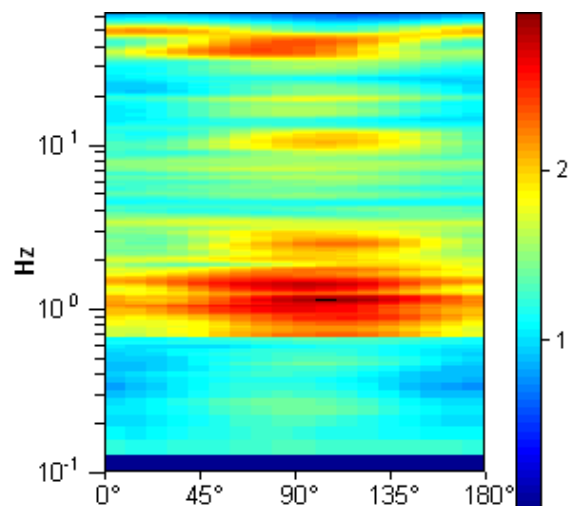
Trace length: 0h30'00".      Analyzed 92% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



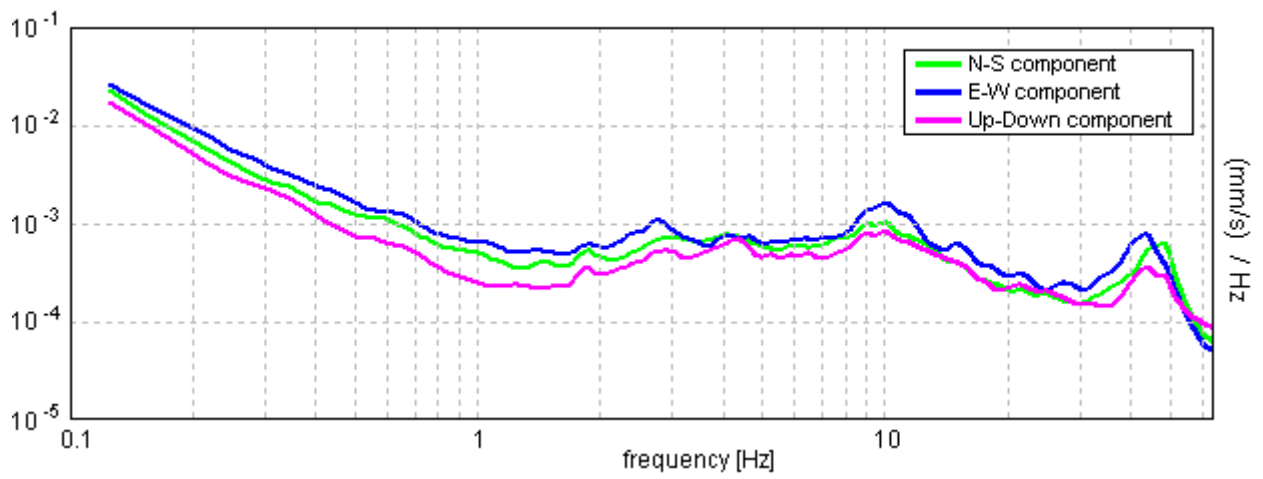
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.06 ± 0.02 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.06 > 0.50	OK	
$n_c(f_0) > 200$	1763.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 52 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	3.719 Hz	OK	
$A_0 > 2$	2.57 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01131  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.01201 < 0.10625	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1812 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0223				
<b>Coordinate</b>	<i>UTM</i>	4217292.51	N	355846.56	E
	<i>Gauss Boaga</i>	4217290.768	N	2375841.613	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	30/05/2014, 11:00				
<b>Nome file</b>	0223				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



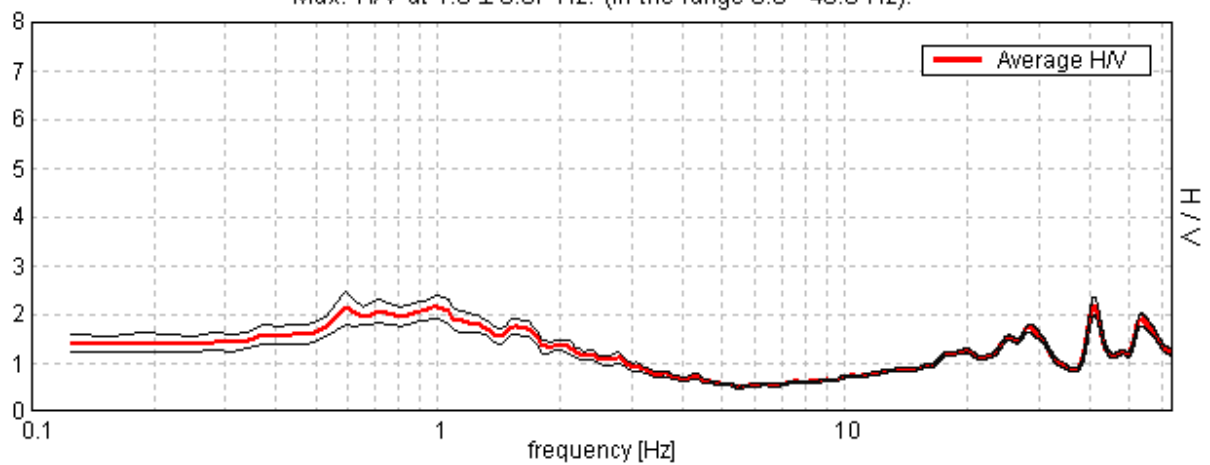
## TRIVEL SICILIA PALERMO, PALERMO TR 0223

Start recording: 30/05/14 11:01:30      End recording: 30/05/14 11:31:31  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

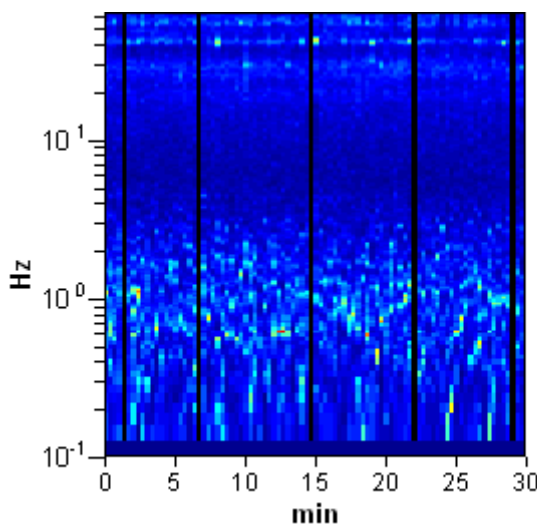
Trace length: 0h30'00".      Analyzed 94% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

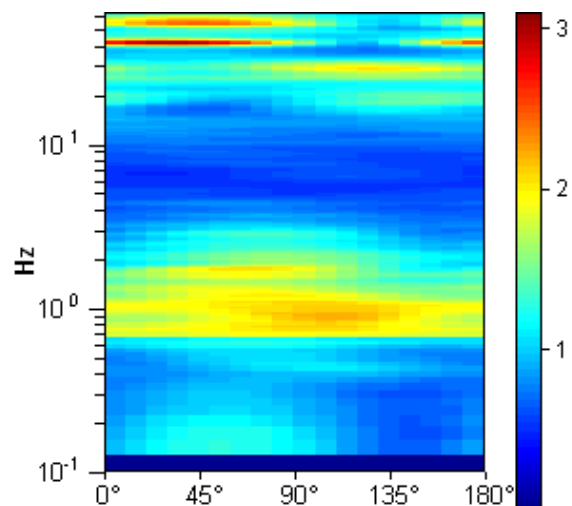
Max. H/V at  $1.0 \pm 0.07$  Hz. (In the range 0.0 - 40.0 Hz).



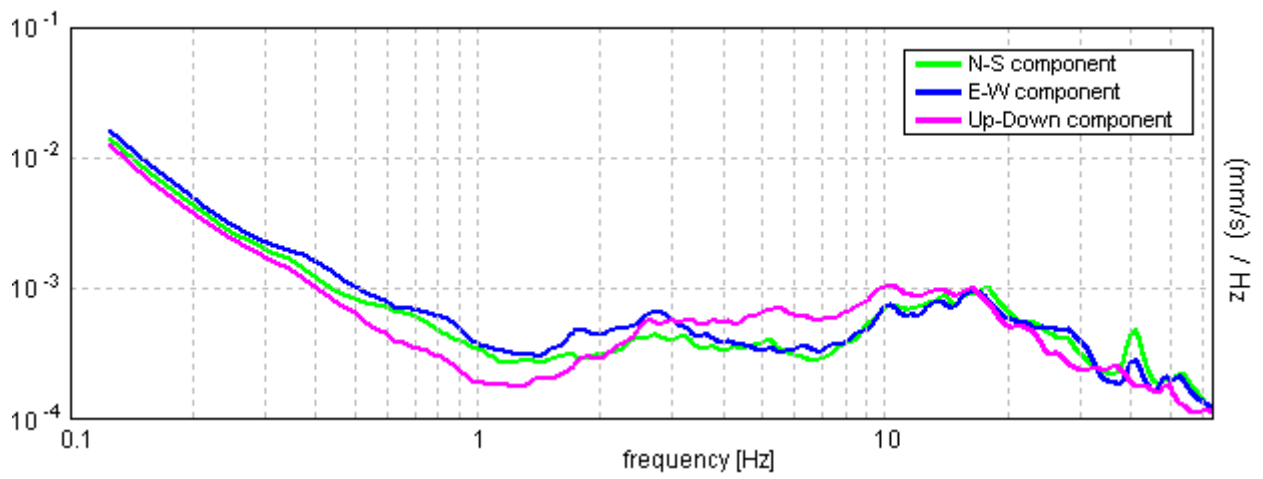
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.0 ± 0.07 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.00 > 0.50	OK	
$n_c(f_0) > 200$	1700.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 49 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.531 Hz	OK	
$A_0 > 2$	2.13 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.0345  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.0345 < 0.1	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1198 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0224			
<b>Coordinate</b>	<i>UTM</i>	4217467.55	N	356410.10	E
	<i>Gauss Boaga</i>	4217465.823	N	2376405.178	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		30/05/2014, 10:19			
<b>Nome file</b>		0224			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**





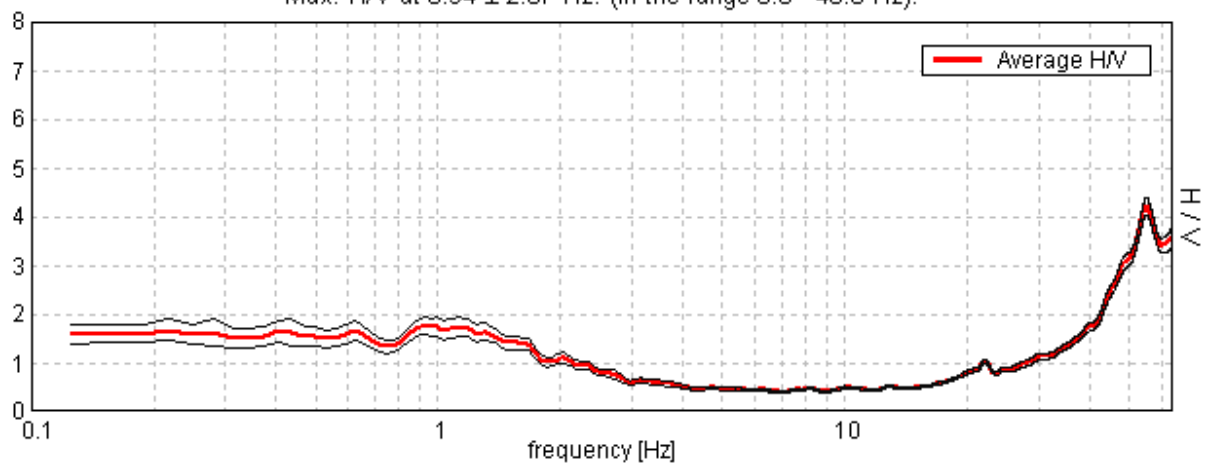
## TRIVEL SICILIA PALERMO, PALERMO TR0224

Start recording: 30/05/14 10:20:23      End recording: 30/05/14 10:50:24  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

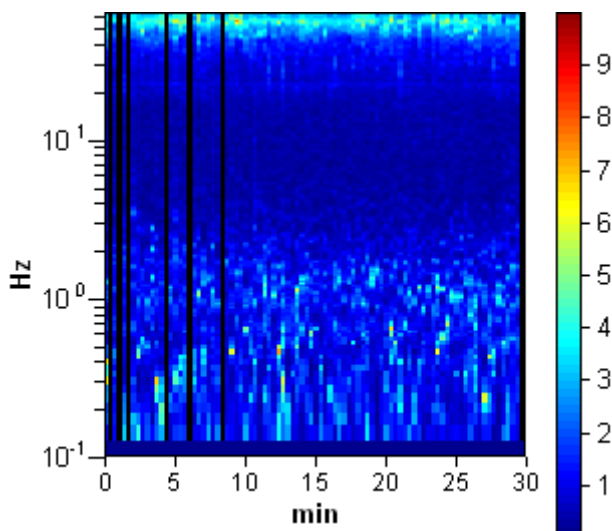
Trace length: 0h30'00".      Analyzed 92% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

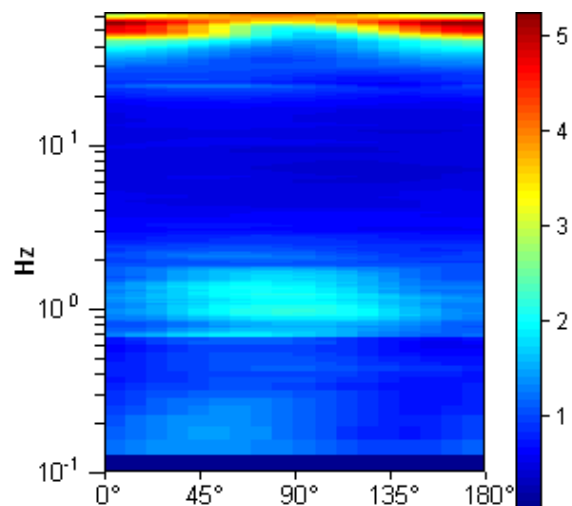
Max. H/V at  $0.94 \pm 2.67$  Hz. (In the range 0.0 - 40.0 Hz).



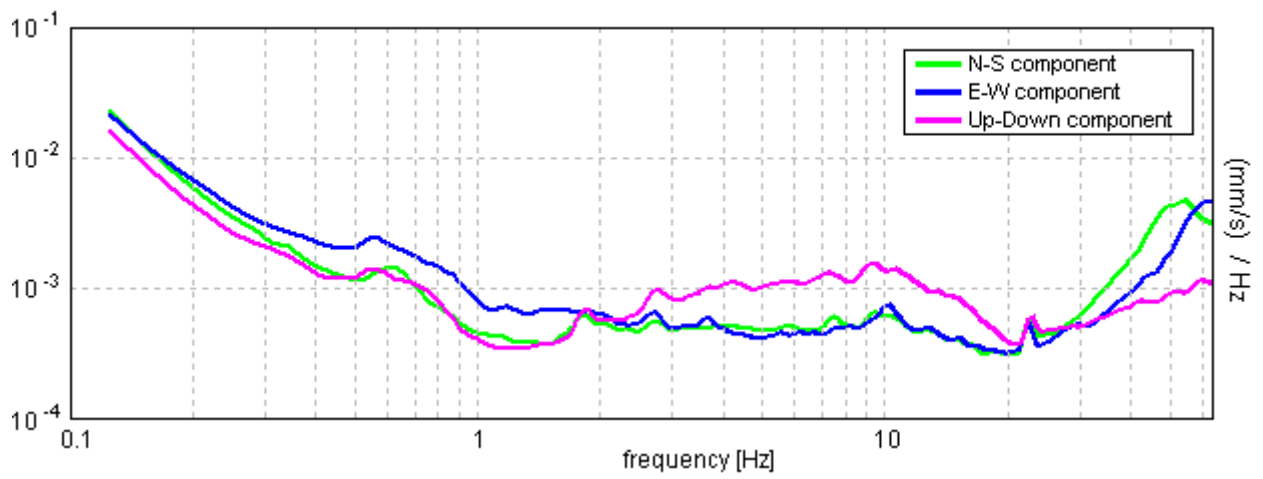
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 0.94 ± 2.67 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.94 > 0.50	OK	
$n_c(f_0) > 200$	1556.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 46 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.406 Hz	OK	
$A_0 > 2$	1.76 > 2		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 1.42132  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	1.33249 < 0.14063		NO
$\sigma_A(f_0) < \theta(f_0)$	0.0825 < 2.0	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>				
<b>Nome base sismica</b>	0225				
<b>Coordinate</b>	<i>UTM</i>	4217492.37	N	356751.68	E
	<i>Gauss Boaga</i>	4217490.648	N	2376746.774	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	30/05/2014, 09:55				
<b>Nome file</b>	0225				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Terreno				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

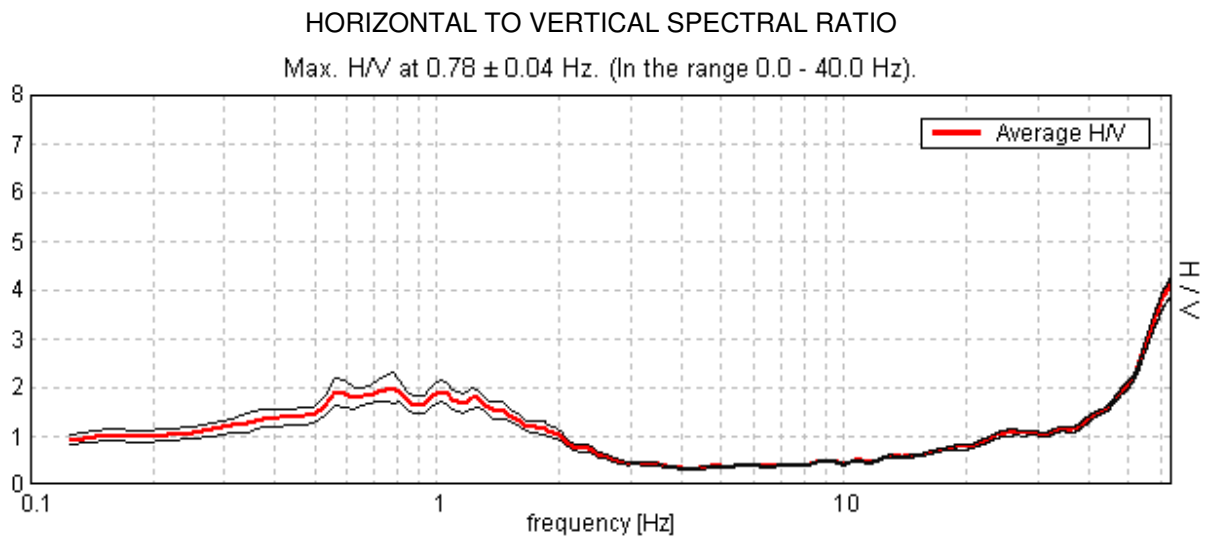
**Documentazione fotografica**



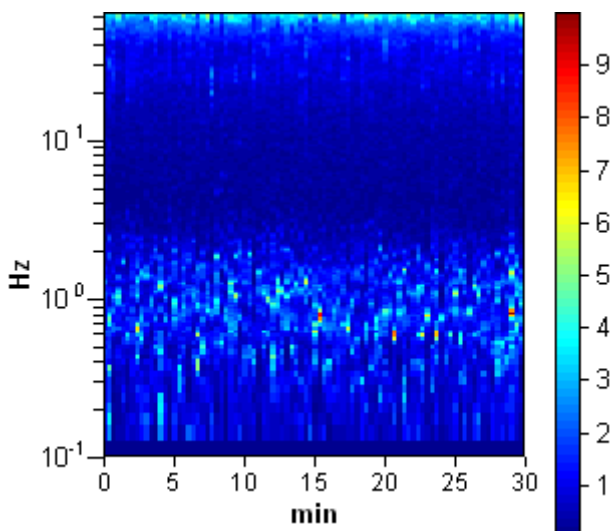
## TRIVEL SICILIA PALERMO, PALERMO TR0225

Start recording: 30/05/14 09:37:16      End recording: 30/05/14 10:07:17  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

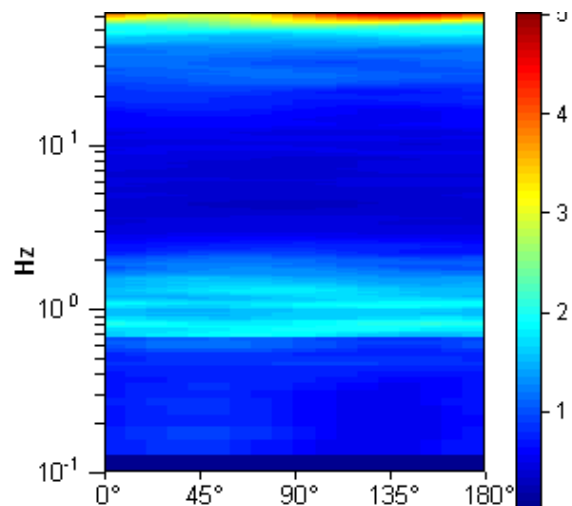
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



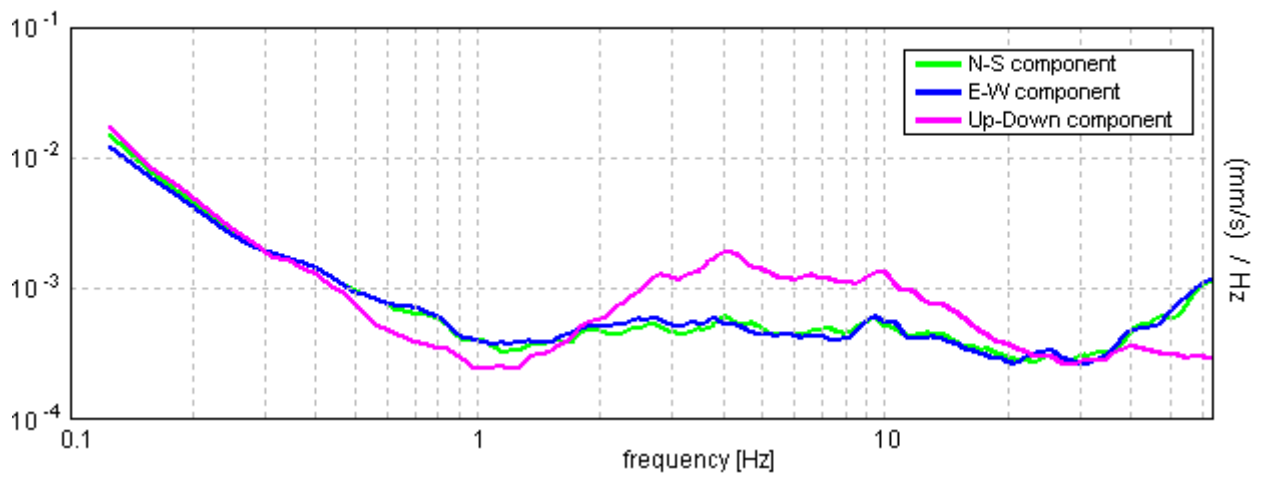
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $0.78 \pm 0.04$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.78 > 0.50$	OK	
$n_c(f_0) > 200$	$1406.3 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 38 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.188 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.031 Hz	OK	
$A_0 > 2$	$1.99 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02296  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01793 < 0.11719$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.156 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0226				
<b>Coordinate</b>	<i>UTM</i>	4227098.72	N	353542.68	E
	<i>Gauss Boaga</i>	4227097.369	N	2373537.793	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	21/05/2014, 10:50				
<b>Nome file</b>	0226				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**





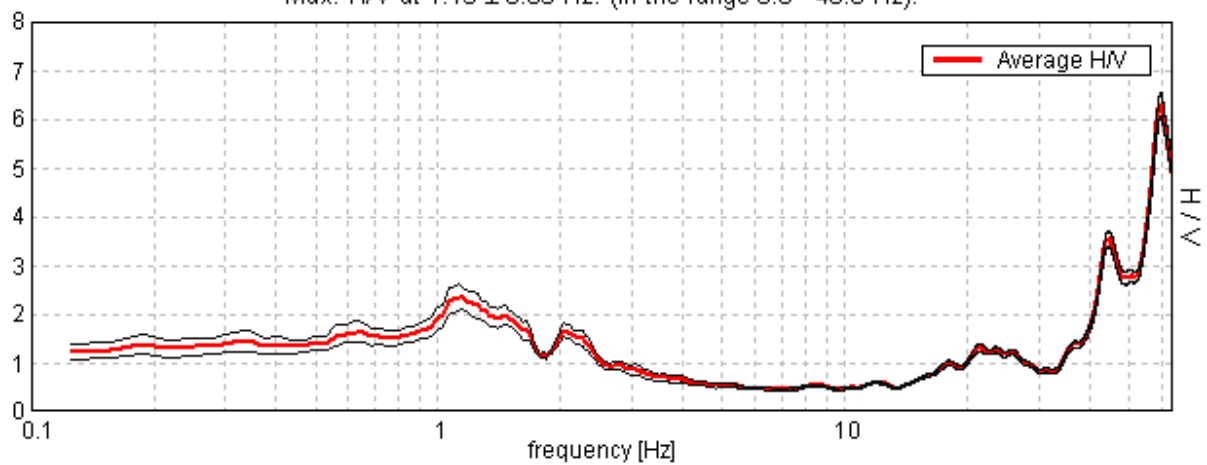
## TRIVELSICILIA PALERMO, PALERMO 0226

Start recording: 21/05/14 10:53:36      End recording: 21/05/14 11:23:37  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

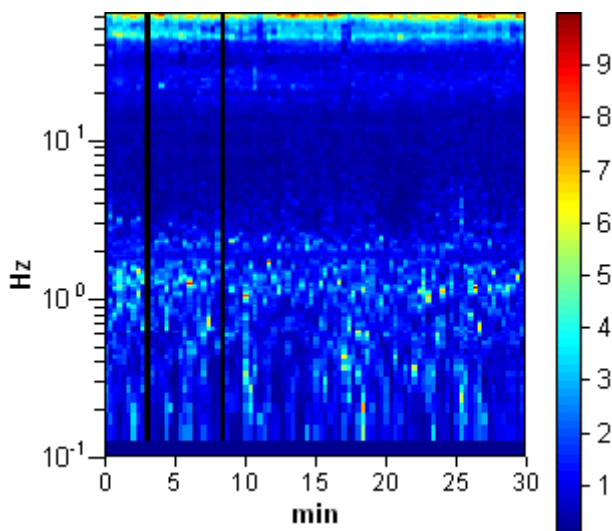
Trace length: 0h30'00".      Analyzed 98% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

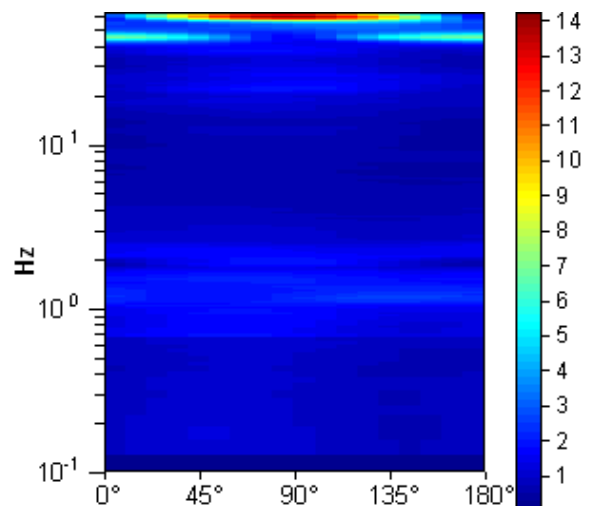
Max. H/V at  $1.13 \pm 0.03$  Hz. (In the range 0.0 - 40.0 Hz).



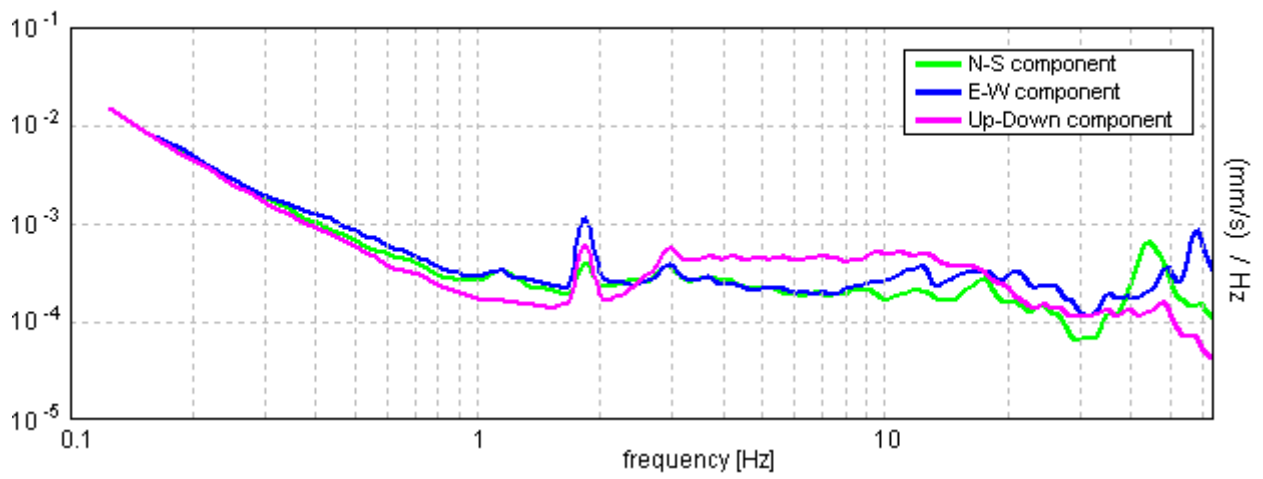
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.13 ± 0.03 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.13 > 0.50	OK	
$n_c(f_0) > 200$	1980.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 55 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.781 Hz	OK	
$A_0 > 2$	2.34 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.0146  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01643 < 0.1125$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1399 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0227			
<b>Coordinate</b>	UTM	4226721.08	N	353623.49	E
	Gauss Boaga	4226719.714	N	2373618.594	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		21/05/2014, 10:11			
<b>Nome file</b>		0227			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>Si</b>		
		<b>Altro</b>	<b>No</b>		

**Documentazione fotografica**



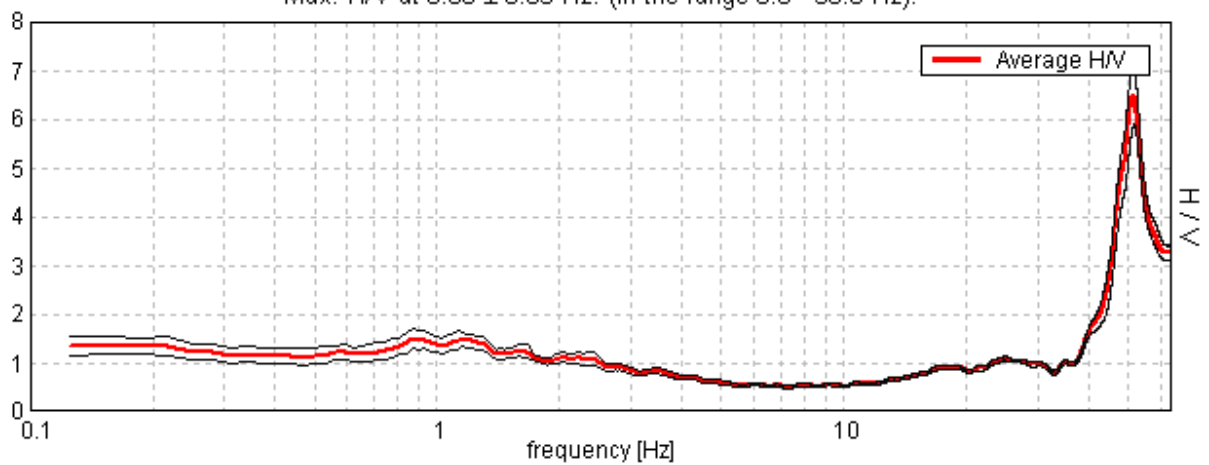
## TRIVELSICILIA PALERMO, PALERMO 0227

Start recording: 21/05/14 10:13:49      End recording: 21/05/14 10:43:50  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

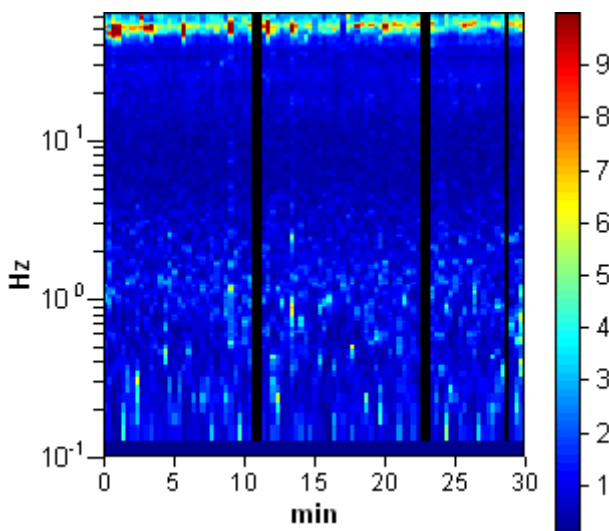
Trace length: 0h30'00".      Analyzed 94% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

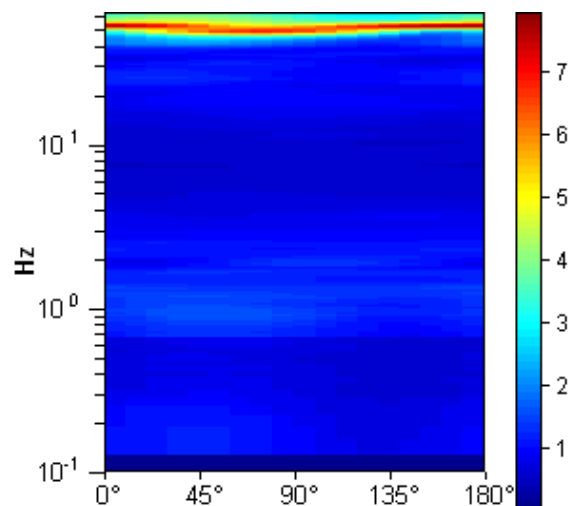
Max. H/V at  $0.88 \pm 0.05$  Hz. (In the range 0.0 - 30.0 Hz).



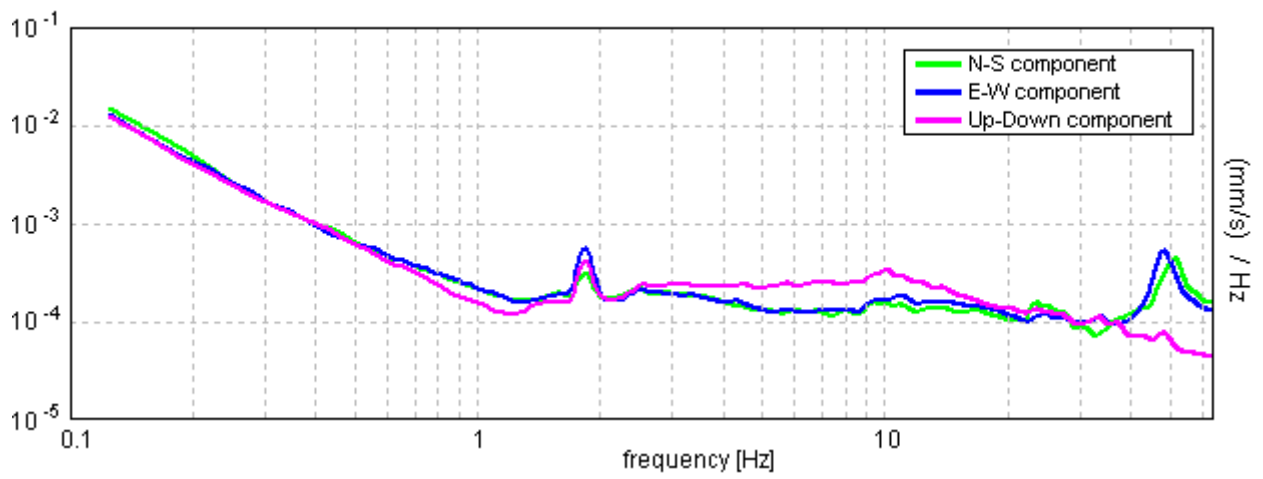
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $0.88 \pm 0.05$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.88 > 0.50$	OK	
$n_c(f_0) > 200$	$1487.5 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 43 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$1.50 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03115  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02726 < 0.13125$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1048 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0228				
<b>Coordinate</b>	<i>UTM</i>	4227564.07	N	353555.95	E
	<i>Gauss Boaga</i>	4227562.738	N	2373551.080	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	21/05/2014, 11:32				
<b>Nome file</b>	0228				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**

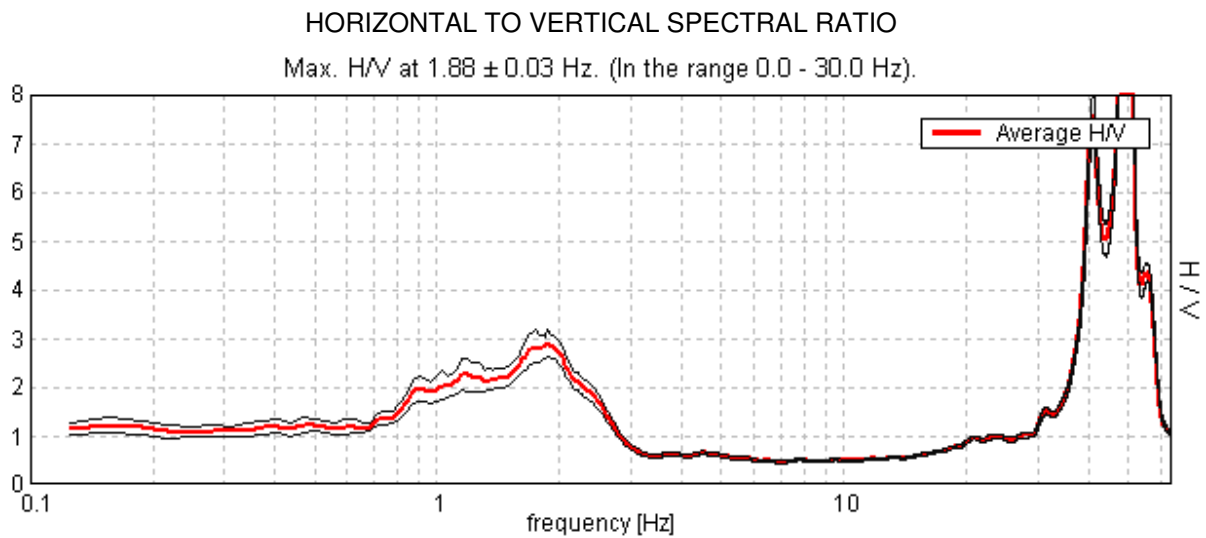




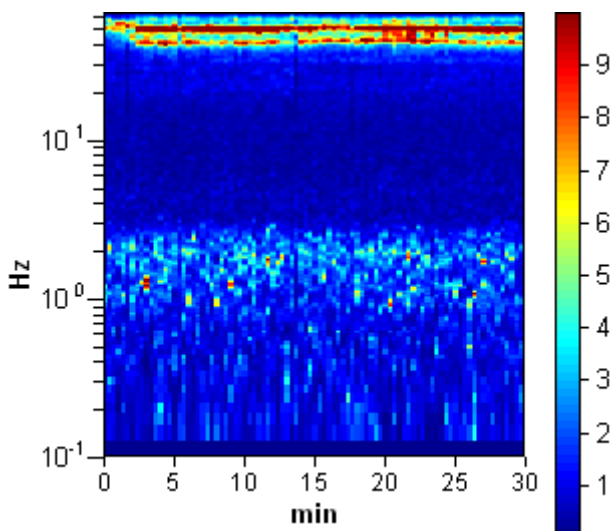
## TRIVELSICILIA PALERMO, PALERMO 0228

Start recording: 21/05/14 11:35:27      End recording: 21/05/14 12:05:28  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

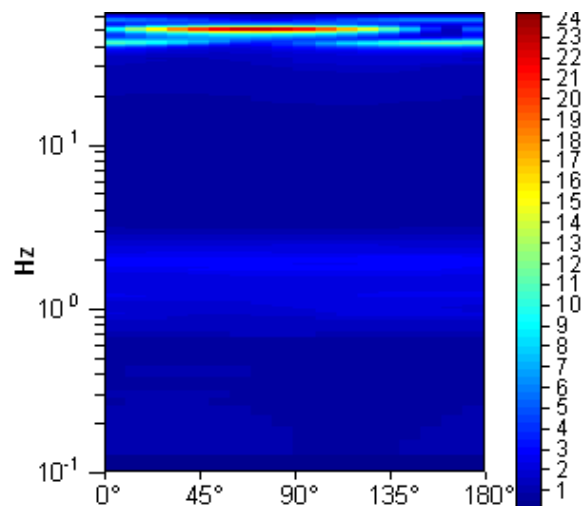
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



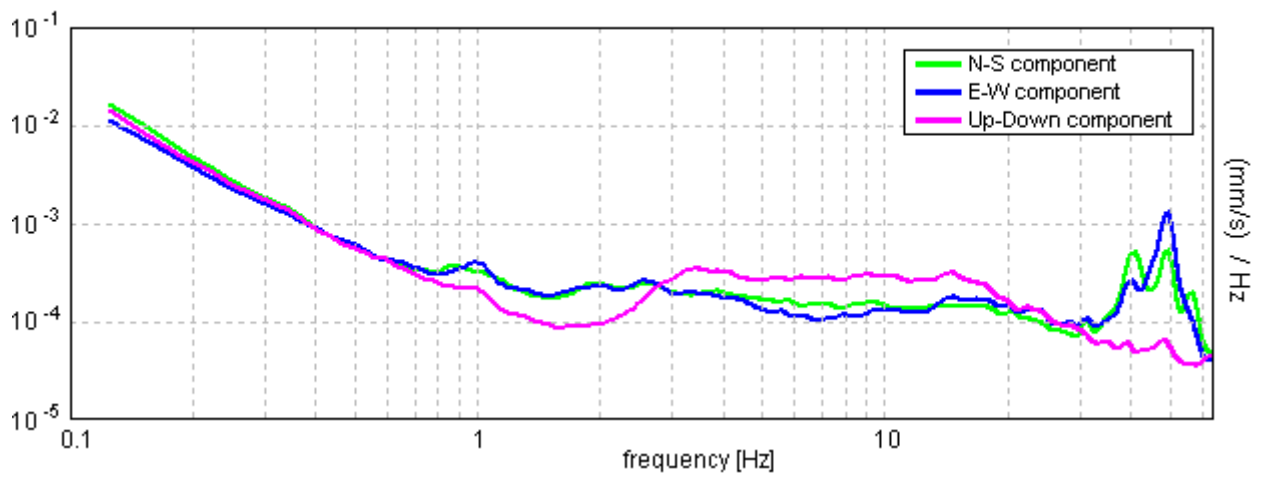
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.88 ± 0.03 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.88 > 0.50	OK	
$n_c(f_0) > 200$	3375.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 91 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.781 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.625 Hz	OK	
$A_0 > 2$	2.90 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00848  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.0159 < 0.1875	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1328 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0229				
<b>Coordinate</b>	<i>UTM</i>	4227832.90	N	353524.30	E
	<i>Gauss Boaga</i>	4227831.579	N	2373519.437	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	21/05/2014, 12:06				
<b>Nome file</b>	0229				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

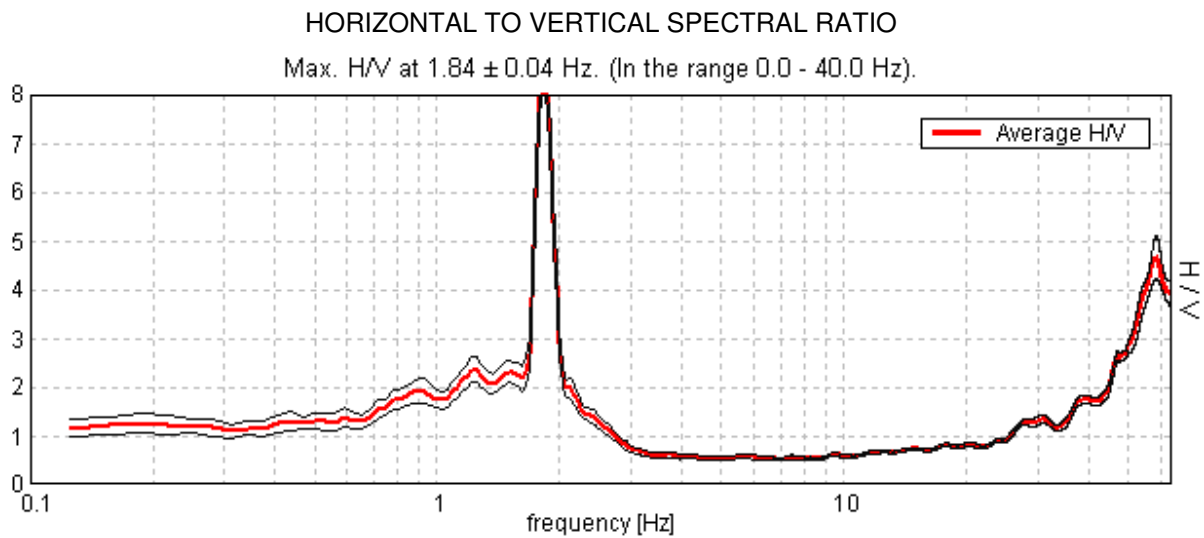
**Documentazione fotografica**



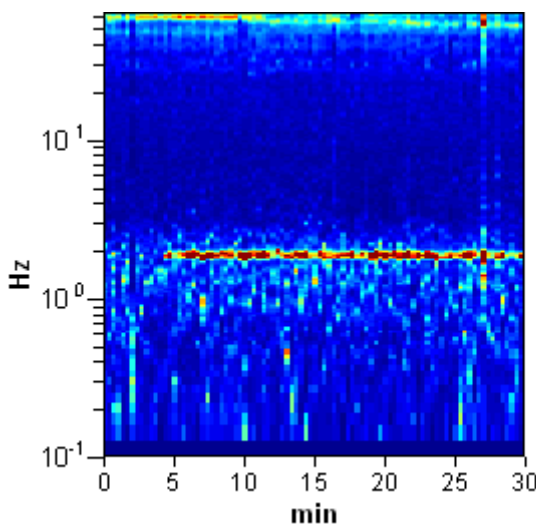
## TRIVELSICILIA PALERMO, PALERMO 0229

Start recording: 21/05/14 12:09:29      End recording: 21/05/14 12:39:30  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

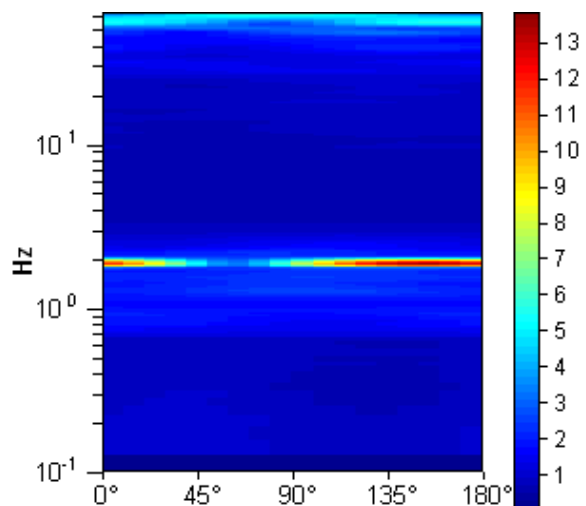
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



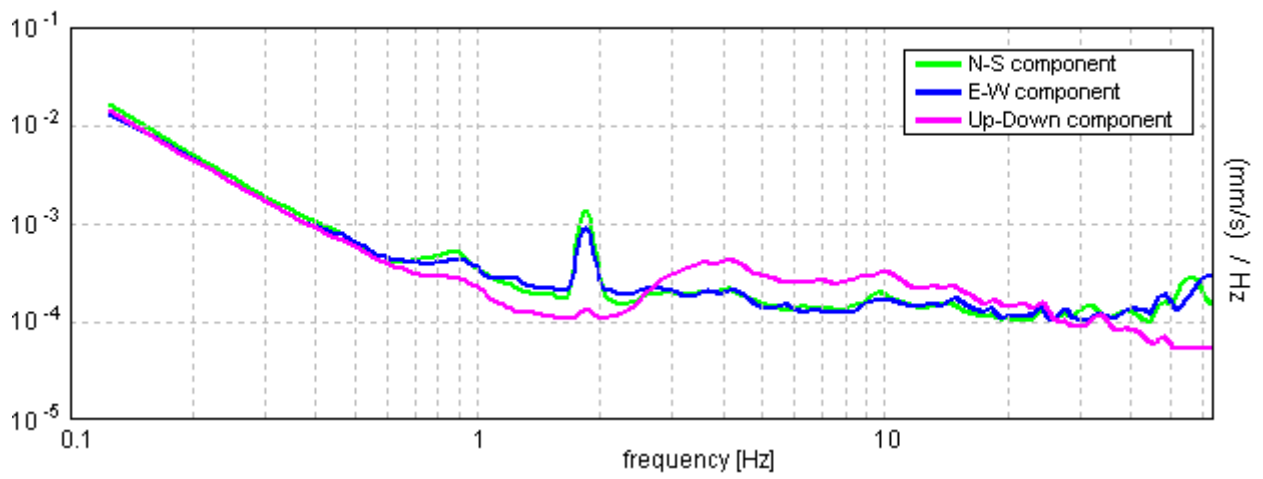
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.84 ± 0.04 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.84 > 0.50	OK	
$n_c(f_0) > 200$	3318.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 90 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	1.719 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	1.969 Hz	OK	
$A_0 > 2$	9.78 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00978  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.01803 < 0.18438	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.5665 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>	0230			
<b>Coordinate</b>	<i>UTM</i>	4228271.00	N	353562.00 E
	<i>Gauss Boaga</i>	4228269.698	N	2373557.154 E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®			
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>	21/05/2014, 12:46			
<b>Nome file</b>	0230			
<b>Durata</b>	30 min			
<b>Frequenza campionamento</b>	128 Hz			
<b>Accoppiamento strumento-suolo</b>	Massetto Stradale			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>		
	<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>		
	<b>Pedoni</b>	<b>Si</b>		
	<b>Altro</b>	<b>No</b>		

**Documentazione fotografica**





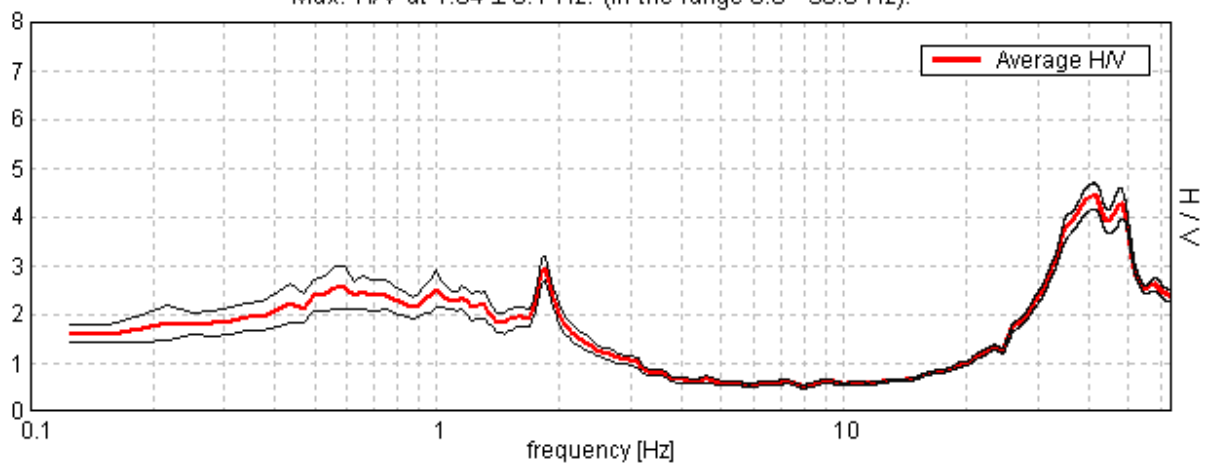
## TRIVELSICILIA PALERMO, PALERMO 0230

Start recording: 21/05/14 12:50:19      End recording: 21/05/14 13:20:20  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

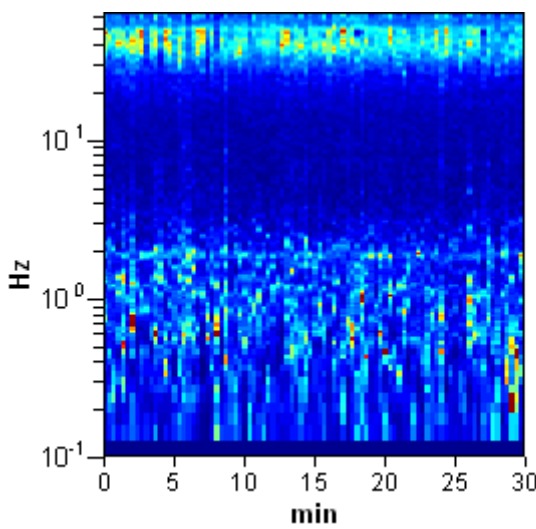
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

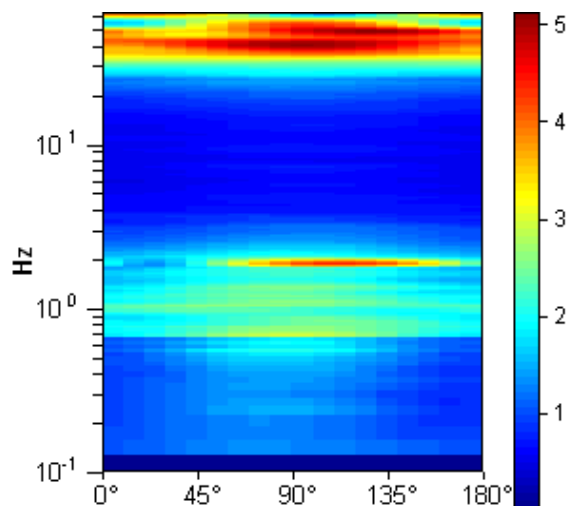
Max. H/V at  $1.84 \pm 0.1$  Hz. (In the range 0.0 - 30.0 Hz).



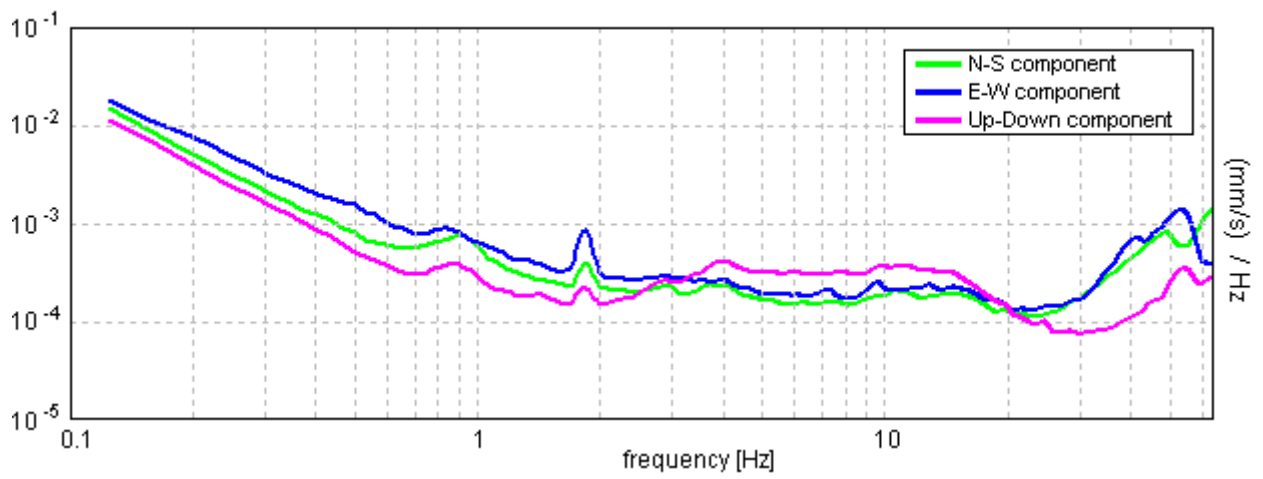
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.84 ± 0.1 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.84 > 0.50	OK	
$n_c(f_0) > 200$	3318.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 90 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.281 Hz	OK	
$A_0 > 2$	2.94 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02681  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.04943 < 0.18438	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1222 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0231			
<b>Coordinate</b>	<i>UTM</i>	4229088.21	N	349185.73	E
	<i>Gauss Boaga</i>	4229086.887	N	2369180.708	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		21/05/2014, 15:18			
<b>Nome file</b>		0231			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

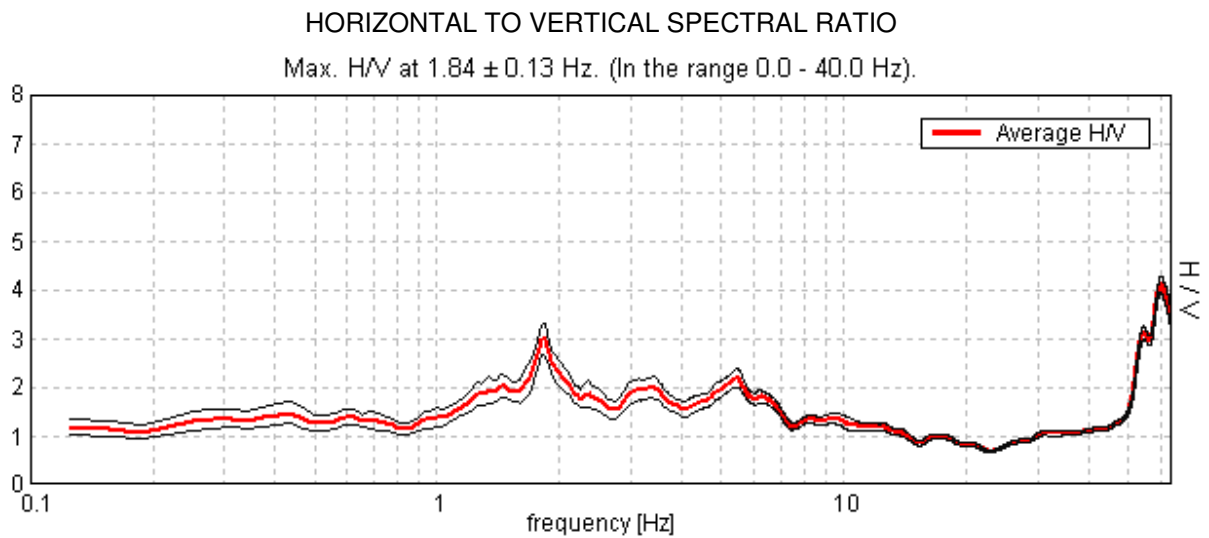
**Documentazione fotografica**



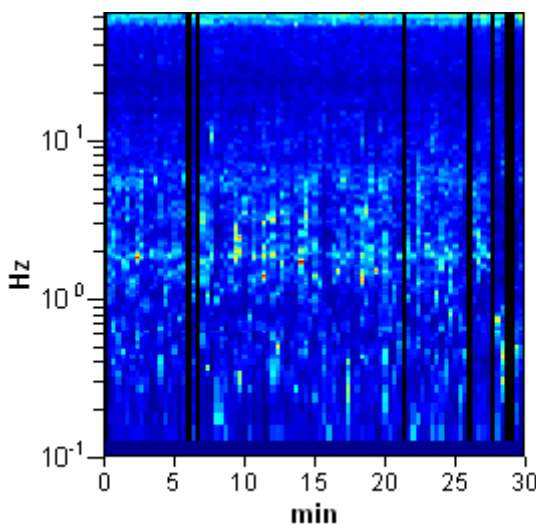
## TRIVELSICILIA PALERMO, PALERMO 0231

Start recording: 21/05/14 15:21:24      End recording: 21/05/14 15:51:25  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

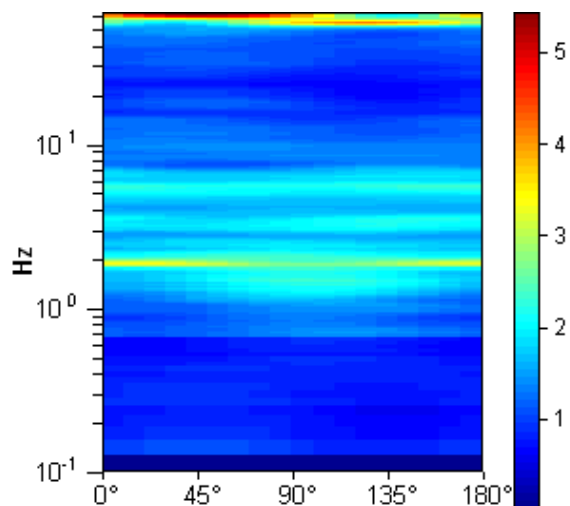
Trace length: 0h30'00".      Analyzed 91% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



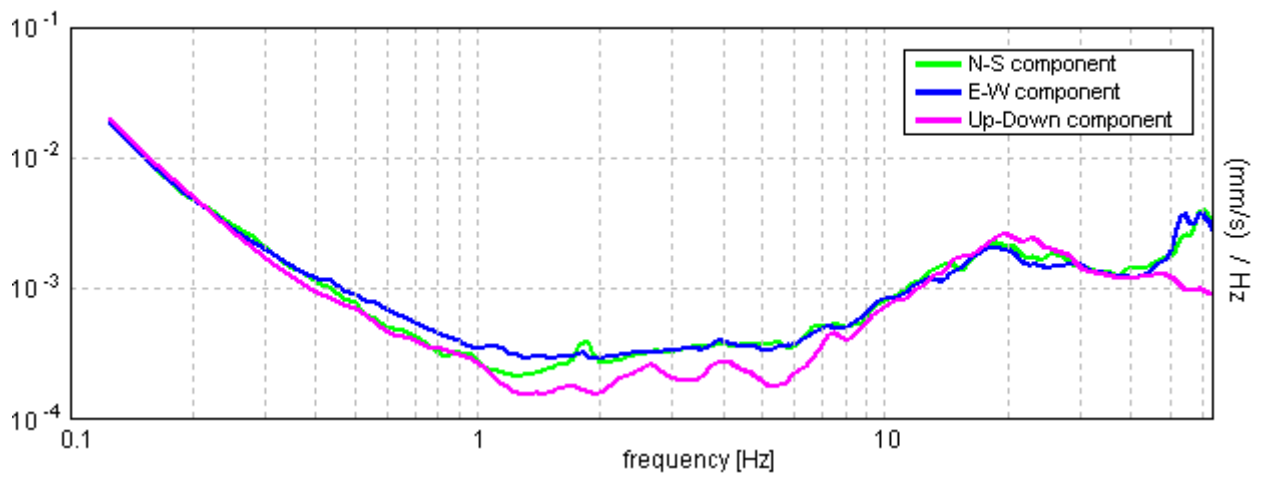
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.84 ± 0.13 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.84 > 0.50	OK	
$n_c(f_0) > 200$	3023.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 90 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	1.094 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	7.0 Hz	OK	
$A_0 > 2$	2.97 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03583  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.06605 < 0.18438	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1653 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0232				
<b>Coordinate</b>	<i>UTM</i>	4229094.87	N	349602.66	E
	<i>Gauss Boaga</i>	4229093.552	N	2369597.658	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	30/05/2014, 06:55				
<b>Nome file</b>	0232				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

**Documentazione fotografica**





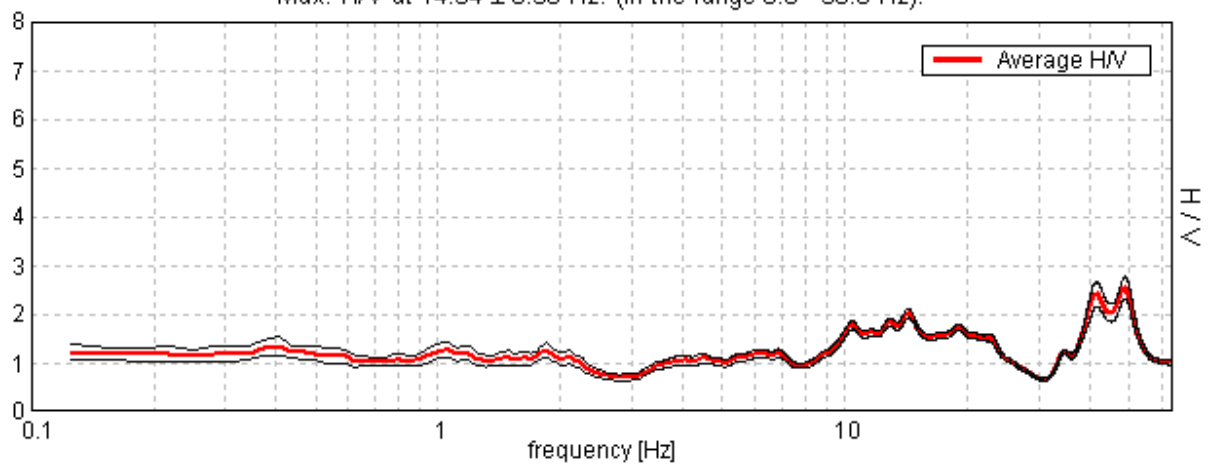
## TRIVEL SICILIA PALERMO, PALERMO TR0232

Start recording: 30/05/14 06:58:22      End recording: 30/05/14 07:28:23  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

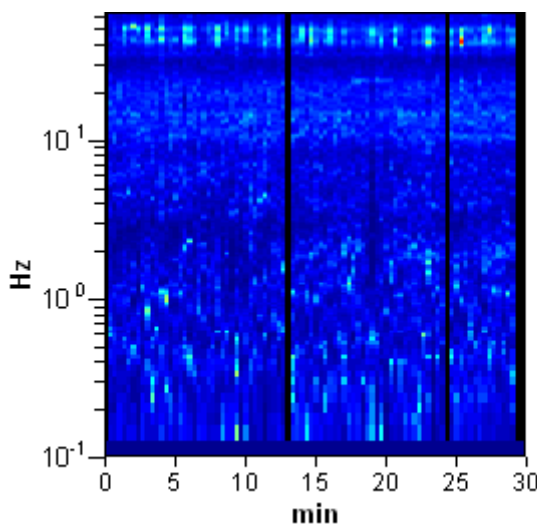
Trace length: 0h30'00".      Analyzed 94% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

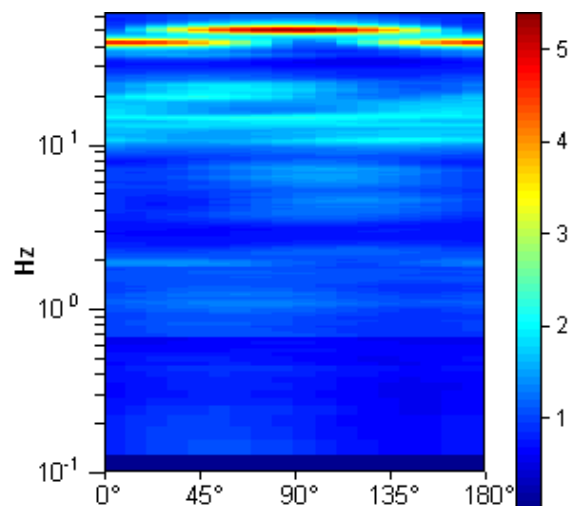
Max. H/V at  $14.34 \pm 0.56$  Hz. (In the range 0.0 - 30.0 Hz).



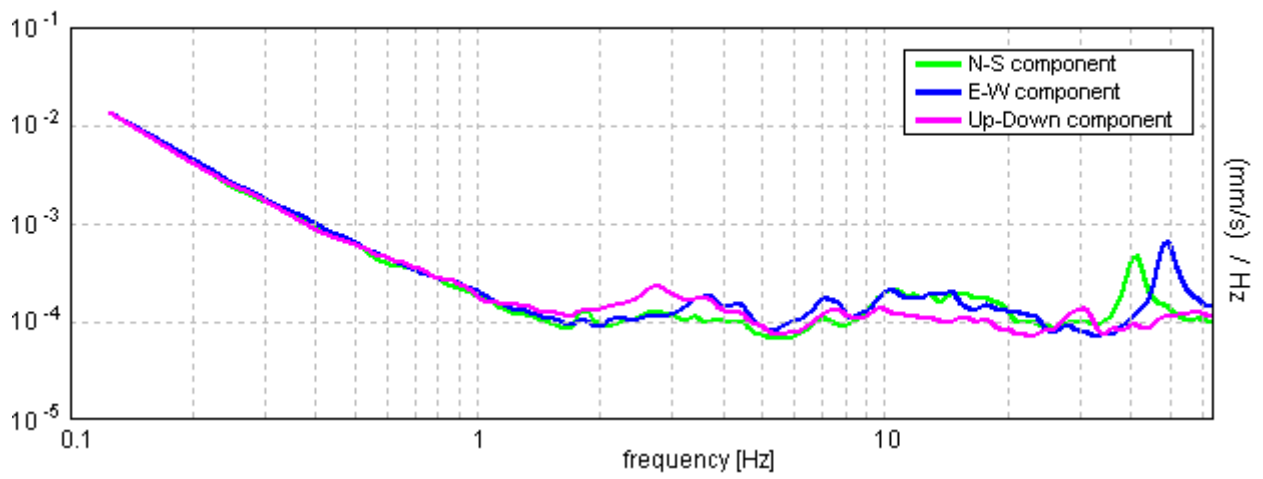
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 14.34 ± 0.56 Hz. (in the range 0.0 - 30.0 Hz).**

<b>Criteria for a reliable HVSR curve</b> [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	14.34 > 0.50	<b>OK</b>	
$n_c(f_0) > 200$	24384.4 > 200	<b>OK</b>	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 690 times	<b>OK</b>	
<b>Criteria for a clear HVSR peak</b> [At least 5 out of 6 should be fulfilled]			
<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	8.313 Hz	<b>OK</b>	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	25.813 Hz	<b>OK</b>	
$A_0 > 2$	2.02 > 2	<b>OK</b>	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01958  < 0.05$	<b>OK</b>	
$\sigma_f < \varepsilon(f_0)$	0.28087 < 0.71719	<b>OK</b>	
$\sigma_A(f_0) < \theta(f_0)$	0.0485 < 1.58	<b>OK</b>	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for $\sigma_f$ and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0233			
<b>Coordinate</b>	<i>UTM</i>	4229424.00	N	349161.00	E
	<i>Gauss Boaga</i>	4229422.690	N	2369155.989	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		21/05/2014, 14:00			
<b>Nome file</b>		0233			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

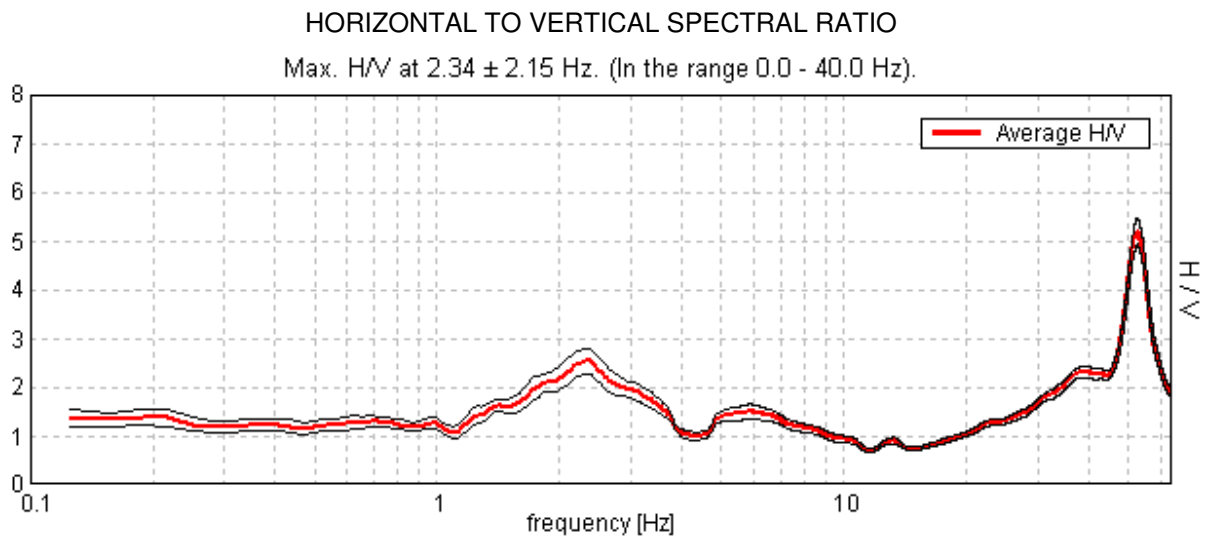
**Documentazione fotografica**



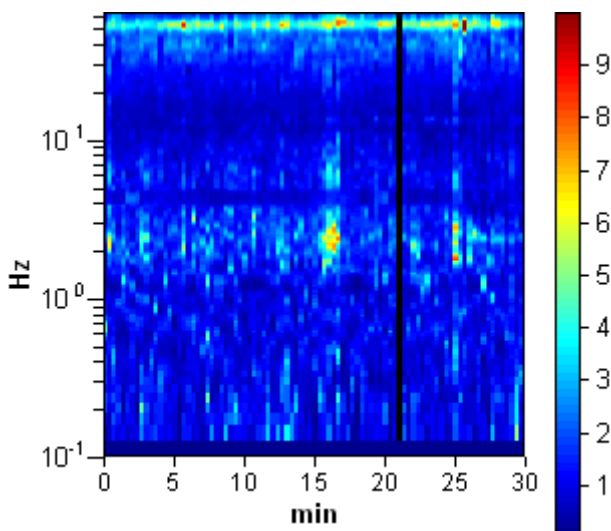
## TRIVELSICILIA PALERMO, PALERMO 0233

Start recording: 21/05/14 14:05:59      End recording: 21/05/14 14:36:00  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

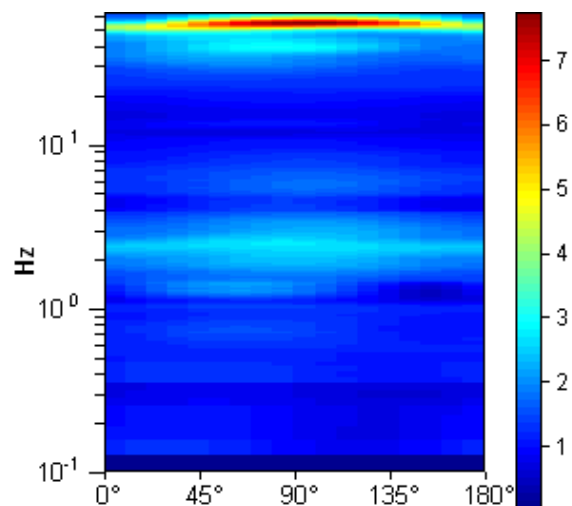
Trace length: 0h30'00".      Analyzed 99% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 10%



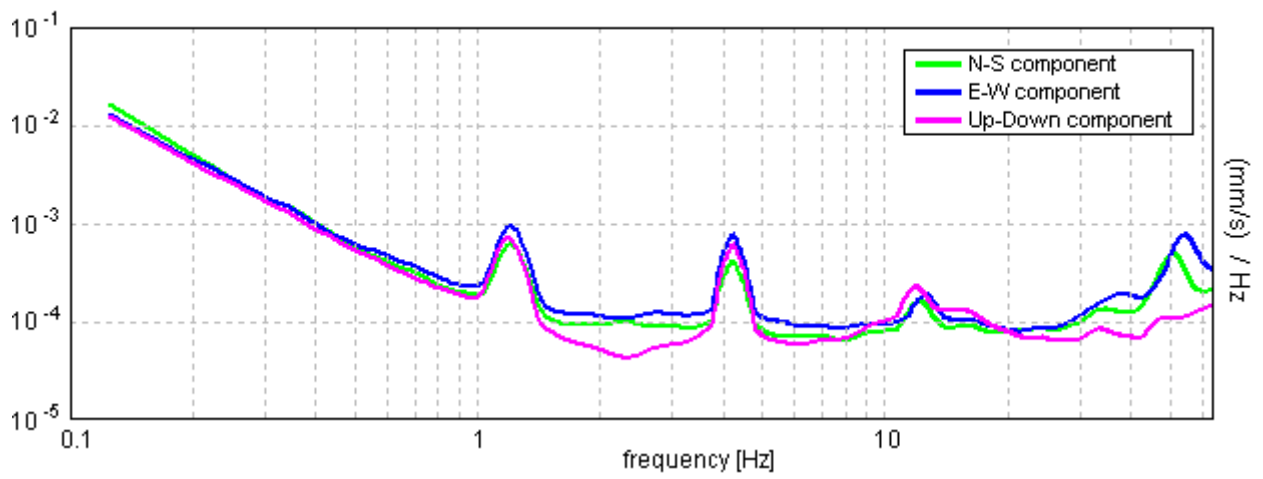
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 2.34 ± 2.15 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.34 > 0.50	OK	
$n_c(f_0) > 200$	4171.9 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 114 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	1.188 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	3.844 Hz	OK	
$A_0 > 2$	2.53 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.45858  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	1.0748 < 0.11719		NO
$\sigma_A(f_0) < \theta(f_0)$	0.1319 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0234				
<b>Coordinate</b>	<i>UTM</i>	4229529.00	N	349615.00	E
	<i>Gauss Boaga</i>	4229527.701	N	2369610.013	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	21/05/2014, 14:38				
<b>Nome file</b>	0234				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			
<b>Nota</b>	Base sismica ripetuta per l'inattendibilità del segnale				

**Documentazione fotografica**





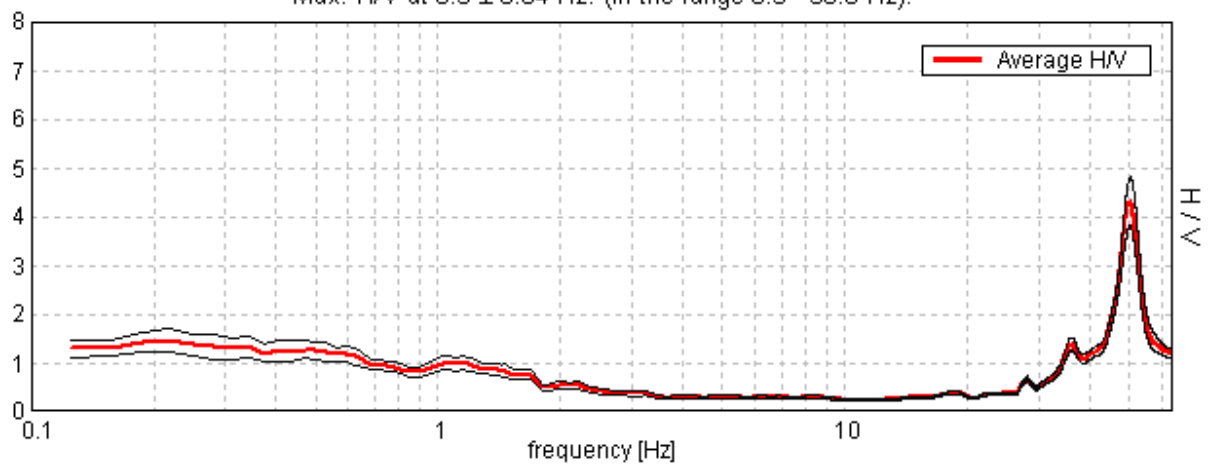
## TRIVELSICILIA PALERMO, PALERMO 0234

Start recording: 21/05/14 14:42:07      End recording: 21/05/14 15:12:08  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

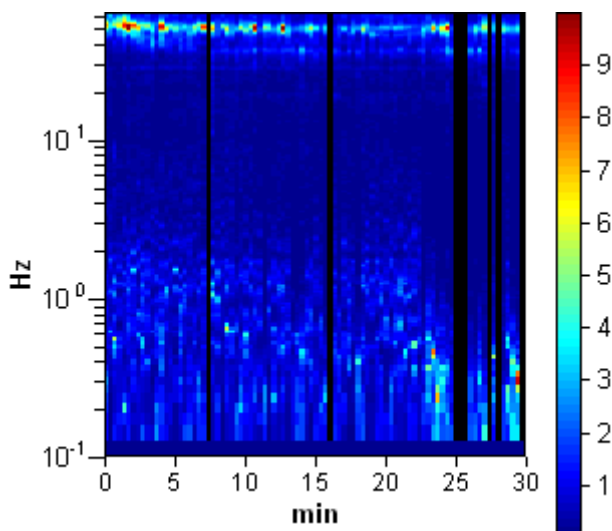
Trace length: 0h30'00".      Analyzed 91% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

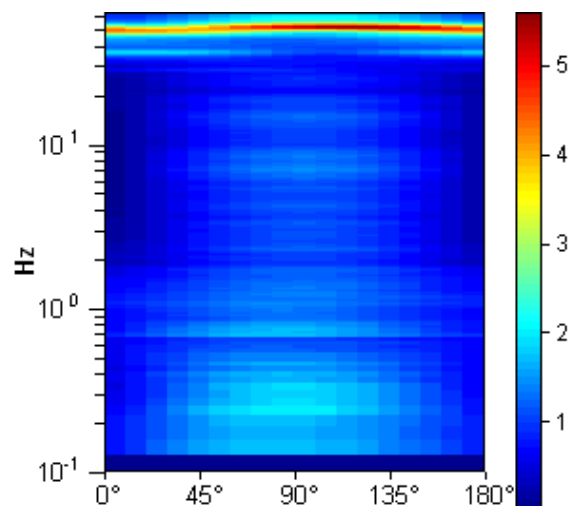
Max. H/V at  $0.5 \pm 0.04$  Hz. (In the range 0.5 - 30.0 Hz).



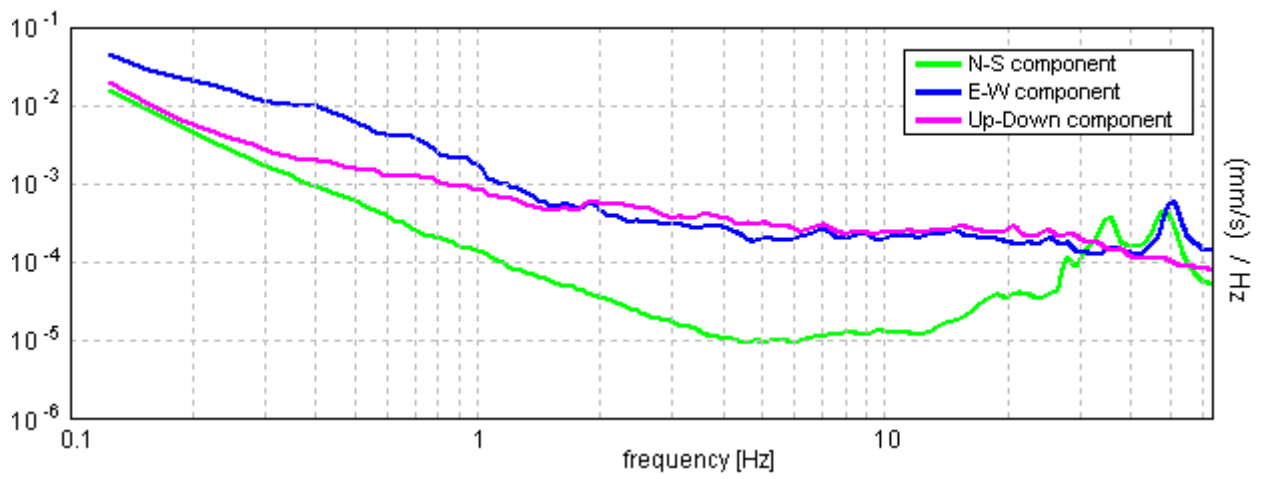
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $0.5 \pm 0.04$  Hz. (in the range 0.5 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.50 > 0.50$		<b>NO</b>
$n_c(f_0) > 200$	$820.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 25 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	1.75 Hz	OK	
$A_0 > 2$	$1.25 > 2$		<b>NO</b>
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03918  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01959 < 0.075$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.0878 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0234 bis				
<b>Coordinate</b>	<i>UTM</i>	4229554.51	N	349591.72	E
	<i>Gauss Boaga</i>	4229553.211	N	2369586.733	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	16/06/2014, 15:36				
<b>Nome file</b>	0234 bis				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	MarciapiEDE				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>No</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



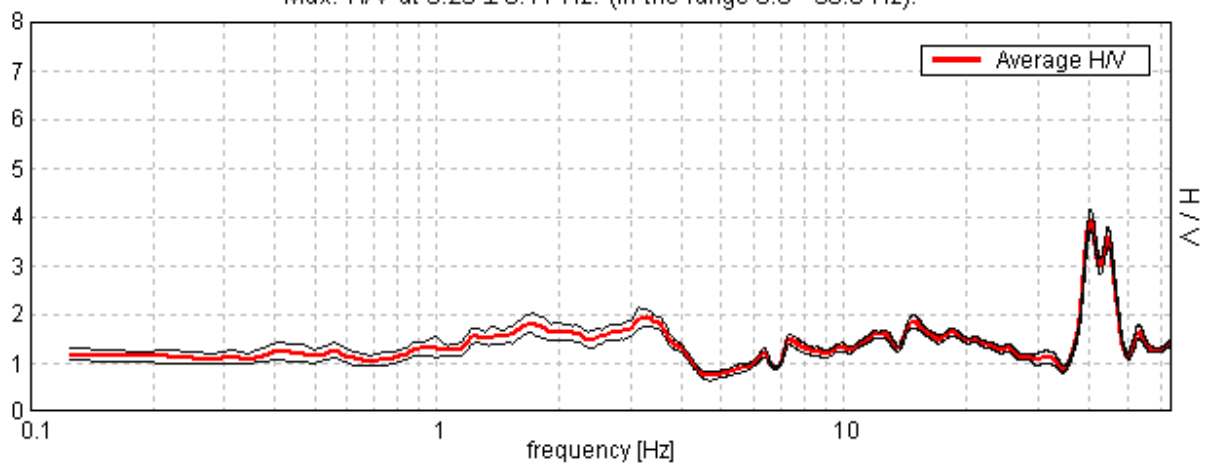
## TRIVEL SICILIA PALERMO, PALERMO 0234 BIS

Start recording: 16/06/14 15:40:32      End recording: 16/06/14 16:10:33  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

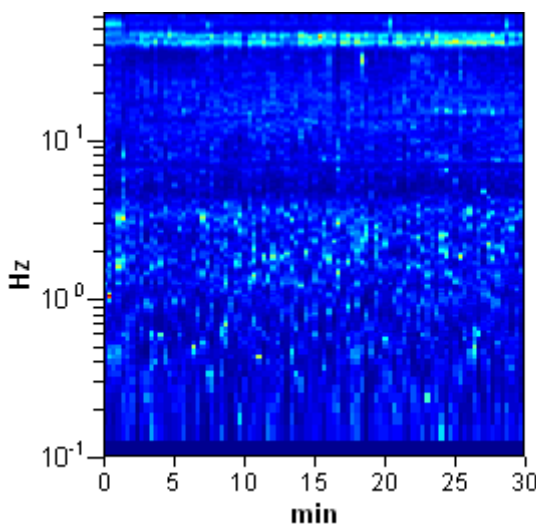
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

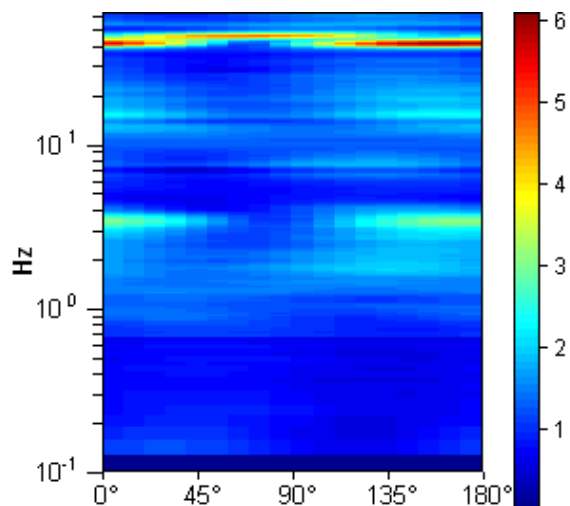
Max. H/V at  $3.25 \pm 0.11$  Hz. (In the range 0.0 - 30.0 Hz).



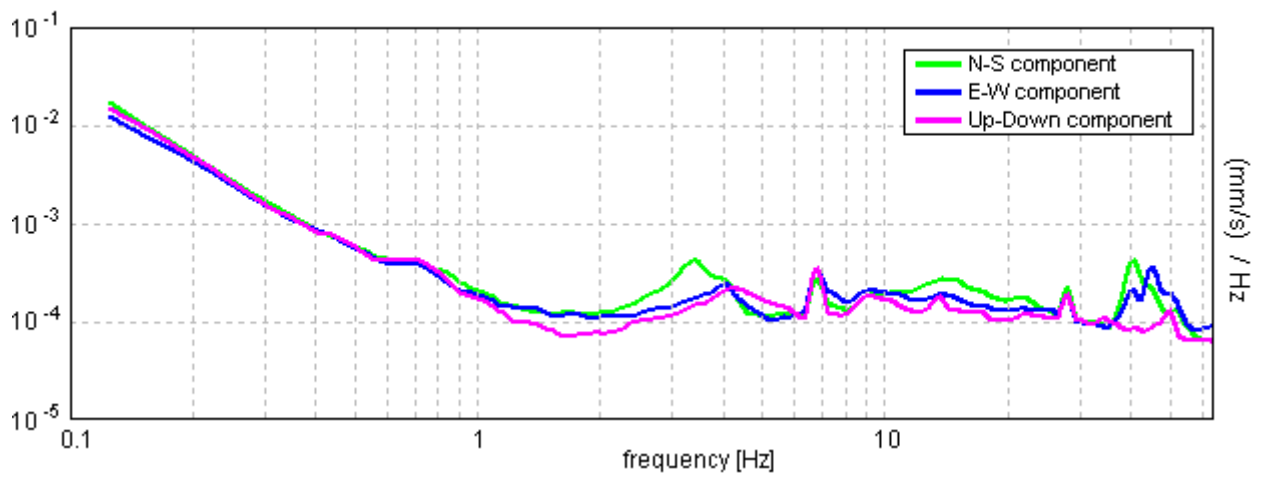
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $3.25 \pm 0.11$  Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$3.25 > 0.50$	OK	
$n_c(f_0) > 200$	$5850.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 157 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	4.281 Hz	OK	
$A_0 > 2$	$1.93 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01635  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.05315 < 0.1625$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.0875 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

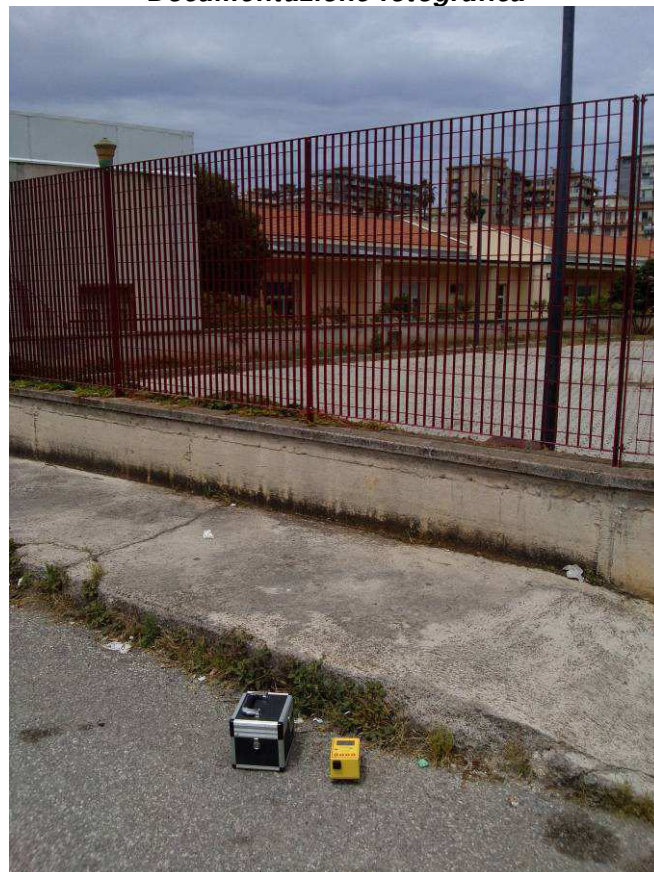


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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0235				
<b>Coordinate</b>	<i>UTM</i>	4217427.93	N	358319.78	E
	<i>Gauss Boaga</i>	4217426.234	N	2378314.948	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	28/05/2014, 13:32				
<b>Nome file</b>	0235				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**





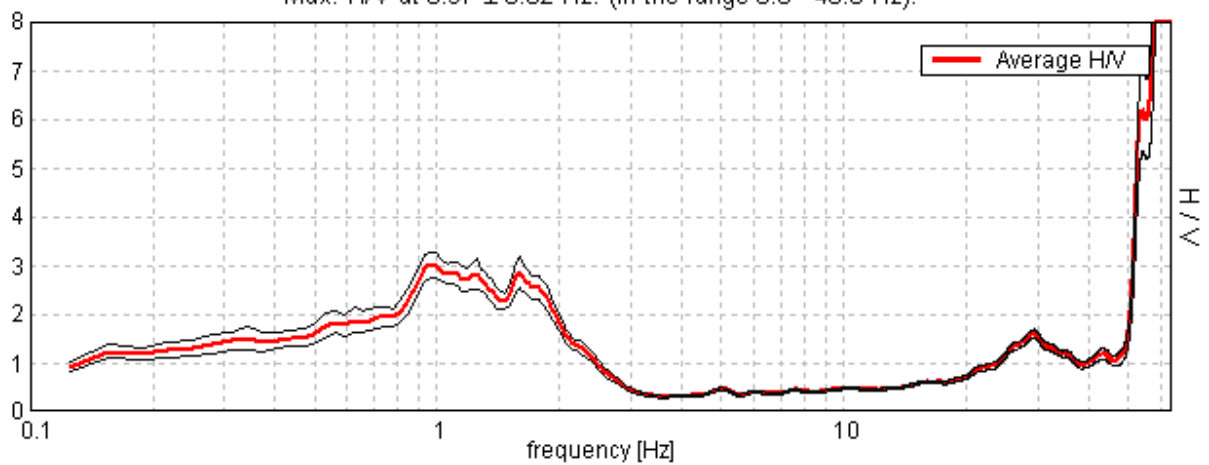
### TRIVELSICILIA PALERMO, PALERMO 0235

Start recording: 28/05/14 13:34:55      End recording: 28/05/14 14:04:56  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

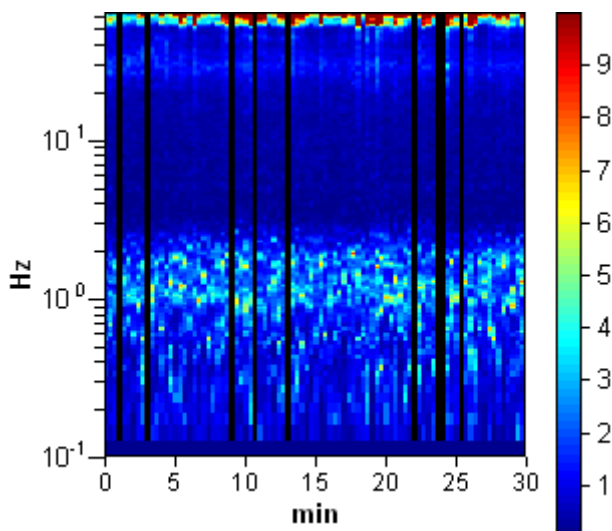
Trace length: 0h30'00".      Analyzed 90% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

#### HORIZONTAL TO VERTICAL SPECTRAL RATIO

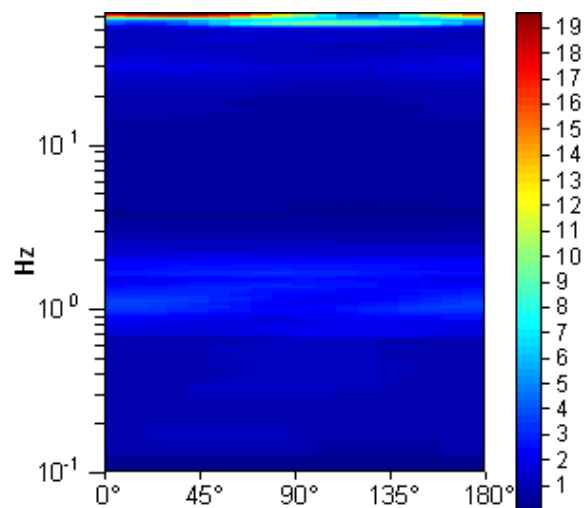
Max. H/V at  $0.97 \pm 0.02$  Hz. (In the range 0.0 - 40.0 Hz).



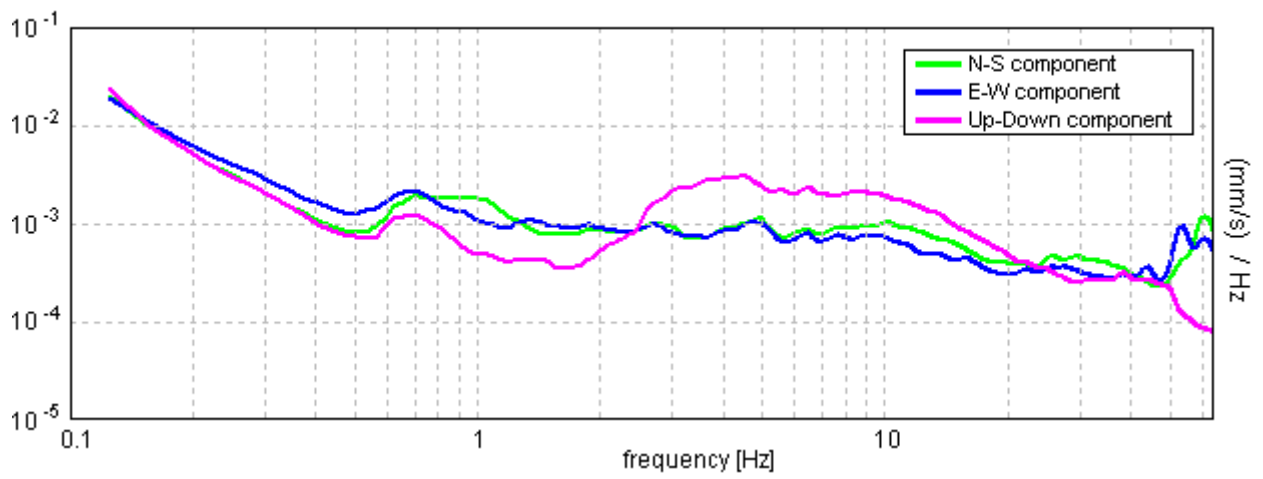
#### H/V TIME HISTORY



#### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $0.97 \pm 0.02$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.97 > 0.50$	OK	
$n_c(f_0) > 200$	$1569.4 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 48 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.438 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.125 Hz	OK	
$A_0 > 2$	$3.00 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01039  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01006 < 0.14531$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1348 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

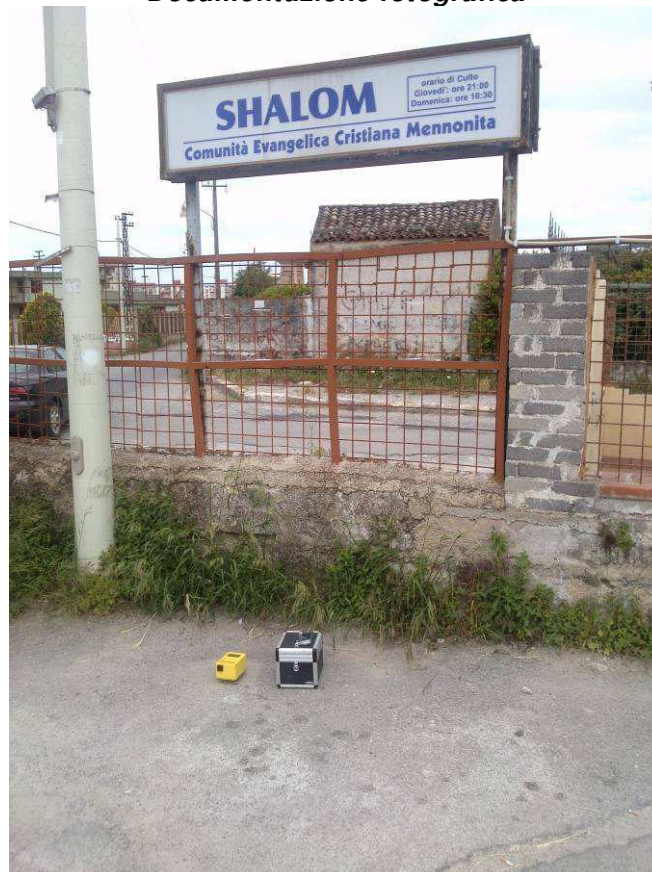


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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0236			
<b>Coordinate</b>	<i>UTM</i>	4217476.04	N	358035.53	E
	<i>Gauss Boaga</i>	4217474.341	N	2378030.685	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		28/05/2014, 14:16			
<b>Nome file</b>		0236			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



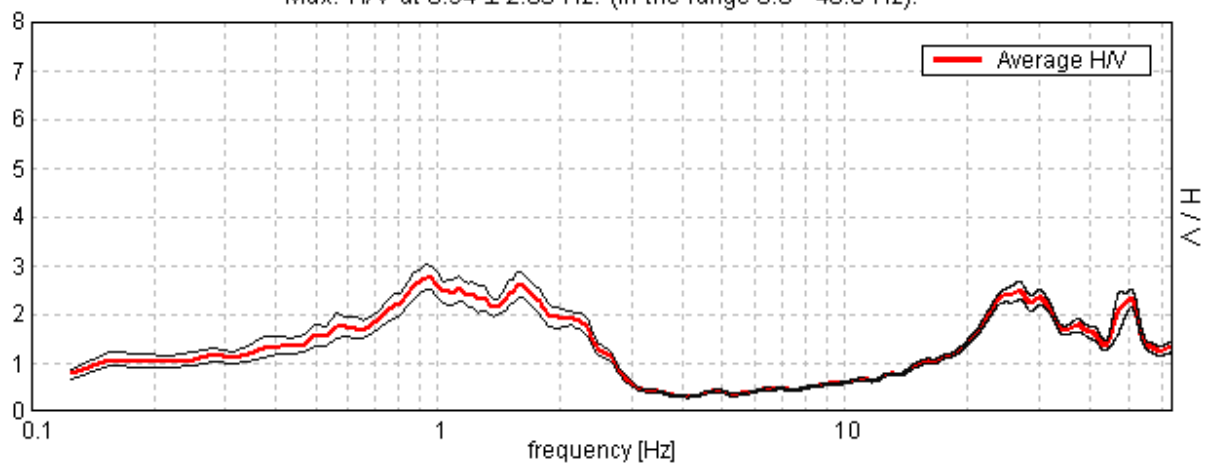
## TRIVELSICILIA PALERMO, PALERMO 0236

Start recording: 28/05/14 14:18:06      End recording: 28/05/14 14:48:07  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

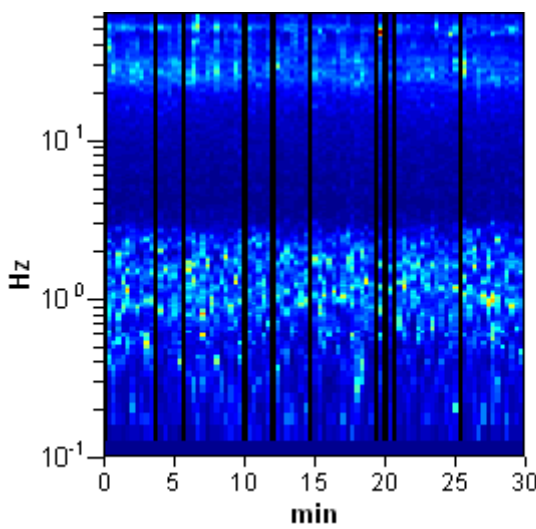
Trace length: 0h30'00".      Analyzed 89% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

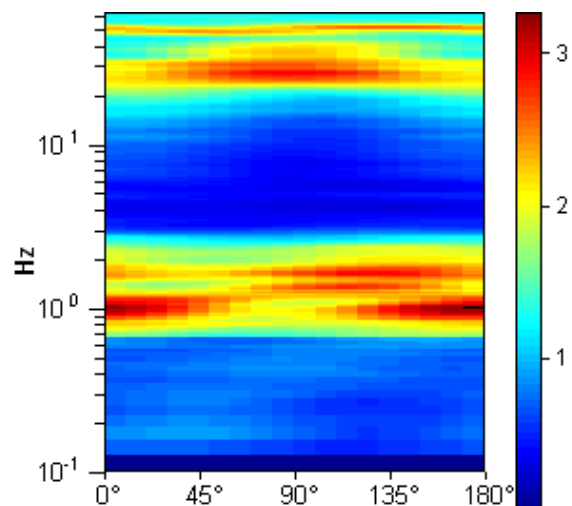
Max. H/V at  $0.94 \pm 2.65$  Hz. (In the range 0.0 - 40.0 Hz).



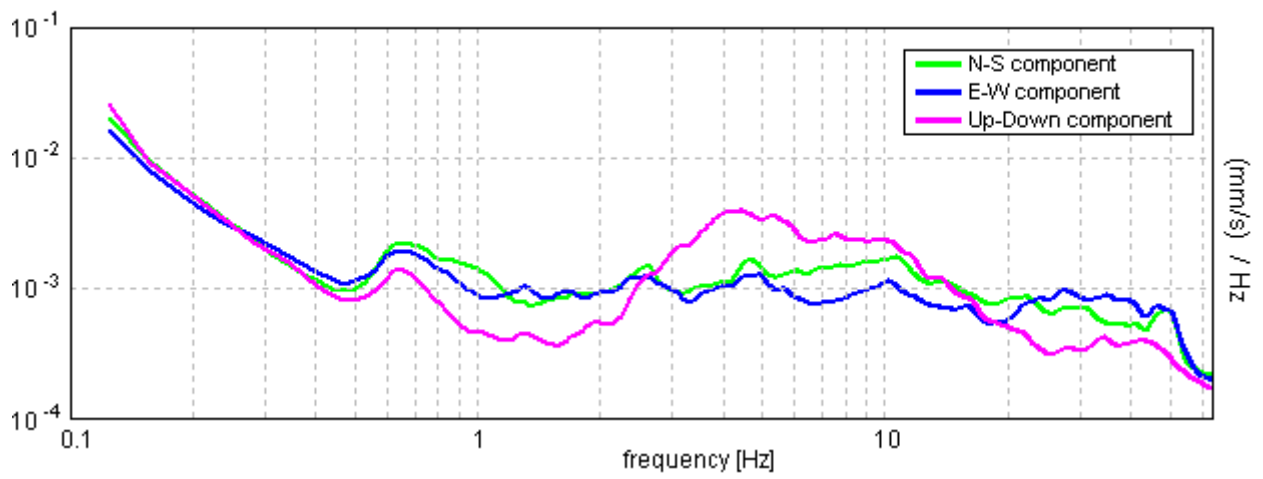
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $0.94 \pm 2.65$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.94 > 0.50$	OK	
$n_c(f_0) > 200$	$1500.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 46 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.438 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.469 Hz	OK	
$A_0 > 2$	$2.75 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 1.41312  < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$1.3248 < 0.14063$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.1323 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0237				
<b>Coordinate</b>	<i>UTM</i>	4217478.26	N	357555.00	E
	<i>Gauss Boaga</i>	4217476.551	N	2377550.133	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	30/05/2014, 08:04				
<b>Nome file</b>	0237				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Terreno				
<b>Condizioni meteo</b>	<b>Vento</b>	No			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

**Documentazione fotografica**

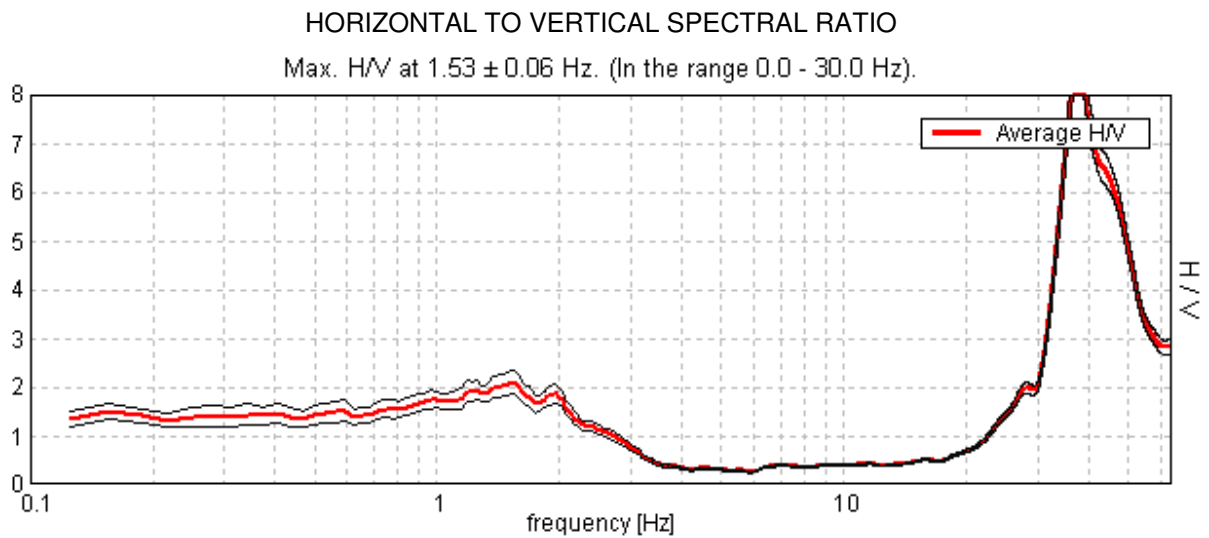




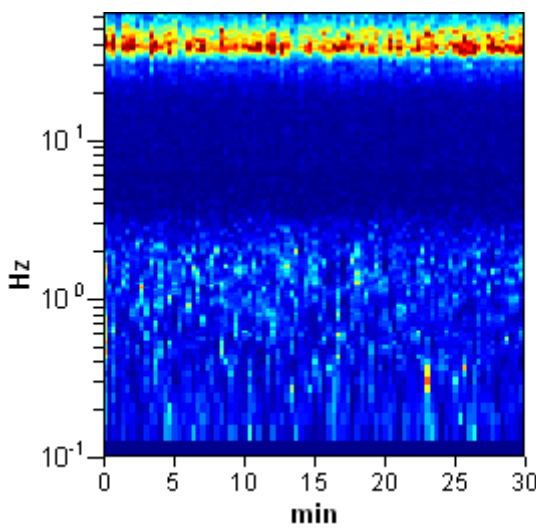
## TRIVEL SICILIA PALERMO, PALERMO TR 0237

Start recording: 30/05/14 08:02:36      End recording: 30/05/14 08:32:37  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

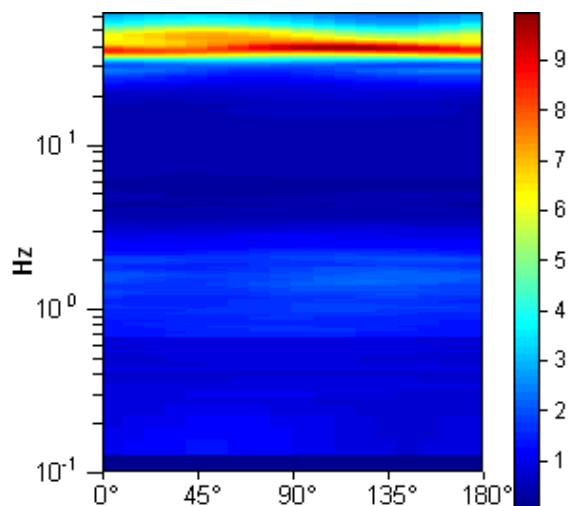
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



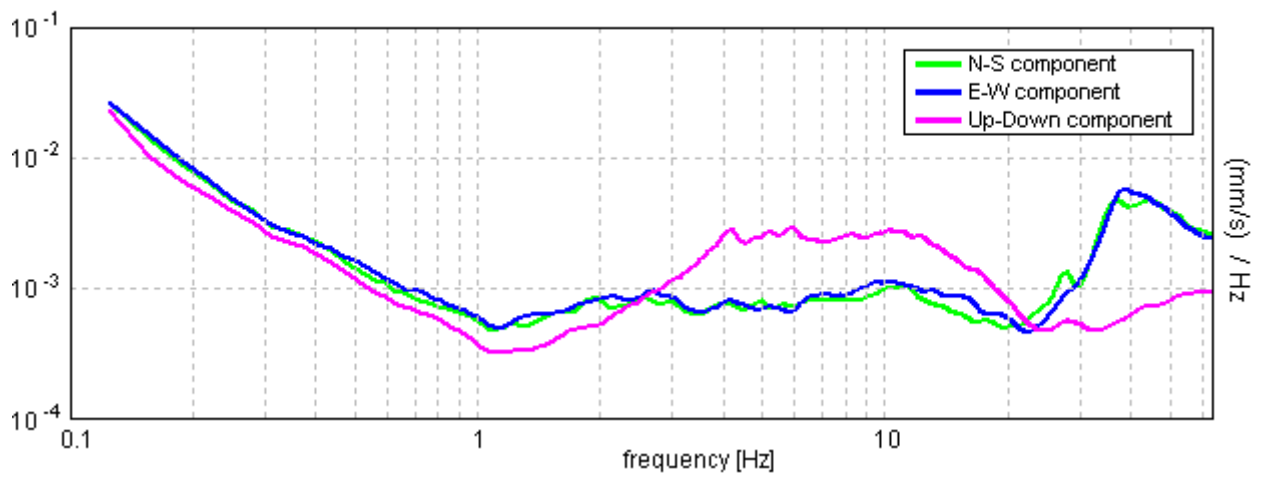
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.53 ± 0.06 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.53 > 0.50	OK	
$n_c(f_0) > 200$	2756.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 74 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.656 Hz	OK	
$A_0 > 2$	2.10 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01822  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.0279 < 0.15313	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1228 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0238			
<b>Coordinate</b>	UTM	4217421.73	N	357555.00	E
	Gauss Boaga	4217420.012	N	2377257.270	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		30/05/2014, 08:07			
<b>Nome file</b>		0238			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



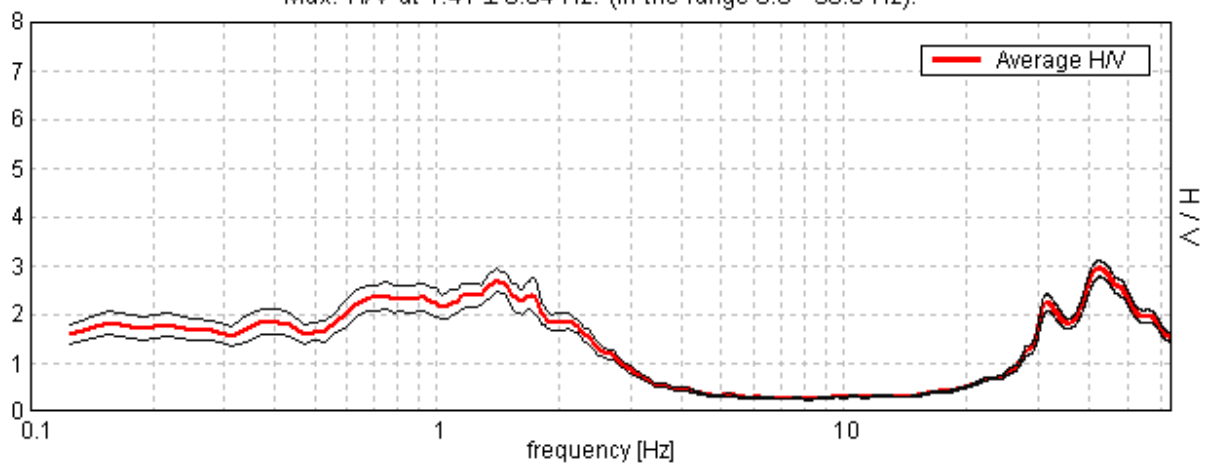
## TRIVEL SICILIA PALERMO, PALERMO TR 0238

Start recording: 30/05/14 08:15:06      End recording: 30/05/14 08:45:07  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

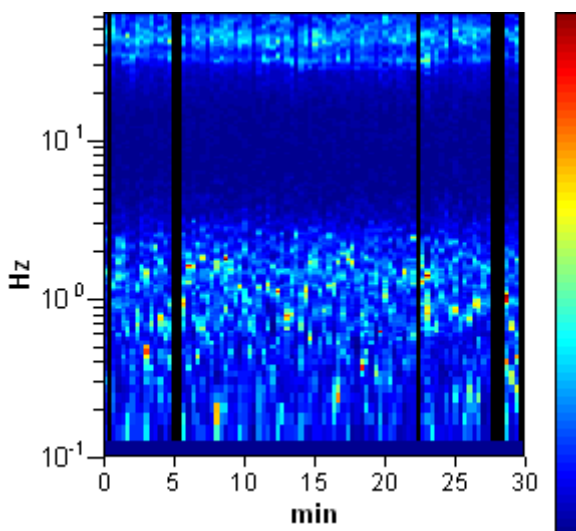
Trace length: 0h30'00".      Analyzed 91% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

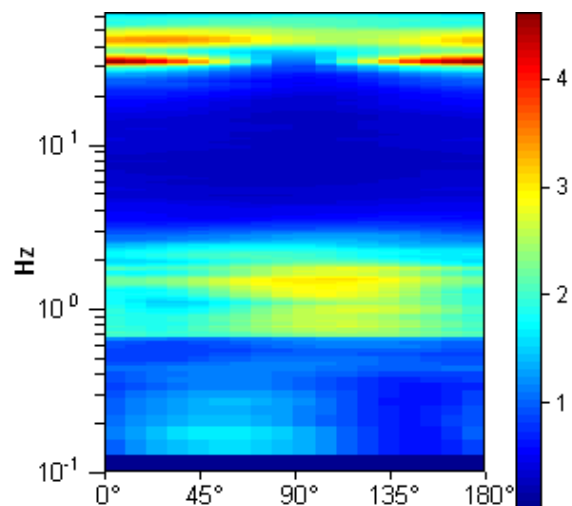
Max. H/V at  $1.41 \pm 0.04$  Hz. (In the range 0.0 - 30.0 Hz).



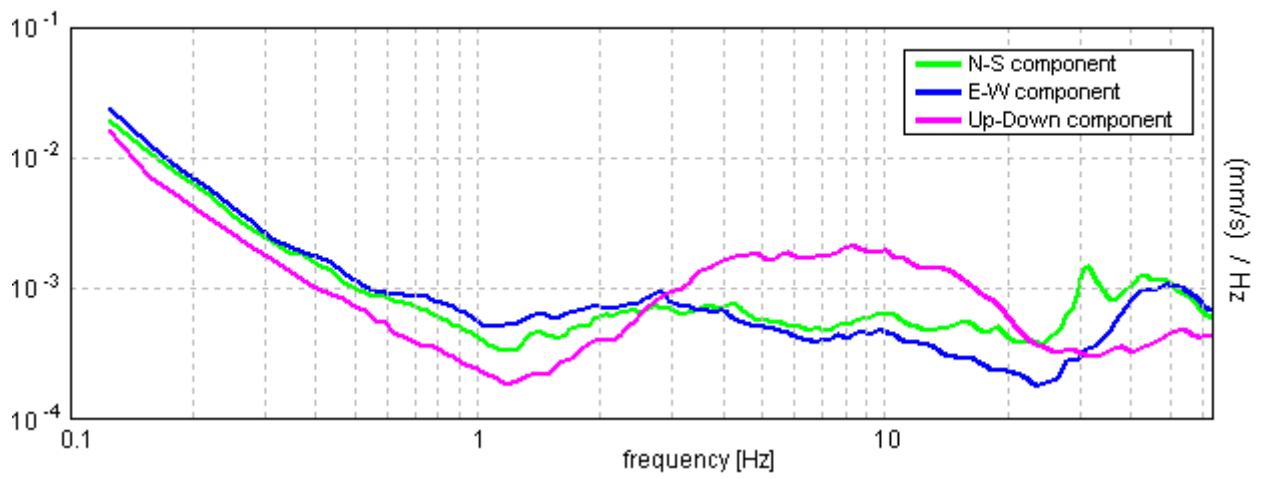
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.41 ± 0.04 Hz. (in the range 0.0 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.41 > 0.50	OK	
$n_c(f_0) > 200$	2306.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 68 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.469 Hz	OK	
$A_0 > 2$	2.69 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01473  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.02071 < 0.14063	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1181 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0239			
<b>Coordinate</b>	UTM	4217489.56	N	355167.77	E
	Gauss Boaga	4217487.819	N	2375162.786	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		30/05/2014, 11:46			
<b>Nome file</b>		0239			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Marciapiede			
<b>Condizioni meteo</b>		<b>Vento</b>	<b>No</b>		
		<b>Pioggia</b>	<b>No</b>		
<b>Transienti nelle vicinanze</b>		<b>Traffico veicolare</b>	<b>Si</b>		
		<b>Pedoni</b>	<b>Si</b>		
		<b>Altro</b>	<b>No</b>		

**Documentazione fotografica**

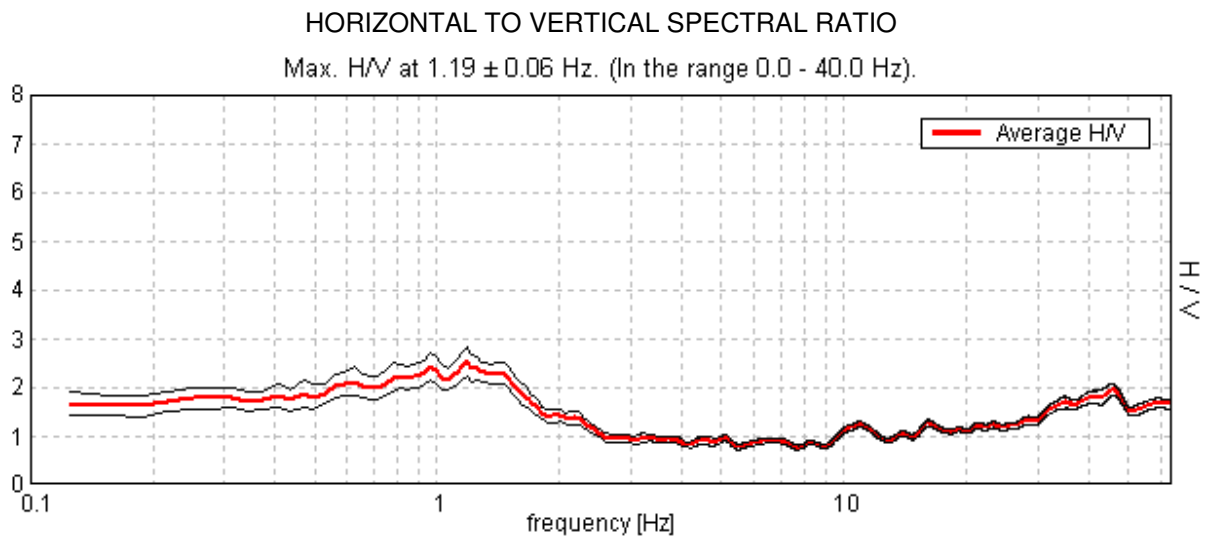




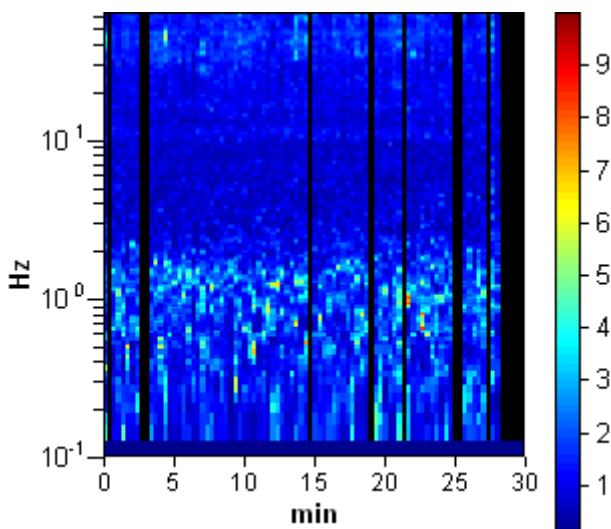
## TRIVEL SICILIA PALERMO, PALERMO TR 0239

Start recording: 30/05/14 11:47:31      End recording: 30/05/14 11:17:32  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

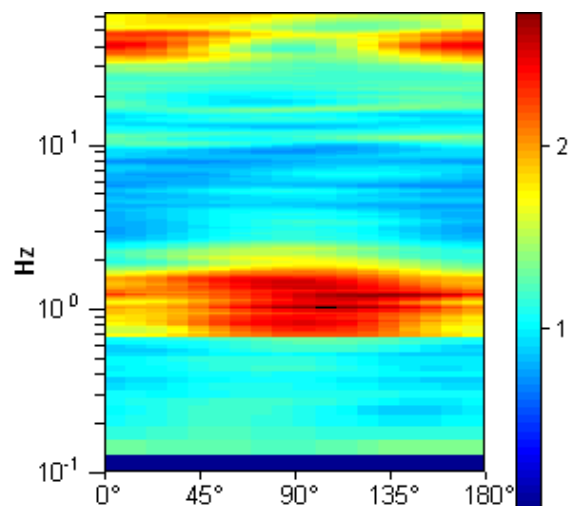
Trace length: 0h30'00".      Analyzed 84% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



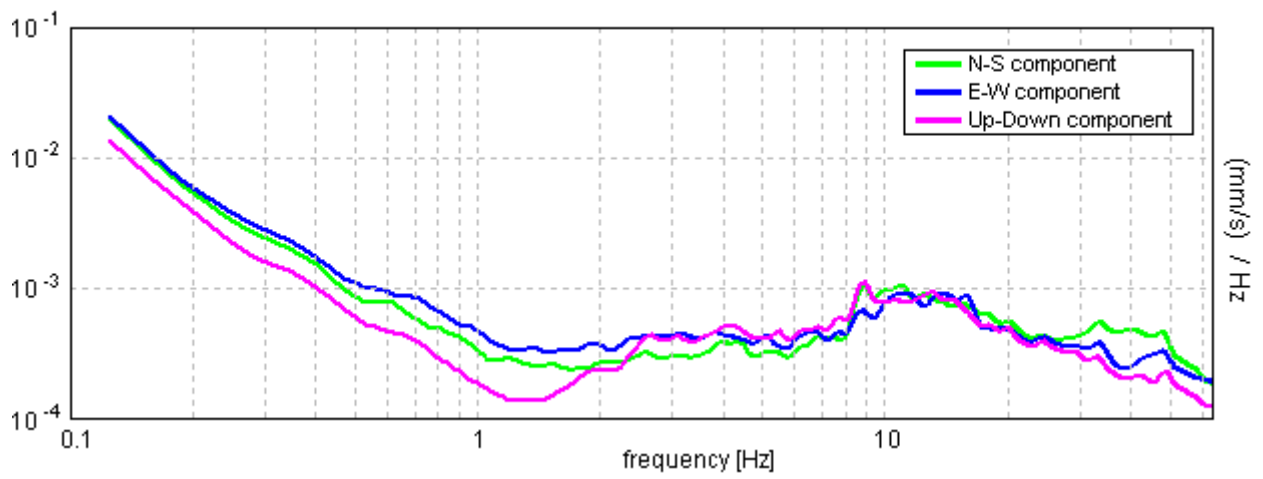
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.19 ± 0.06 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.19 > 0.50	OK	
$n_c(f_0) > 200$	1805.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 58 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.313 Hz	OK	
$A_0 > 2$	2.52 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02404  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02855 < 0.11875$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1417 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0240				
<b>Coordinate</b>	<i>UTM</i>	4216698.91	N	363085.77	E
	<i>Gauss Boaga</i>	4216697.270	N	2383081.162	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	30/05/2014, 11:46				
<b>Nome file</b>	0240				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



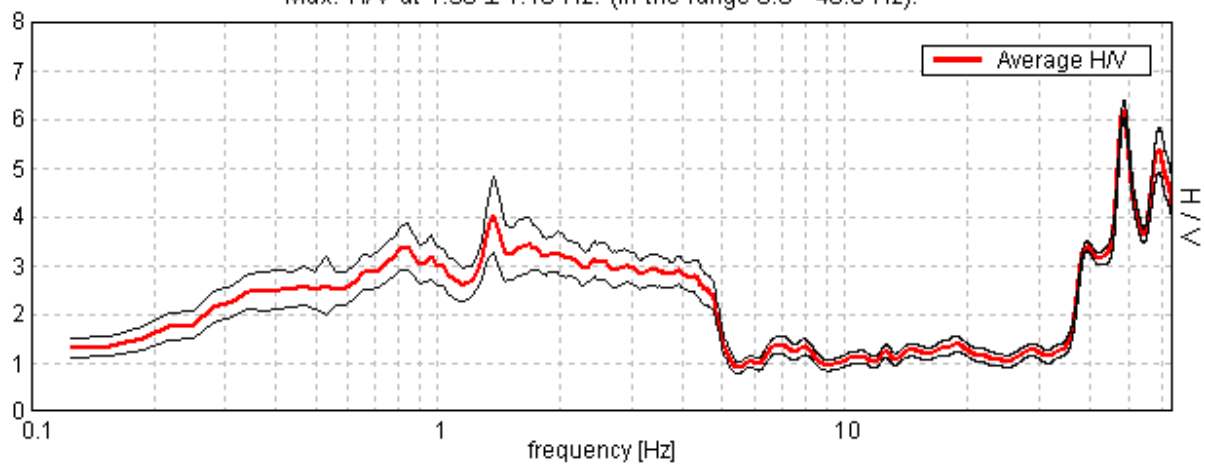
## TRIVELSICILIA PALERMO, PALERMO 0240

Start recording: 29/05/14 13:46:23      End recording: 29/05/14 14:16:24  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

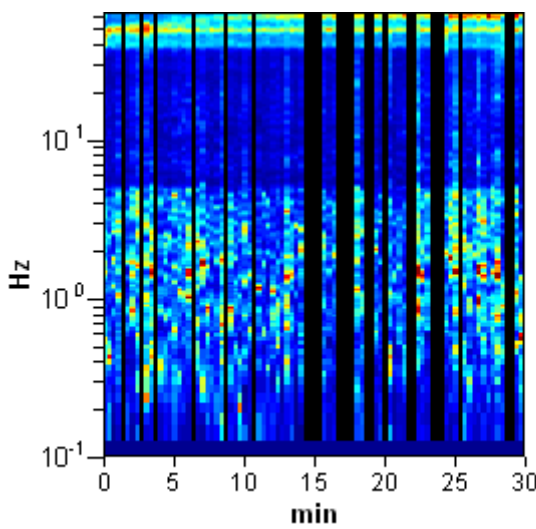
Trace length: 0h30'00".      Analyzed 72% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

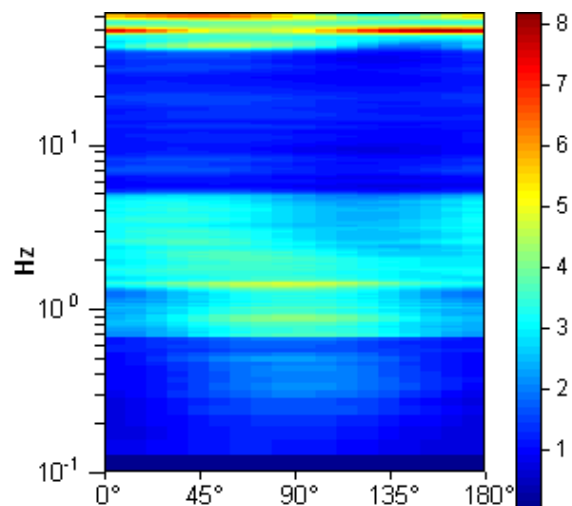
Max. H/V at  $1.38 \pm 1.18$  Hz. (In the range 0.0 - 40.0 Hz).



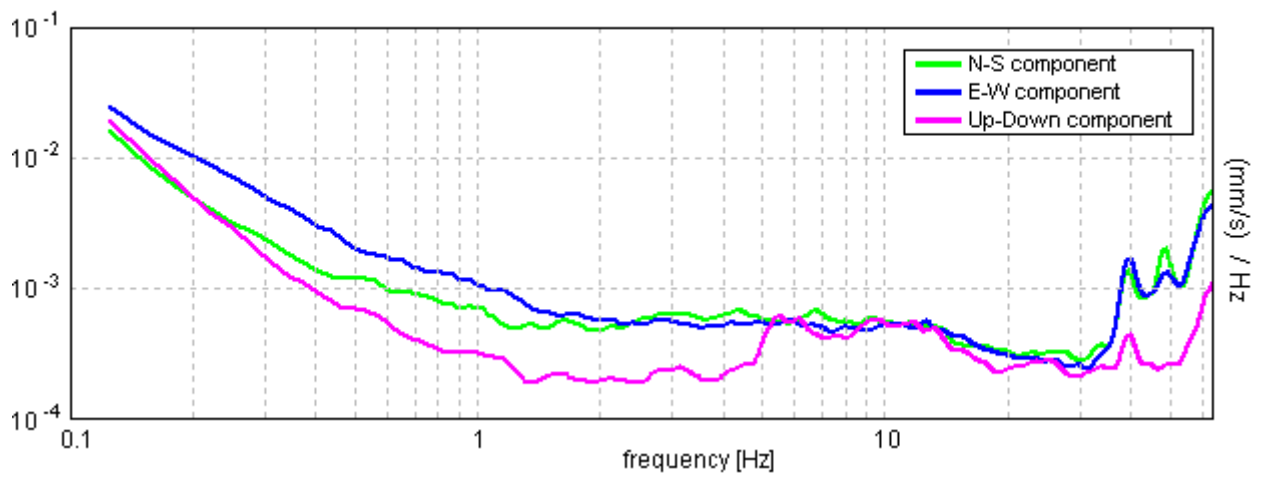
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.38 ± 1.18 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.38 > 0.50	OK	
$n_c(f_0) > 200$	1787.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 67 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	4.875 Hz	OK	
$A_0 > 2$	4.04 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.42599  < 0.05$		<b>NO</b>
$\sigma_f < \varepsilon(f_0)$	0.58574 < 0.1375		<b>NO</b>
$\sigma_A(f_0) < \theta(f_0)$	0.3825 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0241			
<b>Coordinate</b>	UTM	4216621.02	N	362584.91	E
	Gauss Boaga	4216619.367	N	2382580.282	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		29/05/2014, 11:46			
<b>Nome file</b>		0241			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**





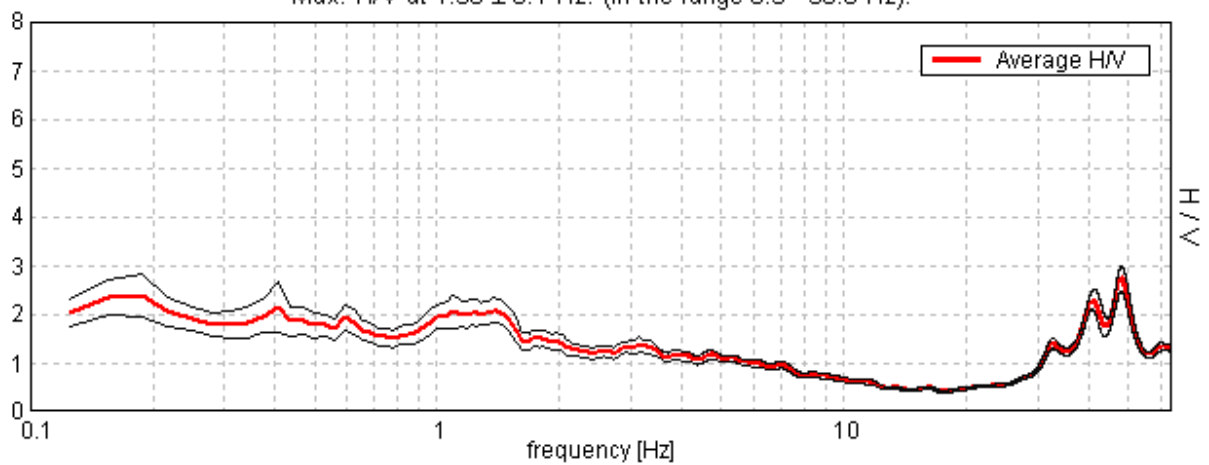
## TRIVEL SICILIA PALERMO, PALERMO TR0241

Start recording: 29/05/14 16:37:58      End recording: 29/05/14 17:07:59  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

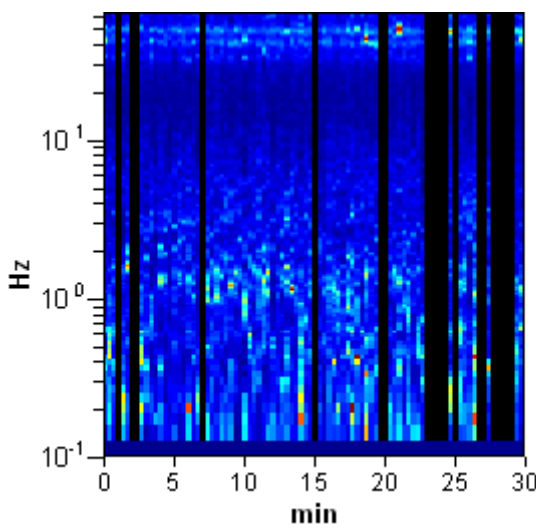
Trace length: 0h30'00".      Analyzed 78% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

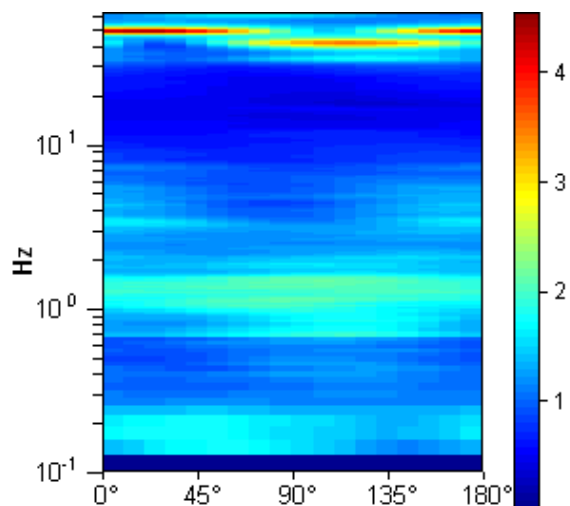
Max. H/V at  $1.38 \pm 0.1$  Hz. (In the range 0.5 - 30.0 Hz).



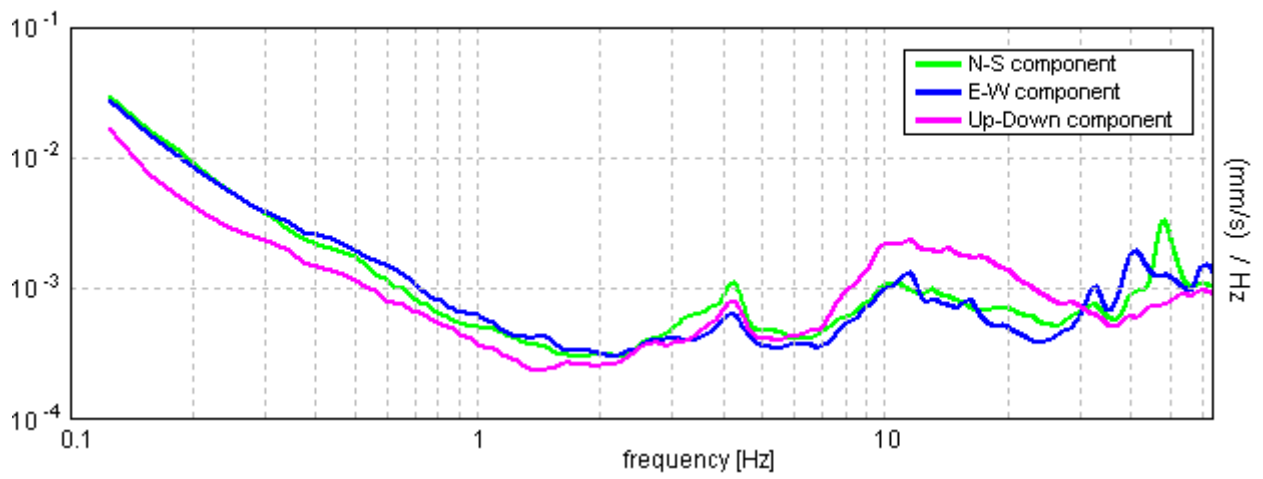
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $1.38 \pm 0.1$  Hz. (in the range 0.5 - 30.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.38 > 0.50$	OK	
$n_c(f_0) > 200$	$1925.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 67 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$			NO
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$2.06 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03705  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.05095 < 0.1375$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1302 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0242			
<b>Coordinate</b>	<i>UTM</i>	4216715.96	N	362440.30	E
	<i>Gauss Boaga</i>	4216714.309	N	2382435.664	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		29/05/2014, 12:52			
<b>Nome file</b>		0242			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

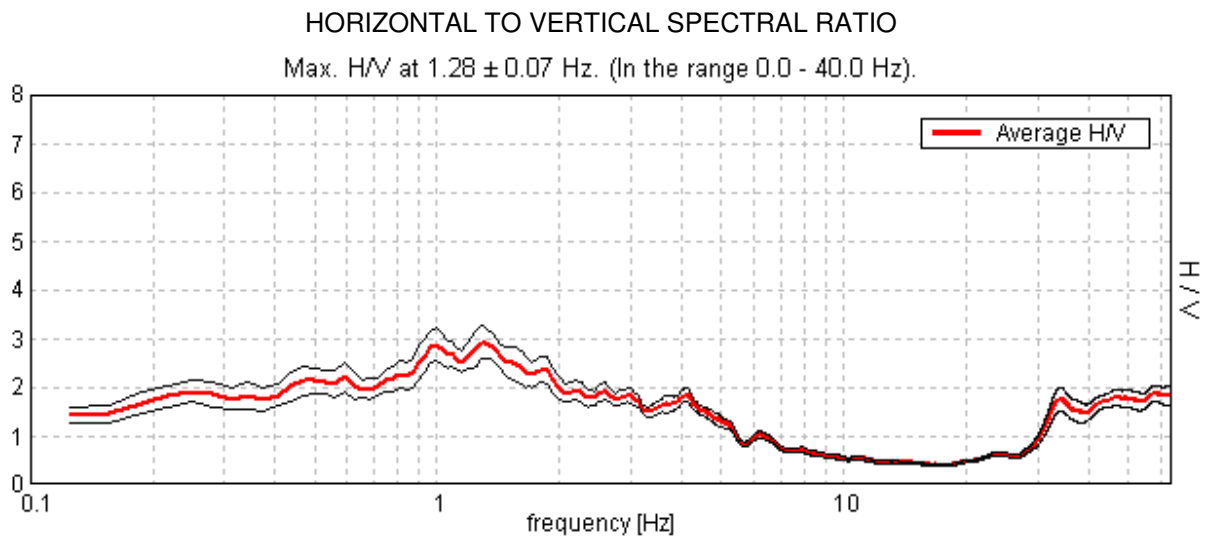
**Documentazione fotografica**



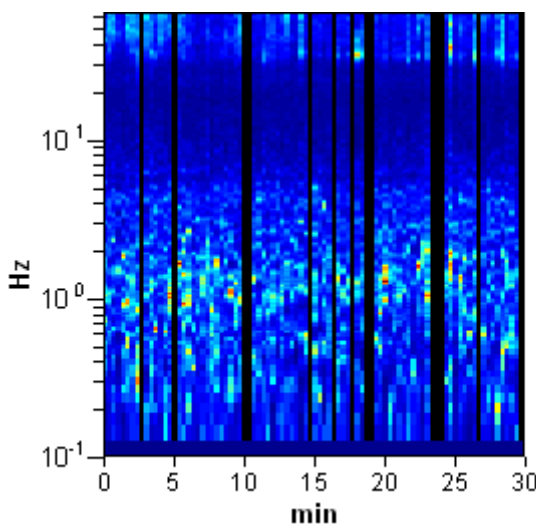
## TRIVEL SICILIA PALERMO, PALERMO TR 0242

Start recording: 29/05/14 13:00:12      End recording: 29/05/14 13:30:13  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

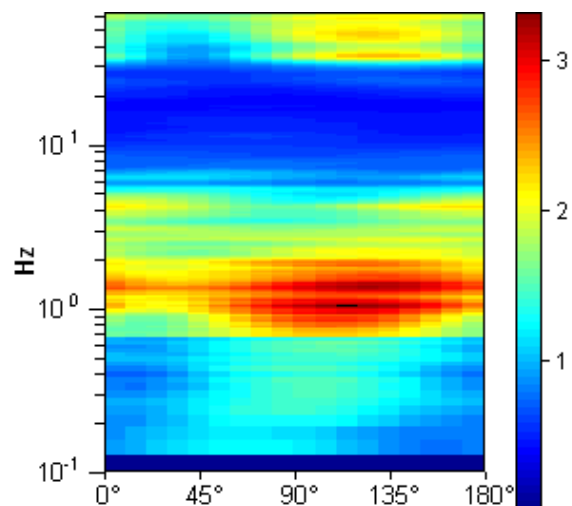
Trace length: 0h30'00".      Analyzed 84% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



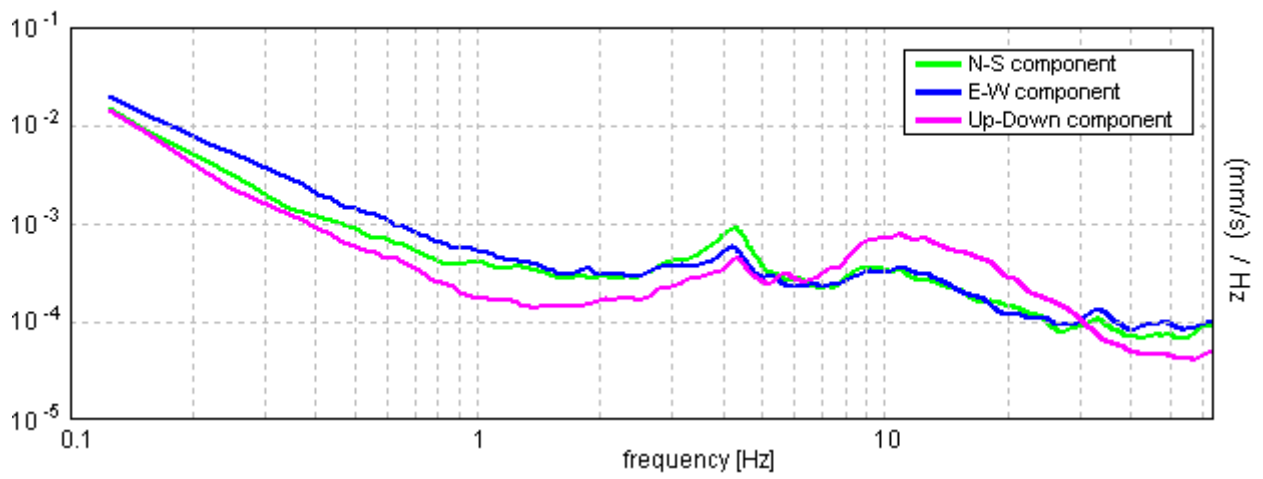
H/V TIME HISTORY



DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $1.28 \pm 0.07$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.28 > 0.50$	OK	
$n_c(f_0) > 200$	$1947.5 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 62 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	4.625 Hz	OK	
$A_0 > 2$	$2.91 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02667  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.03417 < 0.12813$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1649 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

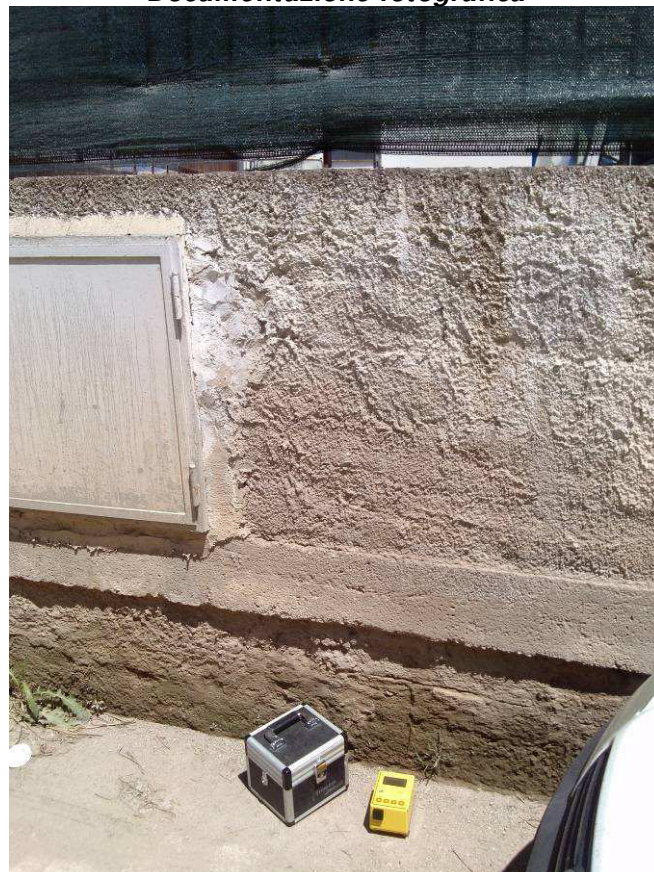


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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0243			
<b>Coordinate</b>	<i>UTM</i>	4216586.03	N	361919.06	E
	<i>Gauss Boaga</i>	4216584.364	N	2381914.403	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		29/05/2014, 12:01			
<b>Nome file</b>		0243			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Cemento			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**





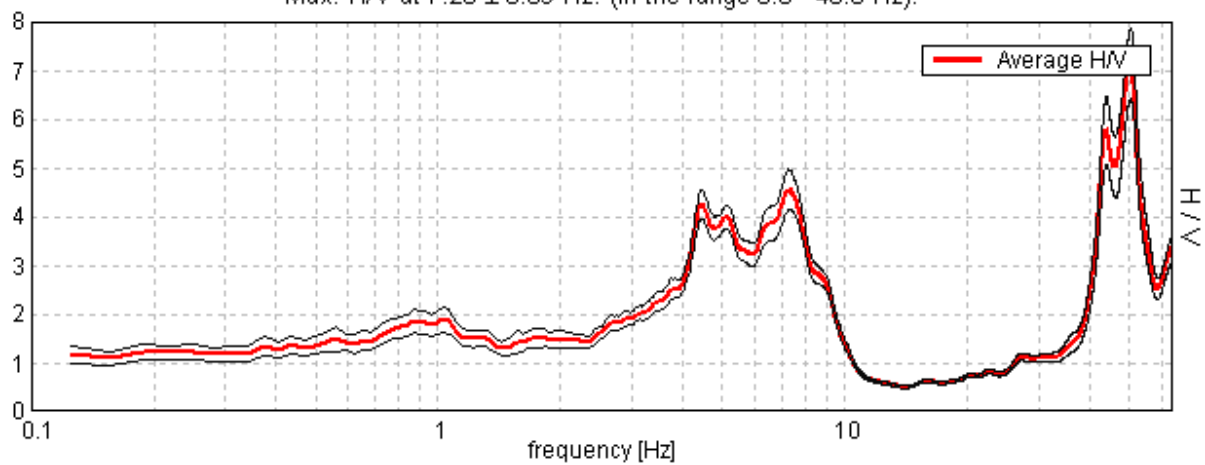
## TRIVELSICILIA PALERMO, PALERMO 0243

Start recording: 29/05/14 12:03:20      End recording: 29/05/14 12:33:21  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

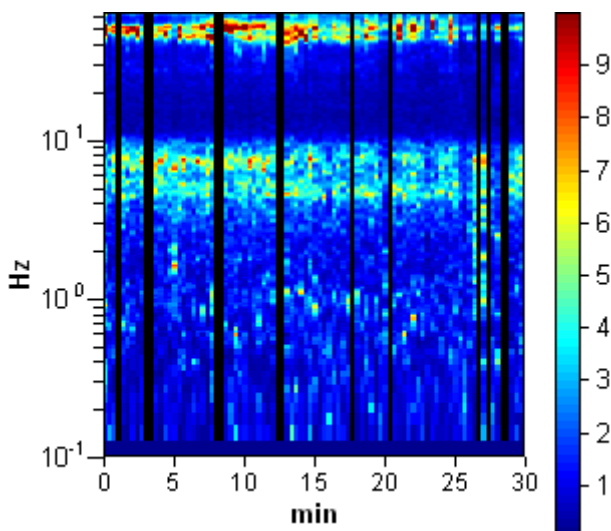
Trace length: 0h30'00".      Analyzed 86% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

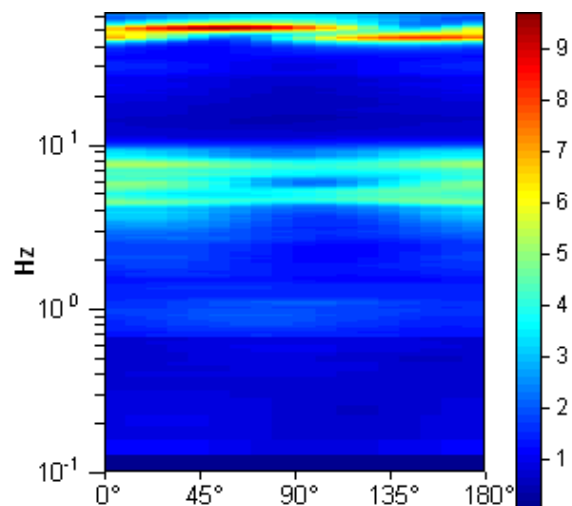
Max. H/V at  $7.28 \pm 0.09$  Hz. (In the range 0.0 - 40.0 Hz).



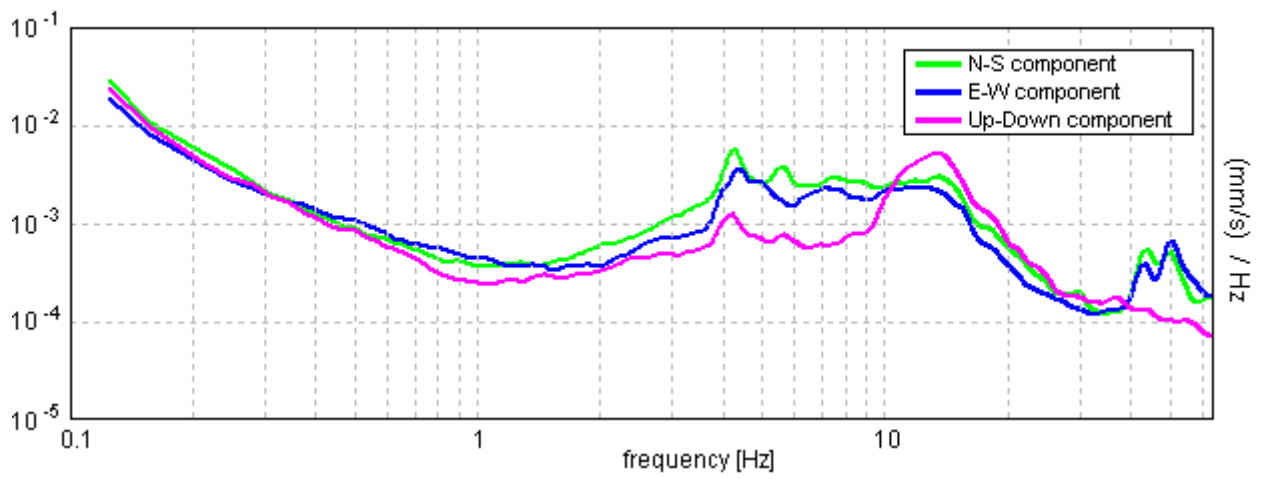
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 7.28 ± 0.09 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	7.28 > 0.50	OK	
$n_c(f_0) > 200$	11213.1 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 350 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	3.531 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	9.313 Hz	OK	
$A_0 > 2$	4.55 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00597  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.04344 < 0.36406	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.2089 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0244				
<b>Coordinate</b>	<i>UTM</i>	4216671.12	N	361611.02	E
	<i>Gauss Boaga</i>	4216669.452	N	2381606.348	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>				
<b>Data e ora</b>	29/05/2014, 11:58				
<b>Nome file</b>	0244				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Marciapiede				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

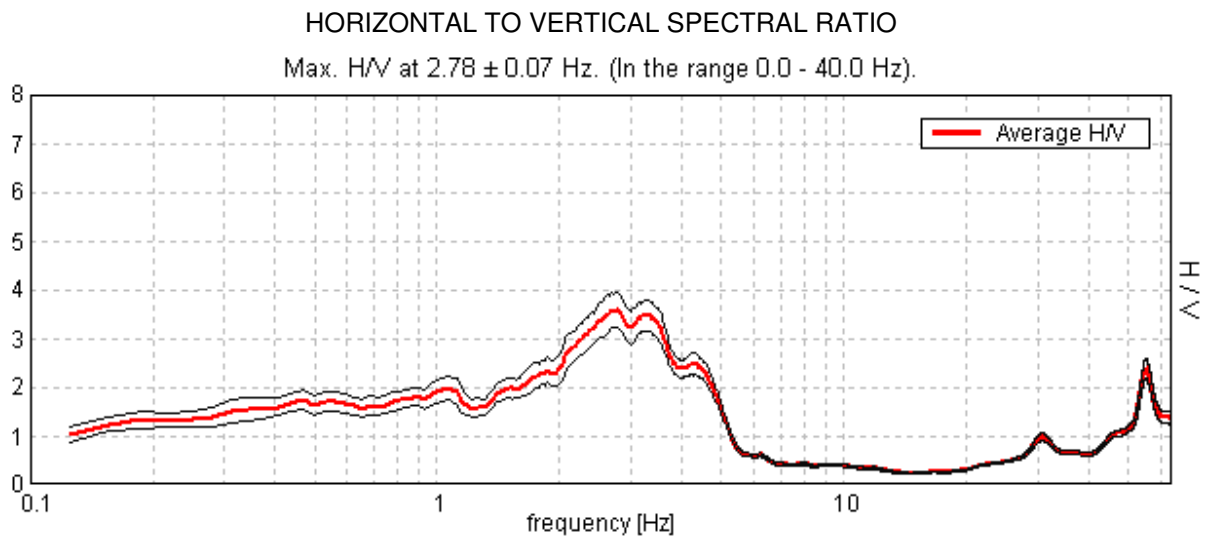
**Documentazione fotografica**



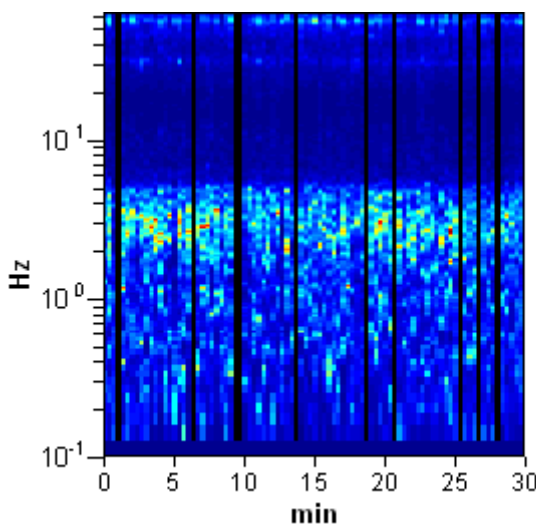
## TRIVEL SICILIA PALERMO, PALERMO TR 0244

Start recording: 29/05/14 12:06:14      End recording: 29/05/14 12:36:15  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

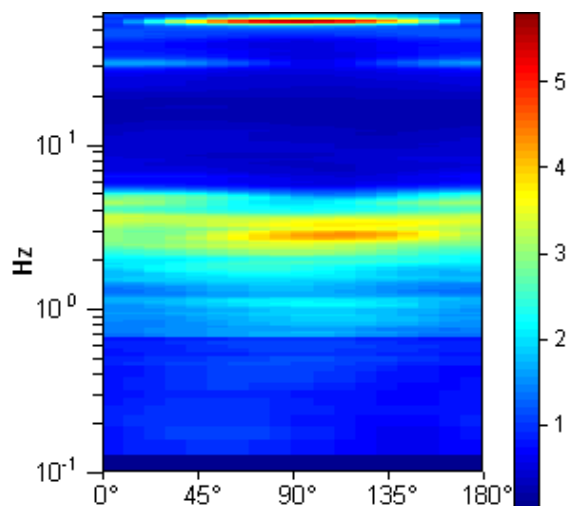
Trace length: 0h30'00".      Analyzed 89% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



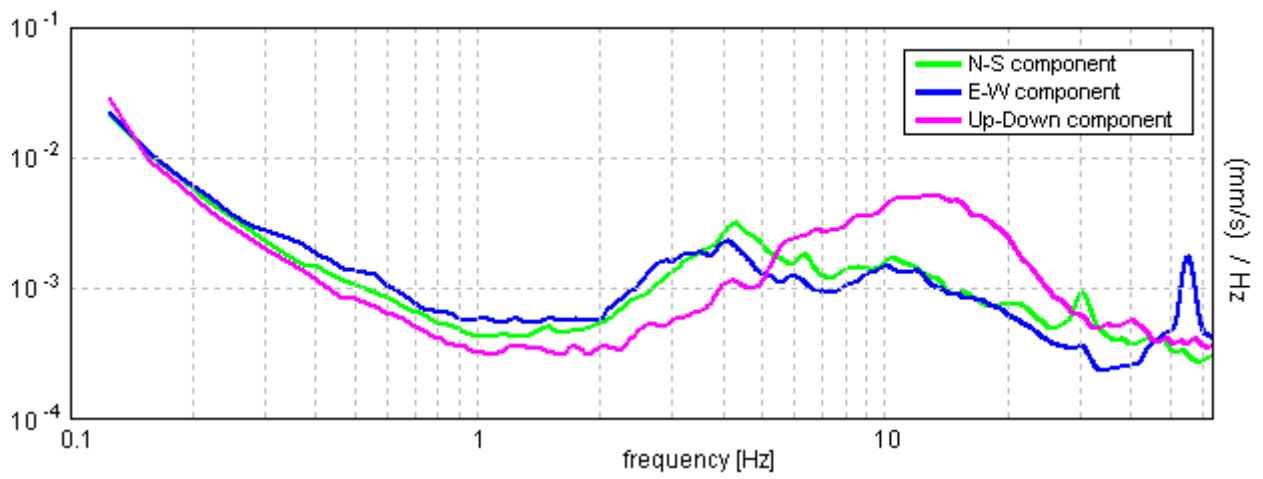
**H/V TIME HISTORY**



**DIRECTIONAL H/V**



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at  $2.78 \pm 0.07$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$2.78 > 0.50$	OK	
$n_c(f_0) > 200$	$4450.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 134 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	1.375 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	4.906 Hz	OK	
$A_0 > 2$	$3.58 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01336  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.03715 < 0.13906$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1828 < 1.58$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>	<i>Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano</i>			
<b>Nome base sismica</b>	0245			
<b>Coordinate</b>	<i>UTM</i>	4216859.09	<i>N</i>	361273.06 <i>E</i>
	<i>Gauss Boaga</i>	4216857.424	<i>N</i>	2381268.369 <i>E</i>
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®			
<b>Operatore</b>	<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>	29/05/2014, 11:22			
<b>Nome file</b>	0245			
<b>Durata</b>	30 min			
<b>Frequenza campionamento</b>	128 Hz			
<b>Accoppiamento strumento-suolo</b>	<i>Asfalto</i>			
<b>Condizioni meteo</b>	<b>Vento</b>	<i>Si</i>		
	<b>Pioggia</b>	<i>No</i>		
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<i>Si</i>		
	<b>Pedoni</b>	<i>Si</i>		
	<b>Altro</b>	<i>No</i>		

**Documentazione fotografica**

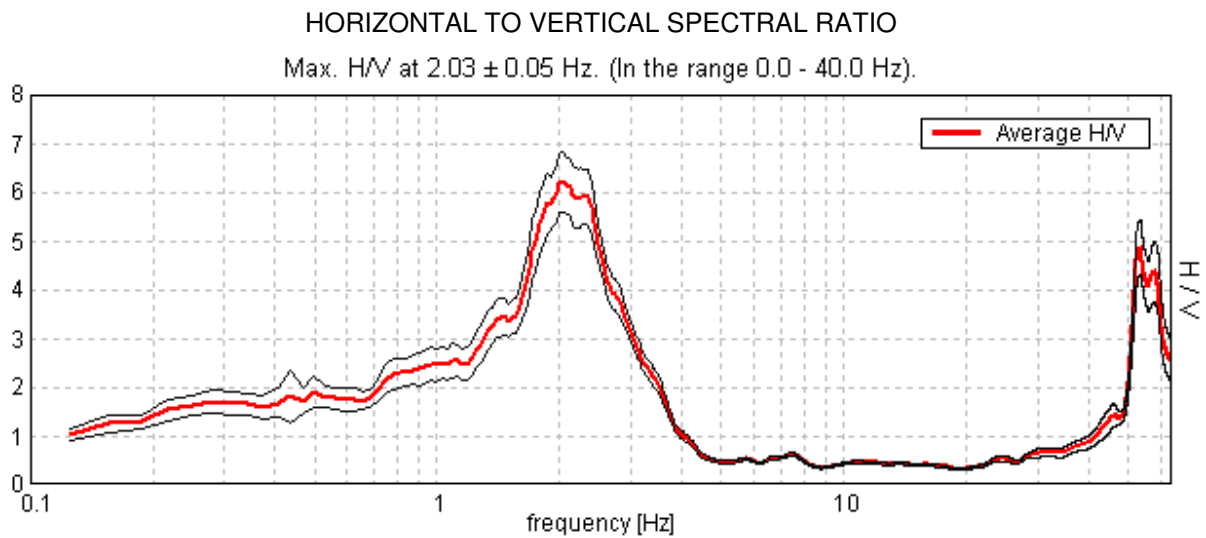




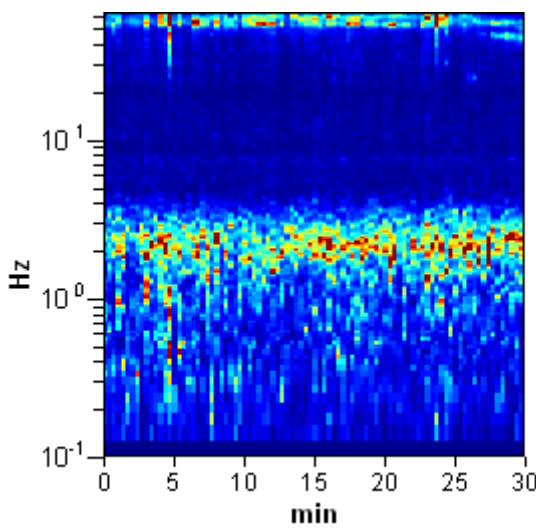
## TRIVEL SICILIA PALERMO, PALERMO TR 0245

Start recording: 29/05/14 11:30:12      End recording: 29/05/14 12:00:13  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

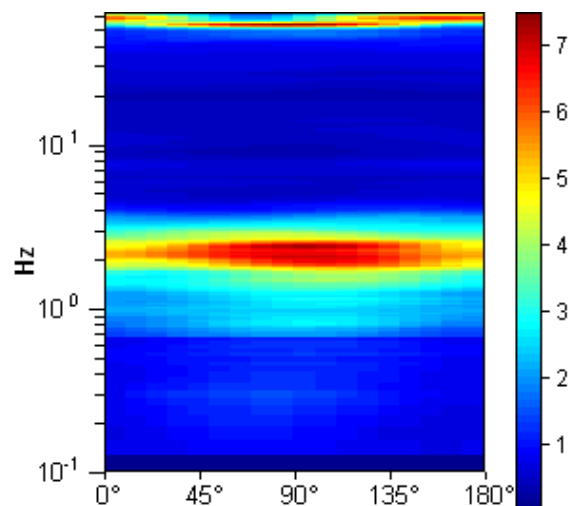
Trace length: 0h30'00".      Analysis performed on the entire trace.  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



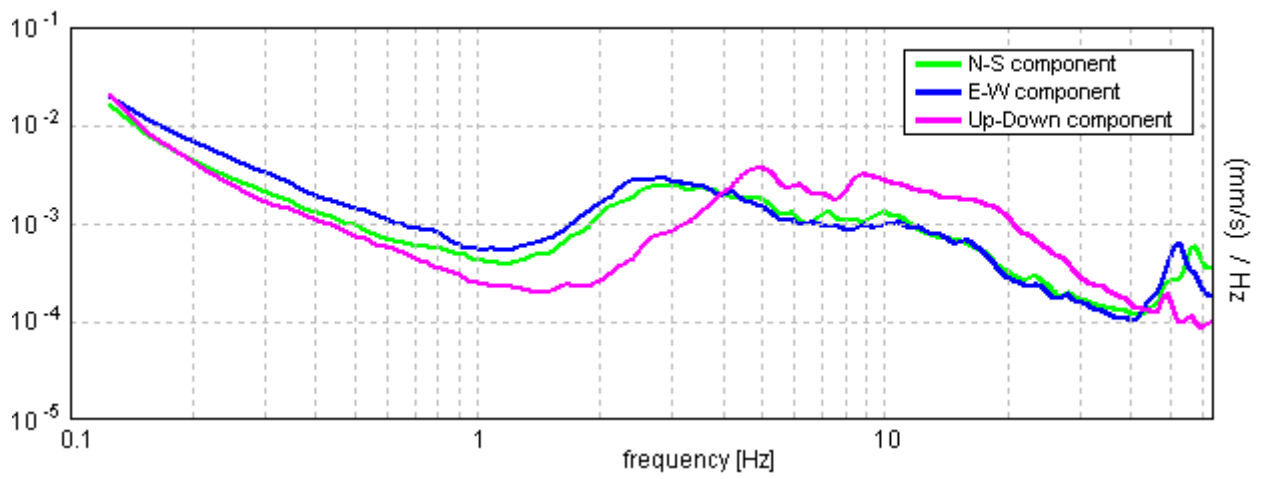
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 2.03 ± 0.05 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.03 > 0.50	OK	
$n_c(f_0) > 200$	3656.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 98 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	1.313 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	3.031 Hz	OK	
$A_0 > 2$	6.20 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01255  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.02549 < 0.10156	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.3035 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

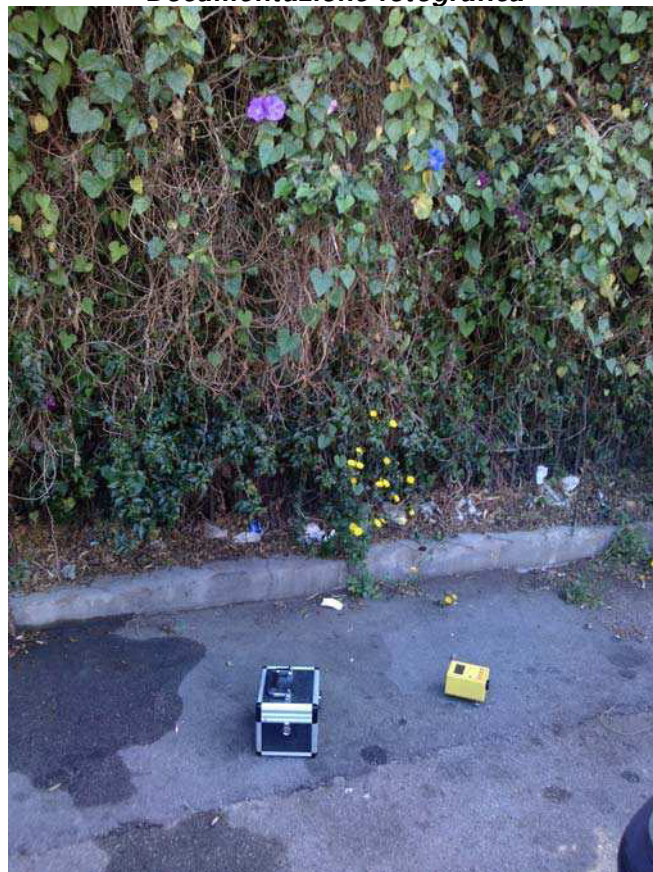


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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0246			
<b>Coordinate</b>	UTM	4216682.46	N	360782.68	E
	Gauss Boaga	4216680.777	N	2380777.971	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		29/05/2014, 09:27			
<b>Nome file</b>		0246			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>	Si			
	<b>Pioggia</b>	No			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	Si			
	<b>Pedoni</b>	Si			
	<b>Altro</b>	No			

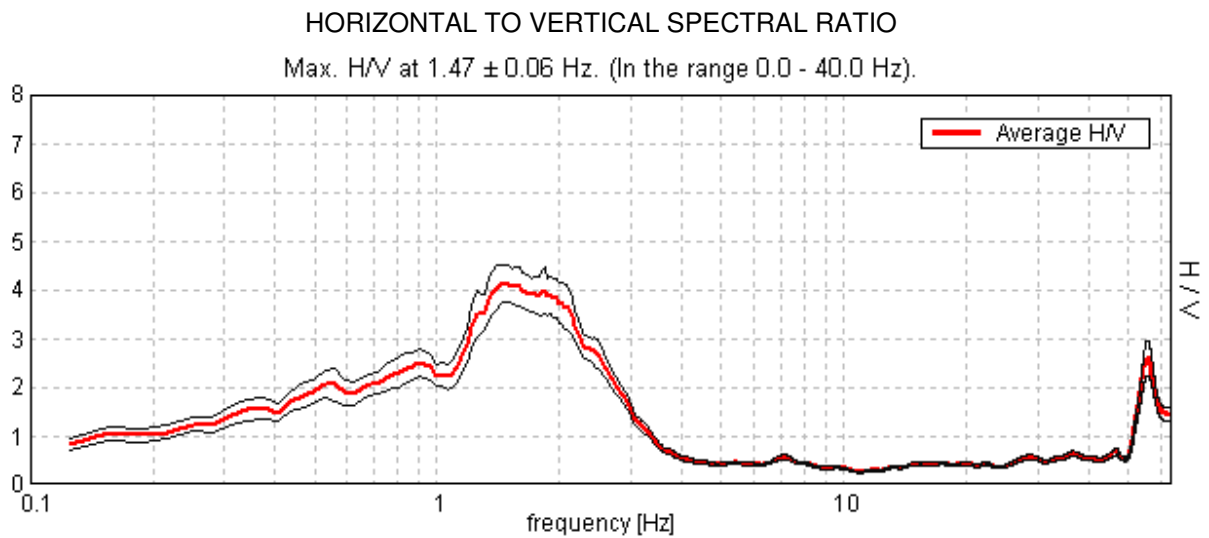
**Documentazione fotografica**



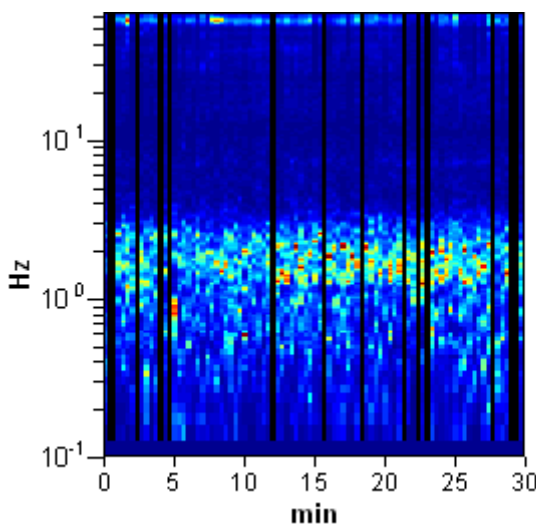
## TRIVEL SICILIA PALERMO, PALERMO TR 0246

Start recording: 29/05/14 09:35:18      End recording: 29/05/14 10:05:19  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

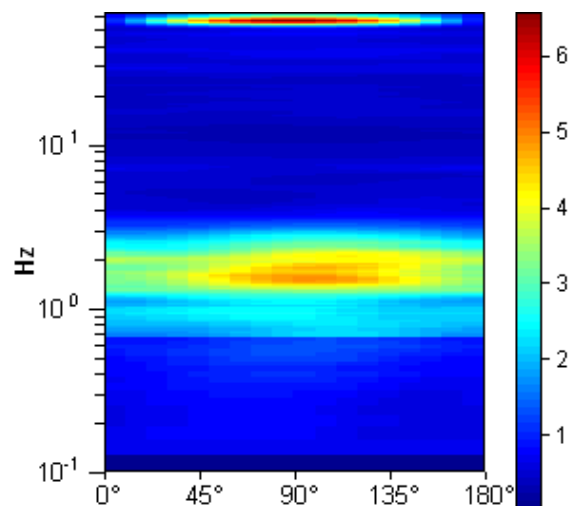
Trace length: 0h30'00".      Analyzed 84% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



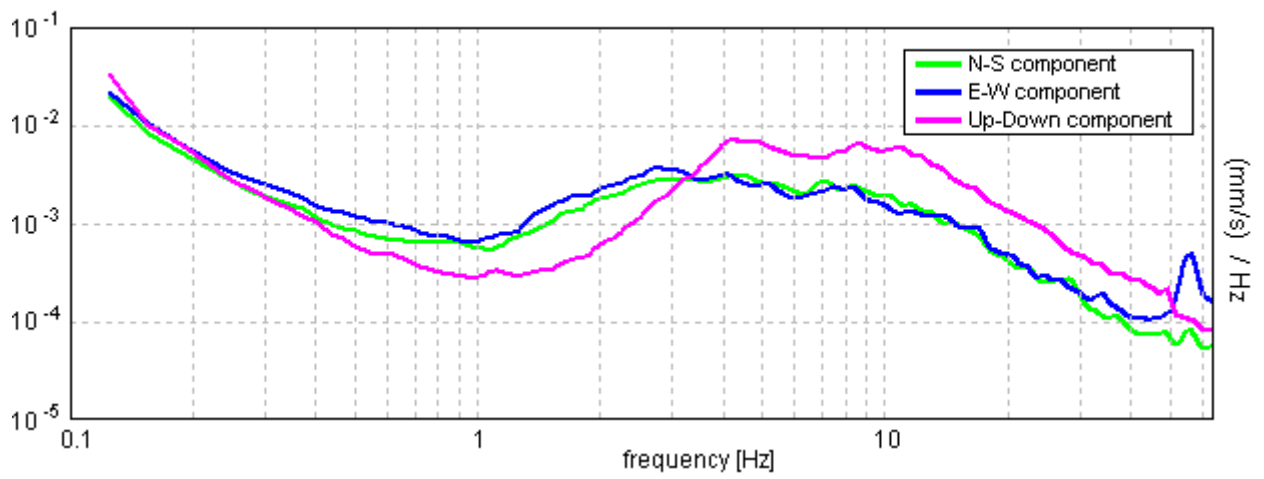
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.47 ± 0.06 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.47 > 0.50	OK	
$n_c(f_0) > 200$	2232.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 72 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	0.688 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.75 Hz	OK	
$A_0 > 2$	4.13 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02117  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.03109 < 0.14688	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1907 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0247			
<b>Coordinate</b>	<i>UTM</i>	4216720.83	N	360342.27	E
	<i>Gauss Boaga</i>	4216719.140	N	2380337.541	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Filippo Di Pietra</b>			
<b>Data e ora</b>		29/05/2014, 09:30			
<b>Nome file</b>		0247			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Asfalto			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>Si</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**





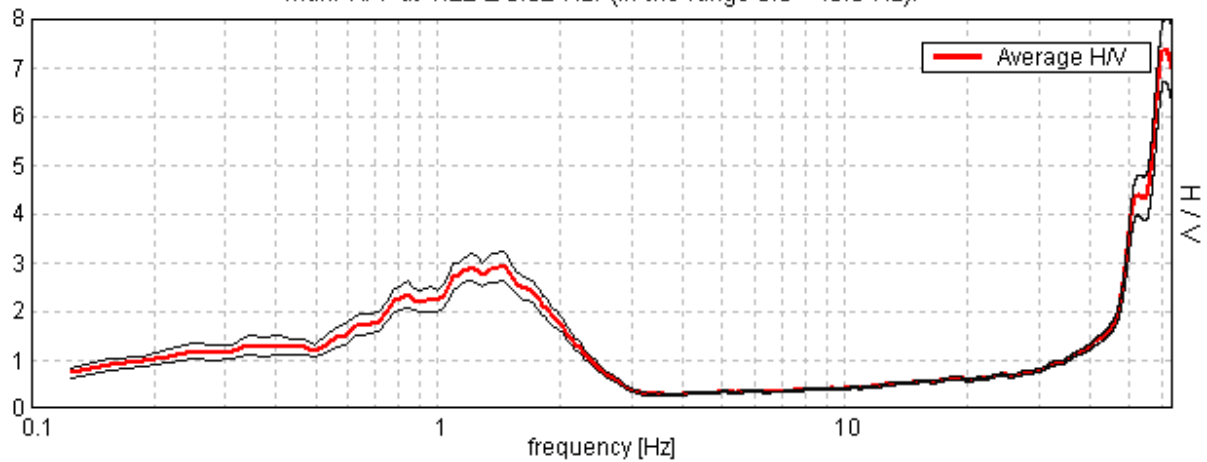
## TRIVELSICILIA PALERMO, PALERMO 0247

Start recording: 29/05/14 09:32:41      End recording: 29/05/14 10:02:42  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

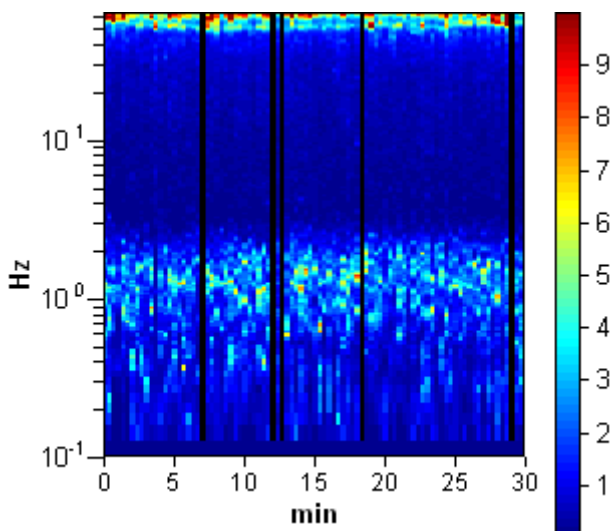
Trace length: 0h30'00".      Analyzed 94% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

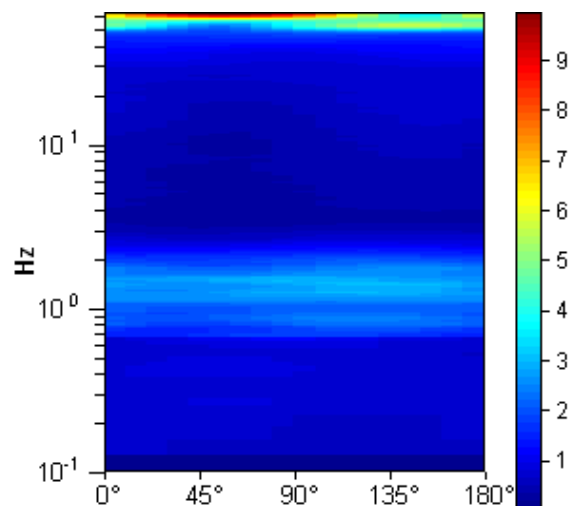
Max. H/V at  $1.22 \pm 0.02$  Hz. (In the range 0.0 - 40.0 Hz).



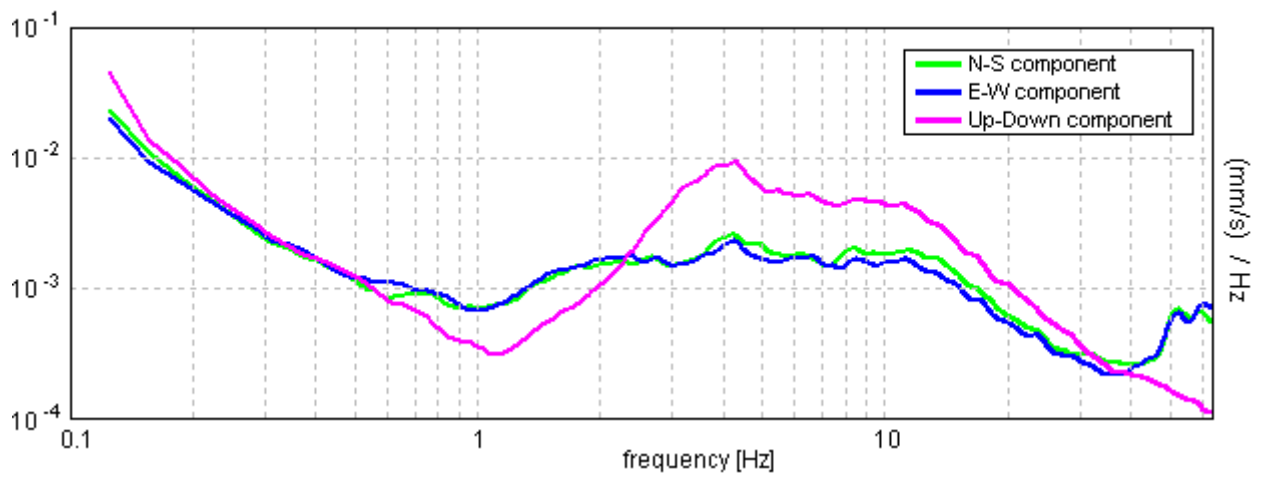
### H/V TIME HISTORY



### DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at 1.22 ± 0.02 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.22 > 0.50	OK	
$n_c(f_0) > 200$	2071.9 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 60 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.563 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	2.125 Hz	OK	
$A_0 > 2$	2.91 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01024  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.01248 < 0.12188	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.141 < 1.78	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



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**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>	<b>Comune di Palermo</b>				
<b>Oggetto dei lavori</b>	Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano				
<b>Nome base sismica</b>	0248				
<b>Coordinate</b>	<i>UTM</i>	4217000.33	N	359867.02	E
	<i>Gauss Boaga</i>	4216998.644	N	2379862.265	E
<b>Strumento utilizzato</b>	Tromografo digitale TROMINO®				
<b>Operatore</b>	<b>Geol. Filippo Di Pietra</b>				
<b>Data e ora</b>	29/05/2014, 10:05				
<b>Nome file</b>	0248				
<b>Durata</b>	30 min				
<b>Frequenza campionamento</b>	128 Hz				
<b>Accoppiamento strumento-suolo</b>	Asfalto				
<b>Condizioni meteo</b>	<b>Vento</b>	<b>Si</b>			
	<b>Pioggia</b>	<b>No</b>			
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>	<b>Si</b>			
	<b>Pedoni</b>	<b>Si</b>			
	<b>Altro</b>	<b>No</b>			

**Documentazione fotografica**



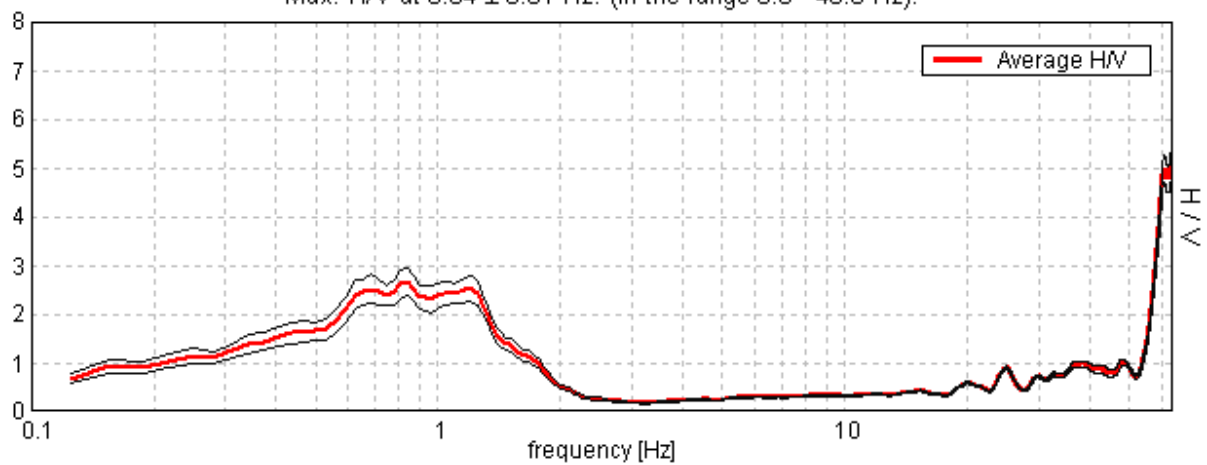
## TRIVELSICILIA PALERMO, PALERMO 0248

Start recording: 29/05/14 10:07:17      End recording: 29/05/14 10:37:18  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

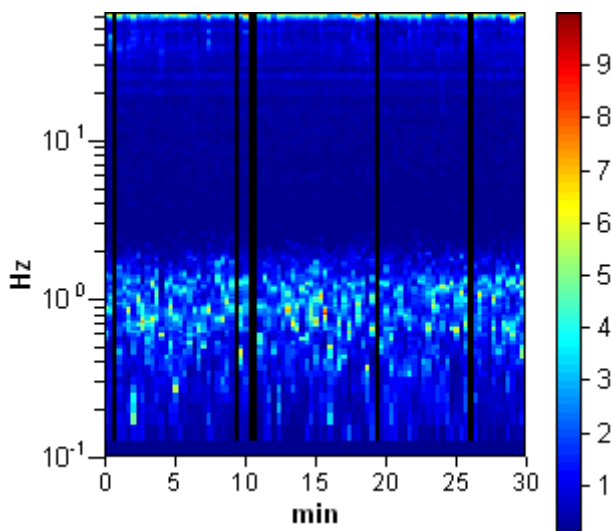
Trace length: 0h30'00".      Analyzed 93% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

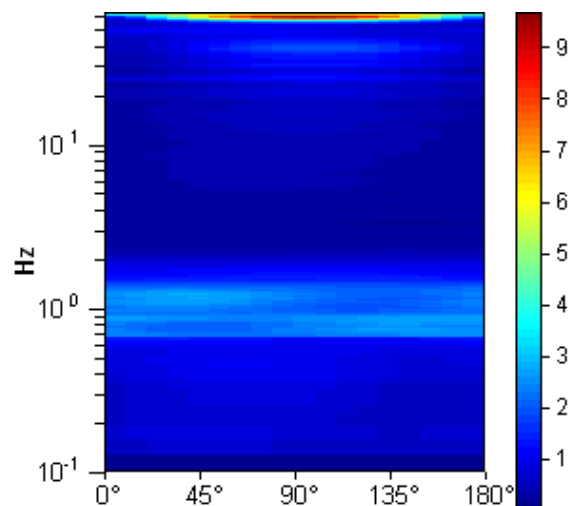
Max. H/V at  $0.84 \pm 0.01$  Hz. (In the range 0.0 - 40.0 Hz).



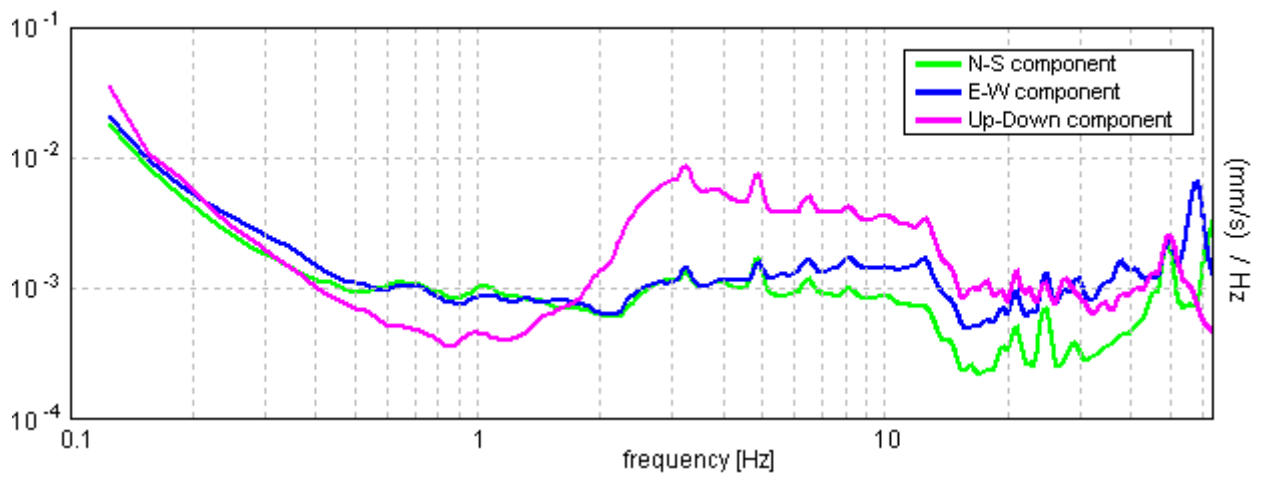
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the *Grilla* manual before interpreting the following tables.]

**Max. H/V at  $0.84 \pm 0.01$  Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$0.84 > 0.50$	OK	
$n_c(f_0) > 200$	$1417.5 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 42 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

Exists $f^-$ in $[f_0/4, f_0]$   $A_{H/V}(f^-) < A_0 / 2$	0.313 Hz	OK	
Exists $f^+$ in $[f_0, 4f_0]$   $A_{H/V}(f^+) < A_0 / 2$	1.531 Hz	OK	
$A_0 > 2$	$2.66 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00561  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.00474 < 0.12656$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1451 < 2.0$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0249			
<b>Coordinate</b>	UTM	4223037.19	N	356345.24	E
	Gauss Boaga	4223035.705	N	2376340.344	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		21/05/2014, 08:39			
<b>Nome file</b>		0249			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		Terreno			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**

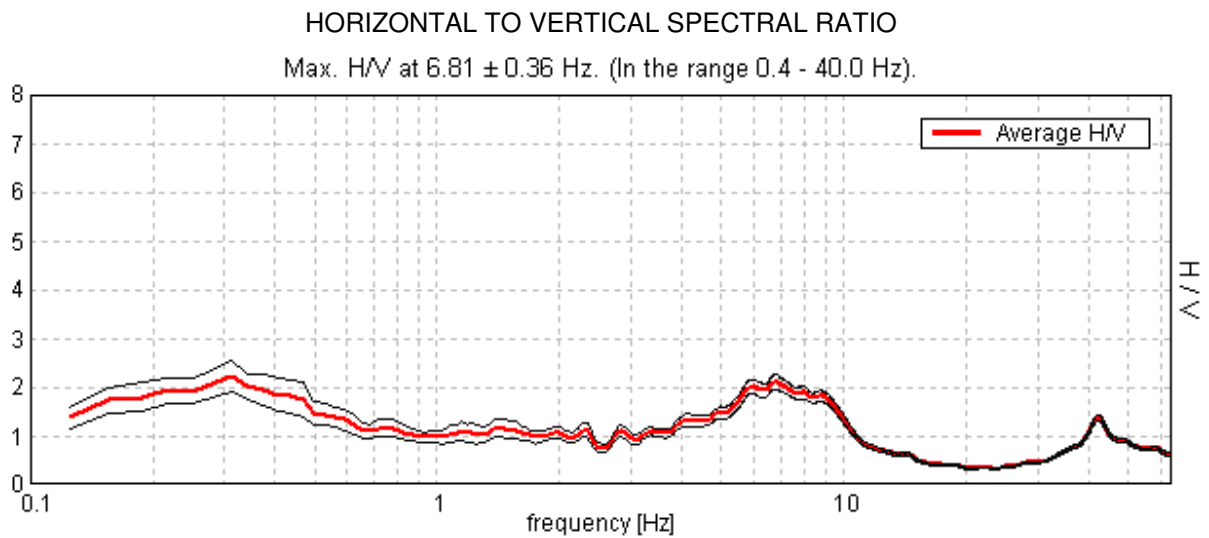




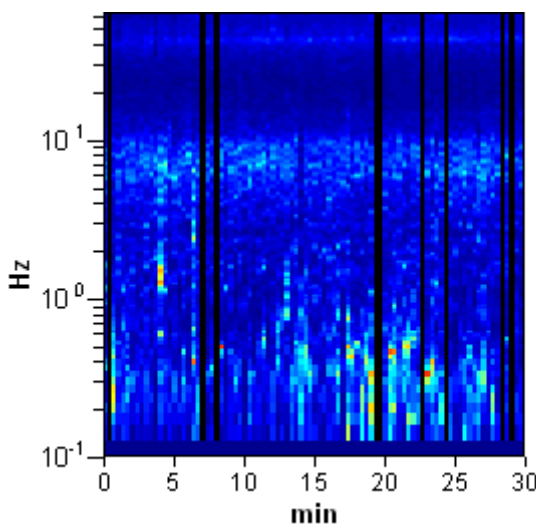
## TRIVELSICILIA PALERMO, PALERMO 0249

Start recording: 21/05/14 08:41:15      End recording: 21/05/14 09:11:16  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

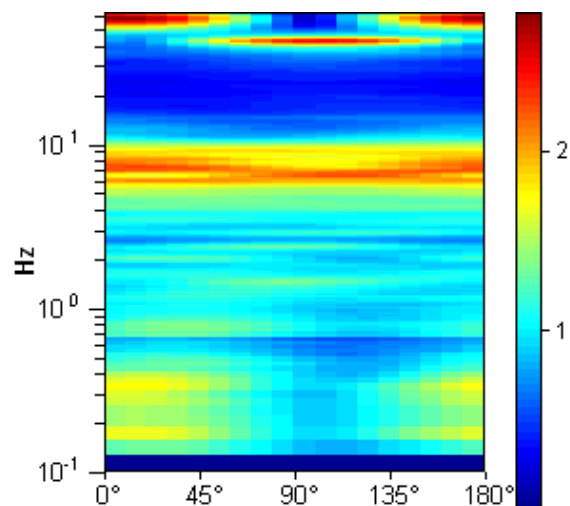
Trace length: 0h30'00".      Analyzed 90% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%



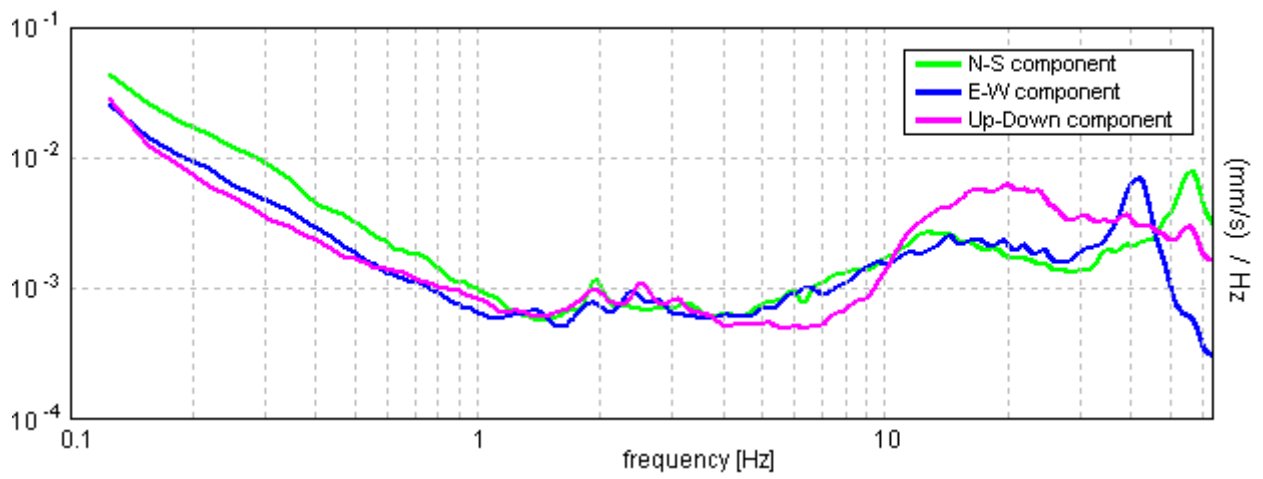
H/V TIME HISTORY



DIRECTIONAL H/V



### SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 6.81 ± 0.36 Hz. (in the range 0.4 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	6.81 > 0.50	OK	
$n_c(f_0) > 200$	11036.3 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 328 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>	3.719 Hz	OK	
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	10.563 Hz	OK	
$A_0 > 2$	2.11 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02645  < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.18021 < 0.34063	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.0778 < 1.58	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20



Autorizza ai sensi del DPR 06/06/01 n. 380 art. 59 – Circolare della Presidenza del C.S.L.P. n. 7619/STC dell'8 Settembre 2010  
 n. prot. 3513 del 16/03/2012

**SCHEDA RI EPI LOGATI VA DELL'INDAGINE SISMICA ESEGUITA**

<b>Commitente</b>		<b>Comune di Palermo</b>			
<b>Oggetto dei lavori</b>		Esecuzione di sondaggi geognostici e prove geotecniche in alcune vie e piazze del territorio urbano			
<b>Nome base sismica</b>		0250			
<b>Coordinate</b>	UTM	4223062.75	N	355946.35	E
	Gauss Boaga	4223061.261	N	2375941.436	E
<b>Strumento utilizzato</b>		Tromografo digitale TROMINO®			
<b>Operatore</b>		<b>Geol. Vito Ingrassia</b>			
<b>Data e ora</b>		21/05/2014, 09:15			
<b>Nome file</b>		0250			
<b>Durata</b>		30 min			
<b>Frequenza campionamento</b>		128 Hz			
<b>Accoppiamento strumento-suolo</b>		MarciapiEDE			
<b>Condizioni meteo</b>	<b>Vento</b>			<b>No</b>	
	<b>Pioggia</b>			<b>No</b>	
<b>Transienti nelle vicinanze</b>	<b>Traffico veicolare</b>			<b>Si</b>	
	<b>Pedoni</b>			<b>Si</b>	
	<b>Altro</b>			<b>No</b>	

**Documentazione fotografica**



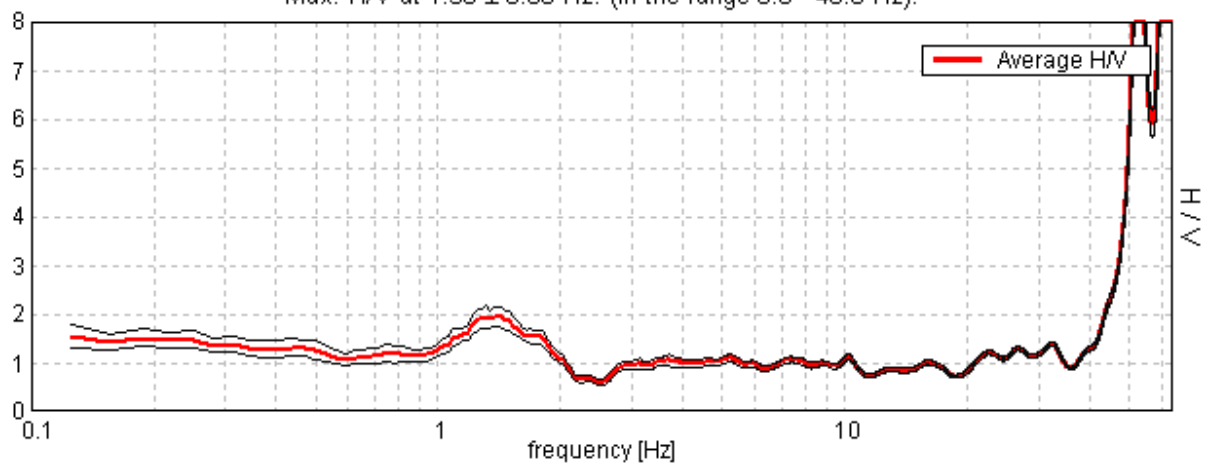
## TRIVELSICILIA PALERMO, PALERMO 0250

Start recording: 21/05/14 09:18:48      End recording: 21/05/14 09:48:49  
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN  
GPS data not available

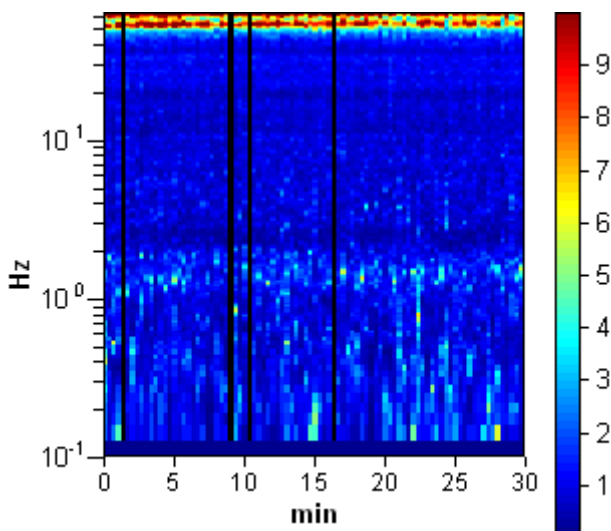
Trace length: 0h30'00".      Analyzed 96% trace (manual window selection)  
Sampling frequency: 128 Hz  
Window size: 20 s  
Smoothing window: Triangular window  
Smoothing: 5%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

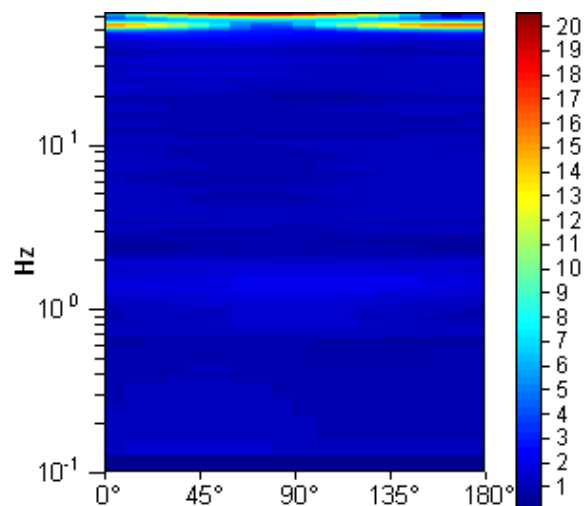
Max. H/V at  $1.38 \pm 0.06$  Hz. (In the range 0.0 - 40.0 Hz).



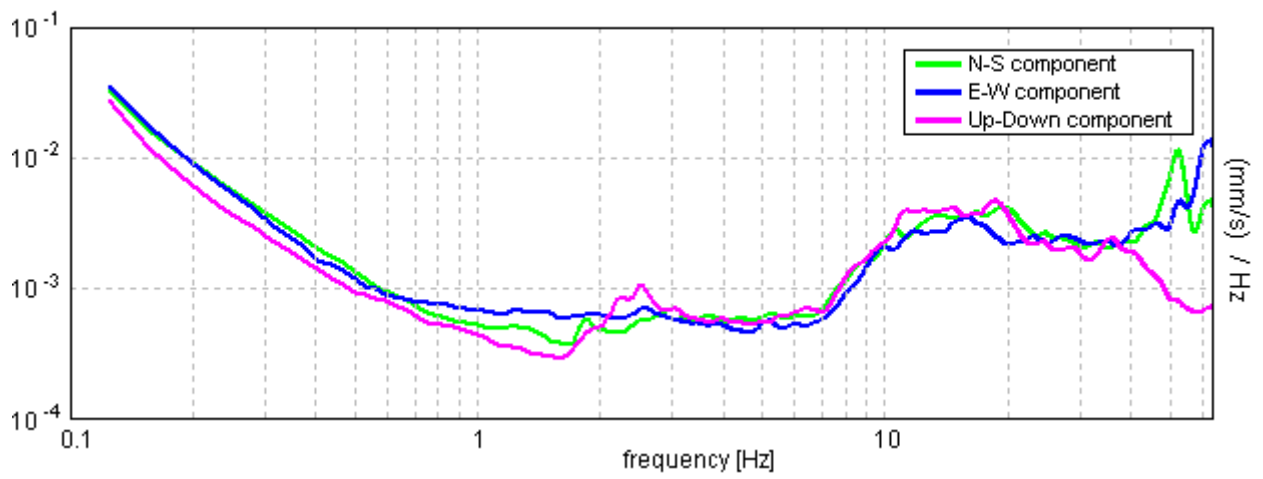
### H/V TIME HISTORY



### DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA



[According to the Sesame, 2005 guidelines. Please read carefully the Grilla manual before interpreting the following tables.]

**Max. H/V at 1.38 ± 0.06 Hz. (in the range 0.0 - 40.0 Hz).**

**Criteria for a reliable HVSR curve**

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.38 > 0.50	OK	
$n_c(f_0) > 200$	2365.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 67 times	OK	

**Criteria for a clear HVSR peak**

[At least 5 out of 6 should be fulfilled]

<b>Exists <math>f^-</math> in <math>[f_0/4, f_0]</math>   <math>A_{H/V}(f^-) &lt; A_0 / 2</math></b>			<b>NO</b>
<b>Exists <math>f^+</math> in <math>[f_0, 4f_0]</math>   <math>A_{H/V}(f^+) &lt; A_0 / 2</math></b>	2.063 Hz	OK	
<b><math>A_0 &gt; 2</math></b>	1.95 > 2		<b>NO</b>
<b><math>f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%</math></b>	$ 0.0219  < 0.05$	OK	
<b><math>\sigma_f &lt; \varepsilon(f_0)</math></b>	$0.03011 < 0.1375$	OK	
<b><math>\sigma_A(f_0) &lt; \theta(f_0)</math></b>	$0.1017 < 1.78$	OK	

$L_w$	window length
$n_w$	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
$f$	current frequency
$f_0$	H/V peak frequency
$\sigma_f$	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
$A_0$	H/V peak amplitude at frequency $f_0$
$A_{H/V}(f)$	H/V curve amplitude at frequency $f$
$f^-$	frequency between $f_0/4$ and $f_0$ for which $A_{H/V}(f^-) < A_0/2$
$f^+$	frequency between $f_0$ and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$ , $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

Threshold values for  $\sigma_f$  and  $\sigma_A(f_0)$

Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 $f_0$	0.2 $f_0$	0.15 $f_0$	0.10 $f_0$	0.05 $f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20