Attuazione dell'articolo 11 della legge 24 giugno 2009, n.77
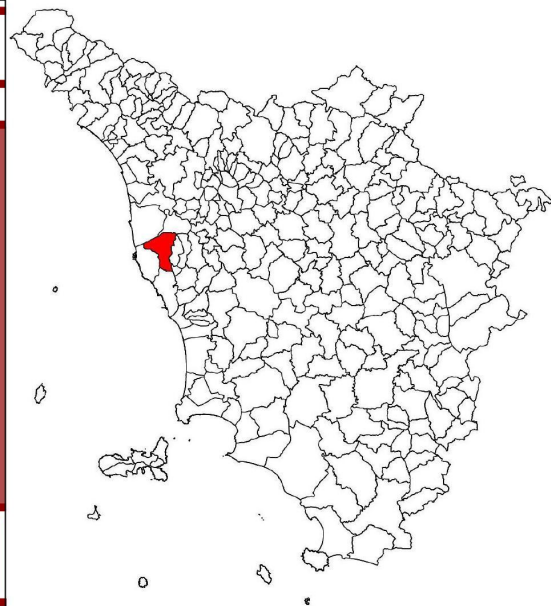
MICROZONAZIONE SISMICA

Livello I e II

Appendice 1– Indagini di campagna

Regione Toscana
Comune di Collesalvetti

PIANO STRUTTURALE
ai sensi dell'art.92 della Legge Regionale Toscana n.65 del 10 Novembre 2014

QUADRO CONOSCITIVO

SINDACO
Adelio ANTOLINI

ASSESSORE ALL'URBANISTICA

Mila GIOMMETTI

COORDINATORE PROGETTISTA E RES.
PROCEDIMENTO
Arch. Leonardo ZINNA
(Servizio urbanistica)

All. 1a - App. 1

| Regione Toscana | Soggetto realizzatore:
Geol Sergio Crocetti

Collaboratori MZS:
Geol. Francesca Biasci
Geol Silvia Caccavale
Geol. Roberto Maggiore

Collaboratori CLE:
Ing. Federico Bernardini
Ing. Francesca Novelli | Settembre 2018 |

INDICE

- Indagini di campagna 2018 – Livello 2

- Indagini di campagna 2013 - Livello 1

Nota: i documenti pdf delle indagini geognostiche raccolte per la carta delle indagini in occasione degli studi del 2013 e del successivo approfondimento del 2018 sono archiviate nella cartella "Documenti" così come indicato dagli standard di "Rappresentazione ed archiviazione informativa della MS – Versione 4.1"

Indagini di campagna 2018
Livello 2

Provincia di Livorno

Comune di Collesalvetti

OGGETTO: **Relazione Tecnica illustrativa sulle indagini geofisiche per gli studi di Microzonazione sismica di Livello 1 nel territorio del Comune di Collesalvetti (LI)-**

Committente: Comune di Collesalvetti – Regione Toscana

DATA: 05 Maggio 2018

INDICE

RELAZIONE TECNICA

1. Presentazione e finalità del progetto

Nell'ambito degli studi di I livello di Microzonazione sismica nel territorio comunale di Collesalvetti (LI), è stata realizzata una campagna di indagine sismica condotta conformemente alla vigente normativa sismica ed in particolare ai contenuti dell'O.P.C.M. n. 3274/2003, al D.M. NTC 2018 e smi.

In particolare sono state effettuate n. 7 indagini M.A.S.W. (Multichannel Analysis of Surface Waves), elaborate congiuntamente a n. 7 indagini ESAC (Extended Spatial Autocorrelation), e n. 30 acquisizioni di microtremori di tipo HVSR (Horizontal and Vertical Spectral Ratio).

Gli stendimenti e le acquisizioni puntuali sono stati ubicati, come concordato con i tecnici della Regione Toscana - Servizio sismico e sono riportate nelle tavole allegate.

Gli stendimenti sono stati effettuati considerando la logistica a disposizione e la risposta sismica verificata in fase di sopralluogo (considerando il rumore di fondo).

Nella presente relazione tecnica verrà illustrato il metodo di acquisizione, elaborazione ed i risultati ottenuti.

2. Metodo di acquisizione

MASW e ESAC

Il contributo predominante alle onde superficiali è dato dalle onde di Rayleigh, che viaggiano con una velocità correlata alla rigidezza della porzione di terreno interessata dalla propagazione delle onde. In un mezzo stratificato le onde di Rayleigh sono dispersive, cioè onde con diverse lunghezze d'onda si propagano con diverse velocità di fase e velocità di gruppo (Achenbach, J.D., 1999, Aki, K. and Richards, P.G., 1980) o, detto in maniera equivalente, la velocità di fase (o di gruppo) apparente delle onde di Rayleigh dipende dalla frequenza di propagazione. La natura dispersiva delle onde superficiali è correlabile al fatto che onde ad alta frequenza con lunghezza d'onda corta si propagano negli strati più superficiali e quindi danno informazioni sulla parte più superficiale del suolo; onde a bassa frequenza si propagano negli strati più profondi e quindi interessano gli strati più profondi del suolo. I metodi di utilizzo delle MASW sono di tipo attivo, mentre le acquisizioni di sismica passiva sono ReMi (se acquisite con stendimento lineare o ESAC se acquisite con geometria bidimensionale; nel primo caso il concetto è quello di energizzare verticalmente con i metodi tradizionali e procedere ad un'analisi del segnale non più nel campo nel tempo, come si fa abitualmente con la rifrazione, ma nel dominio della frequenza. Il metodo attivo generalmente consente di ottenere una velocità di fase (o curva di dispersione) sperimentale apparente nel range di frequenze compreso tra 5/10 Hz e 70/100 Hz, quindi fornisce informazioni sulla parte più superficiali de suolo, generalmente compresa nei primi 20m-30m, in funzione della rigidezza del suolo e delle caratteristiche della sorgente. Nel caso invece del metodo passivo, denominato anche ESAC o ReMI a seconda degli autori, l'analisi delle frequenze viene condotta su registrazioni, che in questo caso devono essere prolungate per un tempo sufficientemente lungo, dei "naturali" rumori di fondo. I principali vantaggi

pratici nell'utilizzo di queste tecniche sono evidentemente nella semplicità di acquisizione rispetto alla sismica a rifrazione; le onde di taglio infatti non sempre possono essere rilevate in modo soddisfacente sia per il basso rapporto segnale/rumore, sia per la mancanza degli spazi necessari per effettuare profili di lunghezza adeguata.

Il metodo passivo risulta inoltre particolarmente indicato in situazioni di elevato rumore di fondo caratteristico delle aree urbane, anche se può risentire negativamente di fonti di rumore orientate (fonti industriali).Il metodo passivo generalmente consente di ottenere una velocità di fase (o curva di dispersione) sperimentale apparente nel range di frequenze compreso tra 2 Hz e 15/25 Hz, quindi fornisce informazioni sulla parte più profonde del suolo, generalmente compresa oltre i primi 20m-30m, sempre in funzione della rigidezza del suolo e delle caratteristiche delle sorgenti.

Le tecniche di indagine M.A.S.W. (Multichannel Analysis of Surface Waves) derivano da sperimentazioni condotte, alla fine degli anni '90, da ricercatori del Kansas Geological Survey.Tali indagini risultano fra le più utilizzate nel mondo poiché consentono di determinare una classificazione del suolo in modo speditivo e non invasivogenerando, mediante una sorgente artificiale (generalmente una mazza battente su piastra), onde che si propagano lungo un piano verticale. Come nella prospezione sismica a rifrazione, tali energizzazioni possono essere ripetute più volte nello stesso punto, sommando in modo aritmetico i segnali per ottenere un aumento del rapporto segnale/rumore.

Data la necessità di analizzare con elevato dettaglio le basse frequenze (tipicamente anche al di sotto dei 20 Hz), vengono utilizzati geofoni ad asse verticale con frequenza di taglio non superiore a 4,5 Hz.

Le acquisizioni sono eseguite con array lineari, in cui la distanza intergeofonica è costante.

L'analisi delle onde "S",indipendentemente dalla tecnica di acquisizione (attiva o passiva), viene eseguita attraverso la trattazione spettrale del sismogramma, cioè a seguito di una trasformata di Fourier che restituisce lo spettro del segnale nel dominio trasformato. L'osservazione dello spettro consente di notare che l'onda "S" si propaga a velocità variabile a seconda della frequenza dell'onda stessa: questo fenomeno è detto dispersione ed è caratteristico di questo tipo di onde.

La teoria sviluppata suggerisce di caratterizzare tale fenomeno mediante una funzione detta curva di dispersione, che associa ad ogni frequenza la velocità di propagazione dell'onda. Tale curva è facilmente estraibile dallo spettro del segnale poiché approssimativamente posa sui massimi del valore assoluto dello spettro.

La curva di dispersione sperimentale viene confrontata con quella relativa ad un modello sintetico che verrà successivamente modificato in base alle differenze riscontrate tra le due curve. Ciò è finalizzato all'ottenimento di un modello sintetico che approssima nel miglior modo possibile la curva sperimentale a quella teorica. Questa delicata seconda fase di interpretazione è comunemente detta "fase di inversione".

HVSR

La caratterizzazione sismica dei terreni tramite la tecnica di indagine sismica passiva HVSR (Horizzontal to Vertical Spectral Ratio – Metodo di Nakamura) è finalizzata all'individuazione delle frequenze caratteristiche di risonanza di sito. Esse sono correlabili ai cambi litologici presenti sia all'interno della copertura che nell'ammasso roccioso.

Le vibrazioni sismiche ambientali (rumore sismico o microtremore) sono onde sismiche di bassa energia con ampiezze dell'ordine di 10^-4 - 10^-2 mm (Okada, 2003). L'origine del rumore sismico è dovuto alle perturbazioni atmosferiche sugli oceani che si propagano come onde superficiali sui continenti, mentre le sorgenti dei microtremori sono le attività antropiche e si propagano come onde superficiali di Rayleigh. L'analisi delle misure di rumore sismico che sembra fornire i risultati migliori è proprio quello dei rapporti spettrali H/V noto anche come metodo HVSR.

L'utilizzo di algoritmi di calcolo finalizzati ad una modellizzazione sintetica dello spettro H/V, permette di correlare ogni picco spettrale con le discontinuità presenti nel sottosuolo (per esempio i cambi litologici). I dati che si possono ricavare sono spessori, profondità e velocità di propagazione delle onde di taglio all'interno del sismo–strato individuato. Tramite l'elaborazione di modi superiori e l'analisi dell'andamento delle tre componenti del moto, è possibile distinguere i picchi di origine naturale da quelli generati dai modi superiori o da artefatti, al fine di garantire una corretta interpretazione dello spettro sismico registrato.

Le misure puntuali di rumore sismico possono essere utilizzate per la stima sia degli effetti di sito (funzione di amplificazione), sia degli effetti sulle costruzioni ed ottenere una stima della velocità delle onde di taglio Vseq per la definizione della categoria sismica dei terreni in ottemperanza alle nuove N.T.C. - D.M. 2018 integrato con la circ. 02/02/09 N° 617 C.S. LL.PP.

3. Descrizione della strumentazione utilizzata

L'apparecchiatura utilizzata per l'indagine sismica si compone di:

- *SISTEMA DI ACQUISIZIONE DATI*
    - n.1 sismografo analogico a 24 canali "SYSMATRACK" della ditta M.A.E. S.r.l., perfettamente idoneo per simica a rifrazione, acquisizione dati per calcolo di V_{s30}, monitoraggio di vibrazioni, applicazioni sismologiche Down-Hole e VSP.
    - n.1 PC portatile Acer per il salvataggio dei dati acquisiti.

- *SISTEMA DI RICEZIONE*
    - n.24 geofoni ad asse verticale con frequenza pari a 4,5 Hz, collegati al sistema di acquisizione tramite due cavi paralleli ognuno avente 12 connessioni spaziate 5 m.

- *SISTEMA DI ENERGIZZAZIONE e STARTER*
    - n.1 mazza da 8 Kg
    - n.1 piastra di diametro pari a 20 cm.
    - n.1geofono starter collegato al sismografo tramite un cavo elettrico.
- INDAGINE HVSR

    - n.1 PC portatile Acer per il salvataggio dei dati acquisiti.
    - n.1 Tromografo digitale SR04 a tre componenti con frequenza dei geofoni di 4,5 Hz

Il sismografo SR04 è finalizzato alla rilevazione di vibrazioni naturali e artificiali, dal rumore di fondo ai forti terremoti sfruttando le seguenti caratteristiche:

Alimentazione:	10-16Vdc o da batteria interna < 1W
Numero canali:	3 a 24 bit (SD)
Range dinamico:	124dB (144dB, 24 bit effettivi [enob], fra 0.1 e 10Hz)
Campionamento:	simultaneo sui tre canali
Samplingrates:	da 10-600 Hz
Real Time Clock:	+/-10ppm (-20/+50°C)
Sincrononizzazione :	GPS via PPS modulato
Velocità:	115200 baud
Contenitore:	Monoblocco in alluminio IP66
Temperatura operativa:	-30/+60°C
Dimensioni e peso:	155x140x110 mm
Precisione rispetto a UTC:	<50ms
Interfaccia dati sismici:	RS232, cavo USB in dotazione
Formato dati:	protocollo binario SADC20HS
Peso:	3.1kg con sensori da 4.5Hz; 4.4kg con sensori da 2Hz
Conformità: CE (EN55022, EN55011)	

Tab. 1 - Caratteristiche tecniche tromografo.

4. Metodo di elaborazione ed analisi dei dati sismici

MASW e ESAC

Per l'interpretazione dei dati sperimentali relativi alle indagini sismiche MASW sono stati utilizzati i software di elaborazione Geopsy e Dinver.

L'elaborazione del segnale consiste nell'operare una trasformata bidimensionale *velocity-frequency*, che consente di analizzare l'energia di propagazione del rumore in un'unica direzione della linea sismica rappresentando poi lo spettro di frequenza su un grafico che mette in relazione la velocità e la frequenza dell'onda.

Dallo spettro così ottenuto viene eseguito un picking i cui valori sono poi riportati sul software Dinver per l'analisi della curva di dispersione e l'ottimizzazione di un modello interpretativo.

Variando la geometria del modello interpretativo ed i valori di velocità delle onde S si modifica automaticamente la curva di dispersione calcolata in modo da ottenere un buon *fitting* (indicato dal valore di RMS, *Root Mean Squared Error*) con i valori sperimentali assumendo tale modello come interpretativo.

Al fine di ridurre i casi di equivalenza, quando possibile, si opera introducendo nell'interpretazione, come inamovibili, elementi quali: le densità dei litotipi dell'area indagata ed il numero degli strati con la loro rispettiva potenza. Lo studio dello spettro di potenza permette in definitiva la ricostruzione di un modello sismico monodimensionale del sottosuolo, con le velocità delle onde di superficie S e la profondità.

HVSR

Per l'interpretazione dei dati sperimentali relativi all'indagine sismica HVSR è stato utilizzato il software di elaborazione Geoexplorer della Sara Instruments di Perugia, che permette l'analisi dei dati acquisiti fino all'ottenimento della frequenza di risonanza F0 e la verifica di altri fattori quali la permanenza spettrale e successivamente, tramite l'inversione dei dati, permette di arrivare alla restituzione di un modello monodimensionale del sottosuolo.

5. Parametri di acquisizione

Nelle tabelle sottostanti sono riportati i dati tecnici generali utilizzati durante le esecuzioni in campagna:

MASW

N° geofoni	24
Frequenza geofoni	4,5Hz
Frequenza campionamento	1000 camp./s
Tempo passo di campionamento	1,0 ms
Tempo registrazione	2,05 s

ESAC

N° geofoni	9
Frequenza geofoni	4,5Hz
Frequenza campionamento	500 camp./s
Tempo passo di campionamento	2,0 ms
Tempo registrazione complessivo	330 s

HVSR

N° tracce	3
Frequenza geofoni	4,5Hz
Frequenza campionamento	200 camp./s
Direzioni tracce	N-S, E-W, Verticale
Tempo registrazione minimo	2700 s

6. Risultati ottenuti

L'elaborazione dei dati ottenuti dalle indagini MASW e ESAC in base a quanto descritto fin ora, ha consentito di ricavare sia il modello medio di distribuzione della velocità delle onde "S" che il parametro V_{Seq} relativi al sottosuolo del sito.

Inoltre, suddividendo gli strati secondo i valori dalla velocità delle onde S (sismostrati) è possibile ipotizzare le successioni stratigrafiche riportate nelle tabelle che seguono, suddivise per numero di indagine.

Ricordiamo che l'interpretazione, ovvero la definizione dei sismostrati, è soggettiva e può essere modificata dal geologo incaricato sotto la sua esclusiva responsabilità. In allegato è riportato il modello scaturito dall'elaborazione dei dati che può essere usato come punto di partenza per una successiva interpretazione.

Il calcolo della velocità equivalente Vs_{eq} di propagazione delle onde di taglio entro i primi 30 m di profondità, sulla base dei risultati ottenuti, è stato effettuato mediante la seguente espressione:

$$V_{S,eq} = \frac{H}{\sum_{i=1}^{N} \frac{h_i}{V_{S,i}}}$$

dove:

Hi spessore dell'i-esimo strato

$V_{S,i}$ velocità delle onde di taglio nell'i-esimo strato

N numero di strati

H profondità del substrato, definito come quella formazione costituita da roccia o terreno molto rigido, caratterizzata da Vs inferiore a 800 m/sper un totale di nsismostrati presenti nei primi 30 metri di profondità.

Per il calcolo di tale parametro sono stati considerati i primi 30 metri della prova con profondità H del substrato superiore a 30 m, la velocità equivalente delle onde di taglio V_{Seq} è definita dal parametro V_{S30} ottenuto ponendo H=30 m nella precedente espressione e considerando le proprietà degli strati di terreno fino a tale profondità.

1

Spessore strato (m)	V_S misurata in situ (m/s)	Rapporto spessore velocità	Tempi parziali-onda S misurata (sec)
5	332,50	h_1/V_1	0,015
5	243,00	h_2/V_2	0,021
1	376,00	h_3/V_3	0,003
19	263,00	h_4/V_4	0,072

V_{S30}	271 m/s

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2

Spessore strato (m)	V_S misurata in situ (m/s)	Rapporto spessore velocità	Tempi parziali-onda S misurata (sec)
5,2	175,50	h_1/V_1	0,030
8,6	224,50	h_2/V_2	0,038
16,2	315,40	h_3/V_3	0,051

V_{S30}	251 m/s

3

Spessore strato (m)	V_S misurata in situ (m/s)	Rapporto spessore velocità	Tempi parziali-onda S misurata (sec)
7,7	184,30	h_1/V_1	0,042
5	212,50	h_2/V_2	0,024
17,3	252,00	h_3/V_3	0,069

V_{S30}	224 m/s

4

Spessore strato (m)	V_S misurata in situ (m/s)	Rapporto spessore velocità	Tempi parziali-onda S misurata (sec)
12,7	149,00	h_1/V_1	0,085
9,9	132,50	h_2/V_2	0,075
7,4	159,00	h_3/V_3	0,047

V_{S30}	145 m/s

5

Spessore strato (m)	V_S misurata in situ (m/s)	Rapporto spessore velocità	Tempi parziali-onda S misurata (sec)
1,7	324,00	h_1/V_1	0,005
6,9	278,50	h_2/V_2	0,025
3	338,50	h_3/V_3	0,009
15,3	442,00	h_4/V_4	0,035
3,1	322,00	h_5/V_5	0,010

V_{S30}	361 m/s

6

Spessore strato (m)	V_S misurata in situ (m/s)	Rapporto spessore velocità	Tempi parziali-onda S misurata (sec)
1,7	161,50	h_1/V_1	0,011
3,5	214,00	h_2/V_2	0,016
6,4	313,00	h_3/V_3	0,020
16,8	410,00	h_4/V_4	0,041
1,6	340,00	h_5/V_5	0,005

V_{S30}	322 m/s

Spessore strato (m)	V_S misurata in situ (m/s)	Rapporto spessore velocità	Tempi parziali-onda S misurata (sec)
9,6	292,00	h_1/V_1	0,033
3,1	350,00	h_2/V_2	0,009
14,2	416,00	h_3/V_3	0,034
3,1	311,50	h_4/V_4	0,010

V_{S30}	**349 m/s**

Negli allegati che seguono sono riportati i risultati per ogni indagine eseguita, partendo dalle indagini lineari n. 1-7 e successivamente dal report delle n. 30 HVSR effettuate.

Per ogni indagine lineare vengono riportati il sismogramma del MASW, le curve di dispersione del MASW e dell'ESAC, la curva di dispersione del picking effettuato congiuntamente (MASW+ESAC) e il modello risultante.

Successivamente vengono riportate le corografie delle indagini effettuate.

Lucca, 05/05/2018

Dott. Geologo
Roberto Maggiore

ALLEGATI:

1 - Ubicazione indagini effettuate;

2 - Tabulati e diagrammi indagini lineari;

3 - Documentazione fotografica indagini lineari;

4 - Report indagini HVSR (Fuori testo);

UBICAZIONE DELLE INDAGINI 1

Scala 1:1000

MASW 1

ESAC 1

Stralcio delle CTR 2k 16E16

Legenda

— Indagine sismica ESAC

— Indagine sismica MASW

◯ Area di studio

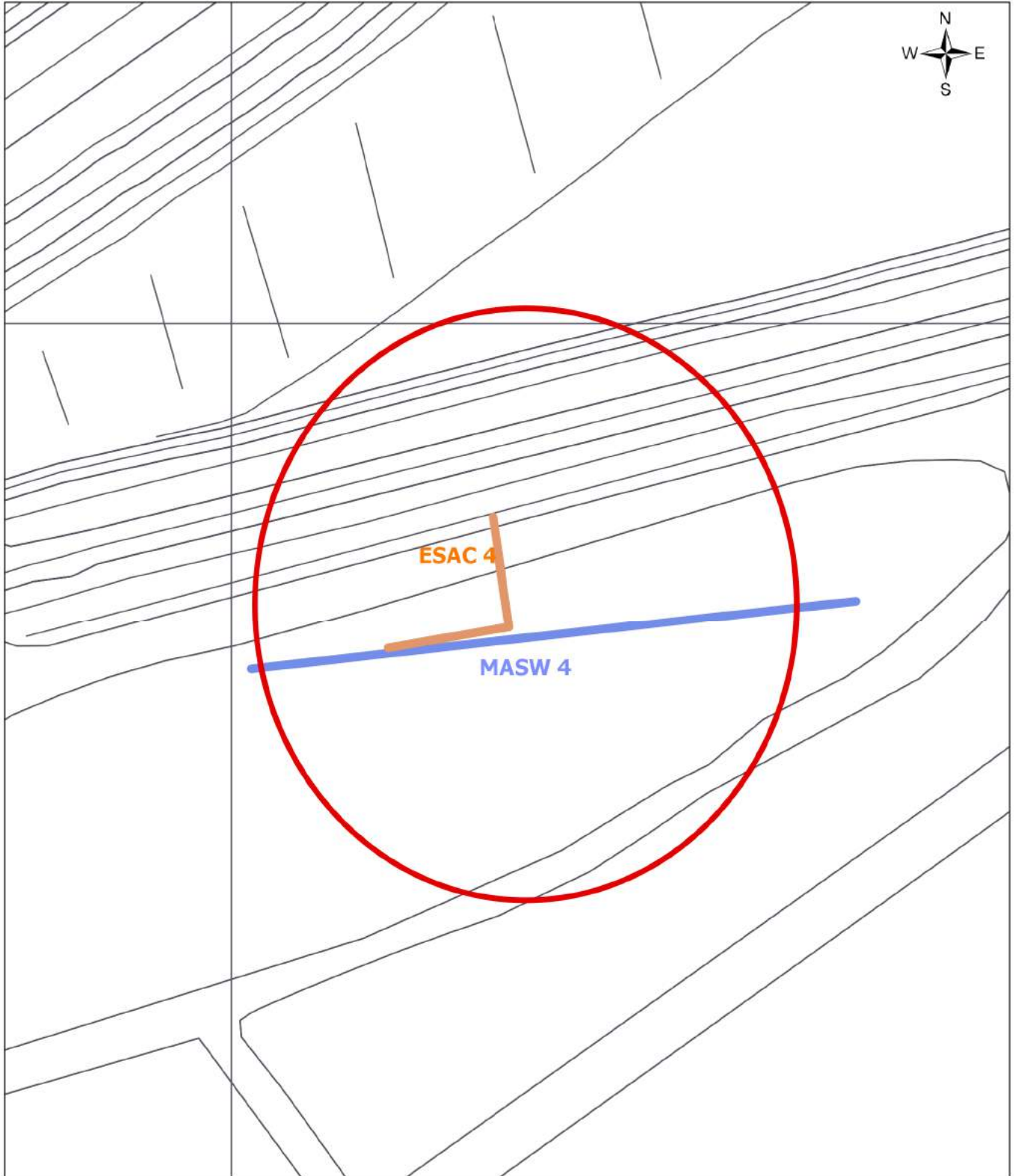# UBICAZIONE DELLE INDAGINI 2

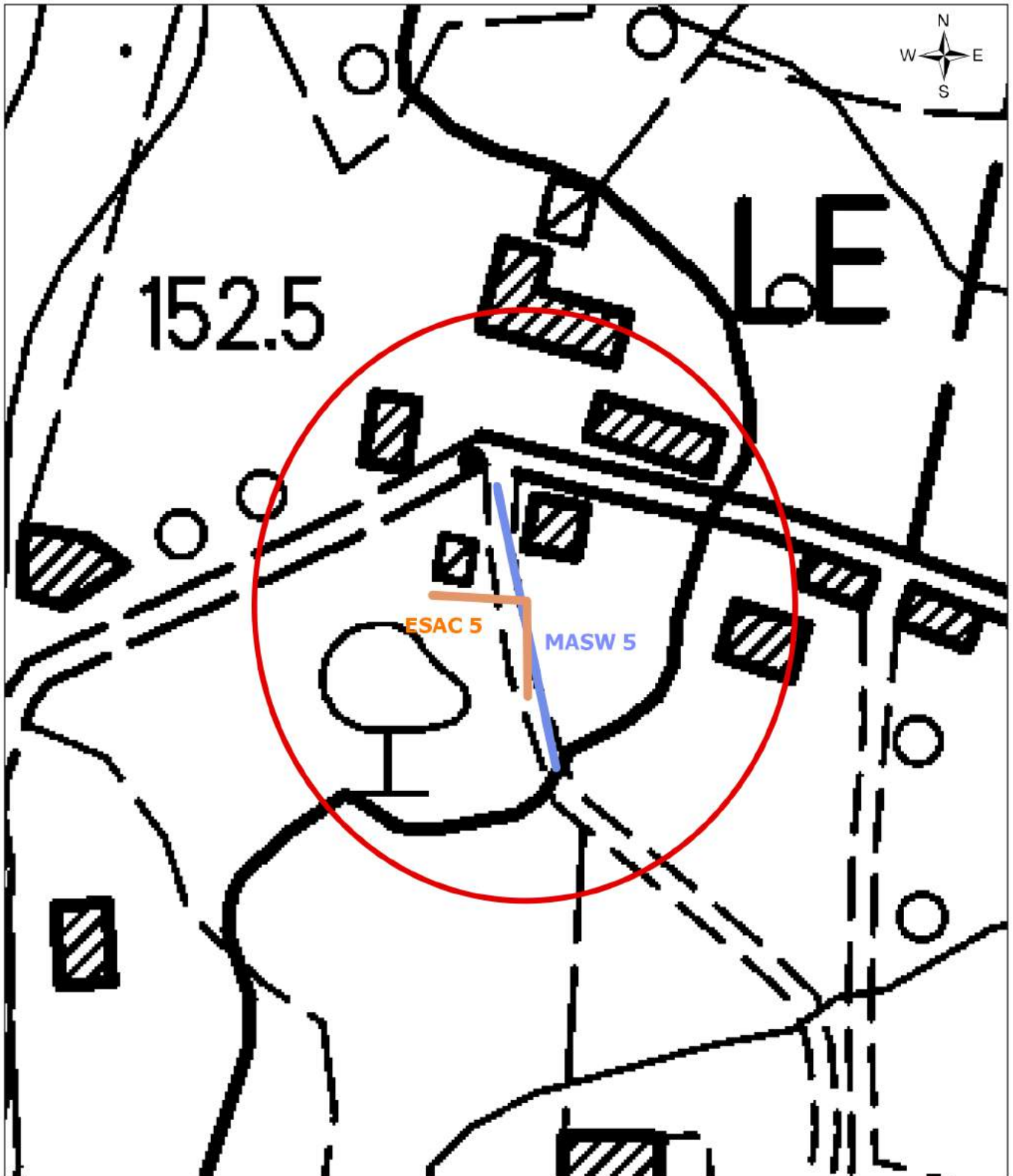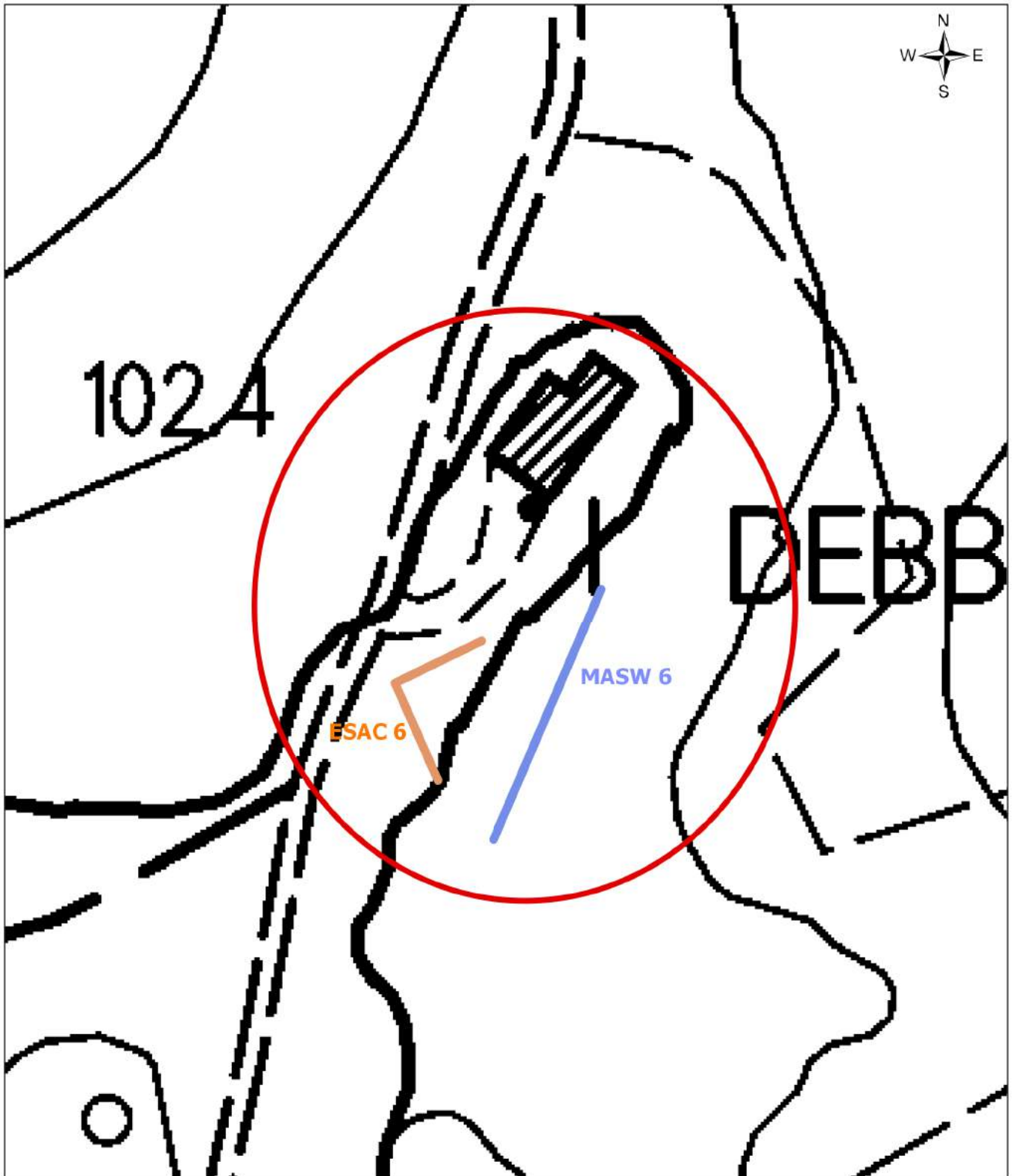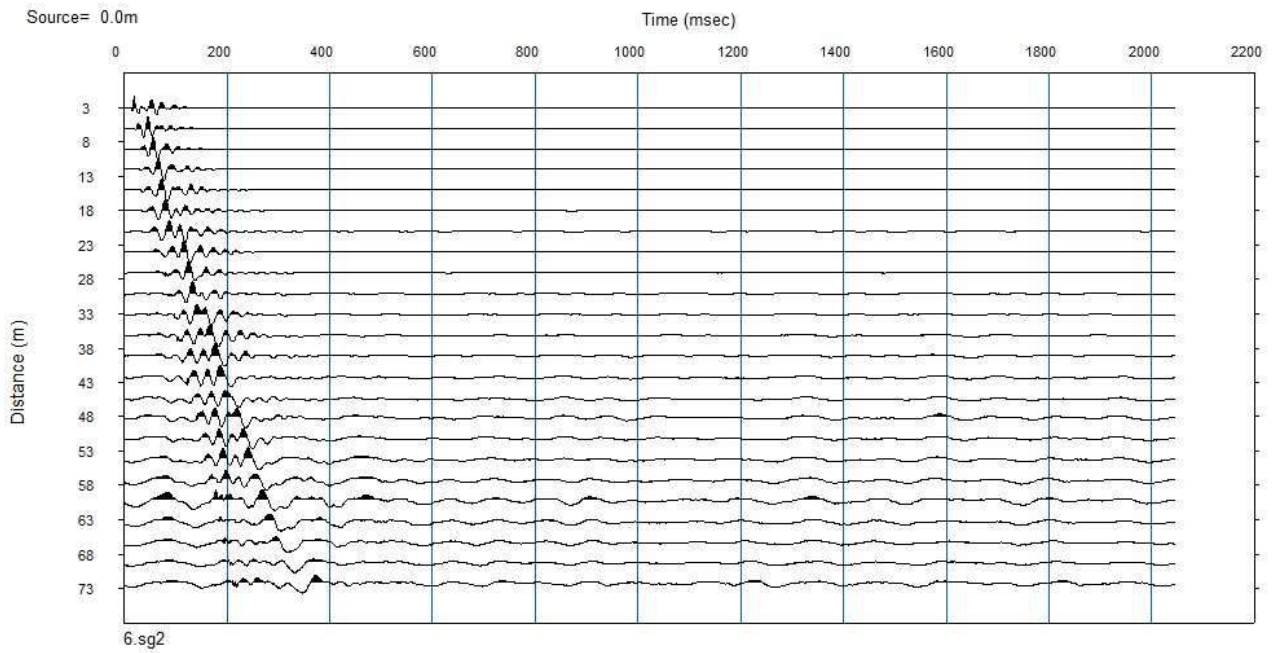Scala 1:1000

Stralcio delle CTR 2k 17F54 e 17F62

Legenda

— Indagine sismica ESAC

— Indagine sismica MASW

◯ Area di studio

UBICAZIONE DELLE INDAGINI 3

Scala 1:1000

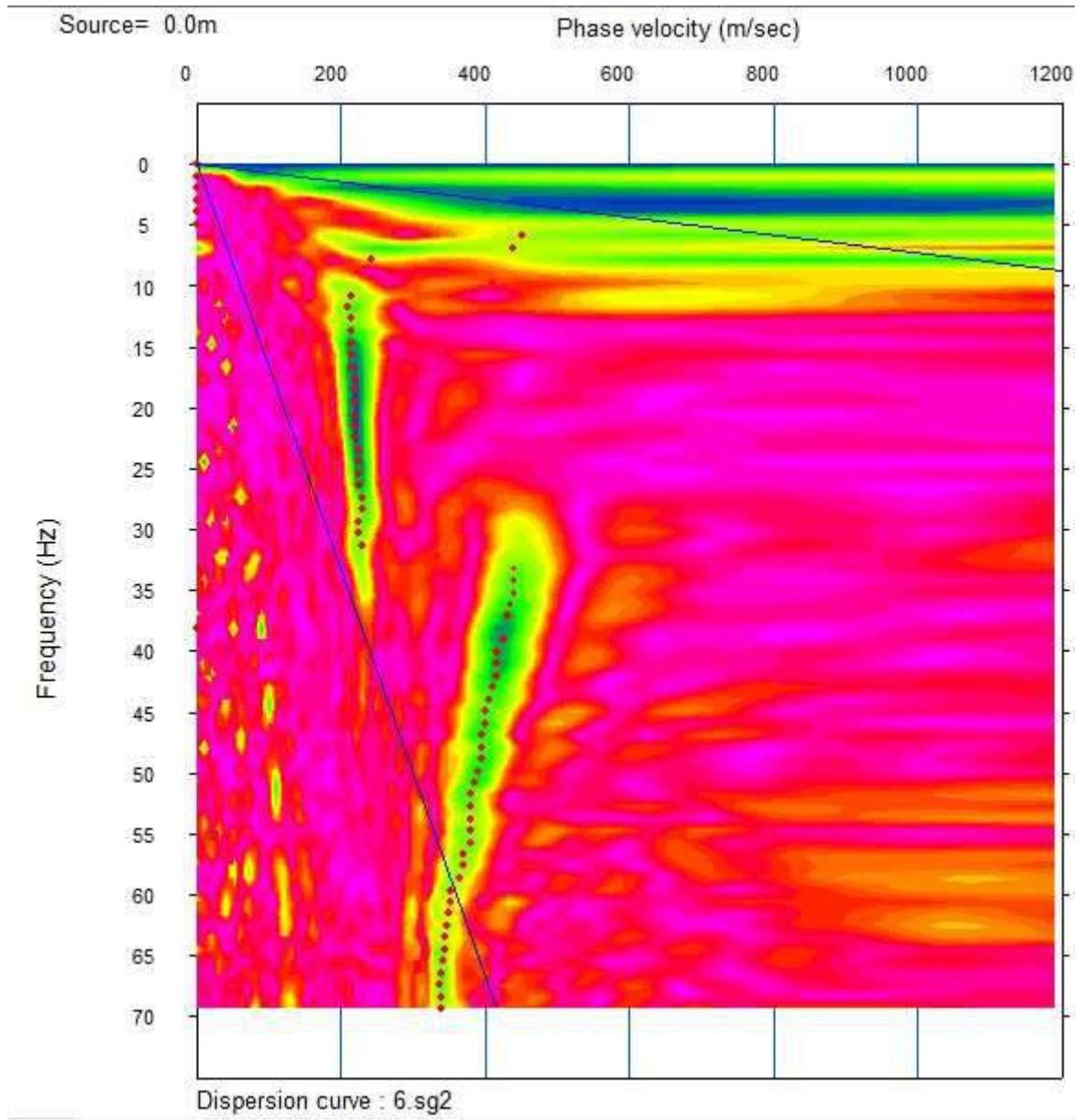Stralcio della CTR 2k 16F06

Legenda

──── Indagine sismica ESAC
──── Indagine sismica MASW

◯ Area di studio

UBICAZIONE DELLE INDAGINI 4

Scala 1:1000

Stralcio della CTR 2k 16F01

ESAC 4

MASW 4

Legenda

— Indagine sismica ESAC

— Indagine sismica MASW

◯ Area di studio

UBICAZIONE DELLE INDAGINI 5

Scala 1:1000

Stralcio della CTR 10k 284060

Legenda

—— Indagine sismica ESAC
—— Indagine sismica MASW

⭕ Area di studio

UBICAZIONE DELLE INDAGINI 6

Scala 1:1000

Stralcio della CTR 10k 284060

Legenda

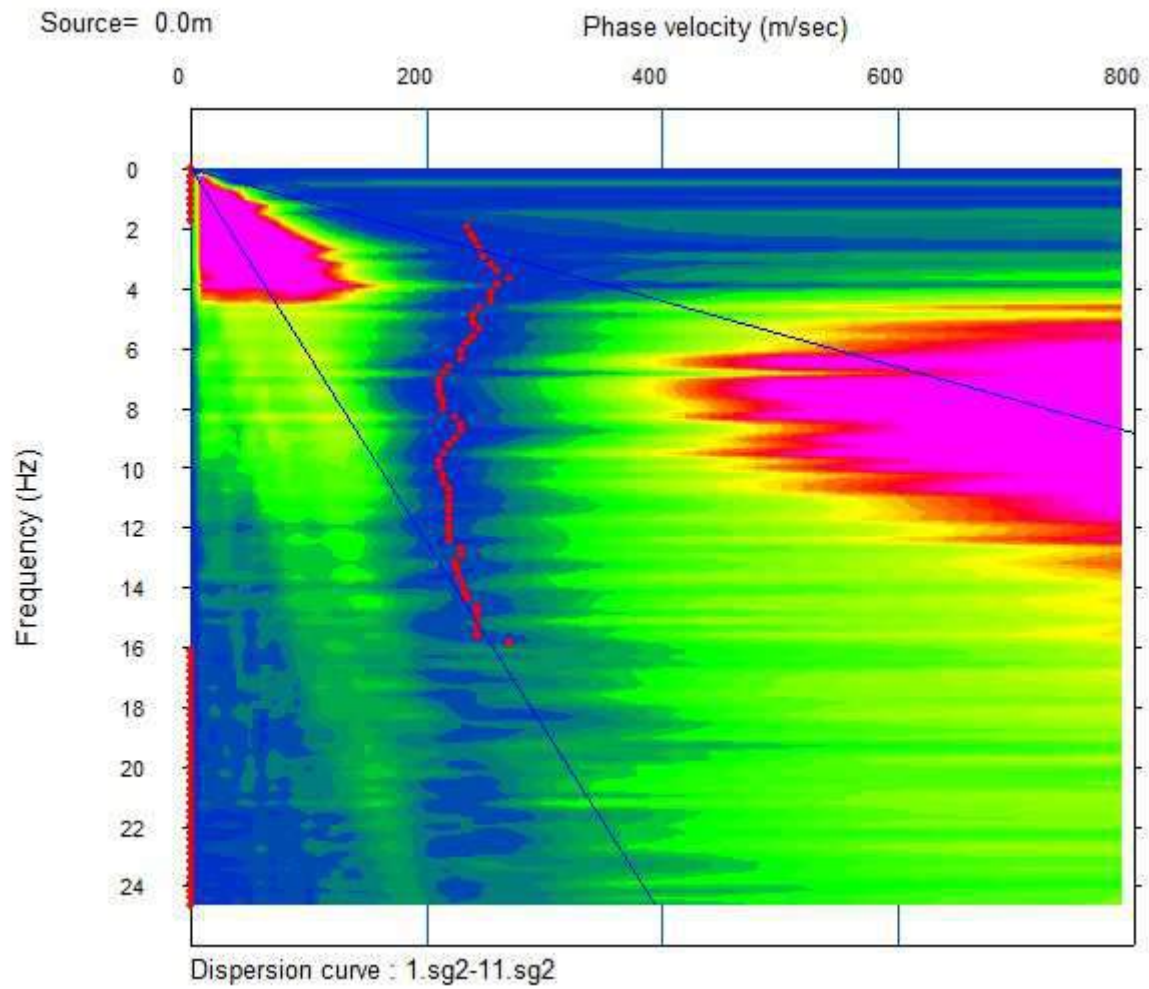— Indagine sismica ESAC

— Indagine sismica MASW

◯ Area di studio

UBICAZIONE DELLE INDAGINI 7

Scala 1:1000

Stralcio della CTR 10k 284020

MASW 7

ESAC 7

292.7

Legenda

— Indagine sismica ESAC

— Indagine sismica MASW

◯ Area di studio

MASW-ESAC 1

Source= 0.0m

Time (msec)

Sismogramma del segnale acquisito

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Curva di dispersione da MASW

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☎ 347-4013701 **e-mail**:r.maggiore@geo-omnia.it www.geo-omnia.it

Curva di dispersione da ESAC

Dispersion curve : masw 6.rst

Distribuzione dei punti del picking effettuato (congiunto).

S-wave velocity (m/s)

S-wave velocity model (inverted): masw 6.rst

Average Vs 30m = 271.4 m/sec

Modello di velocità N. 1

MASW-ESAC 2

Source= 75.0m

Time (msec)

2.sg2

Sismogramma del segnale acquisito

Curva di dispersione da MASW

Curva di dispersione da ESAC

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Distribuzione dei punti del picking effettuato

Modello di velocità N. 2

MASW-ESAC 3

Time (msec)

Distance (m)

3.sg2

Sismogramma del segnale acquisito
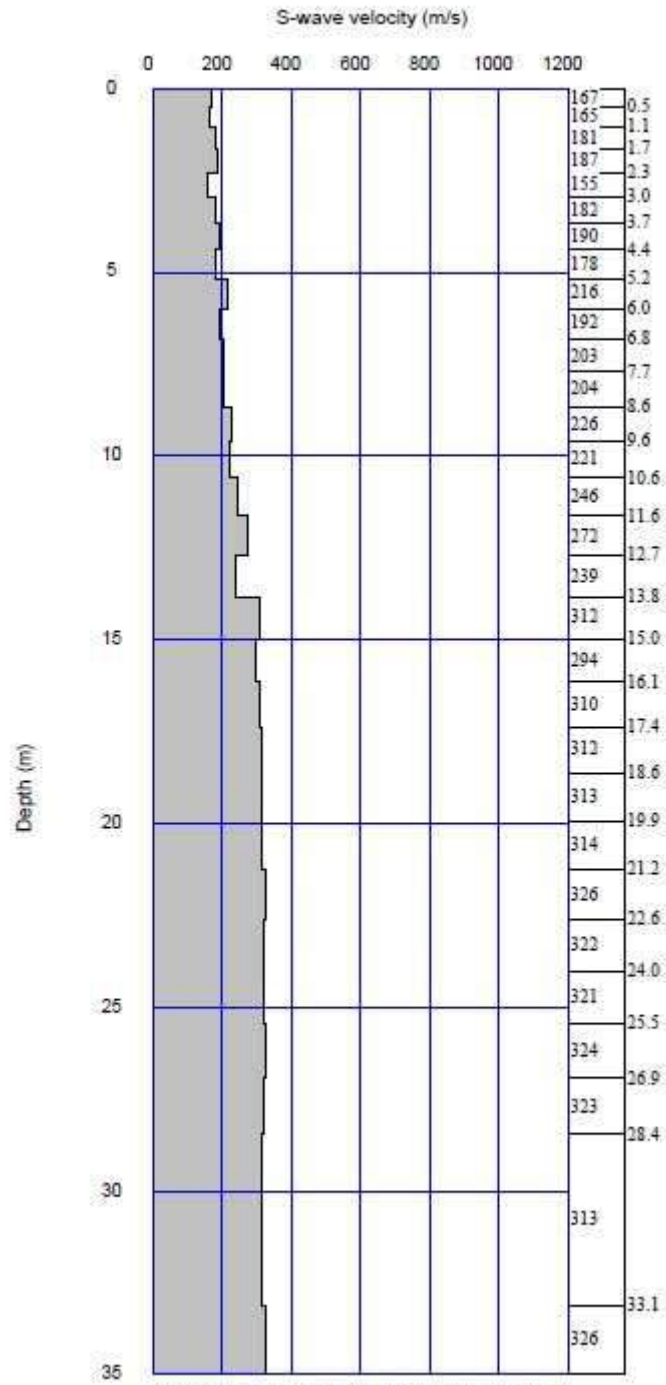
Curva di dispersione da MASW

Curva di dispersione da ESAC

Dispersion curve : masw 3.rst

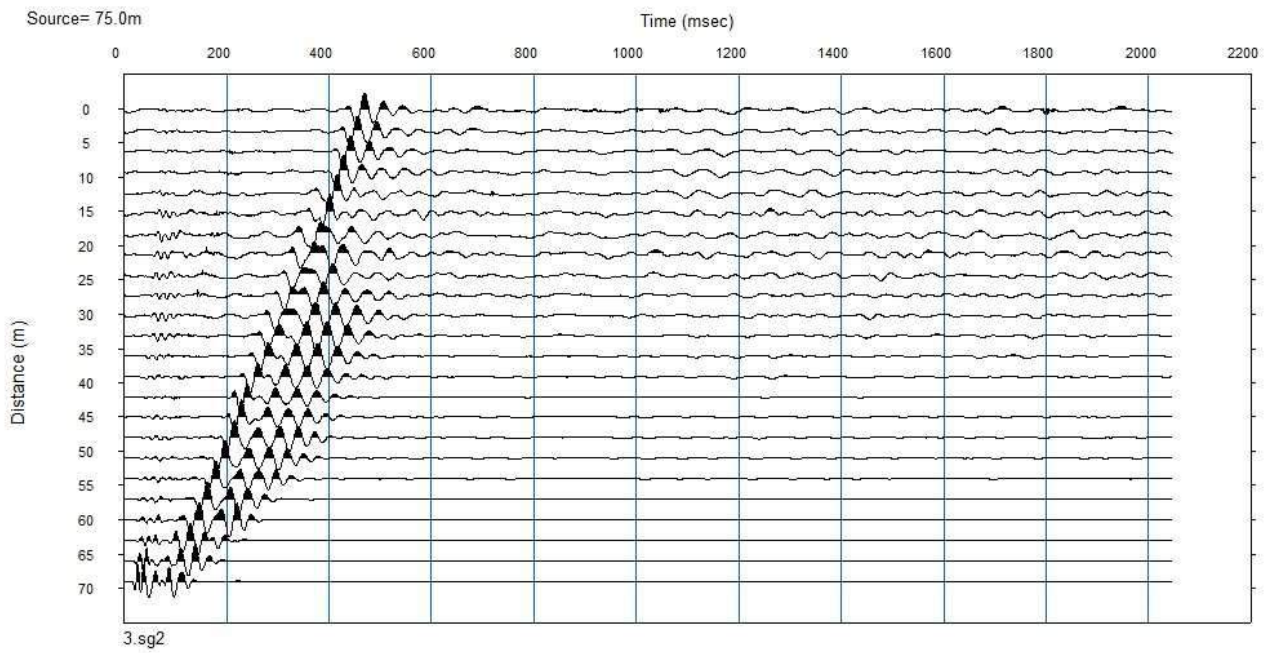*Distribuzione dei punti del picking effettuato*
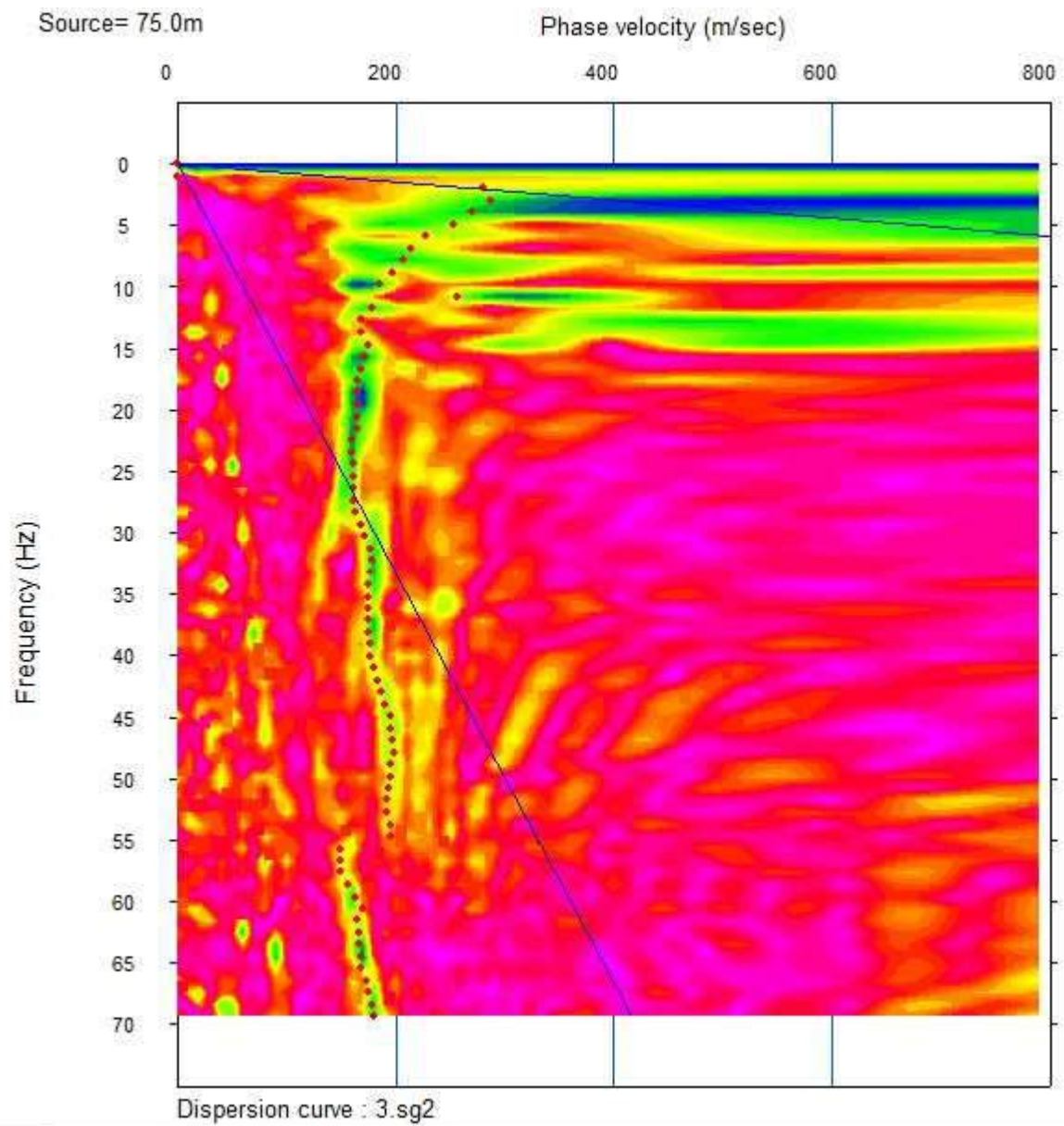
S-wave velocity model (inverted): CONGIUNTO.rst

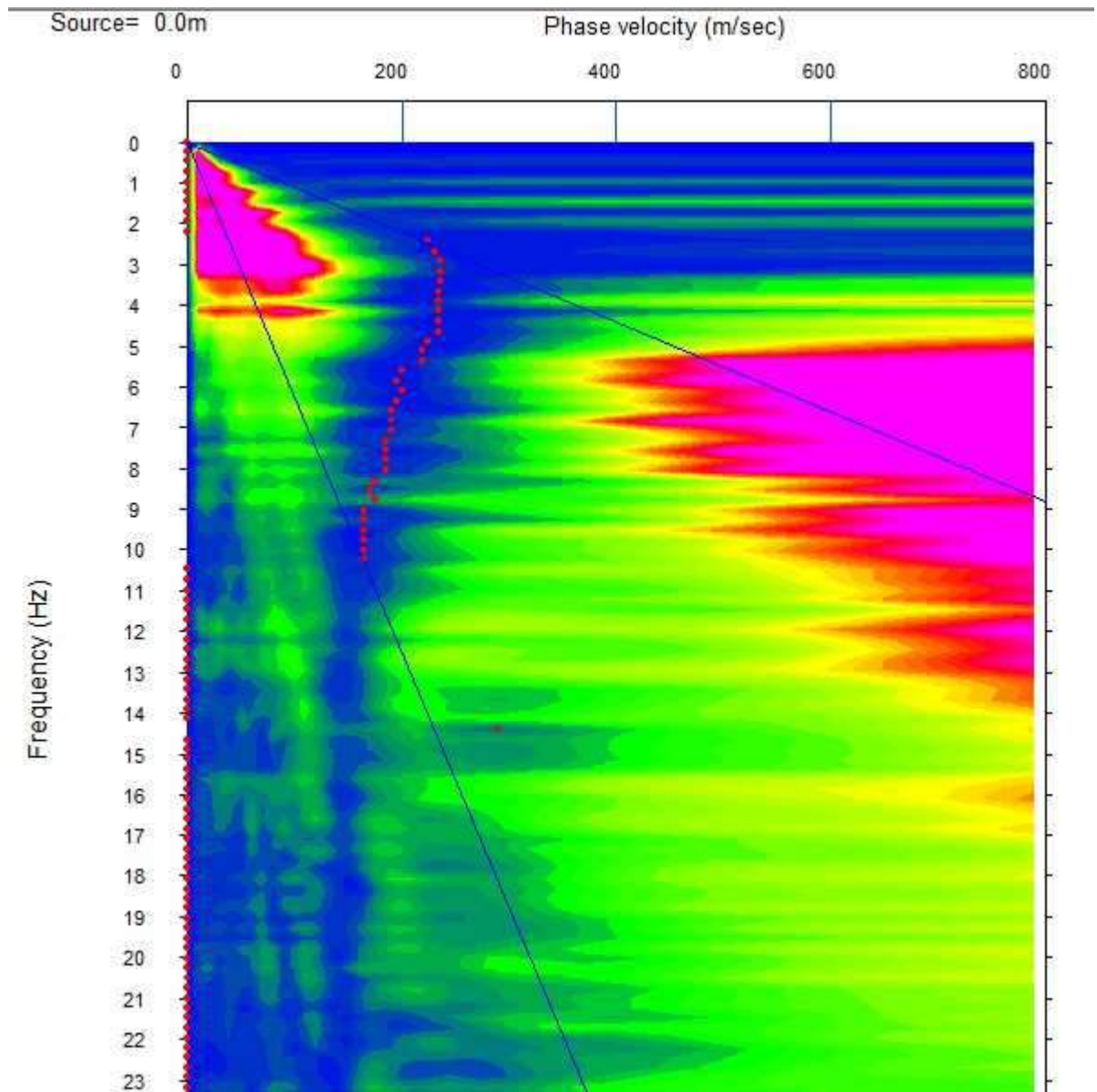Average Vs 30m = 223.9 m/sec

Modello di velocità N. 3

MASW-ESAC 4

Source= 72.0m

Time (msec)

Distance (m)

4.sq2

Sismogramma del segnale acquisito

Source= 72.0m

Phase velocity (m/sec)

Dispersion curve : 4.sq2

Curva di dispersione da MASW

Dott. Geol. Roberto Maggiore Via del Borghetto Trav. I, n. 50, 55100 Lucca
☎ 347-4013701 **e-mail**:r.maggiore@geo-omnia.it www.geo-omnia.it

Source= 0.0m   Phase velocity (m/sec)

Dispersion curve : 1.sg2-11.sg2

Curva di dispersione da ESAC

Dispersion curve : 4 masw.rst

Distribuzione dei punti del picking effettuato

Dott. Geol. Roberto Maggiore Via del Borghetto Trav. I, n. 50, 55100 Lucca
☎ 347-4013701 **e-mail**:r.maggiore@geo-omnia.it www.geo-omnia.it

S-wave velocity model (inverted): 4 masw.rst

Average Vs 30m = 148.8 m/sec

Modello di velocità N. 4

MASW-ESAC 5

Source= 48.0m

Time (msec)

Sismogramma del segnale acquisito

Dott. Geol. Roberto Maggiore Via del Borghetto Trav. I, n. 50, 55100 Lucca
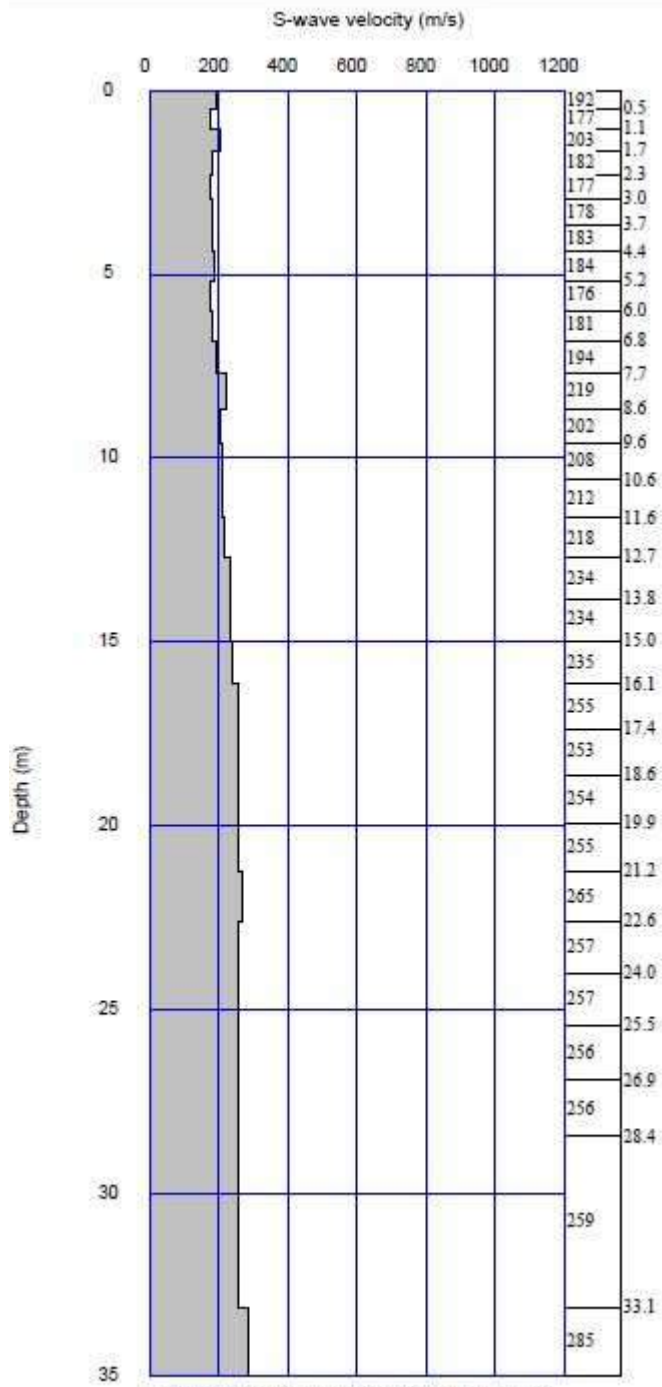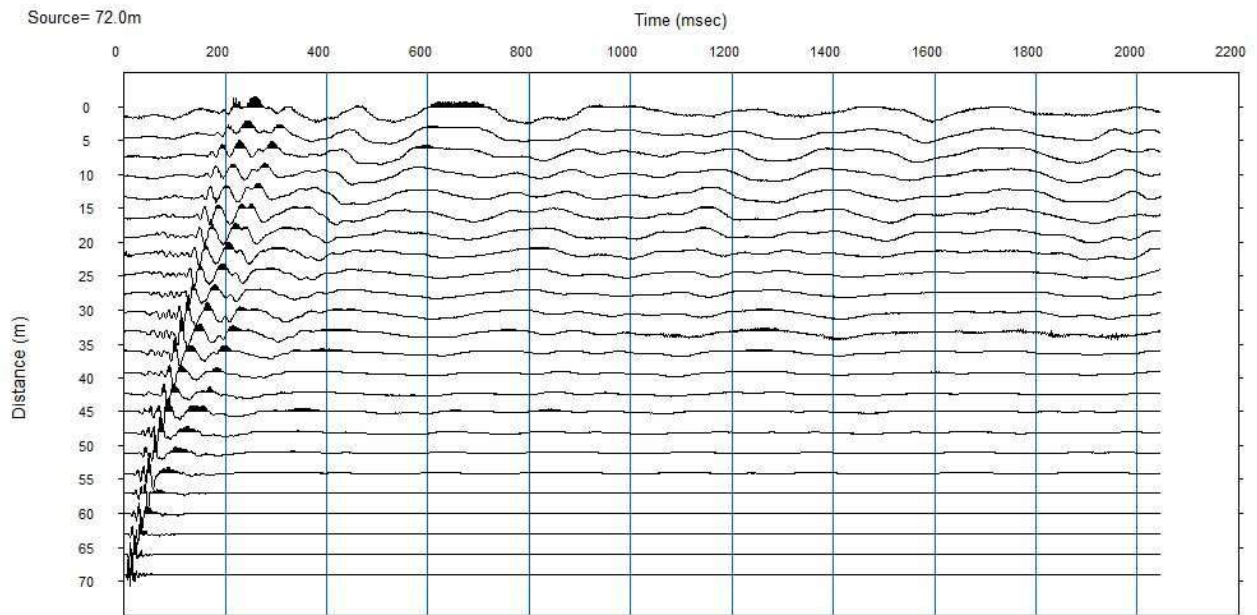☎ 347-4013701 **e-mail**:r.maggiore@geo-omnia.it www.geo-omnia.it

Curva di dispersione da MASW

Curva di dispersione da ESAC

Distribuzione dei punti del picking effettuato

S-wave velocity (m/s)

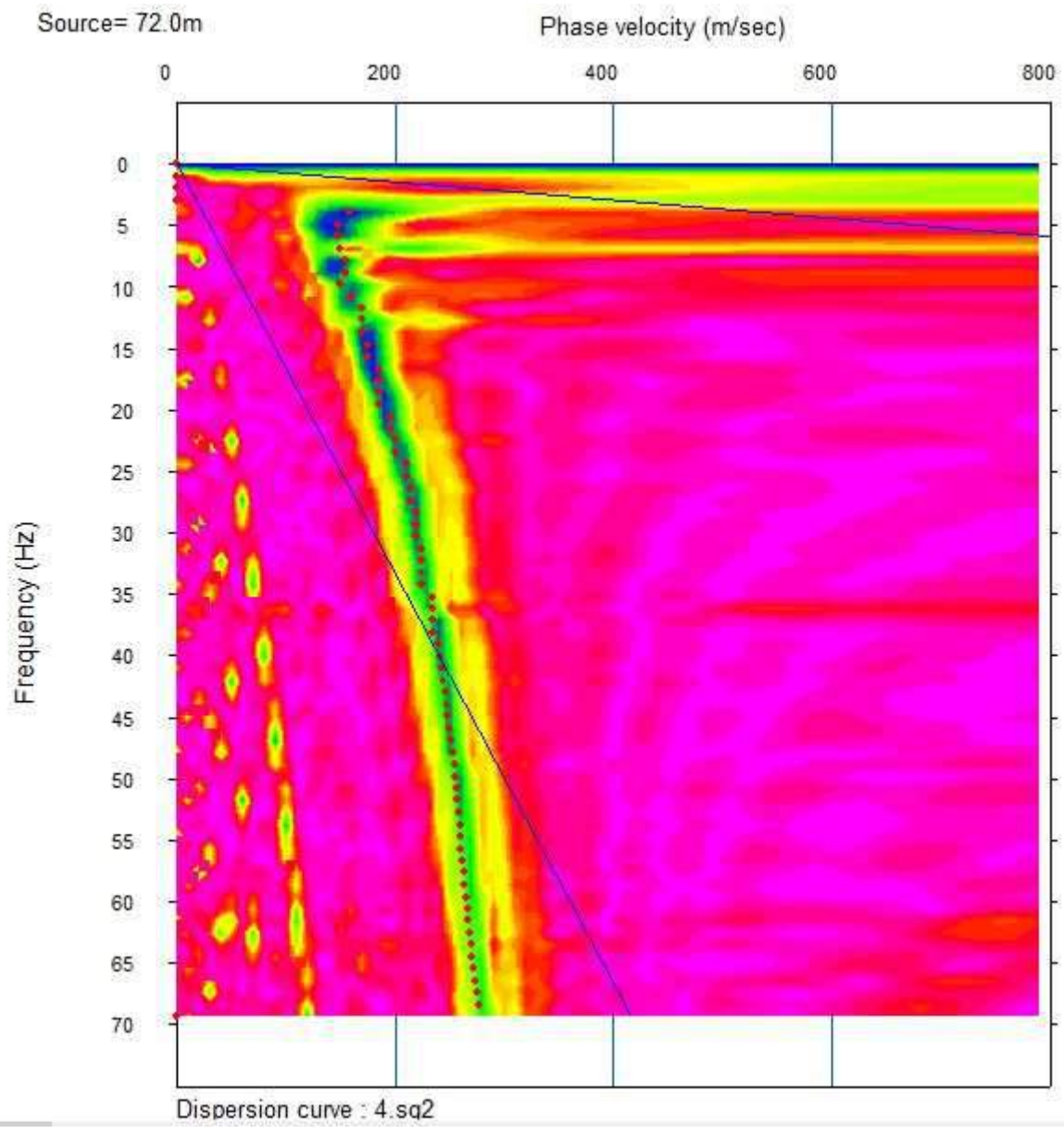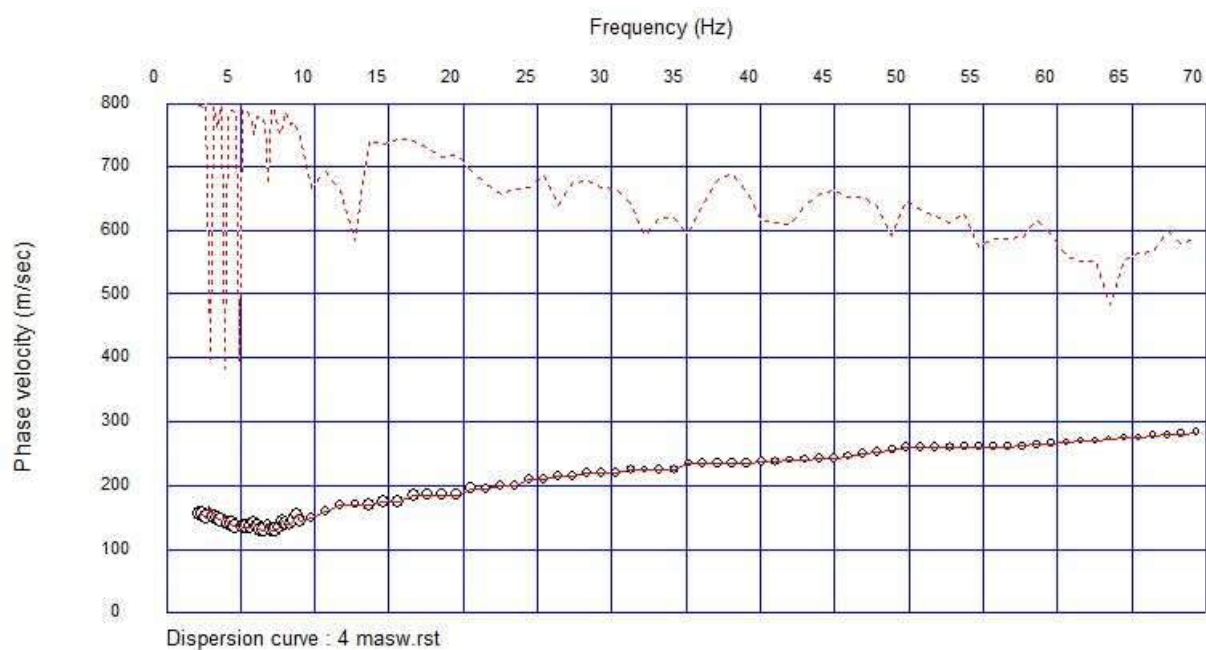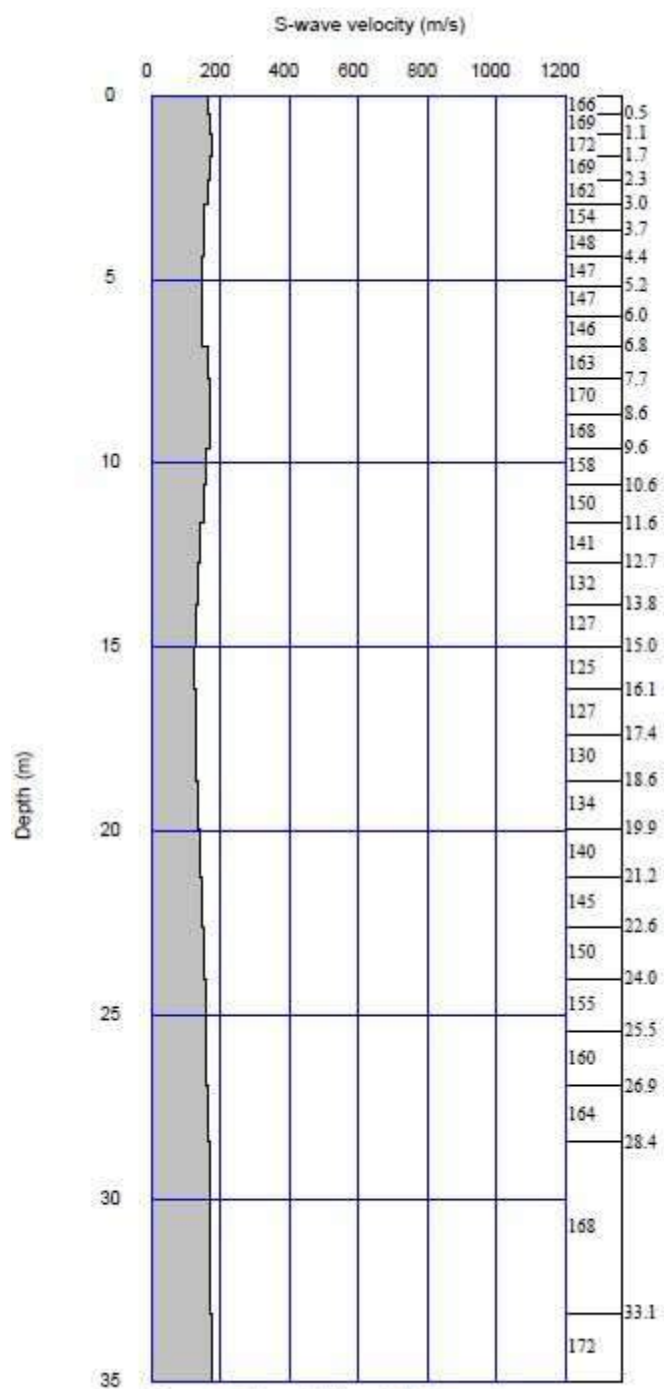| Depth (m)	Vs (m/s)	Depth interval
	324	0.5
	324	1.1
	316	1.7
	281	2.3
	258	3.0
	259	3.7
	281	4.4
	277	5.2
	269	6.0
	263	6.8
	300	7.7
	297	8.6
	335	9.6
	335	10.6
	337	11.6
	411	12.7
	423	13.8
	434	15.0
	443	16.1
	450	17.4
	457	18.6
	462	19.9
	464	21.2
	465	22.6
	458	24.0
	416	25.5
	404	26.9
	363	28.4
	311	
		33.1
	465	

S-wave velocity model (inverted): congiunto 5.rst

Average Vs 30m = 360.7 m/sec

Modello di velocità N. 5

MASW-ESAC 6

Time (msec)

Sismogramma del segnale acquisito

Curva di dispersione da MASW

Dott. Geol. Roberto Maggiore Via del Borghetto Trav. I, n. 50, 55100 Lucca
☎ 347-4013701 **e-mail**:r.maggiore@geo-omnia.it www.geo-omnia.it

Curva di dispersione da ESAC

Dispersion curve : Masw 4.rst

Distribuzione dei punti del picking effettuato

Modello di velocità N. 6

Dott. Geol. Roberto Maggiore Via del Borghetto Trav. I, n. 50, 55100 Lucca
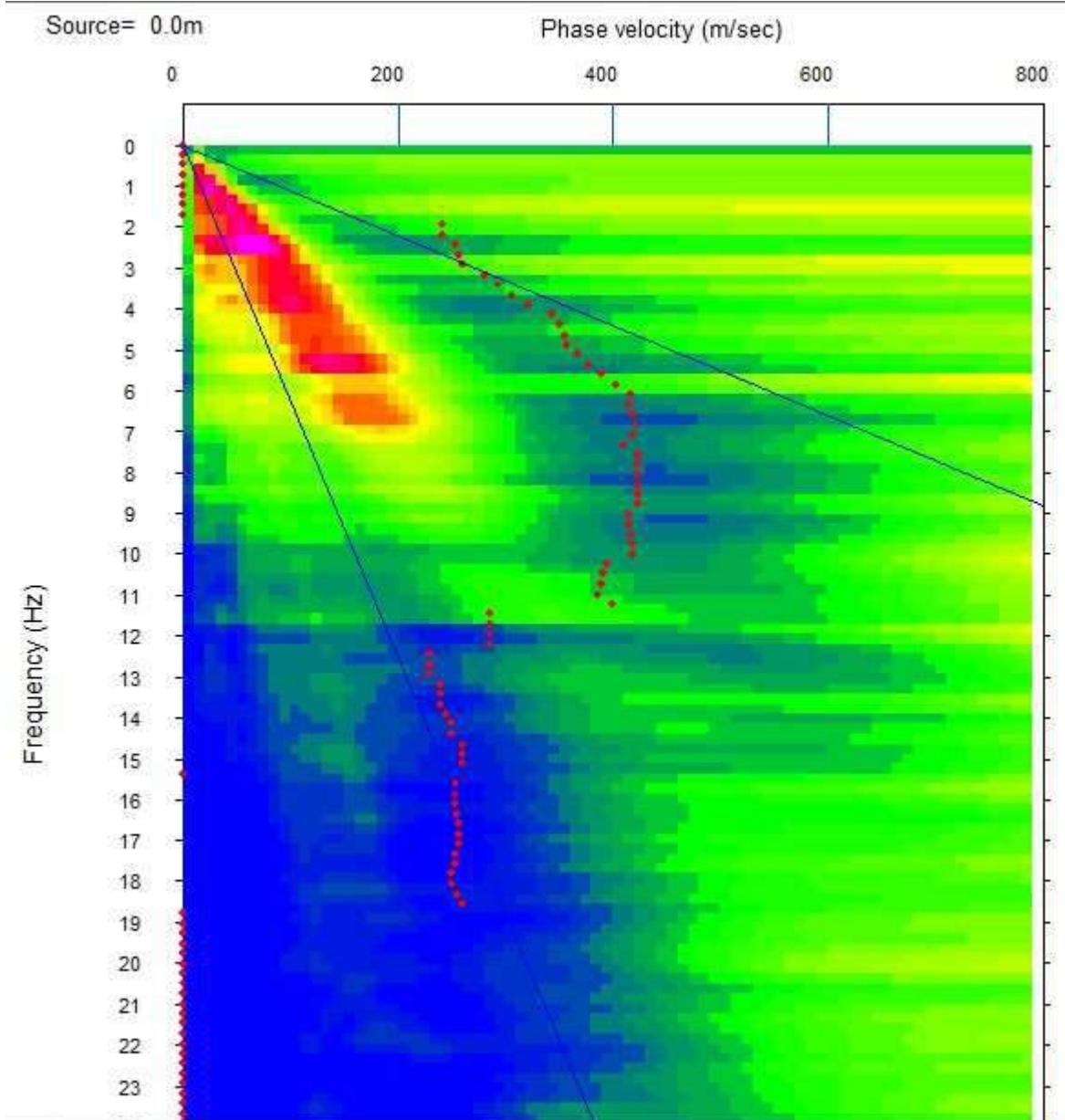☎ 347-4013701 **e-mail**:r.maggiore@geo-omnia.it www.geo-omnia.it

MASW-ESAC 7

Time (msec)

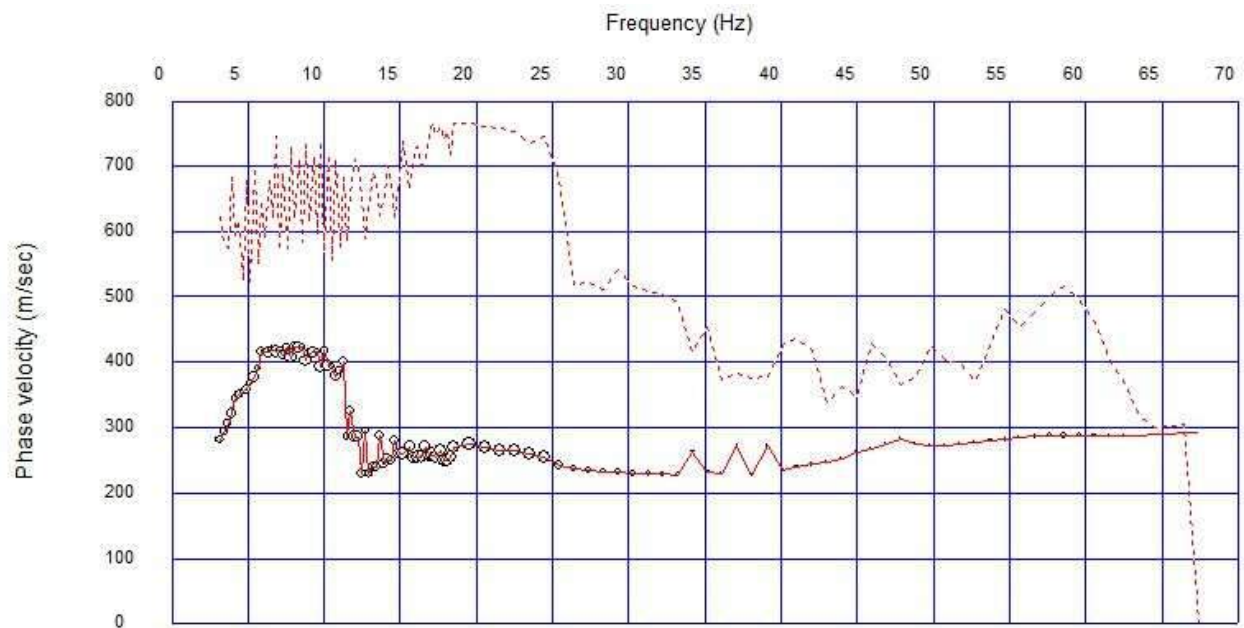*Sismogramma del segnale acquisito*

Curva di dispersione da MASW

Curva di dispersione da ESAC

Distribuzione dei punti del picking effettuato

S-wave velocity model (inverted): CONGIUNTO 7.rst

Average Vs 30m = 349.6 m/sec

Modello di velocità N. 7

All. 3 DOCUMENTAZIONE FOTOGRAFICA INDAGINI LINEARI

Foto 1 - indagine sismica MASW 1.

Foto 2 - indagine sismica ESAC 1

Dott. Geol. Roberto Maggiore Via del Borghetto Trav. I, n. 50, 55100 Lucca
☎ 347-4013701 **e-mail**:r.maggiore@geo-omnia.it www.geo-omnia.it

Foto 3 - indagine sismica MASW 2

Foto 4 - indagine sismica ESAC 2

Foto 5 - indagine sismica MASW 3

Foto 6 - indagine sismica ESAC 3

Foto 7 - indagine sismica MASW 4

Foto 8 - indagine sismica ESAC 4

Foto 9 - indagine sismica MASW 5

Foto 10 - indagine sismica ESAC 5

Foto 11 - indagine sismica MASW 6

Foto 12 - indagine sismica ESAC 6

Foto 13 - indagine sismica MASW 7

Foto 14 - indagine sismica ESAC 7

All. 4 Report indagini HVSR

STATION INFORMATION

Station code: HVSR1

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Comune di Collesalvetti

Address: Stagno - Scuole Elementari/Piazza

Latitude: 4827422,8

Longitude: 1609405,3

Coordinate system: GB

Elevation: 10 m s.l.m.

Weather: Nuvoloso. vento moderato

Notes: -

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/03/24 14:38:54

Recording length: 40 min

Windows count: 47

Average windows length: 38.59

Signal coverage: 75.57%

58412 Counts

CHANNEL #1 [V]

-53101 Counts

19031 Counts

CHANNEL #2 [N]

-17119 Counts

27225 Counts

CHANNEL #3 [E]

-35871 Counts

HVSR ANALYSIS

Tapering: Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

Instrumental correction: Disabled

HVSR average

Signal spectra average

HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

1.587 Hz

A_0 amplitude = *1.362*

Average f_0 = *1.662 ± 0.291*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	47 valid windows (length > 6.3 s) out of 47	**OK**
$n_c(f_0) > 200$	2878.48 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	**OK**
HVSR peak clarity criteria		
$\exists\ f^-$ in $[f_0/4, f_0]\ \|\ A_{H/V}(f^-) < A_0/2$	0 Hz	**NO**
$\exists\ f^+$ in $[f_0, 4f_0]\ \|\ A_{H/V}(f^+) < A_0/2$	4.18185 Hz	**OK**
$A_0 > 2$	1.36 <= 2	**NO**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	7.74% > 5%	**NO**
$\sigma_f < \varepsilon(f_0)$	0.2906 >= 0.15872	**NO**
$\sigma_A(f_0) < \theta(f_0)$	1.27012 < 1.78	**OK**
Overall criteria fulfillment		**NO**

STATION INFORMATION

Station code: HVSR2

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Collesalvetti

Address: Via Modigliani - Stagno

Latitude: 4827190,5

Longitude: 1609561,0

Coordinate system: GB

Elevation: 14 m s.l.m.

Weather: Sereno. Vento assente.

Notes: -

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2017/11/15 12:54:50

Recording length: 23.35 min

Windows count: 22

Average windows length: 32.37

Signal coverage: 50.83%

17068 Counts

CHANNEL #1 [V]

-13928 Counts

21844 Counts

CHANNEL #2 [N]

-23269 Counts

41273 Counts

CHANNEL #3 [E]

-50972 Counts

HVSR ANALYSIS

Tapering: Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

Instrumental correction: Disabled

HVSR average

Signal spectra average

HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

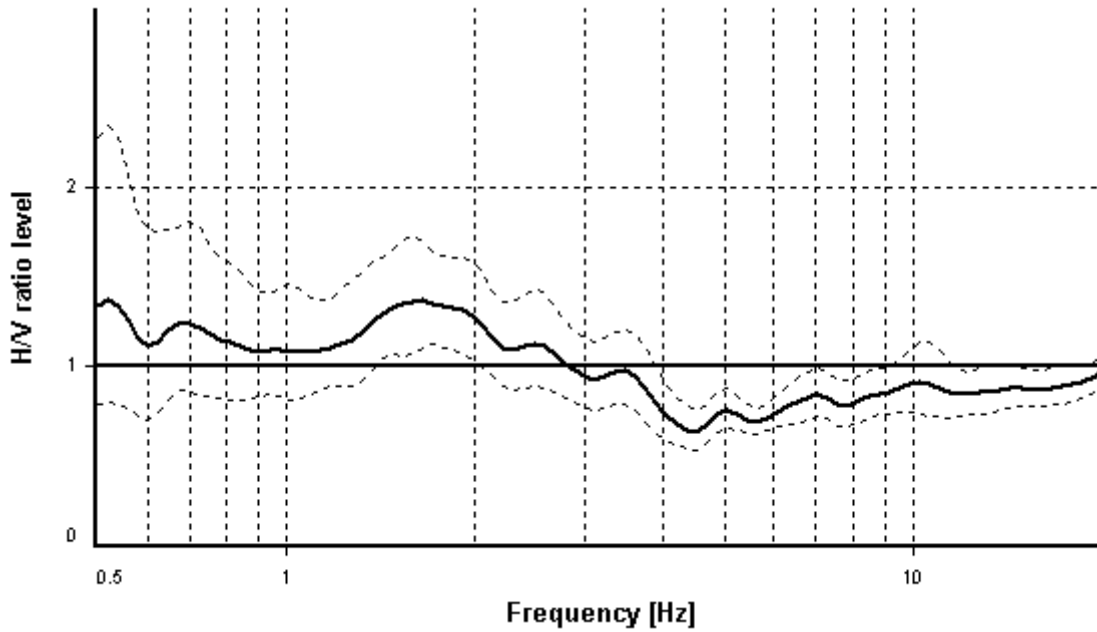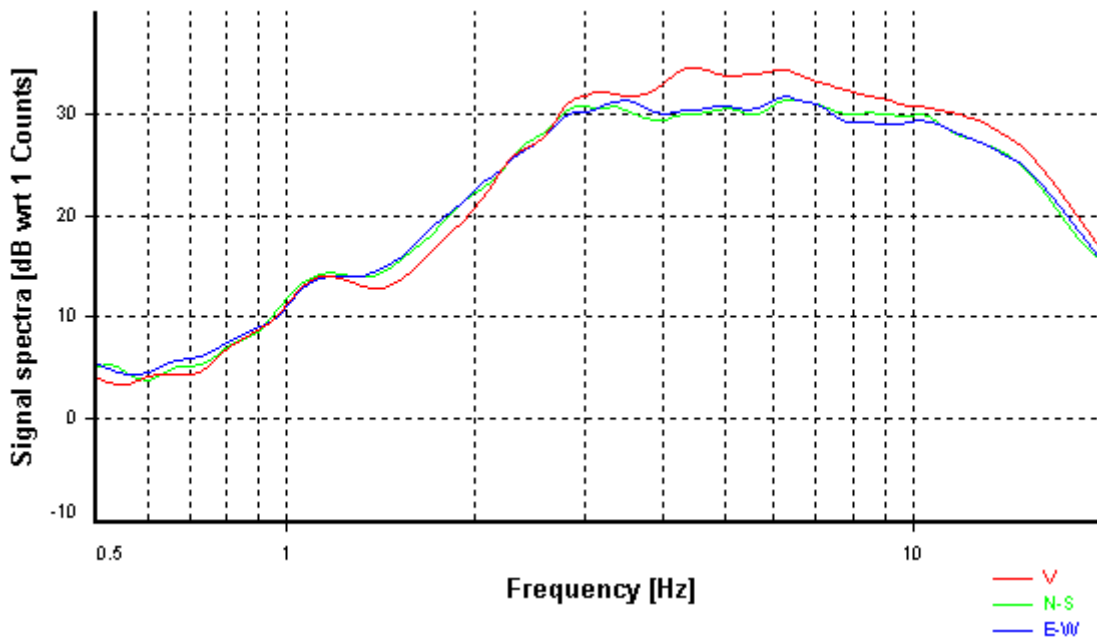# SESAME CRITERIA

Selected f_0 frequency

1.135 Hz

A_0 amplitude = *1.165*

Average f_0 = *1.223 ± 0.276*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	22 valid windows (length > 8.81 s) out of 22	**OK**
$n_c(f_0) > 200$	808.17 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	**OK**
HVSR peak clarity criteria		
$\exists\ f^-$ in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0/2$	0 Hz	**NO**
$\exists\ f^+$ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0/2$	0 Hz	**NO**
$A_0 > 2$	1.16 <= 2	**NO**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	45.15% > 5%	**NO**
$\sigma_f < \varepsilon(f_0)$	0.27579 >= 0.1135	**NO**
$\sigma_A(f_0) < \theta(f_0)$	1.55238 < 1.78	**OK**
Overall criteria fulfillment		**NO**

STATION INFORMATION

Station code: HVSR3

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Comune di Collesalvetti

Address: Stagno Vecchio - Campo di Calcetto - Chiesa

Latitude: 4828168,9

Longitude: 1609147,0

Coordinate system: GB

Elevation: 10 m s.l.m.

Weather: Nuvoloso. vento moderato

Notes: Vicino a chiesa. Prossimo a SS1.

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/03/24 15:41:40

Recording length: 40 min

Windows count: 45

Average windows length: 38.35

Signal coverage: 71.9%

98593 Counts   **CHANNEL #1 [V]**

-89950 Counts

71953 Counts   **CHANNEL #2 [N]**

-70583 Counts

68077 Counts   **CHANNEL #3 [E]**

-70975 Counts

HVSR ANALYSIS

Tapering: Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

Instrumental correction: Disabled

HVSR average

Signal spectra average

HVSR time-frequency analysis (30 seconds windows)
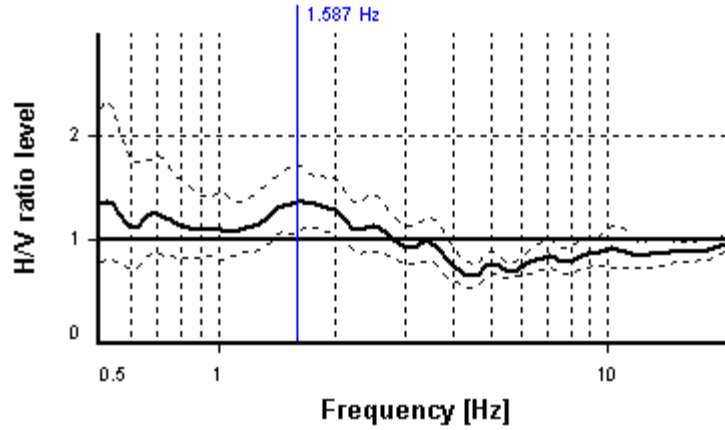

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

1.223 Hz

A_0 amplitude = *1.737*

Average f_0 = *1.104 ± 0.185*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	45 valid windows (length > 8.18 s) out of 45	**OK**
$n_c(f_0) > 200$	2110.17 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	**OK**
HVSR peak clarity criteria		
$\exists \, f^- $ in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0/2$	0 Hz	**NO**
$\exists \, f^+ $ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0/2$	1.84228 Hz	**OK**
$A_0 > 2$	1.74 <= 2	**NO**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	31.11% > 5%	**NO**
$\sigma_f < \varepsilon(f_0)$	0.18494 >= 0.12228	**NO**
$\sigma_A(f_0) < \theta(f_0)$	1.21939 < 1.78	**OK**
Overall criteria fulfillment		**NO**

STATION INFORMATION

Station code: HVSR4

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Comune di Collesalvetti

Address: Stagno

Latitude: 4827925,7

Longitude: 1609208,5

Coordinate system: GB

Elevation: 12 m s.l.m.

Weather: Nuvoloso. vento moderato

Notes: Vicino a chiesa. Prossimo a A12 e FIPILI.

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency:	200 Hz
Recording start time:	2018/03/24 16:36:26
Recording length:	40 min
Windows count:	42
Average windows length:	37.21
Signal coverage:	65.12%

75407 Counts   **CHANNEL #1 [V]**

-105384 Counts

37562 Counts   **CHANNEL #2 [N]**

-49989 Counts

52238 Counts   **CHANNEL #3 [E]**

-69685 Counts

HVSR ANALYSIS

Tapering: Disabled
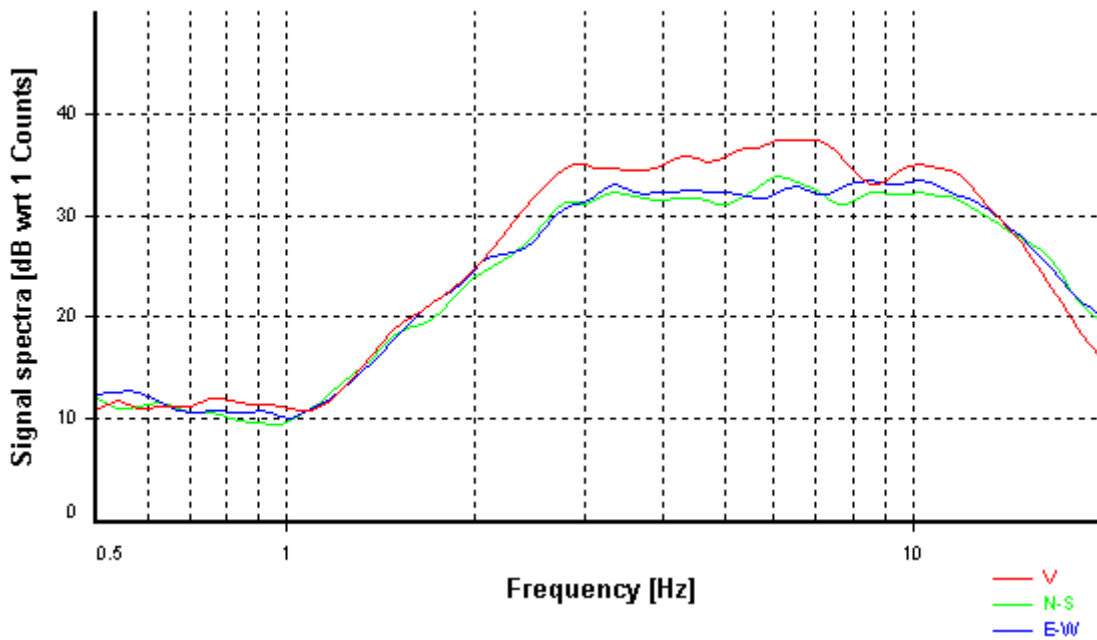
Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

Instrumental correction: Disabled
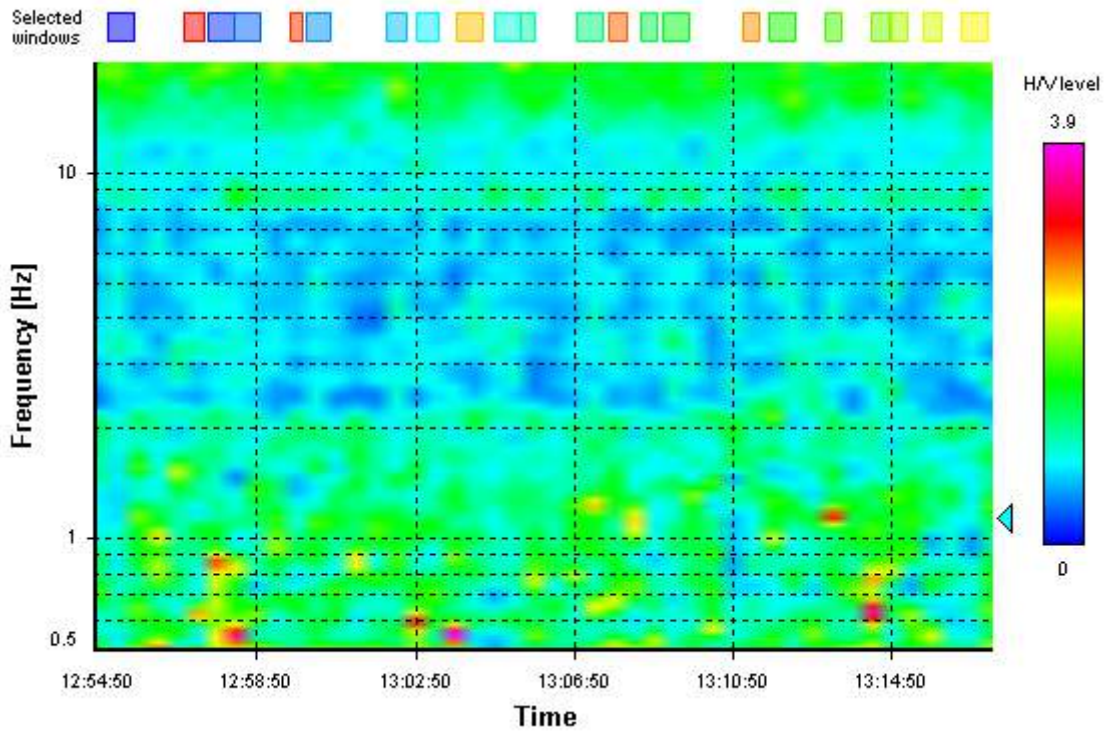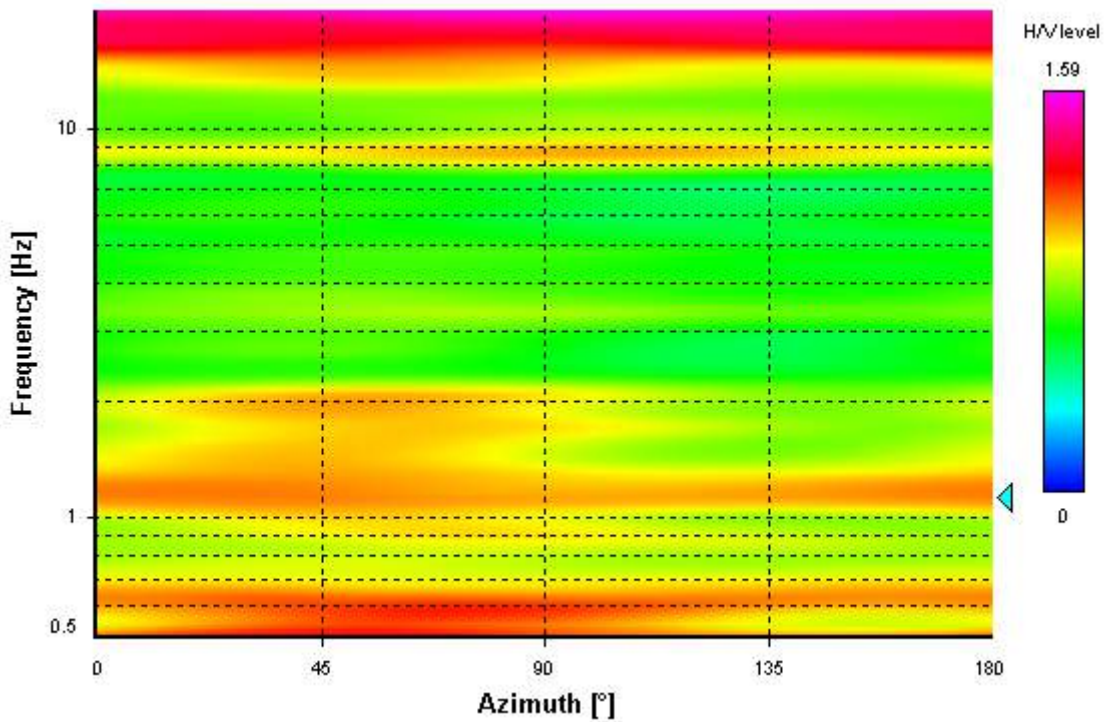
HVSR average

Signal spectra average

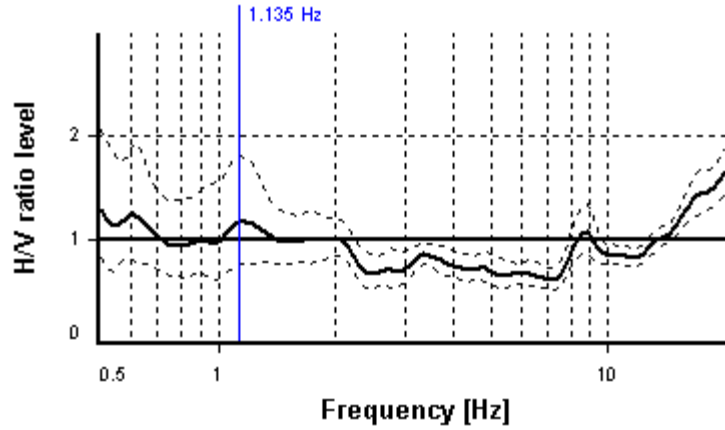## HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

2.776 Hz

A_0 amplitude = *1.645*

Average f_0 = *2.737 ± 0.293*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	42 valid windows (length > 3.6 s) out of 42	**OK**
$n_c(f_0) > 200$	4338.1 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	**OK**
HVSR peak clarity criteria		
$\exists\ f^-$ in $[f_0/4,\ f_0]\ \|\ A_{H/V}(f^-) < A_0/2$	0 Hz	**NO**
$\exists\ f^+$ in $[f_0,\ 4f_0]\ \|\ A_{H/V}(f^+) < A_0/2$	4.02889 Hz	**OK**
$A_0 > 2$	1.65 <= 2	**NO**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	3.8% <= 5%	**OK**
$\sigma_f < \varepsilon(f_0)$	0.29289 >= 0.13878	**NO**
$\sigma_A(f_0) < \theta(f_0)$	1.20511 < 1.58	**OK**
Overall criteria fulfillment		**NO**

STATION INFORMATION

Station code: HVSR5

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Comune di Collesalvetti

Address: Stagno - Mc Donald

Latitude: 4827116,1

Longitude: 1608737,2

Coordinate system: GB

Elevation: 2 m s.l.m.

Weather: Sereno

Notes: Traffico della SS1

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

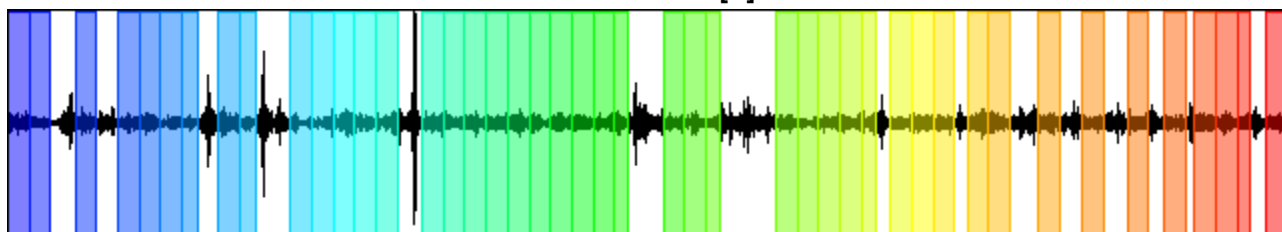*Recording start time:* 2018/04/15 10:01:59

Recording length: 33.33 min

Windows count: 37

Average windows length: 38.26

Signal coverage: 70.78%

123562 Counts **CHANNEL #1 [V]**

-102077 Counts

64722 Counts **CHANNEL #2 [N]**

-65064 Counts

141886 Counts **CHANNEL #3 [E]**
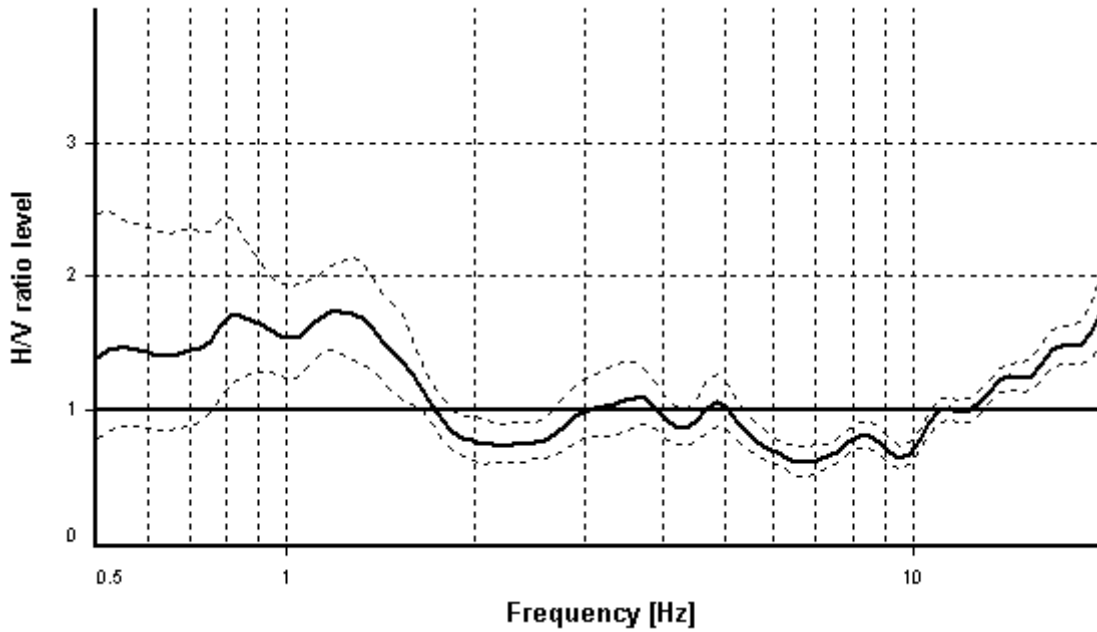

-197163 Counts

HVSR ANALYSIS

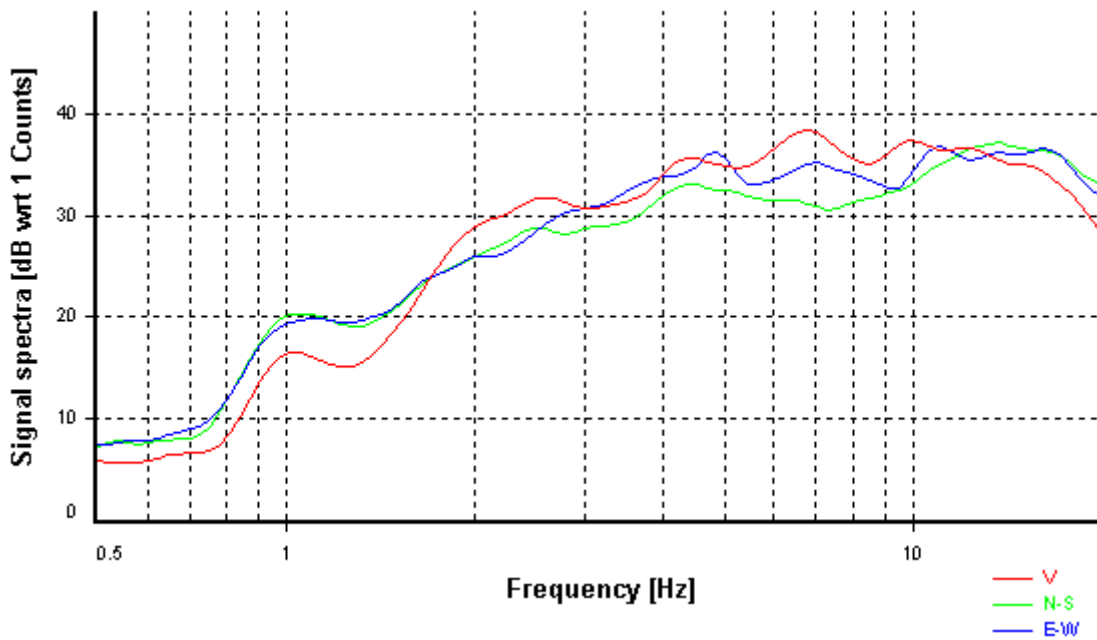*Tapering:*   Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

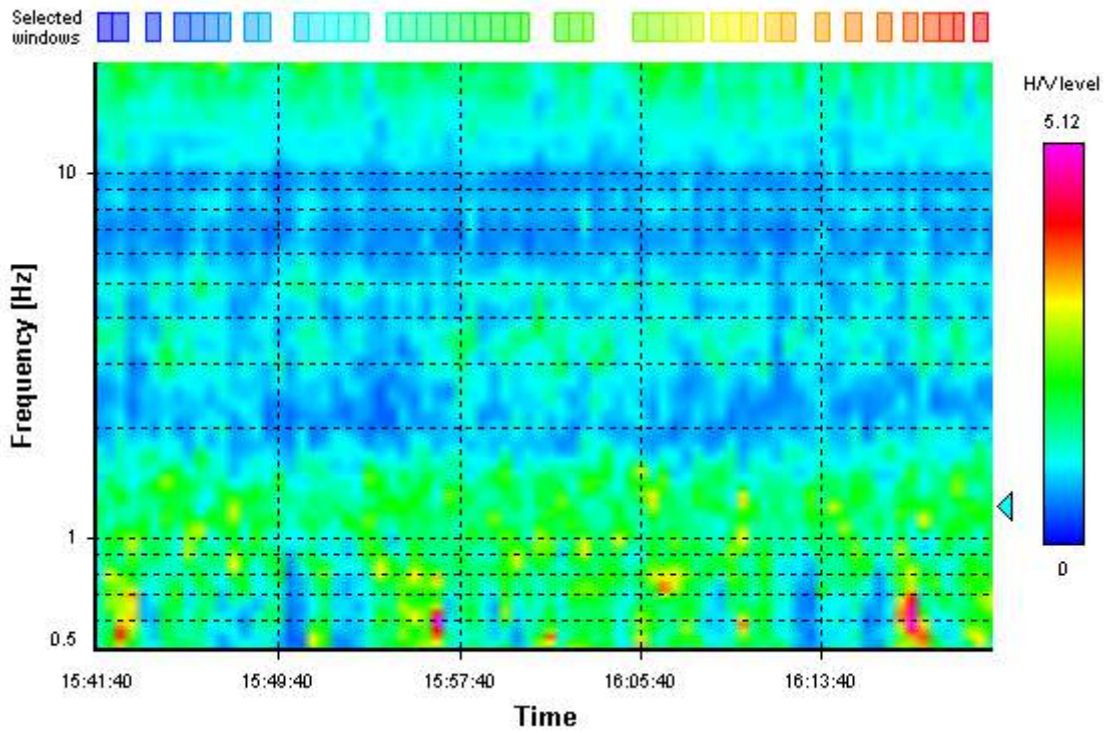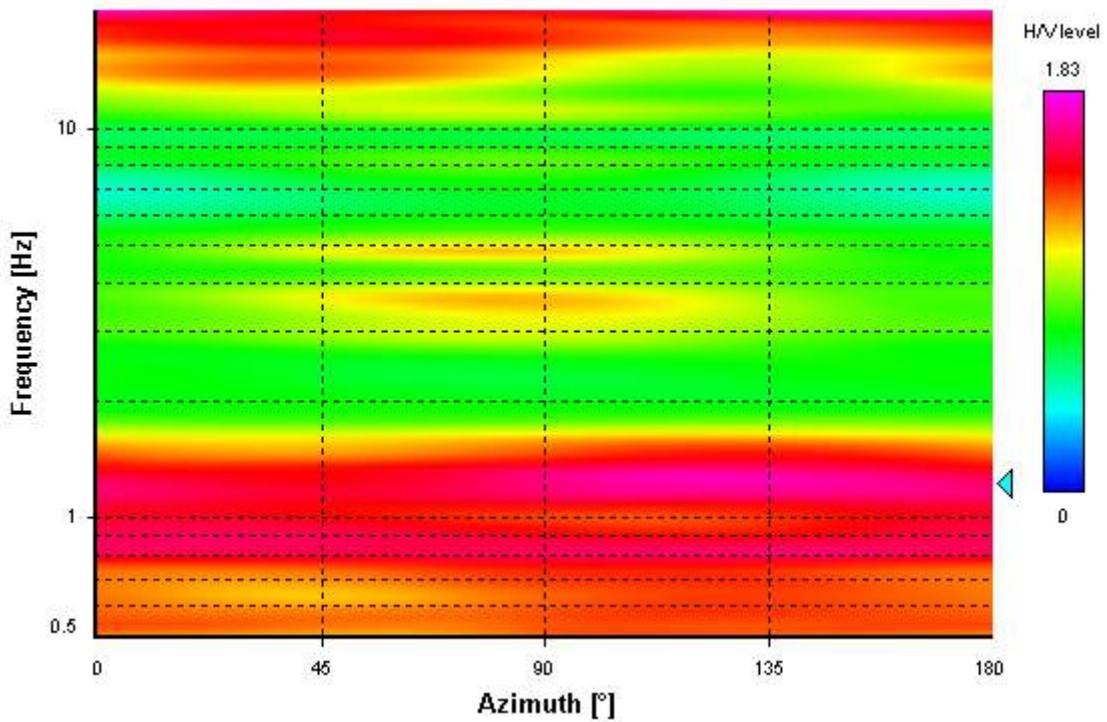*Instrumental correction:*   Disabled

HVSR average

Signal spectra average

HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

1.912 Hz

A_0 amplitude = *1.720*

Average f_0 = *1.672 ± 0.289*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	37 valid windows (length > 5.23 s) out of 37	**OK**
$n_c(f_0) > 200$	2707.06 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	**OK**
HVSR peak clarity criteria		
$\exists\ f^- $ in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0/2$	0 Hz	**NO**
$\exists\ f^+ $ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0/2$	2.881 Hz	**OK**
$A_0 > 2$	1.72 <= 2	**NO**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	22.96% > 5%	**NO**
$\sigma_f < \varepsilon(f_0)$	0.28892 >= 0.19122	**NO**
$\sigma_A(f_0) < \theta(f_0)$	1.19278 < 1.78	**OK**
Overall criteria fulfillment		**NO**

STATION INFORMATION

Station code: HVSR6

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Comune di Collesalvetti

Address: Colognole - SP della Valle

Latitude: 4818552,9

Longitude: 1617510,6

Coordinate system: GB

Elevation: 170 m s.l.m.

Weather: -

Notes: -

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/03/25 15:25:49

Recording length: 40 min

Windows count: 39

Average windows length: 31.7

Signal coverage: 51.52%

5823 Counts   **CHANNEL #1 [V]**

-7716 Counts

3543 Counts   **CHANNEL #2 [N]**

-3475 Counts

4320 Counts   **CHANNEL #3 [E]**

-5622 Counts

HVSR ANALYSIS

Tapering:	Disabled
Smoothing:	Konno-Ohmachi (Bandwidth coefficient = 40)
Instrumental correction:	Disabled

HVSR average

Signal spectra average

HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

2.576 Hz

A_0 amplitude = *3.061*

Average f_0 = *2.533 ± 0.427*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	39 valid windows (length > 3.88 s) out of 39	**OK**
$n_c(f_0) > 200$	3185.38 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	**OK**
HVSR peak clarity criteria		
$\exists\ f^-$ in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0/2$	0 Hz	**NO**
$\exists\ f^+$ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0/2$	10.22696 Hz	**OK**
$A_0 > 2$	3.06 > 2	**OK**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	3.8% <= 5%	**OK**
$\sigma_f < \varepsilon(f_0)$	0.42657 >= 0.12882	**NO**
$\sigma_A(f_0) < \theta(f_0)$	1.30428 < 1.58	**OK**
Overall criteria fulfillment		**NO**

STATION INFORMATION

Station code: HVSR7

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Comune di Collesalvetti

Address: Colognole - zona feste/parcheggio

Latitude: 4818546,4

Longitude: 1617213,9

Coordinate system: GB

Elevation: 170 m s.l.m.

Weather: -

Notes: -

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/03/25 14:26:50

Recording length: 40 min

Windows count: 41

Average windows length: 36.87

Signal coverage: 62.98%

990 Counts   **CHANNEL #1 [V]**

-1465 Counts

1144 Counts   **CHANNEL #2 [N]**

-2629 Counts

4154 Counts   **CHANNEL #3 [E]**

-1760 Counts

HVSR ANALYSIS

Tapering: Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

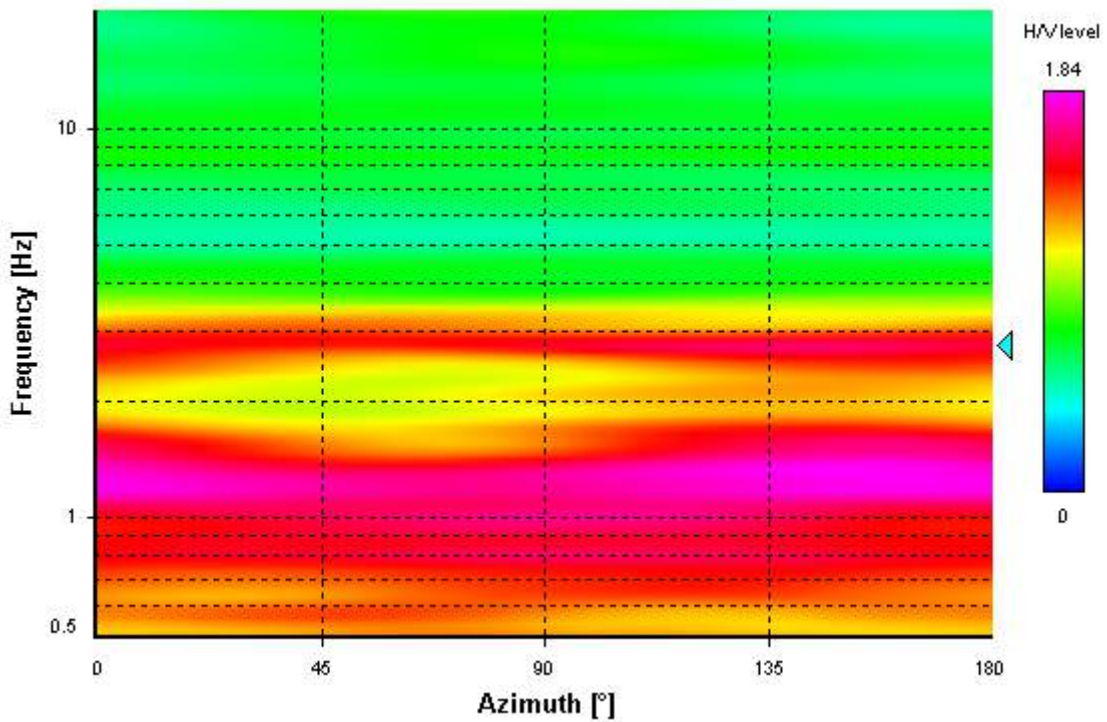*Instrumental correction:*   Disabled

HVSR average

Signal spectra average

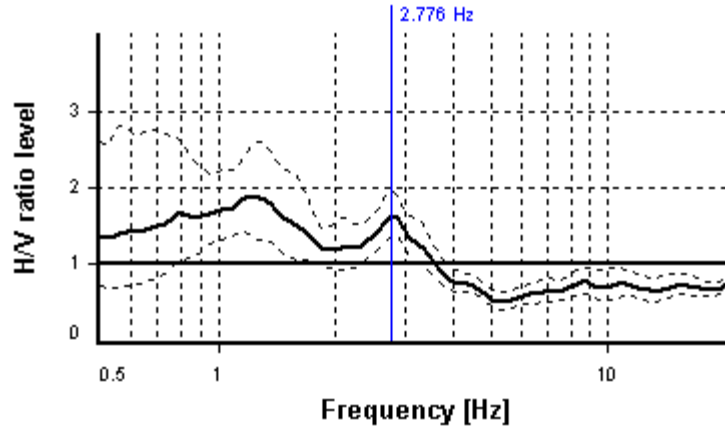## HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

8.811 Hz

A_0 **amplitude =** *2.459*

Average f_0 = *8.761 ± 0.720*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	41 valid windows (length > 1.13 s) out of 41	OK
$n_c(f_0) > 200$	13317.34 > 200	OK
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	OK
HVSR peak clarity criteria		
$\exists\, f^- $ in $[f_0/4, f_0]\mid A_{H/V}(f^-) < A_0/2$	5.03826 Hz	OK
$\exists\, f^+ $ in $[f_0, 4f_0]\mid A_{H/V}(f^+) < A_0/2$	0 Hz	NO
$A_0 > 2$	2.46 > 2	OK
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	0% <= 5%	OK
$\sigma_f < \varepsilon(f_0)$	0.72048 >= 0.44054	NO
$\sigma_A(f_0) < \theta(f_0)$	1.21678 < 1.58	OK
Overall criteria fulfillment		NO

STATION INFORMATION

Station code: HVSR8

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Comune di Collesalvetti

Address: Pandoiano - Piazzetta parcheggio

Latitude: 4819314,2

Longitude: 1616909,3

Coordinate system: GB

Elevation: 230 m s.l.m.

Weather: ventoso

Notes: -

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

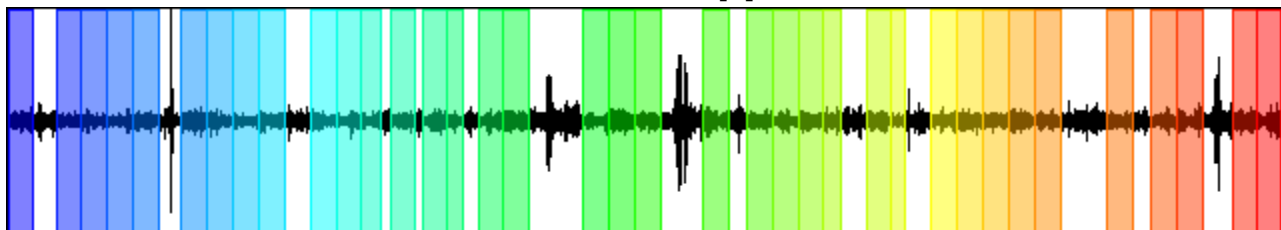*Recording start time:* 2018/03/25 17:22:33

Recording length: 40 min

Windows count: 46

Average windows length: 37.57

Signal coverage: 72.01%

158582 Counts   **CHANNEL #1 [V]**

-116930 Counts

171381 Counts   **CHANNEL #2 [N]**

-231962 Counts

66656 Counts   **CHANNEL #3 [E]**

-46524 Counts

HVSR ANALYSIS

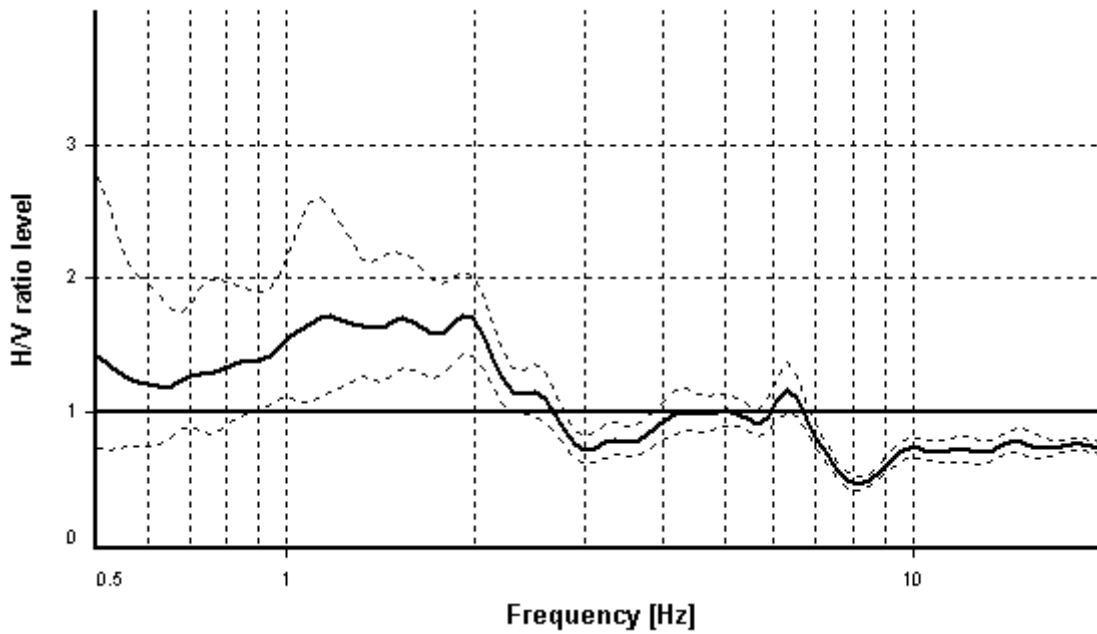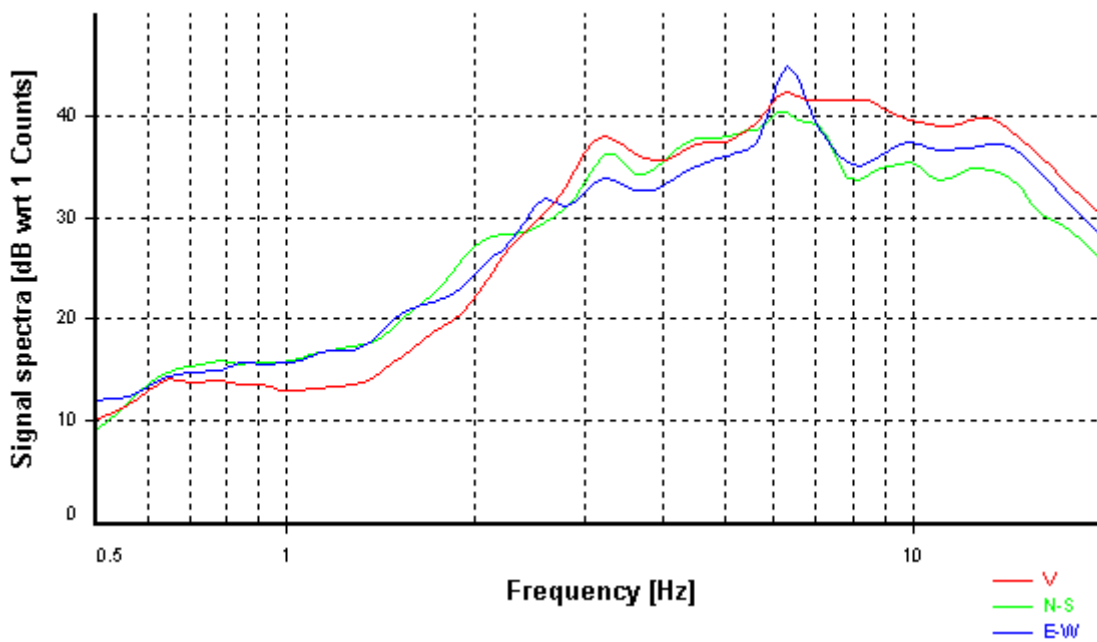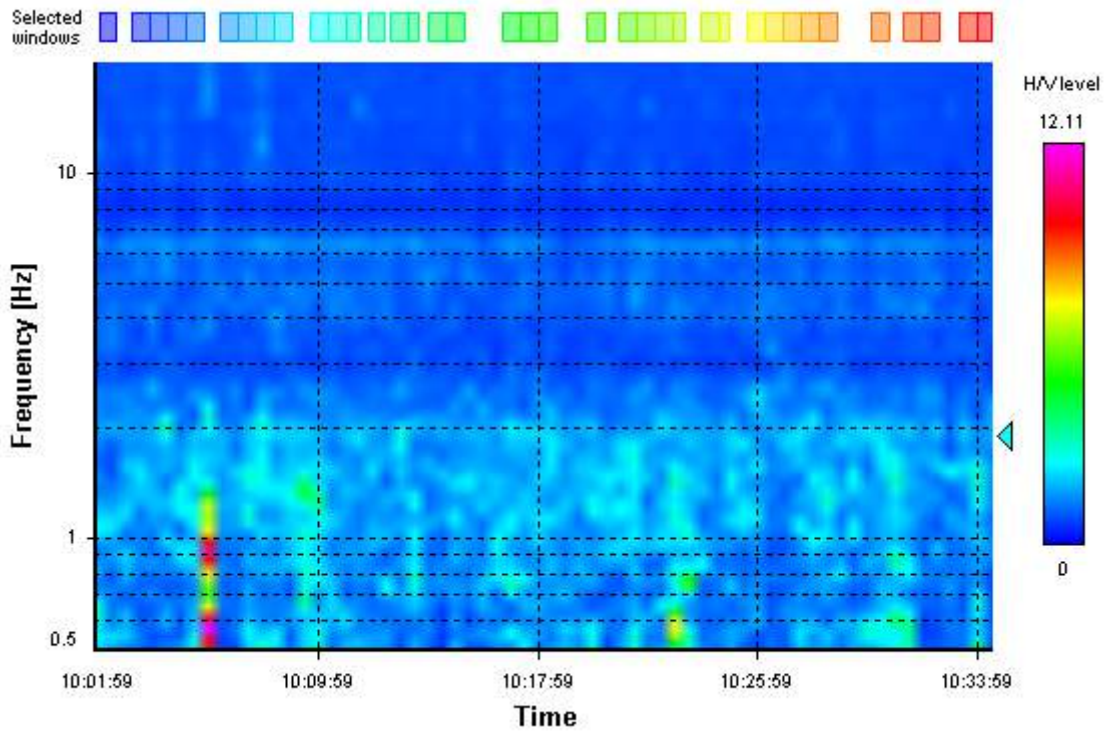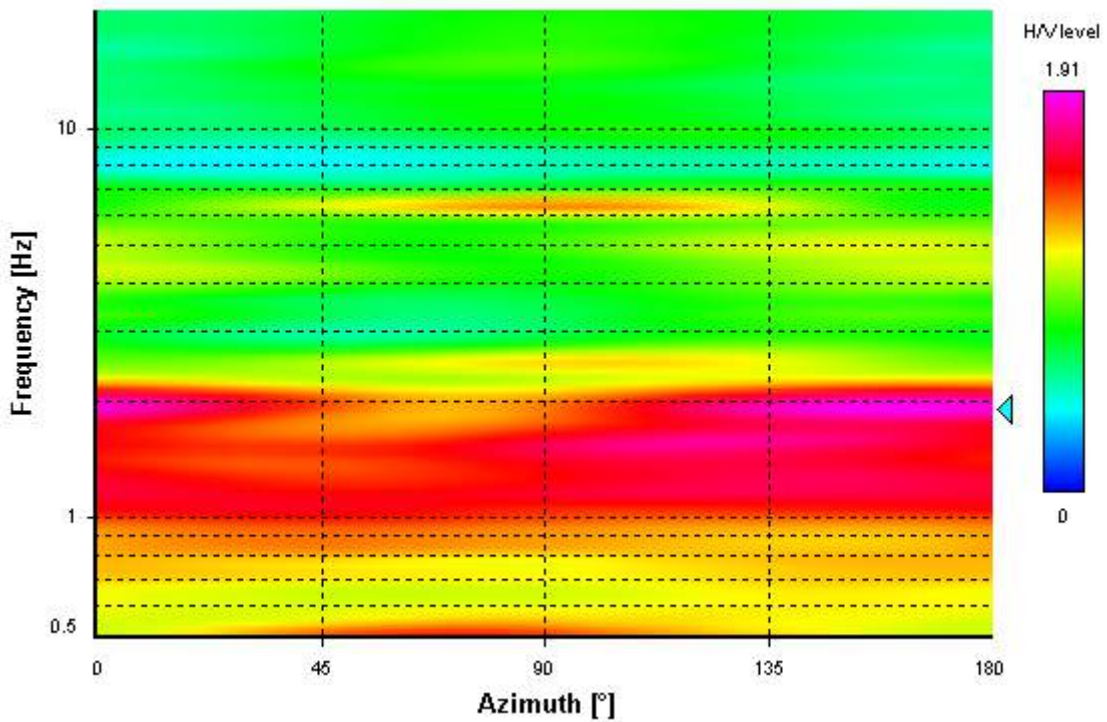|	
Tapering:	Disabled
Smoothing:	Konno-Ohmachi (Bandwidth coefficient = 40)
Instrumental correction:	Disabled

HVSR average

Signal spectra average

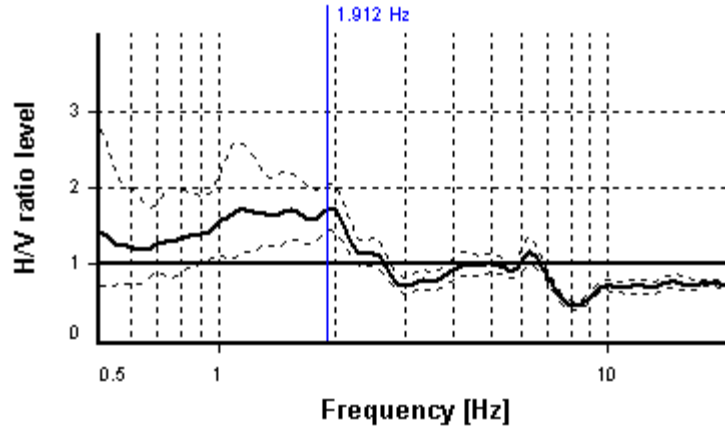## HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

5.848 Hz

A_0 amplitude = *4.308*

Average f_0 = *5.955 ± 0.510*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	46 valid windows (length > 1.71 s) out of 46	**OK**
$n_c(f_0) > 200$	10107.19 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	**OK**
HVSR peak clarity criteria		
$\exists\ f^- \text{ in } [f_0/4, f_0] \mid A_{H/V}(f^-) < A_0/2$	0 Hz	**NO**
$\exists\ f^+ \text{ in } [f_0, 4f_0] \mid A_{H/V}(f^+) < A_0/2$	12.78913 Hz	**OK**
$A_0 > 2$	4.31 > 2	**OK**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	3.8% <= 5%	**OK**
$\sigma_f < \varepsilon(f_0)$	0.51017 >= 0.2924	**NO**
$\sigma_A(f_0) < \theta(f_0)$	1.29237 < 1.58	**OK**
Overall criteria fulfillment		**NO**

STATION INFORMATION

Station code: HVSR9

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Comune di Collesalvetti

Address: Pandoiano - I Loti

Latitude: 4818920,3

Longitude: 1616471,5

Coordinate system: GB

Elevation: 230 m s.l.m.

Weather: vento moderato

Notes: -

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/03/25 16:25:53
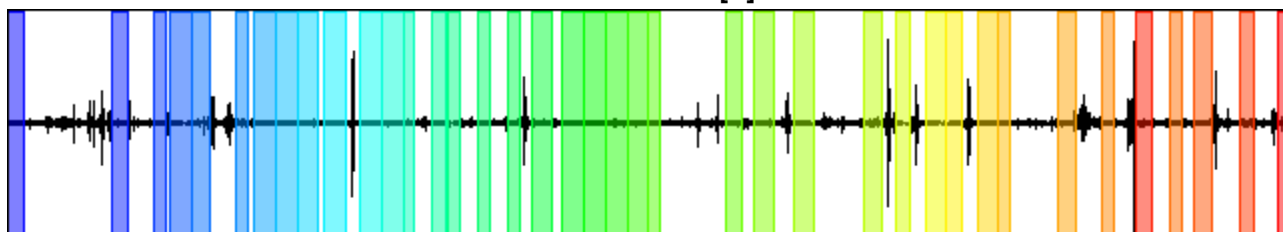
Recording length: 40 min

Windows count: 41

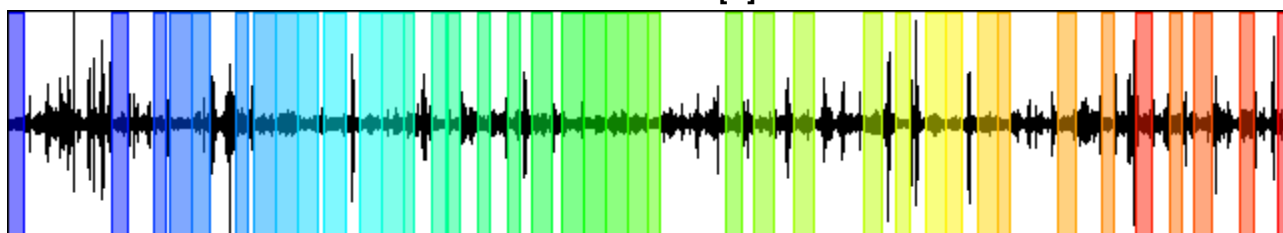*Average windows length:* 36.76

Signal coverage: 62.8%

6303 Counts   **CHANNEL #1 [V]**

-6138 Counts

3912 Counts   **CHANNEL #2 [N]**

-6548 Counts

8116 Counts   **CHANNEL #3 [E]**
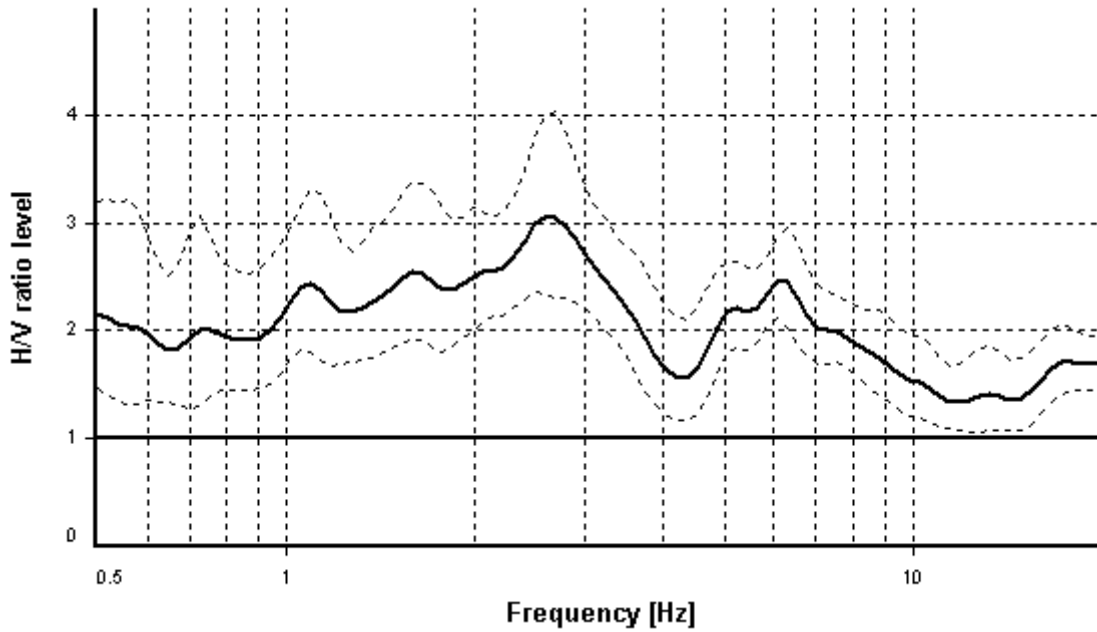

-14443 Counts

HVSR ANALYSIS
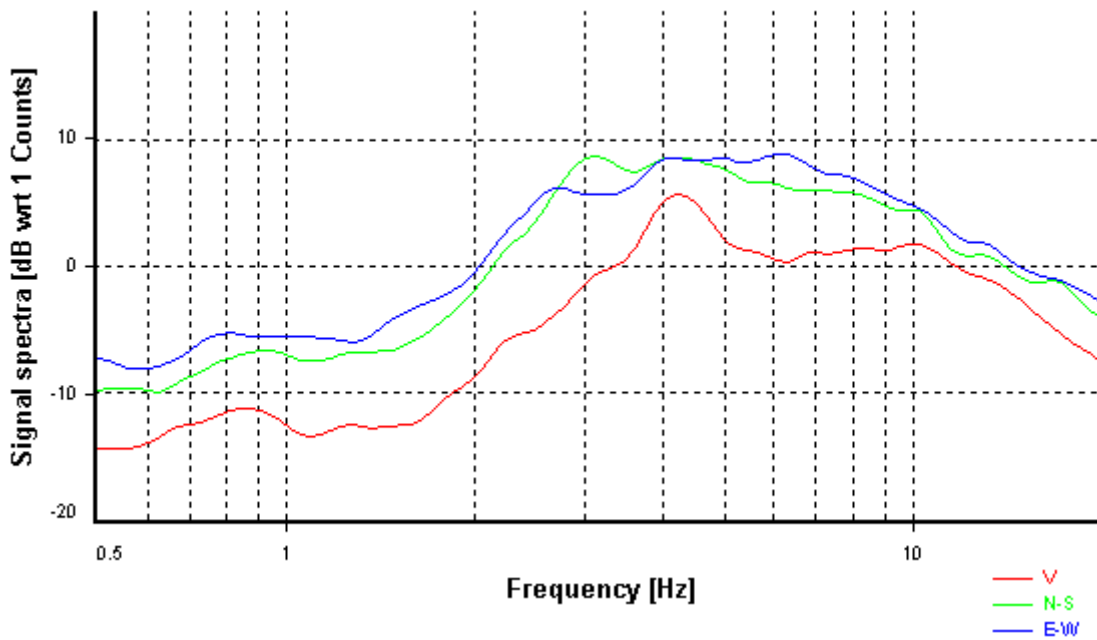
Tapering: Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)
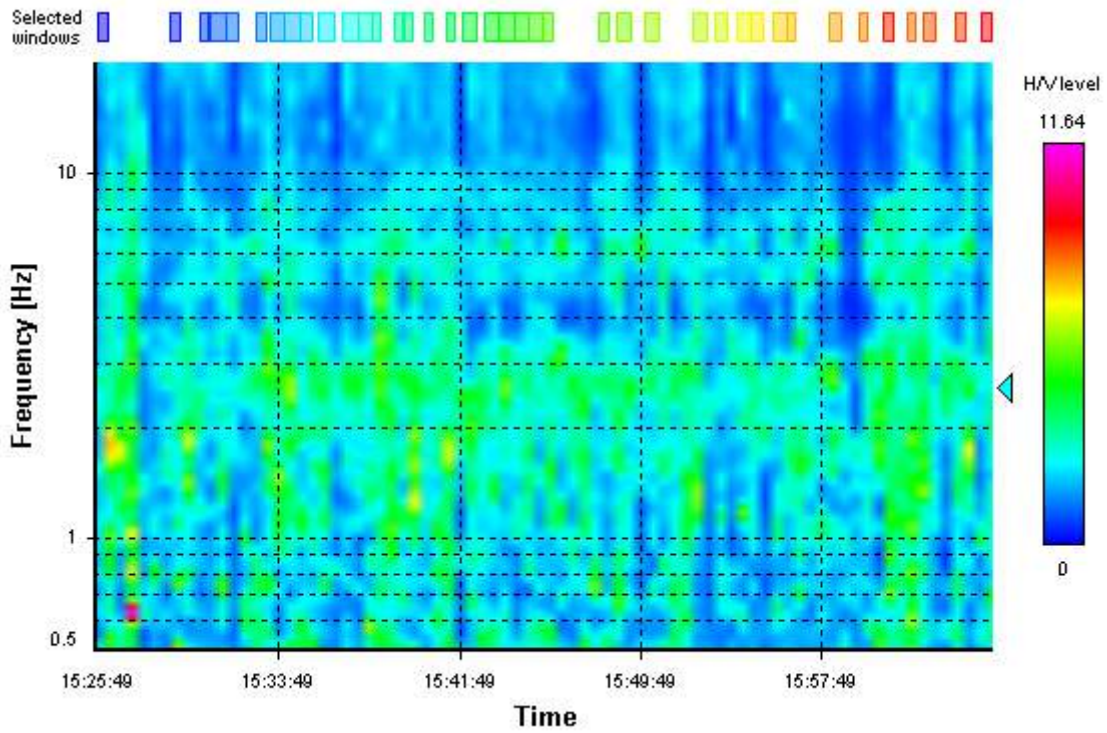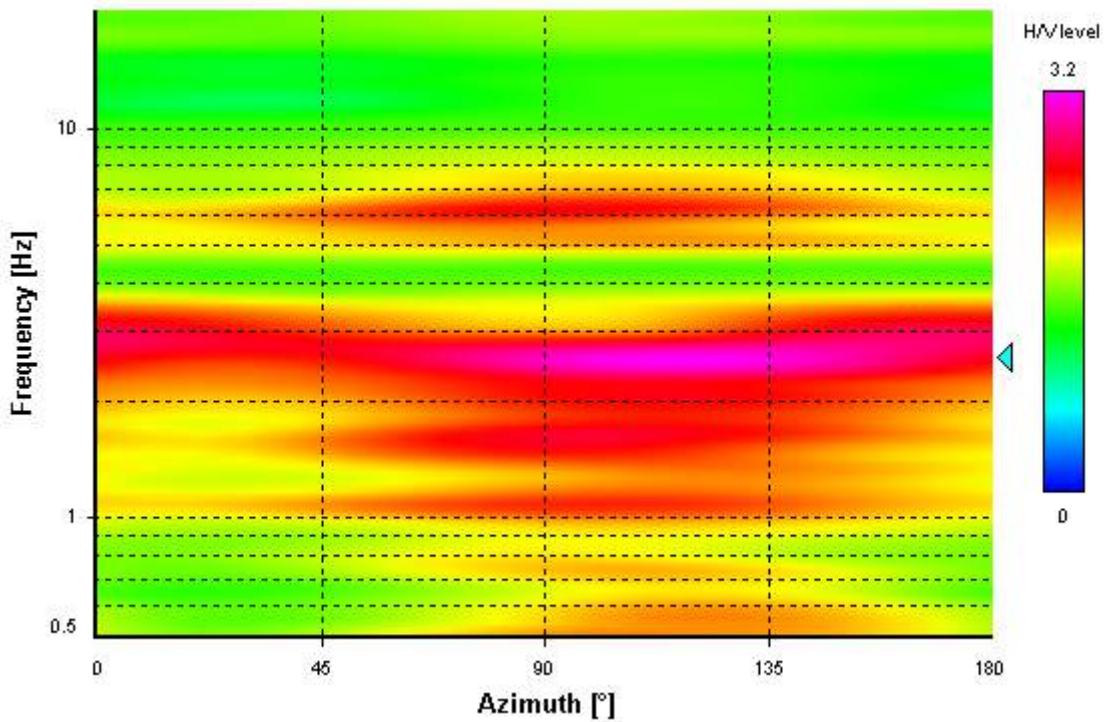
Instrumental correction: Disabled

HVSR average

Signal spectra average

HVSR time-frequency analysis (30 seconds windows)

Selected windows

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

8.489 Hz

A_0 **amplitude** = *2.658*

Average f_0 = *8.736 ± 1.239*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	41 valid windows (length > 1.18 s) out of 41	OK
$n_c(f_0) > 200$	12793.2 > 200	OK
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	OK
HVSR peak clarity criteria		
$\exists\ f^-$ in $[f_0/4, f_0]\ \|\ A_{H/V}(f^-) < A_0/2$	0 Hz	NO
$\exists\ f^+$ in $[f_0, 4f_0]\ \|\ A_{H/V}(f^+) < A_0/2$	0 Hz	NO
$A_0 > 2$	2.66 > 2	OK
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	0% <= 5%	OK
$\sigma_f < \varepsilon(f_0)$	1.23884 >= 0.42443	NO
$\sigma_A(f_0) < \theta(f_0)$	1.28099 < 1.58	OK
Overall criteria fulfillment		NO

STATION INFORMATION

Station code: HVSR10

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Comune di Collesalvetti

Address: Rimazzano

Latitude: 4819470,6

Longitude: 1618760,9

Coordinate system: GB

Elevation: 115 m s.l.m.

Weather: -

Notes: -

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency:	200 Hz
Recording start time:	2018/03/31 15:23:51
Recording length:	33.33 min
Windows count:	40
Average windows length:	38.56
Signal coverage:	77.11%

6853 Counts

CHANNEL #1 [V]

-7290 Counts

8917 Counts

CHANNEL #2 [N]

-9007 Counts

5962 Counts

CHANNEL #3 [E]

-6465 Counts

HVSR ANALYSIS

Tapering: Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

Instrumental correction: Disabled

HVSR average

Signal spectra average

HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

1.419 Hz

A_0 amplitude = *1.543*

Average f_0 = *1.330 ± 0.275*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	40 valid windows (length > 7.05 s) out of 40	**OK**
$n_c(f_0) > 200$	2188.94 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	**OK**
HVSR peak clarity criteria		
$\exists\ f^-$ in $[f_0/4, f_0]\ \|\ A_{H/V}(f^-) < A_0/2$	0 Hz	**NO**
$\exists\ f^+$ in $[f_0, 4f_0]\ \|\ A_{H/V}(f^+) < A_0/2$	0 Hz	**NO**
$A_0 > 2$	1.54 <= 2	**NO**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	31.11% > 5%	**NO**
$\sigma_f < \varepsilon(f_0)$	0.27516 >= 0.14193	**NO**
$\sigma_A(f_0) < \theta(f_0)$	1.23151 < 1.78	**OK**
Overall criteria fulfillment		**NO**

STATION INFORMATION

Station code: HVSR11

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Comune di Collesalvetti

Address: Parrana San Giusto

Latitude: 4820078,9

Longitude: 1616934,0

Coordinate system: GB

Elevation: 143 m s.l.m.

Weather: -

Notes: vicino chiesa

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/03/31 16:13:48

Recording length: 33.33 min

Windows count: 43

Average windows length: 37.74

Signal coverage: 81.14%

13729 Counts   **CHANNEL #1 [V]**

-13169 Counts

10591 Counts   **CHANNEL #2 [N]**

-13319 Counts

11375 Counts   **CHANNEL #3 [E]**

-11431 Counts

HVSR ANALYSIS

Tapering: Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

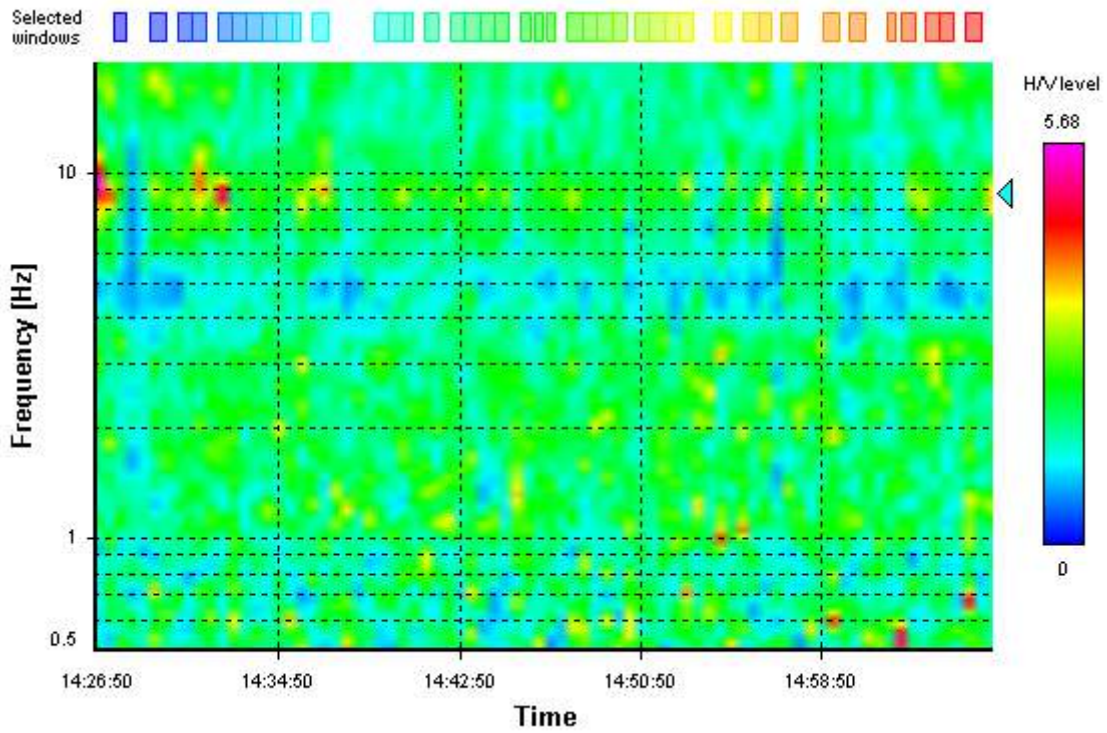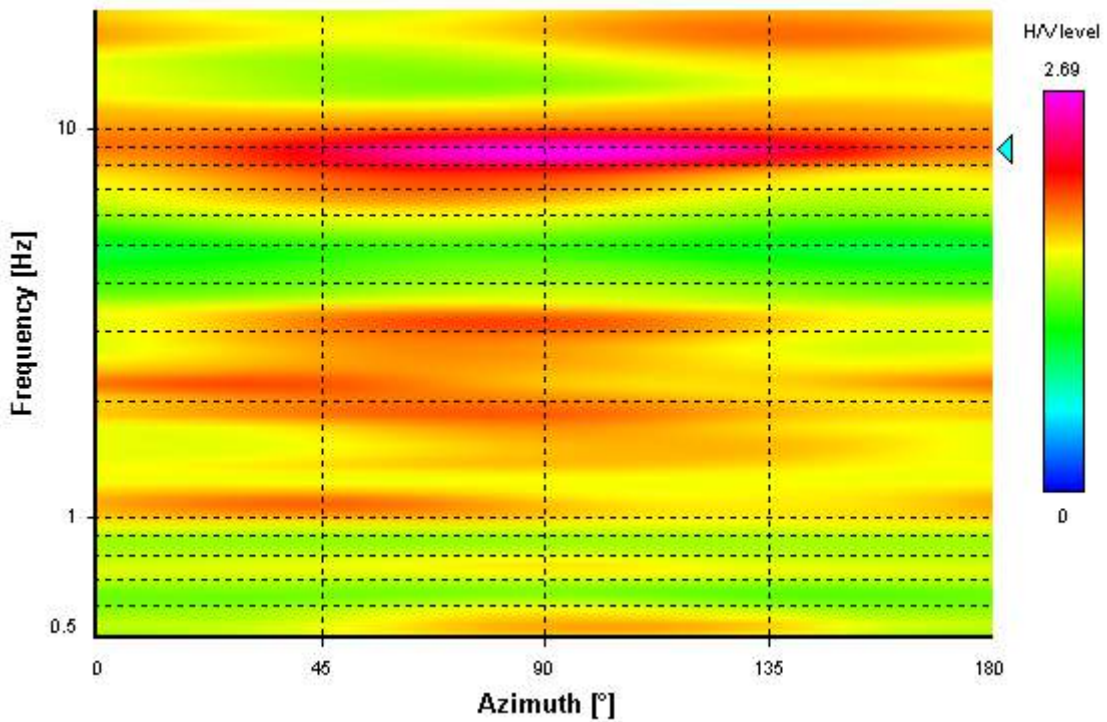*Instrumental correction:*   Disabled

HVSR average

Signal spectra average

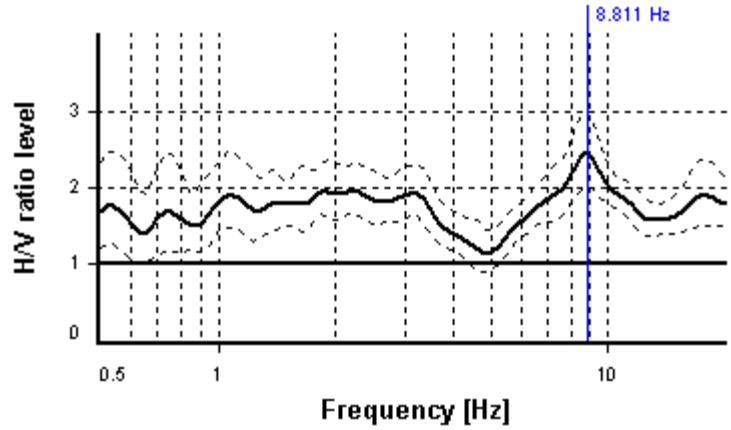## HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

2.881 Hz

A_0 amplitude = *2.335*

Average f_0 = *2.915 ± 0.543*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	43 valid windows (length > 3.47 s) out of 43	**OK**
$n_c(f_0) > 200$	4675.19 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	**OK**
HVSR peak clarity criteria		
$\exists\, f^-$ in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0/2$	1.3674 Hz	**OK**
$\exists\, f^+$ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0/2$	6.53969 Hz	**OK**
$A_0 > 2$	2.34 > 2	**OK**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	7.18% > 5%	**NO**
$\sigma_f < \varepsilon(f_0)$	0.54312 >= 0.14405	**NO**
$\sigma_A(f_0) < \theta(f_0)$	1.25336 < 1.58	**OK**
Overall criteria fulfillment		**NO**

STATION INFORMATION

Station code: HVSR12

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Collesalvetti

Address: Interporto

Latitude: 4828505,7

Longitude: 1612468,3

Coordinate system: GB

Elevation: 6 m s.l.m.

Weather: sereno

Notes: Zona industriale

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/03/25 14:15:26

Recording length: 31.45 min

Windows count: 29

Average windows length: 34.75

Signal coverage: 53.4%

69312 Counts   **CHANNEL #1 [V]**

-70002 Counts

94115 Counts   **CHANNEL #2 [N]**

-91391 Counts

91478 Counts   **CHANNEL #3 [E]**
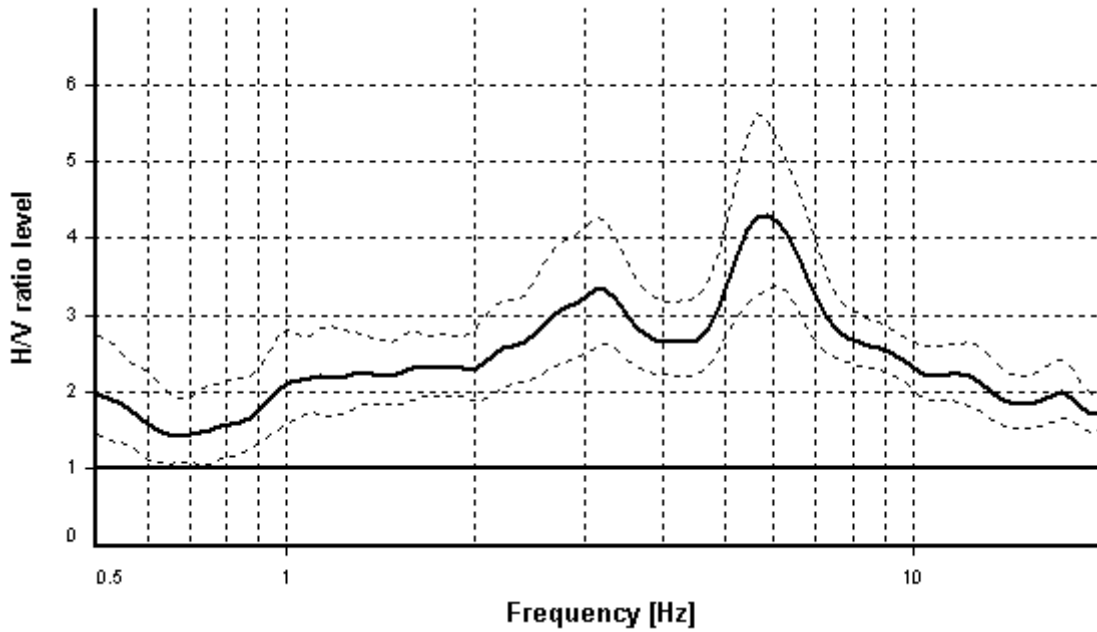

-98962 Counts

HVSR ANALYSIS

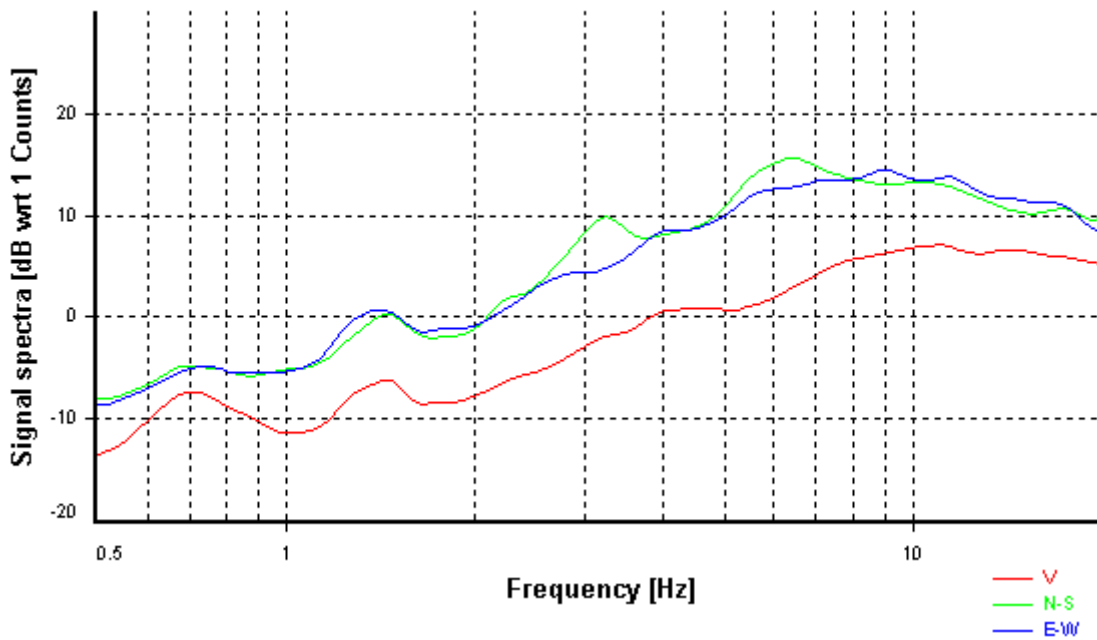*Tapering:* Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

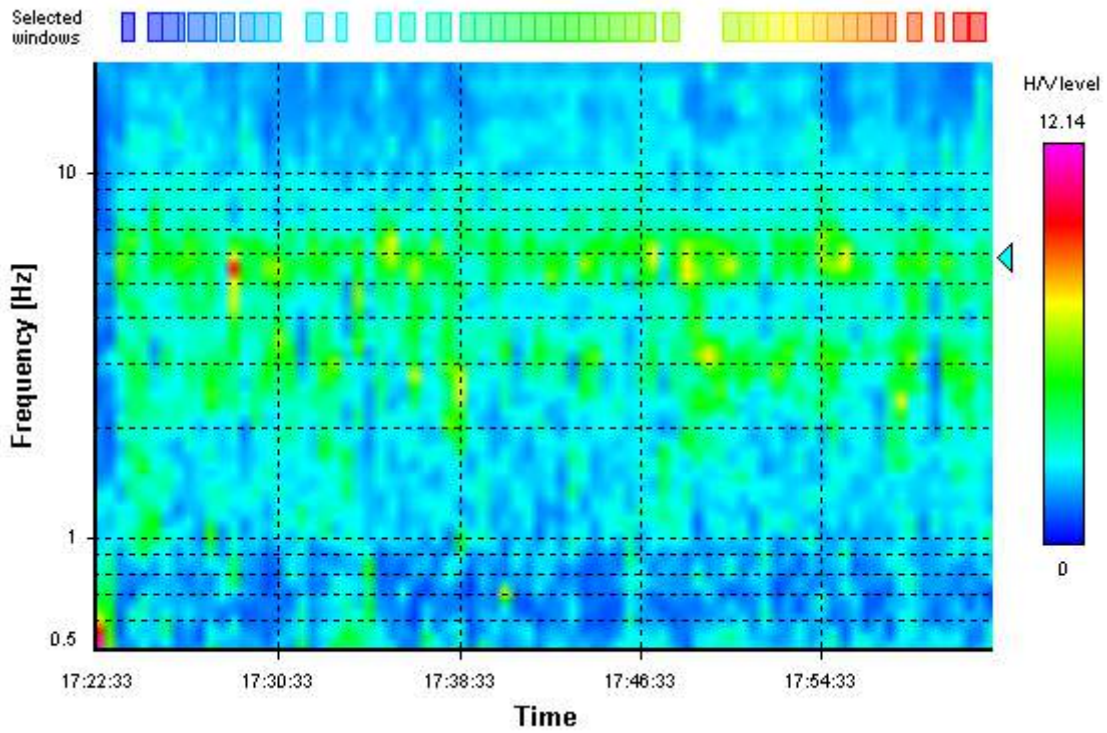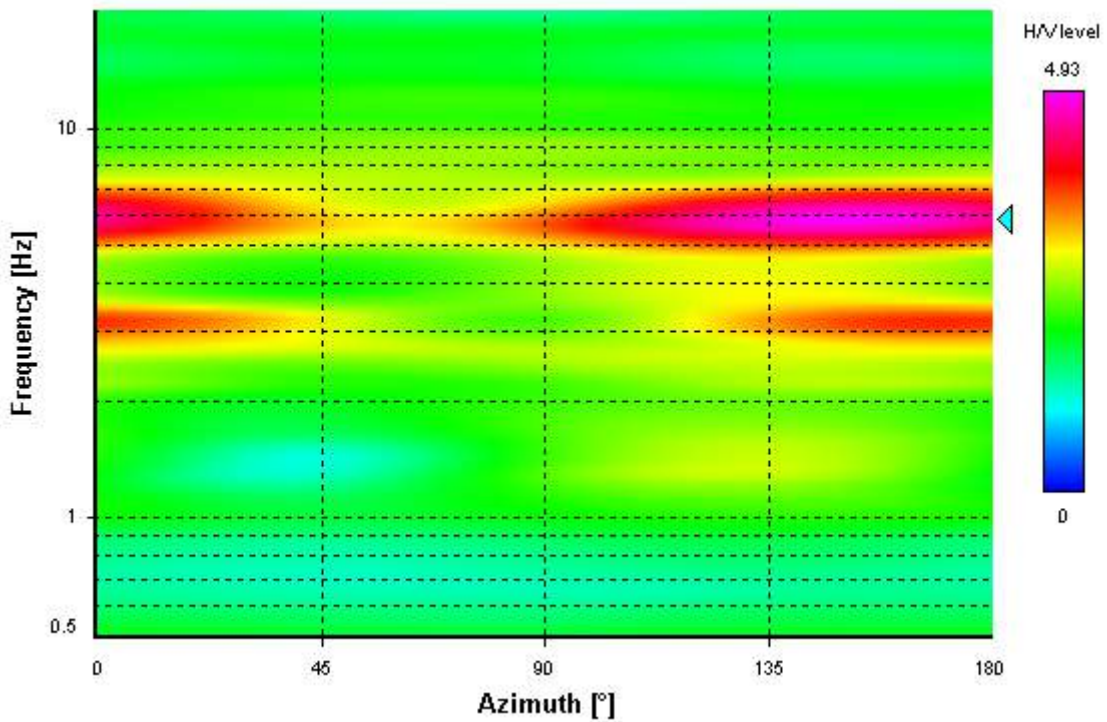*Instrumental correction:* Disabled

HVSR average

Signal spectra average

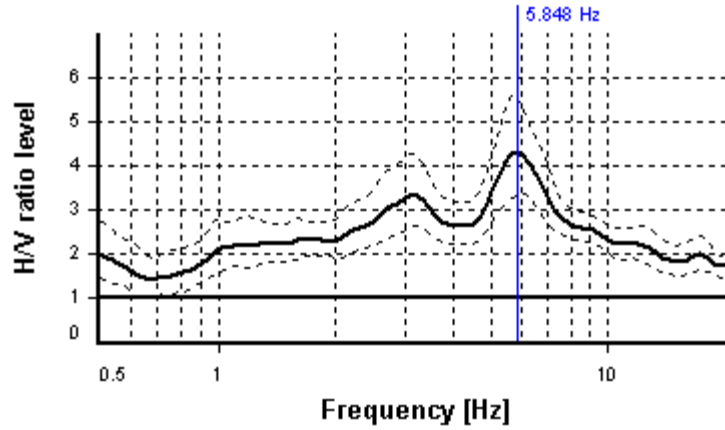## HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

1.985 Hz

A_0 amplitude = 1.746

Average f_0 = 1.684 ± 0.250

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	29 valid windows (length > 5.04 s) out of 29	**OK**
$n_c(f_0) > 200$	2000.2 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	**OK**
HVSR peak clarity criteria		
$\exists\ f^-$ in $[f_0/4, f_0]\ \|\ A_{H/V}(f^-) < A_0/2$	0 Hz	**NO**
$\exists\ f^+$ in $[f_0, 4f_0]\ \|\ A_{H/V}(f^+) < A_0/2$	0 Hz	**NO**
$A_0 > 2$	1.75 <= 2	**NO**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	25.78% > 5%	**NO**
$\sigma_f < \epsilon(f_0)$	0.25046 >= 0.19848	**NO**
$\sigma_A(f_0) < \theta(f_0)$	1.32014 < 1.78	**OK**
Overall criteria fulfillment		**NO**

STATION INFORMATION

Station code: HVSR13

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Comune di Collesalvetti

Address: Villa Orsini - Guasticce

Latitude: 4827704,8

Longitude: 1613259,9

Coordinate system: GB

Elevation: 4 m s.l.m.

Weather: -

Notes: -

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/04/14 16:11:51

Recording length: 33.33 min

Windows count: 34

Average windows length: 36.07

Signal coverage: 61.31%

18330 Counts   **CHANNEL #1 [V]**

-30893 Counts

16716 Counts   **CHANNEL #2 [N]**

-14802 Counts

20365 Counts   **CHANNEL #3 [E]**

-22101 Counts

HVSR ANALYSIS

Tapering: Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

Instrumental correction: Disabled

HVSR average

Signal spectra average

HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

2.391 Hz

A_0 amplitude = *2.170*

Average f_0 = *2.419 ± 0.403*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	34 valid windows (length > 4.18 s) out of 34	OK
$n_c(f_0) > 200$	2932.34 > 200	OK
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	OK
HVSR peak clarity criteria		
$\exists\ f^- $ in $[f_0/4, f_0]\ \|\ A_{H/V}(f^-) < A_0/2$	0 Hz	NO
$\exists\ f^+ $ in $[f_0, 4f_0]\ \|\ A_{H/V}(f^+) < A_0/2$	3.73956 Hz	OK
$A_0 > 2$	2.17 > 2	OK
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	0% <= 5%	OK
$\sigma_f < \varepsilon(f_0)$	0.40281 >= 0.11956	NO
$\sigma_A(f_0) < \theta(f_0)$	1.18568 < 1.58	OK
Overall criteria fulfillment		NO

STATION INFORMATION

Station code: HVSR14

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Comune di Collesalvetti

Address: Collesalvetti - Fattoria del Pallone/Villa Carmignani

Latitude: 4827064,4

Longitude: 1619895,1

Coordinate system: GB

Elevation: 54 m s.l.m.

Weather: -

Notes: -

PHOTOGRAPHIC REFERENCES
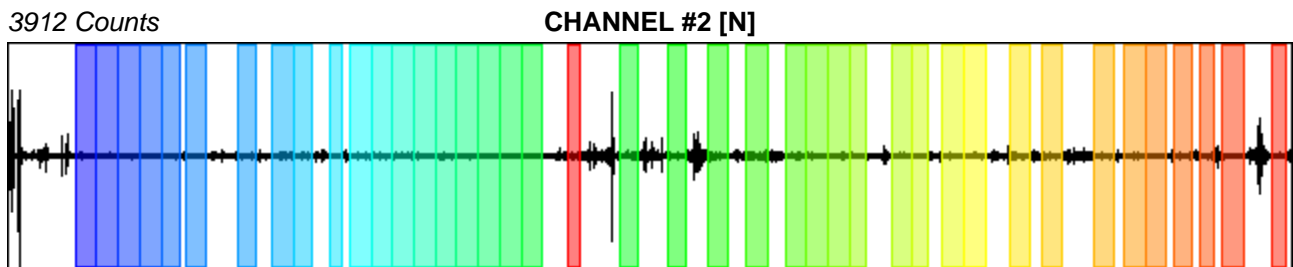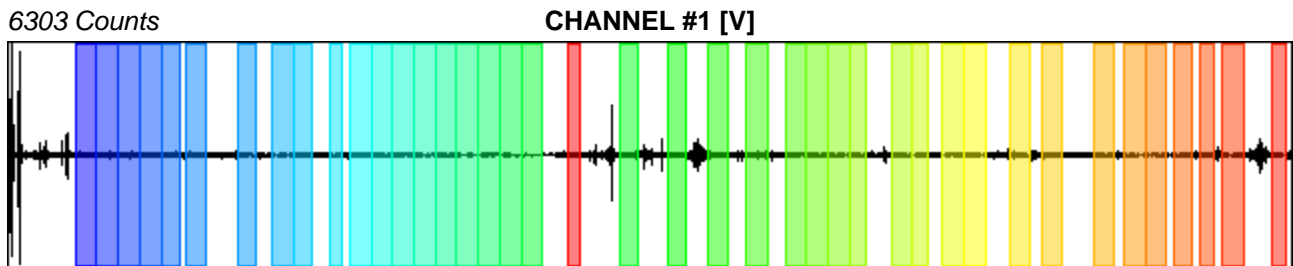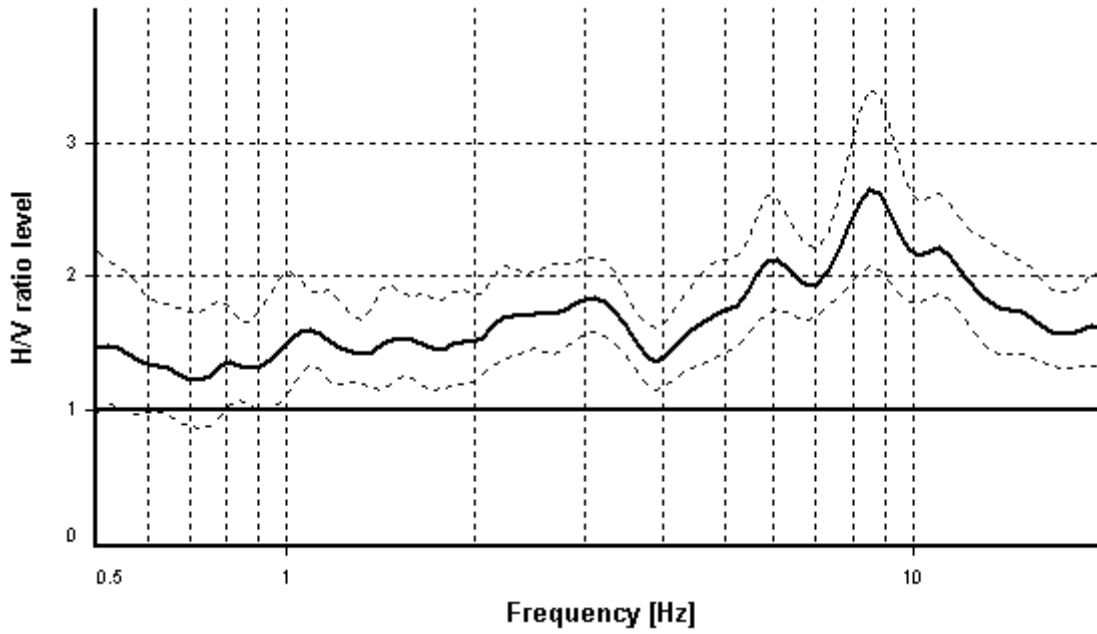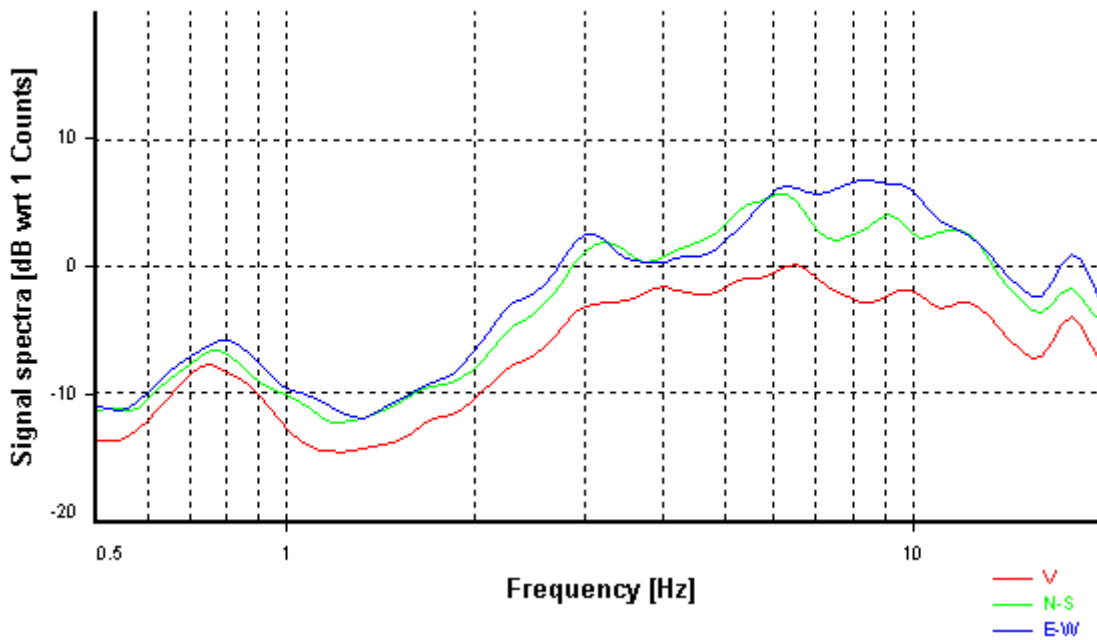
SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/04/10 08:04:28

Recording length: 33.33 min

Windows count: 30

Average windows length: 31.8

Signal coverage: 47.69%

34982 Counts   **CHANNEL #1 [V]**

-38156 Counts

64505 Counts   **CHANNEL #2 [N]**

-59459 Counts

34520 Counts   **CHANNEL #3 [E]**

-33927 Counts

HVSR ANALYSIS

Tapering: Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

Instrumental correction: Disabled

HVSR average

Signal spectra average

HVSR time-frequency analysis (30 seconds windows)
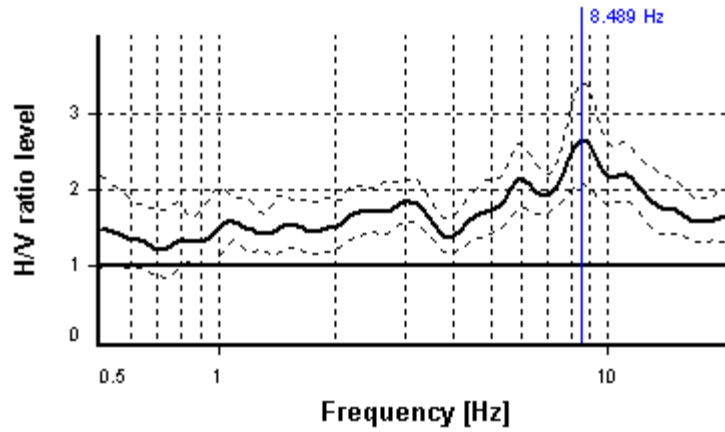

HVSR directional analysis

SESAME CRITERIA

Selected *f₀* frequency

8.178 Hz

A₀ amplitude = *2.679*

Average *f₀* = *8.335 ± 0.474*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	30 valid windows (length > 1.22 s) out of 30	**OK**
$n_c(f_0) > 200$	7800.79 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	**OK**
HVSR peak clarity criteria		
$\exists\ f^- $ in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0/2$	5.03826 Hz	**OK**
$\exists\ f^+ $ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0/2$	14.84467 Hz	**OK**
$A_0 > 2$	2.68 > 2	**OK**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	3.8% <= 5%	**OK**
$\sigma_f < \varepsilon(f_0)$	0.47421 >= 0.4089	**NO**
$\sigma_A(f_0) < \theta(f_0)$	1.15782 < 1.58	**OK**
Overall criteria fulfillment		**OK**

STATION INFORMATION

Station code: HVSR15

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Collesalvetti

Address: Vicarello Via del Pero

Latitude: 4829602,2

Longitude: 1618182,8

Coordinate system: GB

Elevation: 8 m s.l.m.

Weather: Sereno. Vento assente.

Notes: -

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/03/25 14:15:26

Recording length: 31.45 min

Windows count: 33

Average windows length: 32.29

Signal coverage: 56.47%

69312 Counts   **CHANNEL #1 [V]**

-70002 Counts

94115 Counts   **CHANNEL #2 [N]**

-91391 Counts

91478 Counts   **CHANNEL #3 [E]**

-98962 Counts

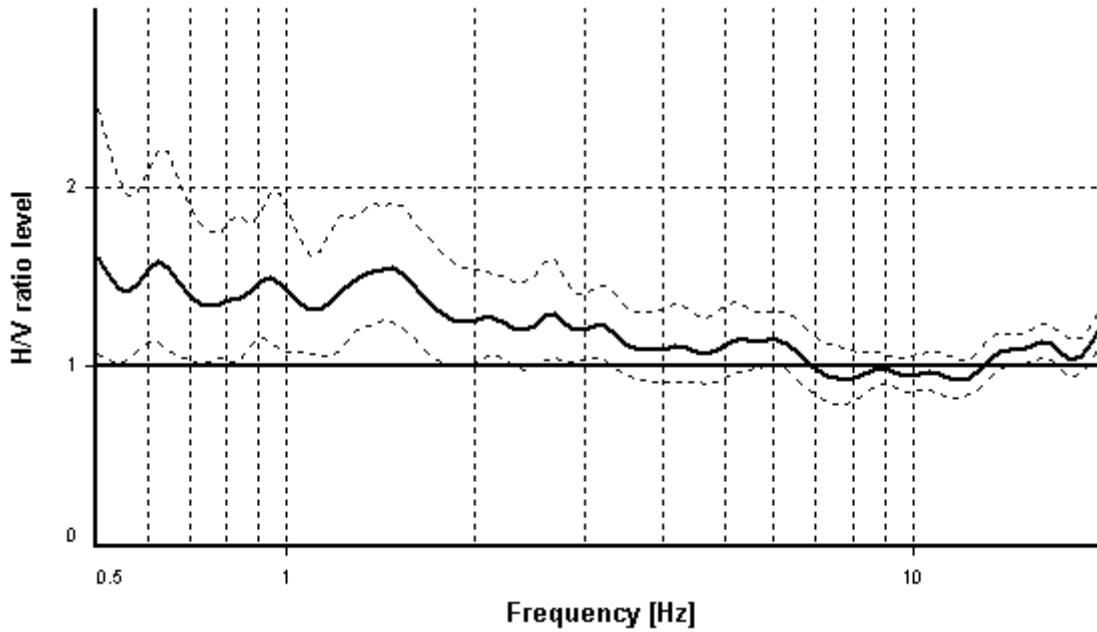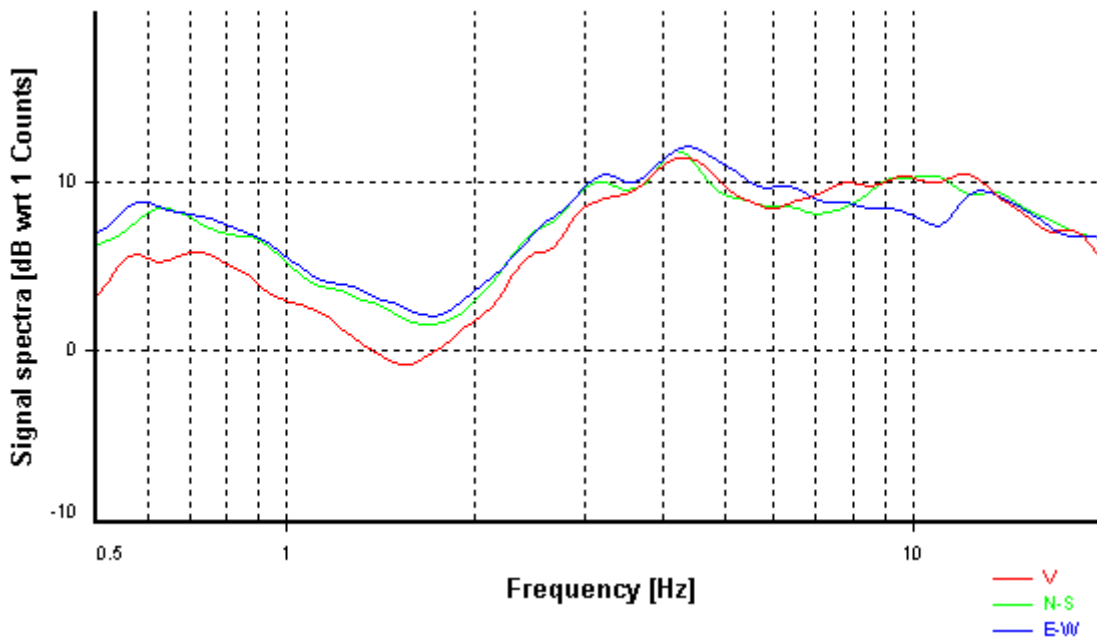# HVSR ANALYSIS

Tapering: Disabled
Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)
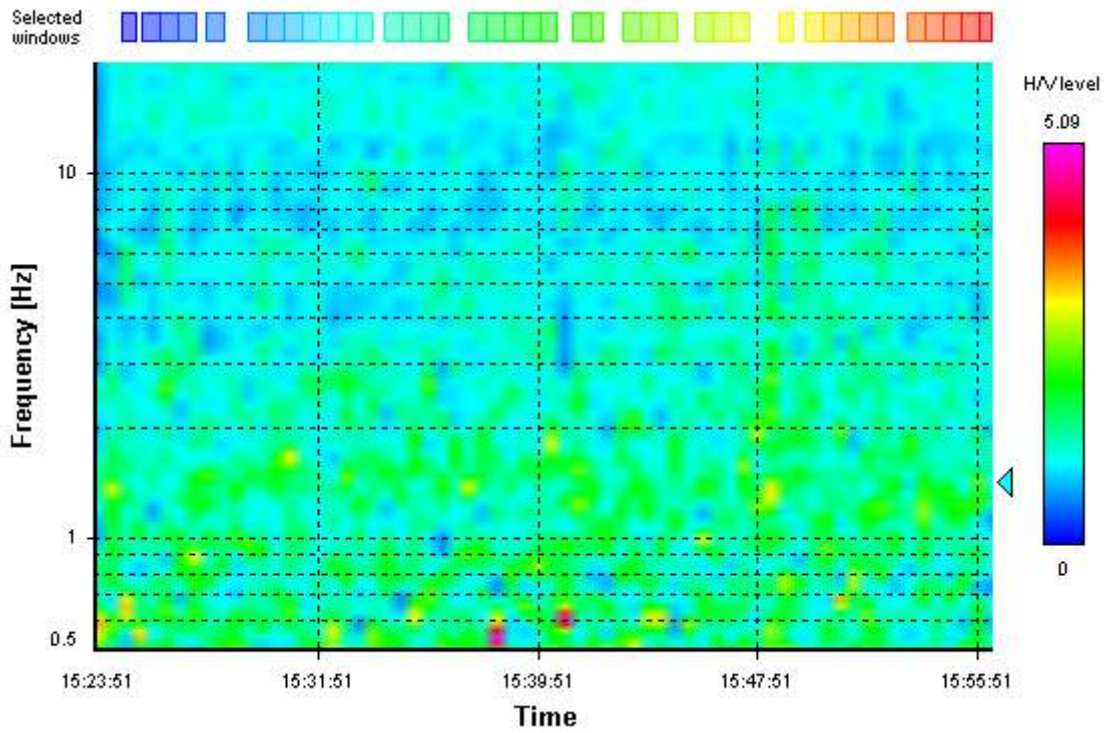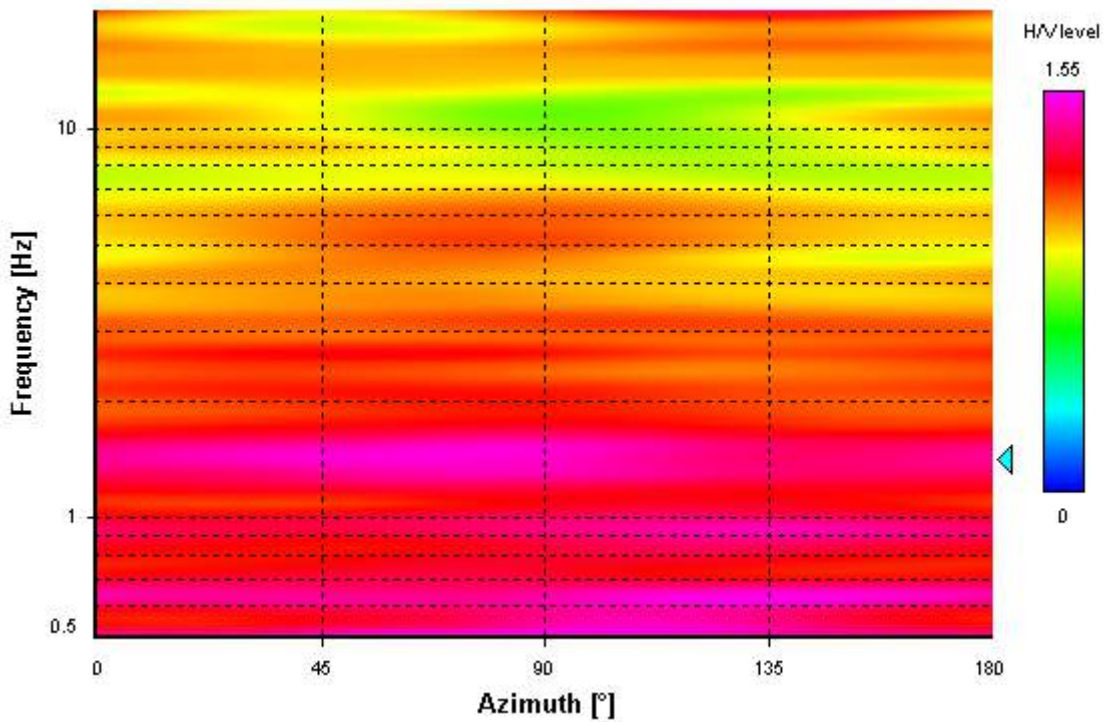*Instrumental correction:*   Disabled

HVSR average

Signal spectra average

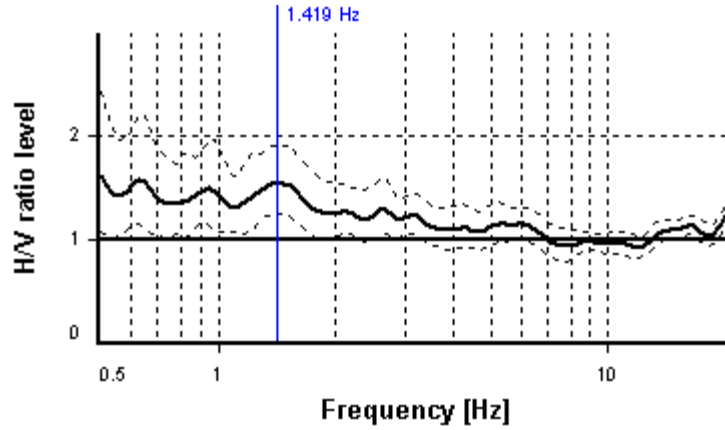## HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

1.587 Hz

A_0 amplitude = *1.934*

Average f_0 = *1.541 ± 0.323*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	33 valid windows (length > 6.3 s) out of 33	**OK**
$n_c(f_0) > 200$	1691.23 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	**OK**
HVSR peak clarity criteria		
$\exists\ f^-$ in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0/2$	0 Hz	**NO**
$\exists\ f^+$ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0/2$	2.77563 Hz	**OK**
$A_0 > 2$	1.93 <= 2	**NO**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	7.18% > 5%	**NO**
$\sigma_f < \varepsilon(f_0)$	0.32327 >= 0.15872	**NO**
$\sigma_A(f_0) < \theta(f_0)$	1.24233 < 1.78	**OK**
Overall criteria fulfillment		**NO**

STATION INFORMATION

Station code: HVSR16

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Comune di Collesalvetti

Address: Collesalvetti - Zona industriale/Depuratore

Latitude: 4828522,7

Longitude: 1618481,4

Coordinate system: GB

Elevation: 9 m s.l.m.

Weather: -

Notes: Presenza di traffico veicolare

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/04/09 08:03:42
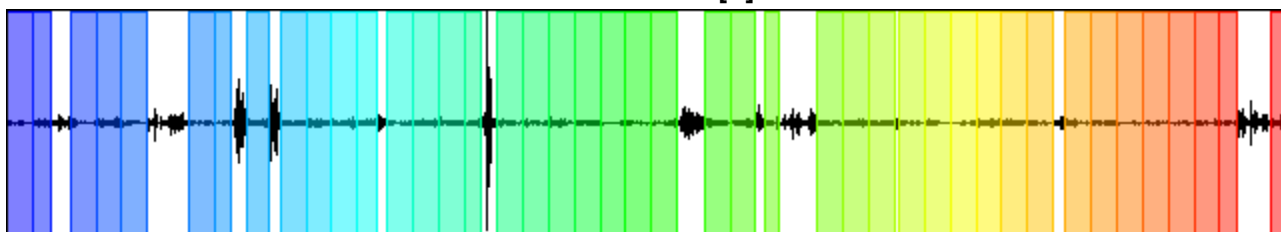
Recording length: 33.33 min

Windows count: 26

Average windows length: 33.33

Signal coverage: 43.33%

75952 Counts   **CHANNEL #1 [V]**

-68430 Counts

82886 Counts   **CHANNEL #2 [N]**
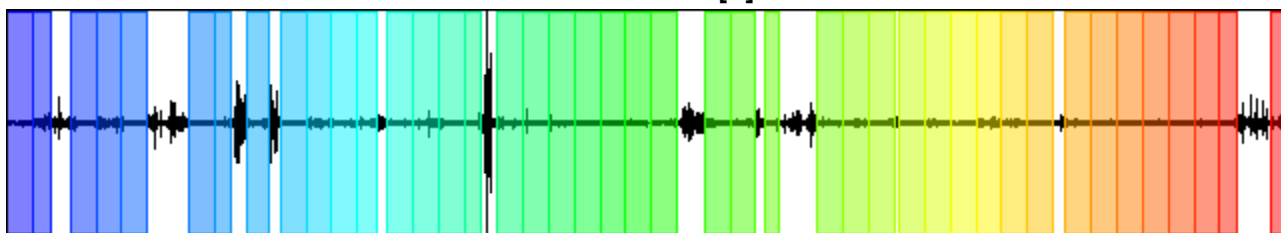

-67363 Counts

104563 Counts   **CHANNEL #3 [E]**
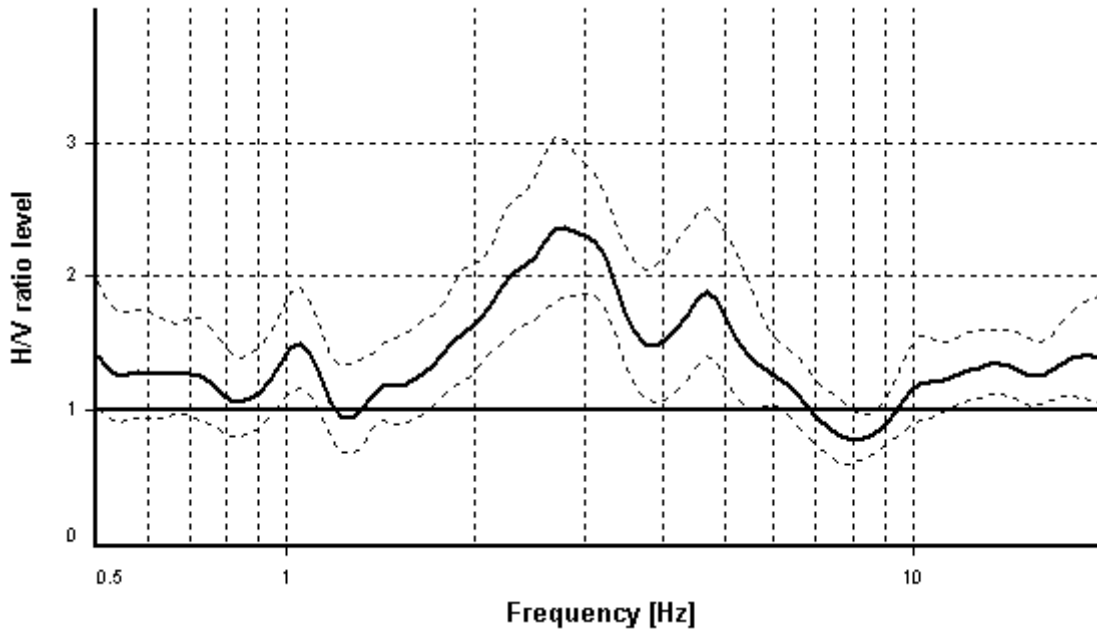

-103122 Counts

HVSR ANALYSIS

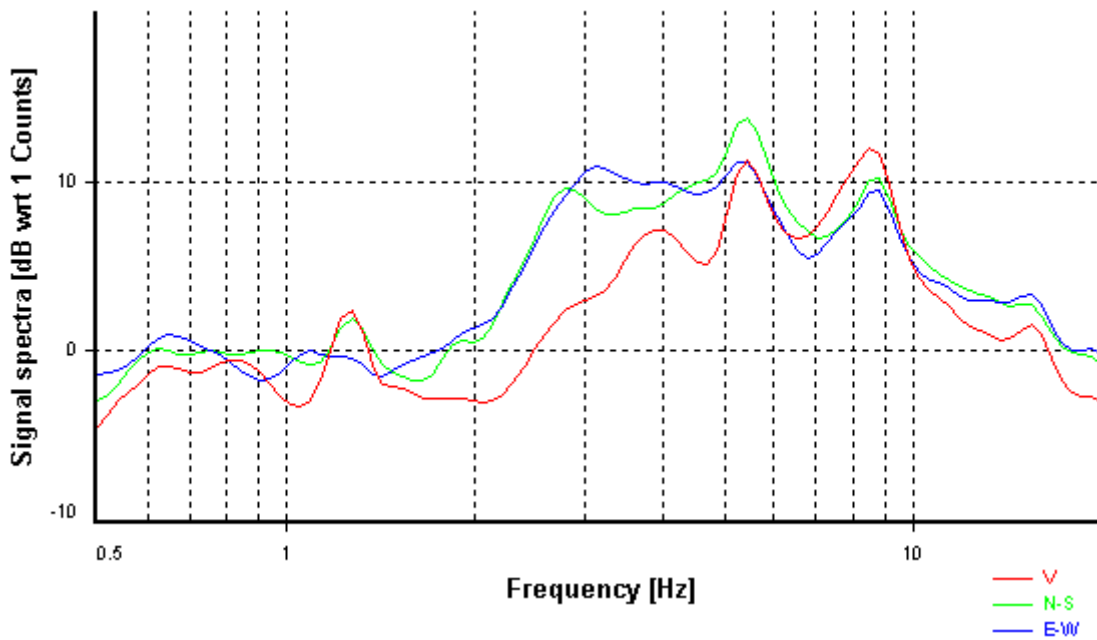*Tapering:*   Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

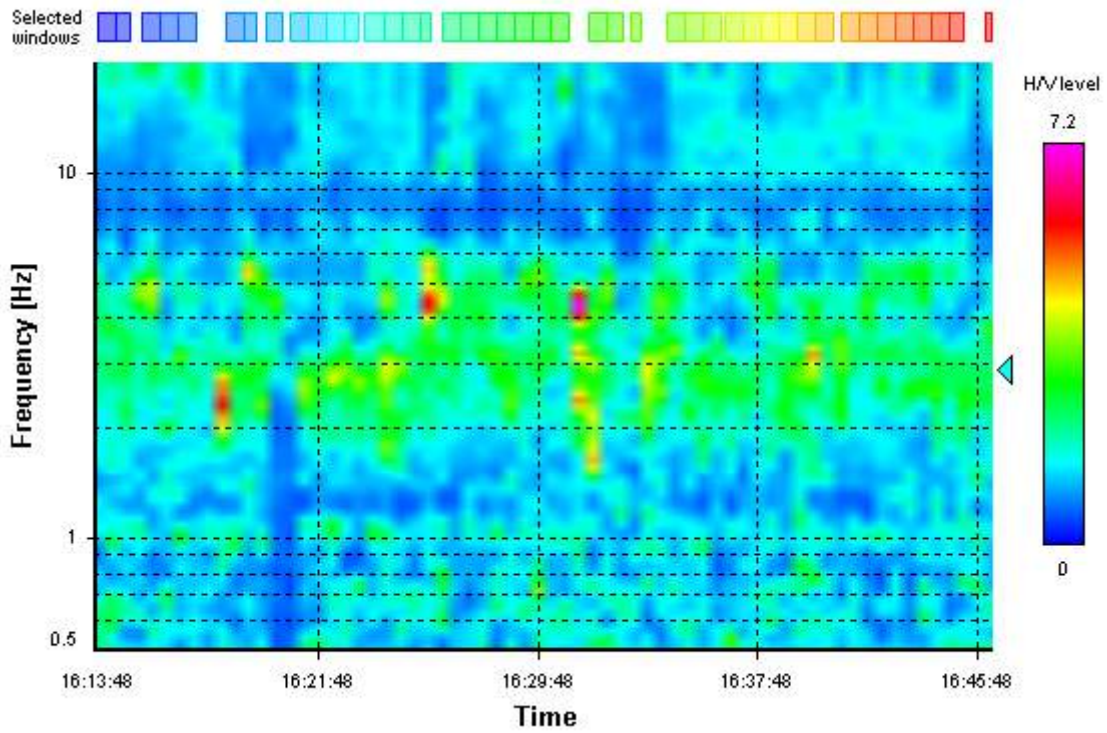*Instrumental correction:*   Disabled

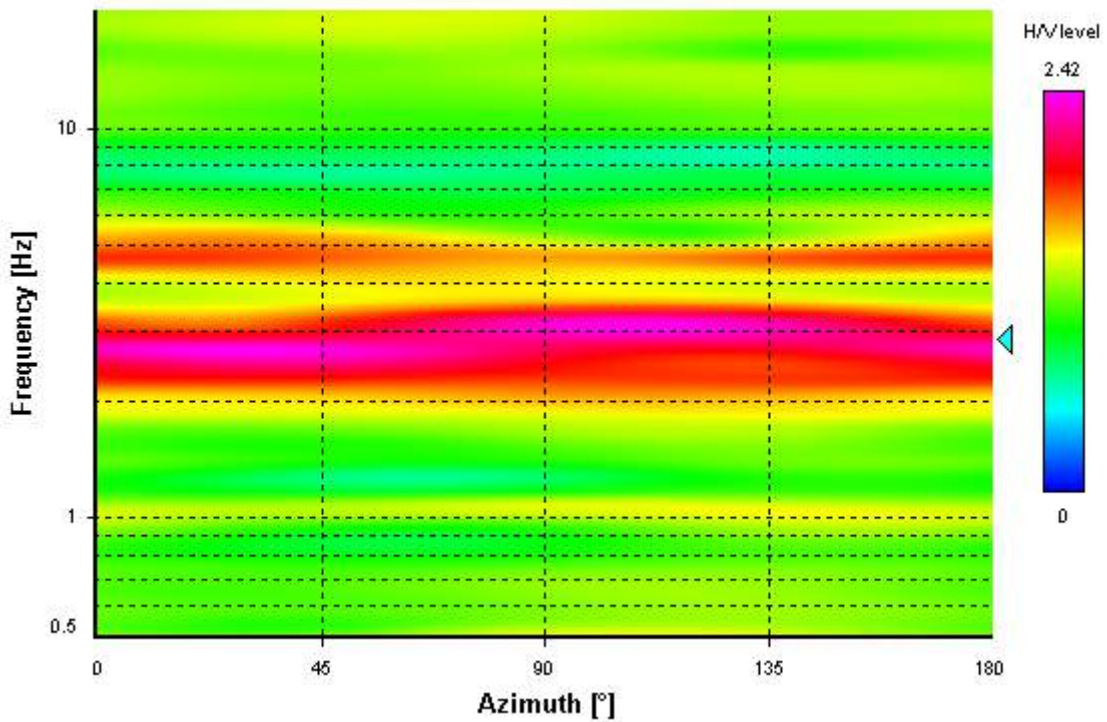## HVSR average

Signal spectra average

HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

1.647 Hz

A_0 amplitude = *2.100*

Average f_0 = *1.554 ± 0.334*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	26 valid windows (length > 6.07 s) out of 26	**OK**
$n_c(f_0) > 200$	1427.51 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	**OK**
HVSR peak clarity criteria		
$\exists\ f^-$ in $[f_0/4, f_0]\ \|\ A_{H/V}(f^-) < A_0/2$	0.8116 Hz	**OK**
$\exists\ f^+$ in $[f_0, 4f_0]\ \|\ A_{H/V}(f^+) < A_0/2$	2.67411 Hz	**OK**
$A_0 > 2$	2.1 > 2	**OK**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	3.8% <= 5%	**OK**
$\sigma_f < \varepsilon(f_0)$	0.33448 >= 0.16474	**NO**
$\sigma_A(f_0) < \theta(f_0)$	1.29583 < 1.78	**OK**
Overall criteria fulfillment		**OK**

STATION INFORMATION

Station code: HVSR17

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Comune di Collesalvetti

Address: Collesalvetti /Magazzino Comunale

Latitude: 4827880,2

Longitude: 1619344,6

Coordinate system: GB

Elevation: 12 m s.l.m.

Weather: Sereno

Notes: -

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/03/30 18:22:27

Recording length: 40 min

Windows count: 42

Average windows length: 33.73

Signal coverage: 59.03%

13227 Counts   **CHANNEL #1 [V]**

-20598 Counts

15944 Counts   **CHANNEL #2 [N]**

-18027 Counts

11962 Counts   **CHANNEL #3 [E]**

-12217 Counts

HVSR ANALYSIS

Tapering: Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

Instrumental correction: Disabled

HVSR average

Signal spectra average

HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

1.775 Hz

A_0 *amplitude* = *1.862*

Average f_0 = *1.816 ± 0.415*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	42 valid windows (length > 5.63 s) out of 42	**OK**
$n_c(f_0) > 200$	2514.52 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	**OK**
HVSR peak clarity criteria		
$\exists\ f^-$ in $[f_0/4, f_0]\ \|\ A_{H/V}(f^-) < A_0/2$	0 Hz	**NO**
$\exists\ f^+$ in $[f_0, 4f_0]\ \|\ A_{H/V}(f^+) < A_0/2$	0 Hz	**NO**
$A_0 > 2$	1.86 <= 2	**NO**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	0% <= 5%	**OK**
$\sigma_f < \varepsilon(f_0)$	0.41496 >= 0.17749	**NO**
$\sigma_A(f_0) < \theta(f_0)$	1.20579 < 1.78	**OK**
Overall criteria fulfillment		**NO**

STATION INFORMATION

Station code: HVSR18

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Comune di Collesalvetti

Address: Vicarello

Latitude: 4829873,2

Longitude: 1618026,5

Coordinate system: GB

Elevation: 7 m s.l.m.

Weather: Sereno

Notes: Area scuole

PHOTOGRAPHIC REFERENCES

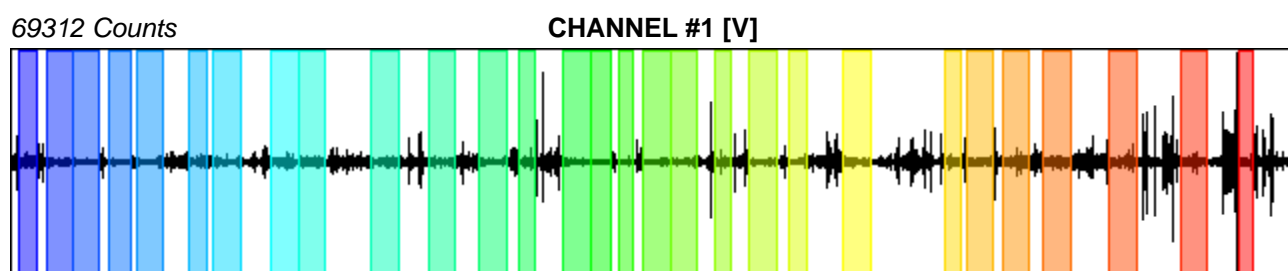# SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/04/15 09:08:33

Recording length: 33.33 min

Windows count: 35

Average windows length: 37.24

Signal coverage: 65.16%

16134 Counts   **CHANNEL #1 [V]**

-18310 Counts

20085 Counts   **CHANNEL #2 [N]**

-24086 Counts

15586 Counts   **CHANNEL #3 [E]**

-17091 Counts

HVSR ANALYSIS

      Tapering: Disabled

   Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)
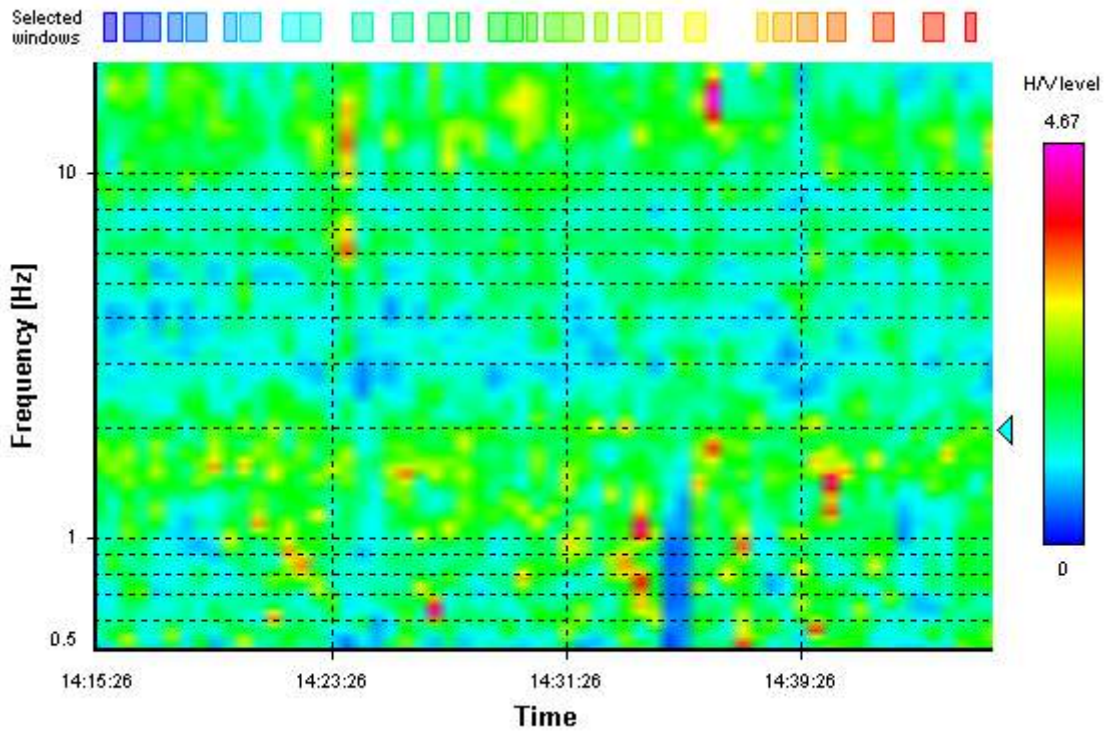
Instrumental correction: Disabled

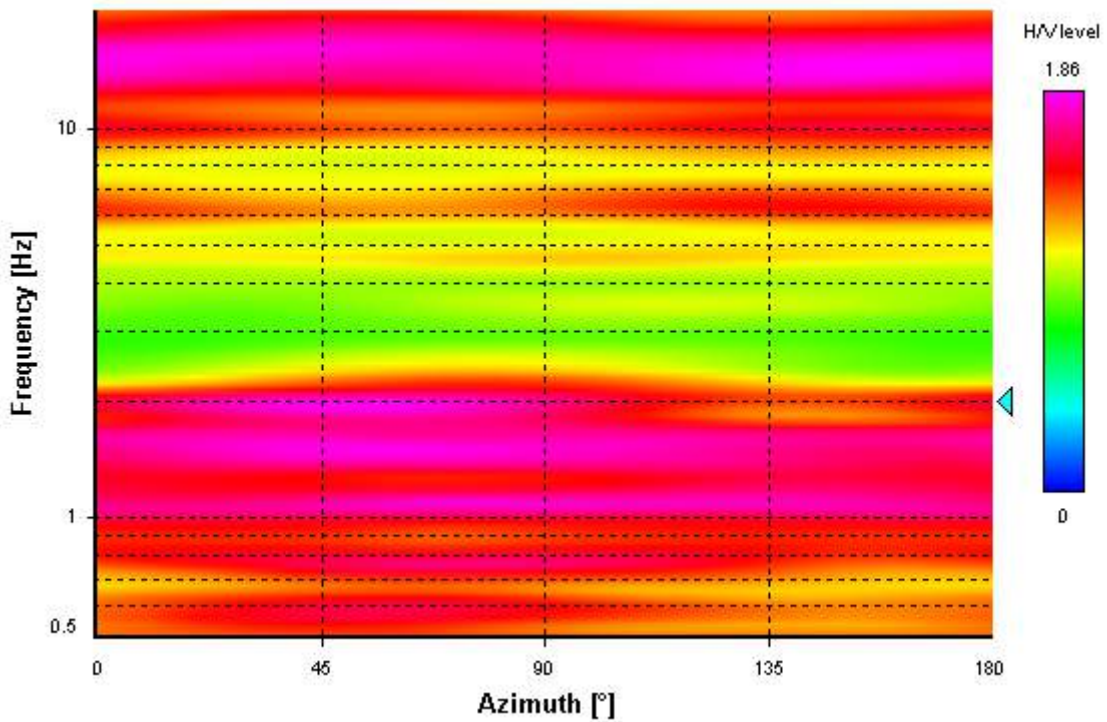## HVSR average

Signal spectra average

HVSR time-frequency analysis (30 seconds windows)
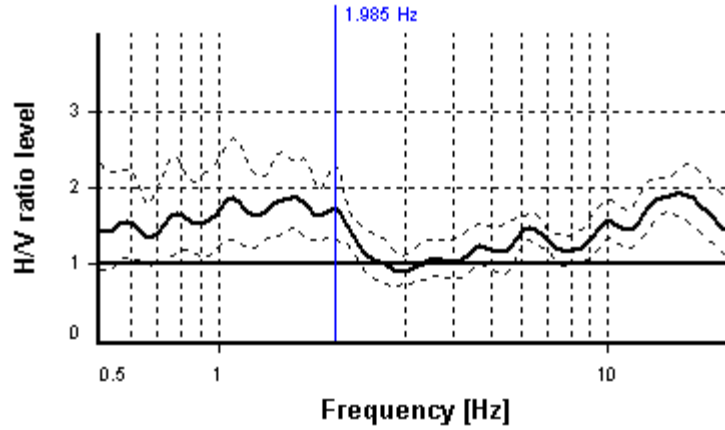

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

1.775 Hz

A_0 **amplitude =** *2.077*

Average f_0 = *1.720 ± 0.260*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	35 valid windows (length > 5.63 s) out of 35	OK
$n_c(f_0) > 200$	2313.17 > 200	OK
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	OK
HVSR peak clarity criteria		
$\exists\ f^- $ in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0/2$	0 Hz	NO
$\exists\ f^+ $ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0/2$	3.88153 Hz	OK
$A_0 > 2$	2.08 > 2	OK
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	7.18% > 5%	NO
$\sigma_f < \varepsilon(f_0)$	0.25955 >= 0.17749	NO
$\sigma_A(f_0) < \theta(f_0)$	1.17138 < 1.78	OK
Overall criteria fulfillment		NO

STATION INFORMATION

Station code: HVSR19

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Comune di Collesalvetti

Address: Vicarello

Latitude: 4829986,7

Longitude: 1618561,7

Coordinate system: GB

Elevation: 7 m s.l.m.

Weather: Nuvoloso - vento modertato

Notes: -

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

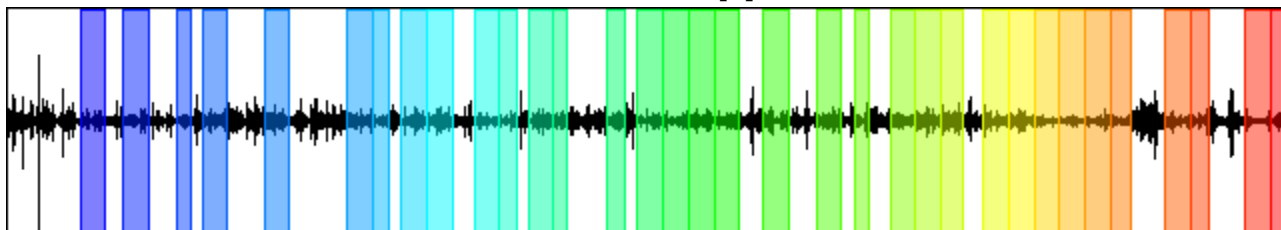*Recording start time:*   2018/03/20 11:46:17

Recording length: 45 min

Windows count: 55

Average windows length: 39.22

Signal coverage: 79.89%

170346 Counts   **CHANNEL #1 [V]**

-140843 Counts

212995 Counts   **CHANNEL #2 [N]**

-270470 Counts

121722 Counts   **CHANNEL #3 [E]**
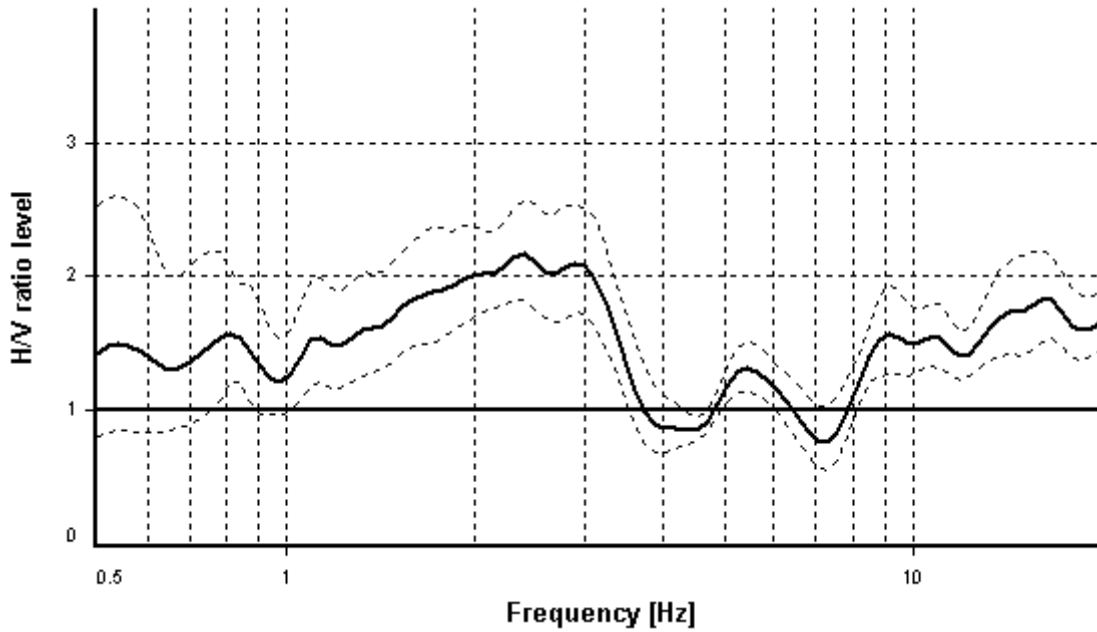

-138448 Counts

HVSR ANALYSIS

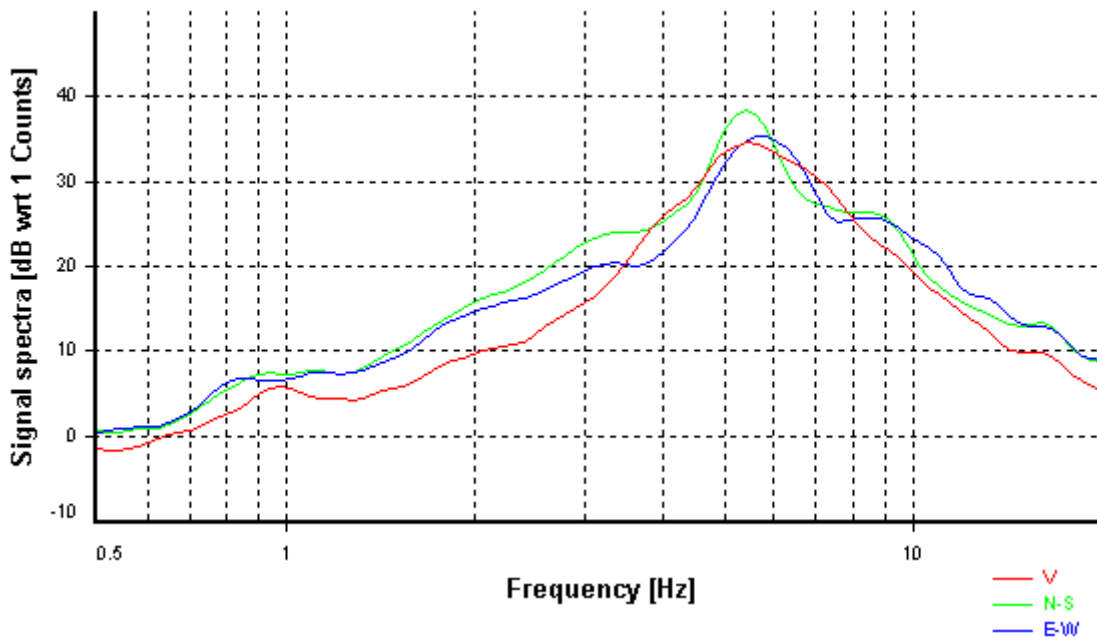*Tapering:*   Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

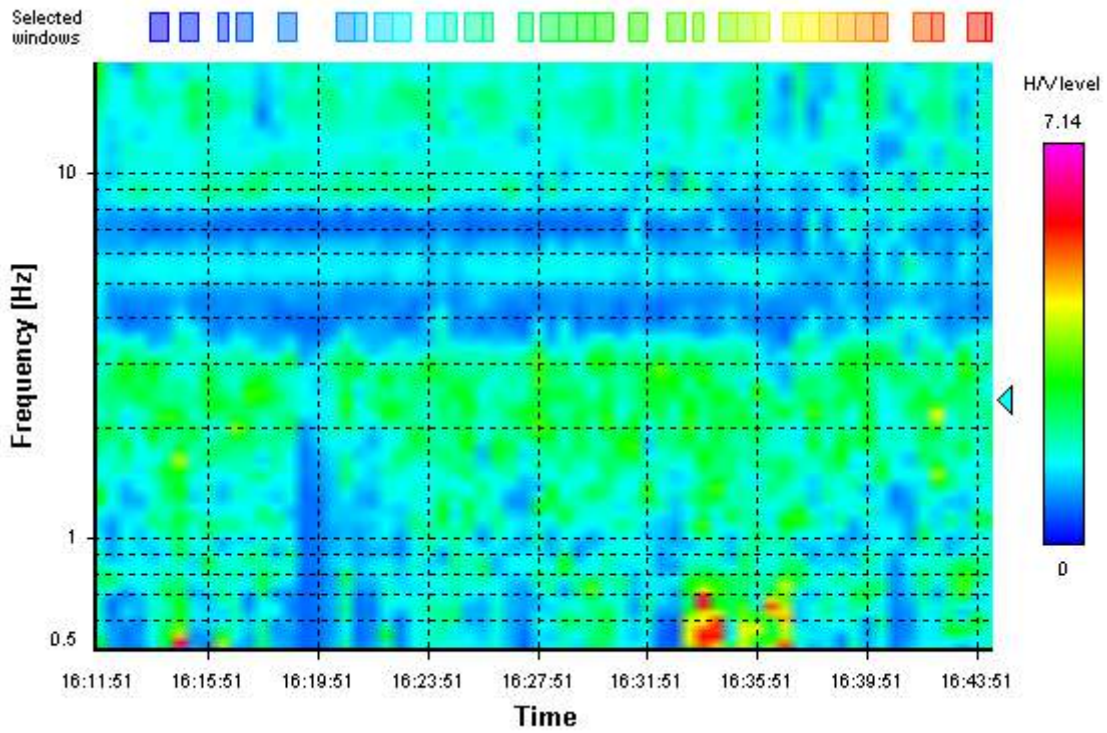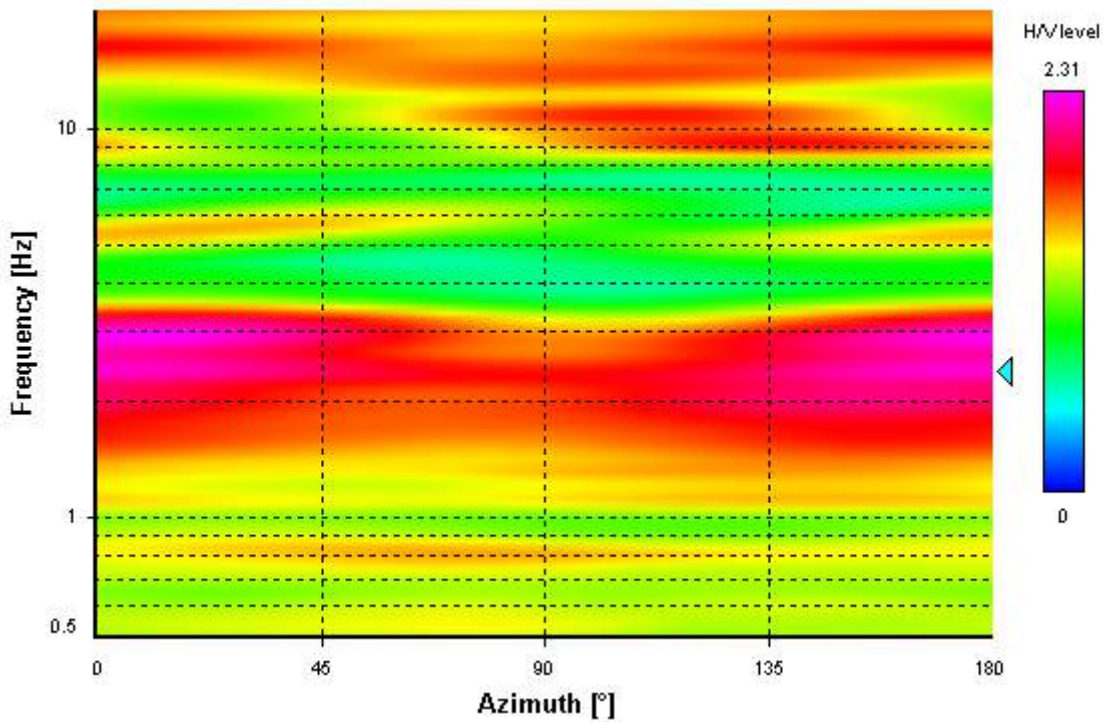*Instrumental correction:*   Disabled

HVSR average

Signal spectra average

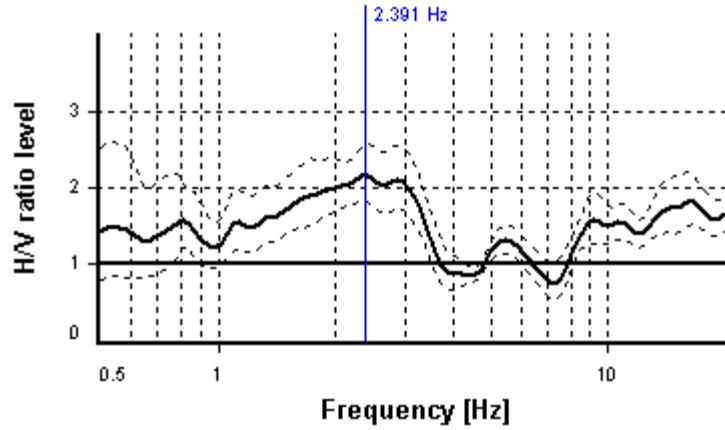## HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

1.912 Hz

A_0 amplitude = *2.628*

Average f_0 = *1.885 ± 0.211*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	55 valid windows (length > 5.23 s) out of 55	**OK**
$n_c(f_0) > 200$	4124.65 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	**OK**
HVSR peak clarity criteria		
$\exists\, f^-$ in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0/2$	0 Hz	**NO**
$\exists\, f^+$ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0/2$	4.67644 Hz	**OK**
$A_0 > 2$	2.63 > 2	**OK**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	0% <= 5%	**OK**
$\sigma_f < \varepsilon(f_0)$	0.21121 >= 0.19122	**NO**
$\sigma_A(f_0) < \theta(f_0)$	1.26434 < 1.78	**OK**
Overall criteria fulfillment		**NO**

STATION INFORMATION

Station code: HVSR20

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Comune di Collesalvetti

Address: Vicarello - Guinceri

Latitude: 4829718,9

Longitude: 1619358,7

Coordinate system: GB

Elevation: 8 m s.l.m.

Weather: sereno

Notes: Presso asilo nido

PHOTOGRAPHIC REFERENCES

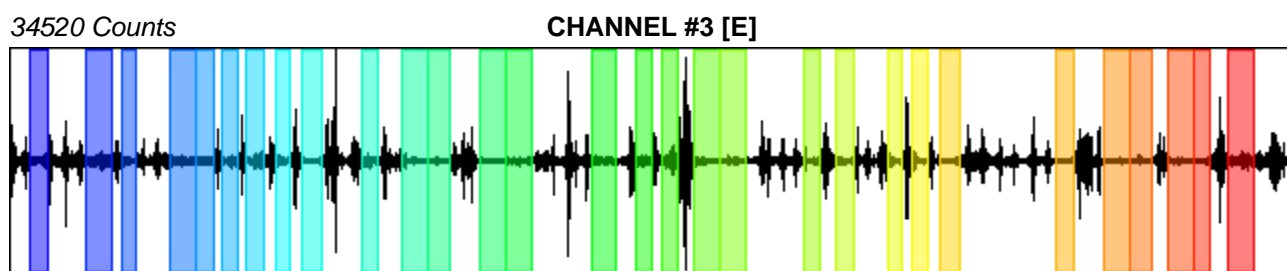# SIGNAL AND WINDOWING

Sampling frequency:　200 Hz

Recording start time:　2018/04/11 08:27:01

Recording length:　33.33 min

Windows count:　37

Average windows length:　34.09

Signal coverage:　63.06%

112141 Counts　　　　　　　　　**CHANNEL #1 [V]**

-105300 Counts

64639 Counts　　　　　　　　　**CHANNEL #2 [N]**

-73367 Counts

49878 Counts　　　　　　　　　**CHANNEL #3 [E]**

-58872 Counts

HVSR ANALYSIS

Tapering: Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

Instrumental correction: Disabled

HVSR average

Signal spectra average

HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

1.015 Hz

A_0 amplitude = *1.694*

   Average f_0 = *1.033 ± 0.209*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	37 valid windows (length > 9.85 s) out of 37	**OK**
$n_c(f_0) > 200$	1280.1 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5 f_0 < f < 2 f_0$	Exceeded 0 times in 37	**OK**
HVSR peak clarity criteria		
$\exists\ f^-$ in $[f_0/4,\ f_0]\ \|\ A_{H/V}(f^-) < A_0/2$	0 Hz	**NO**
$\exists\ f^+$ in $[f_0,\ 4f_0]\ \|\ A_{H/V}(f^+) < A_0/2$	0 Hz	**NO**
$A_0 > 2$	1.69 <= 2	**NO**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	0% <= 5%	**OK**
$\sigma_f < \varepsilon(f_0)$	0.20884 >= 0.10149	**NO**
$\sigma_A(f_0) < \theta(f_0)$	1.47931 < 1.78	**OK**
Overall criteria fulfillment		**NO**

STATION INFORMATION

Station code: HVSR21

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Comune di Collesalvetti

Address: Ca' Lo Spelli

Latitude: 4826834,1

Longitude: 1615262,4

Coordinate system: GB

Elevation: 55 m s.l.m.

Weather: sereno

Notes: -

PHOTOGRAPHIC REFERENCES
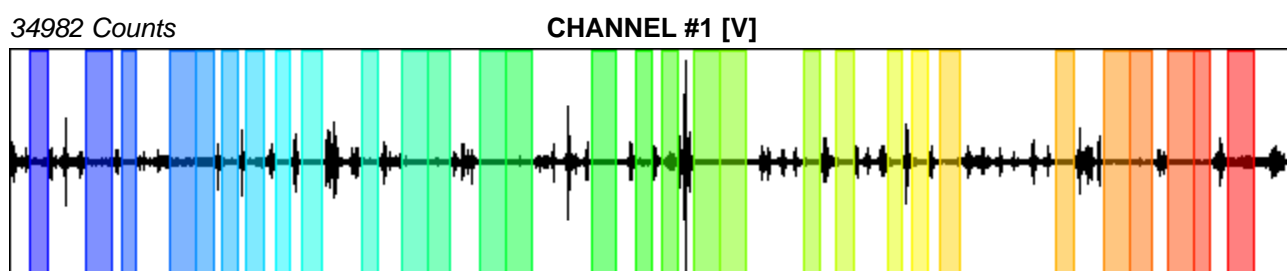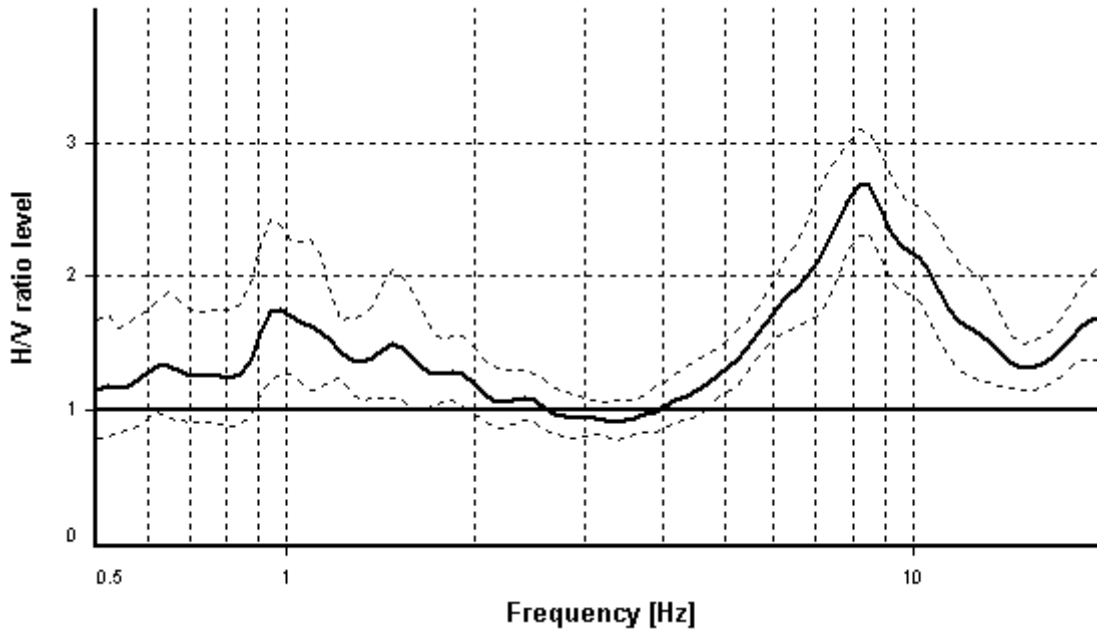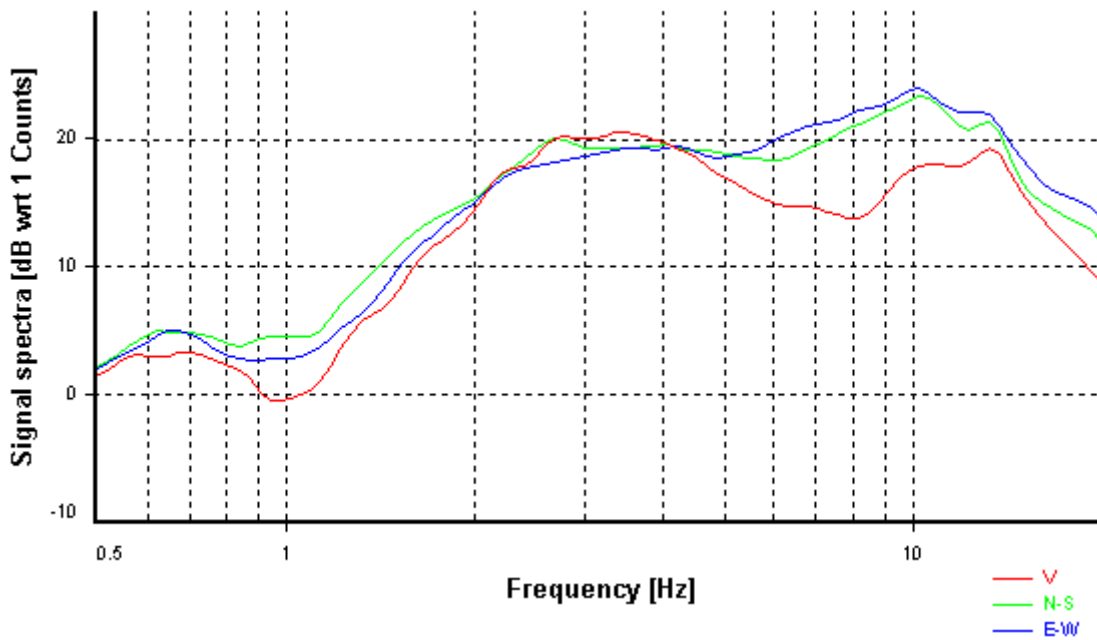
SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/04/14 15:15:56

Recording length: 33.33 min

Windows count: 41

Average windows length: 39.24

Signal coverage: 80.44%

5643 Counts   **CHANNEL #1 [V]**

-9913 Counts

3914 Counts   **CHANNEL #2 [N]**

-4853 Counts

9710 Counts   **CHANNEL #3 [E]**

-9868 Counts

HVSR ANALYSIS

Tapering:　Disabled

Smoothing:　Konno-Ohmachi (Bandwidth coefficient = 40)

Instrumental correction:　Disabled

HVSR average

Signal spectra average

HVSR time-frequency analysis (30 seconds windows)
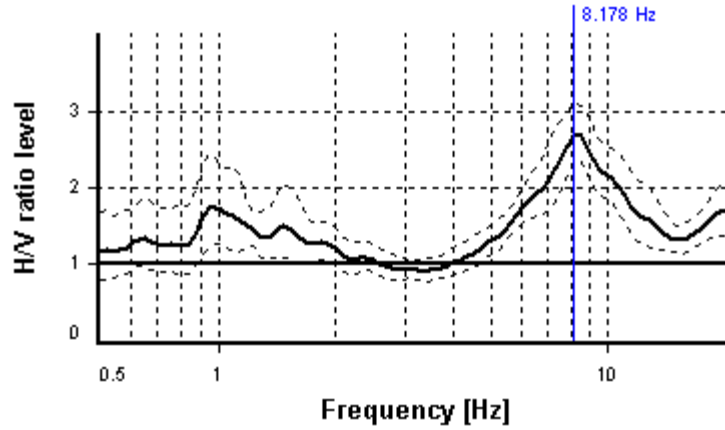

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

1.317 Hz

A_0 amplitude = *2.228*

Average f_0 = *1.466 ± 0.274*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	41 valid windows (length > 7.59 s) out of 41	OK
$n_c(f_0) > 200$	2119.42 > 200	OK
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	OK
HVSR peak clarity criteria		
$\exists\ f\ in\ [f_0/4, f_0]\ \|\ A_{H/V}(f^-) < A_0/2$	0.8116 Hz	OK
$\exists\ f^+\ in\ [f_0, 4f_0]\ \|\ A_{H/V}(f^+) < A_0/2$	5.22953 Hz	OK
$A_0 > 2$	2.23 > 2	OK
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	3.66% <= 5%	OK
$\sigma_f < \epsilon(f_0)$	0.27435 >= 0.13174	NO
$\sigma_A(f_0) < \theta(f_0)$	1.21678 < 1.78	OK
Overall criteria fulfillment		OK

STATION INFORMATION

Station code: HVSR22

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Comune di Collesalvetti

Address: Nugola Vecchia

Latitude: 4826100,7

Longitude: 1617007,2

Coordinate system: GB

Elevation: 52 m s.l.m.

Weather: sereno

Notes: -

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/04/12 07:58:26

Recording length: 33.33 min

Windows count: 37

Average windows length: 36.99

Signal coverage: 68.43%

2299 Counts

CHANNEL #1 [V]

-2344 Counts

2980 Counts

CHANNEL #2 [N]

-2685 Counts

2909 Counts

CHANNEL #3 [E]
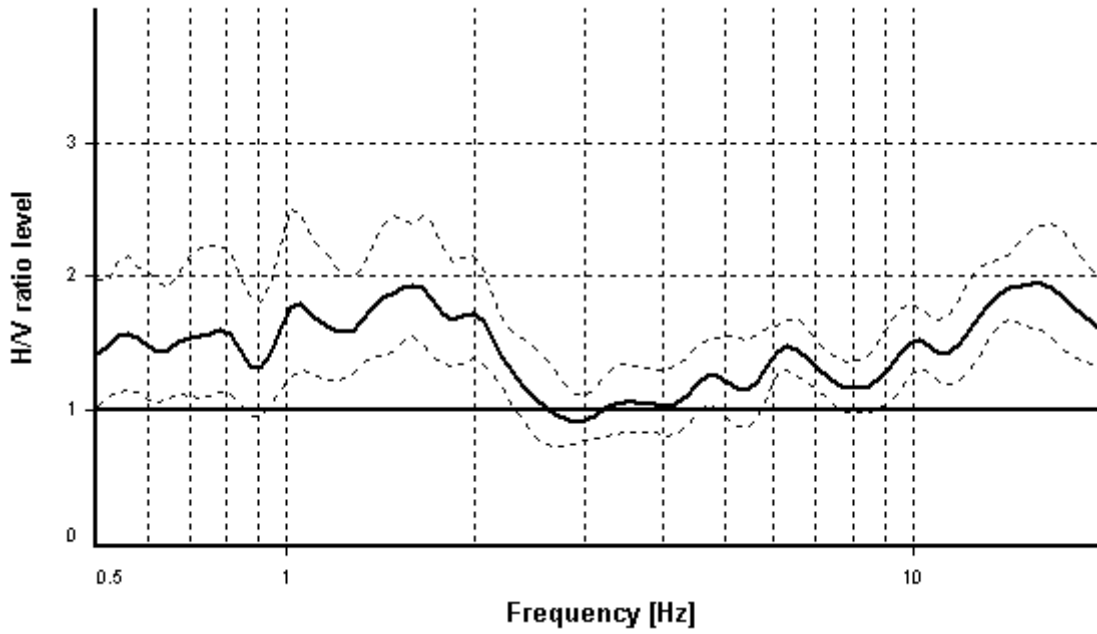

-2928 Counts

HVSR ANALYSIS
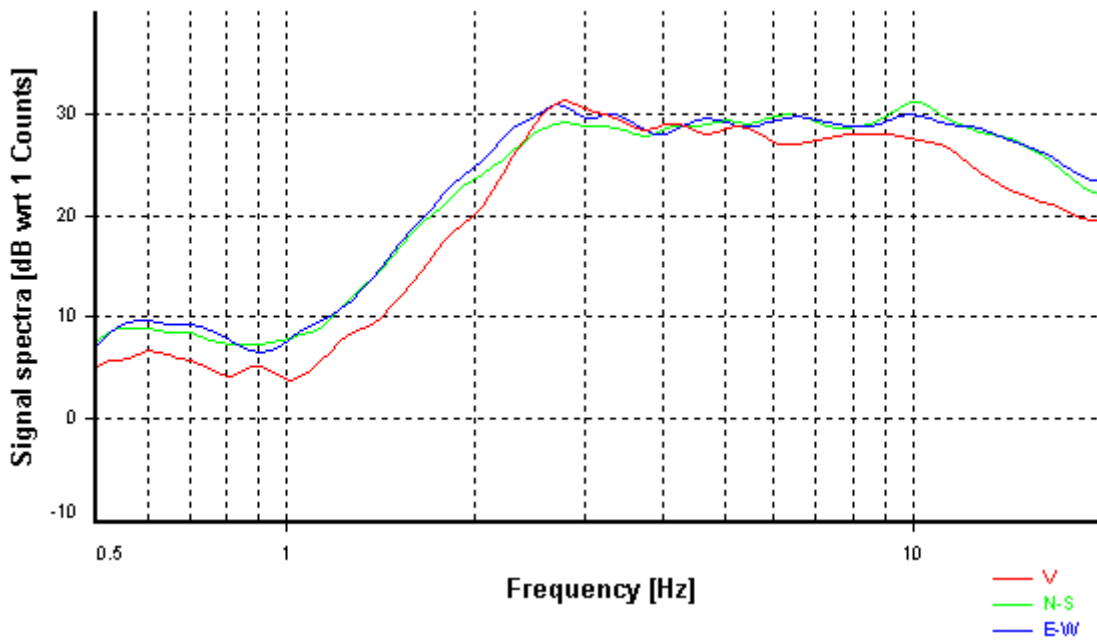
Tapering: Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

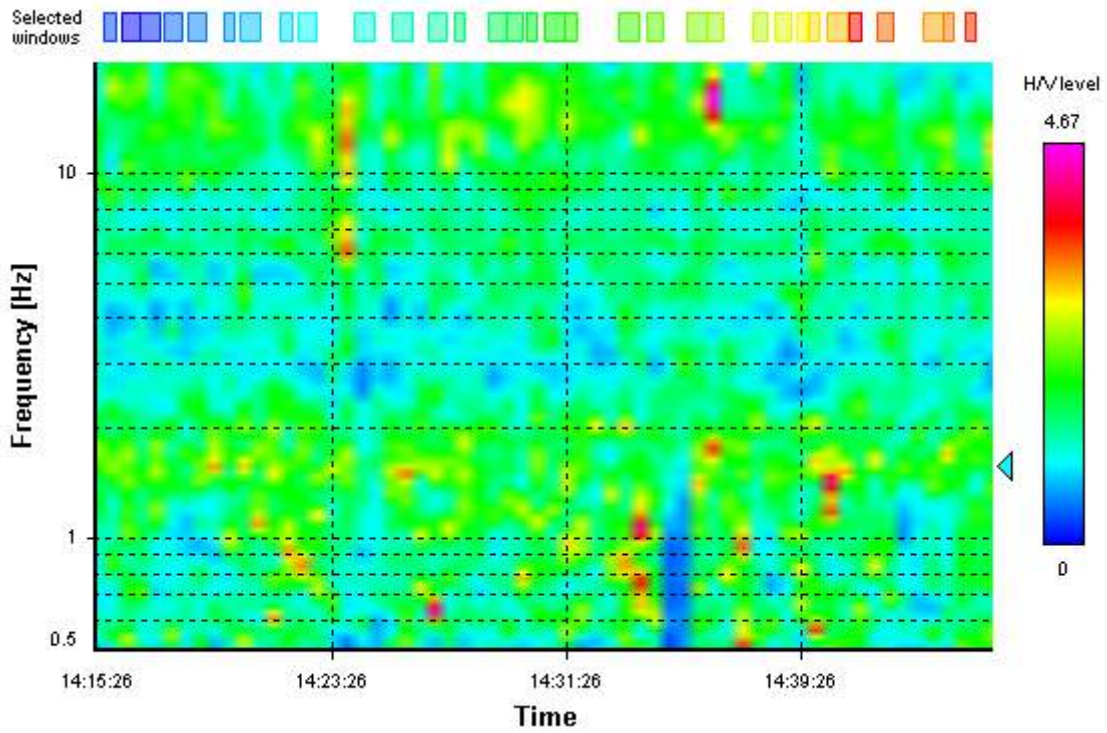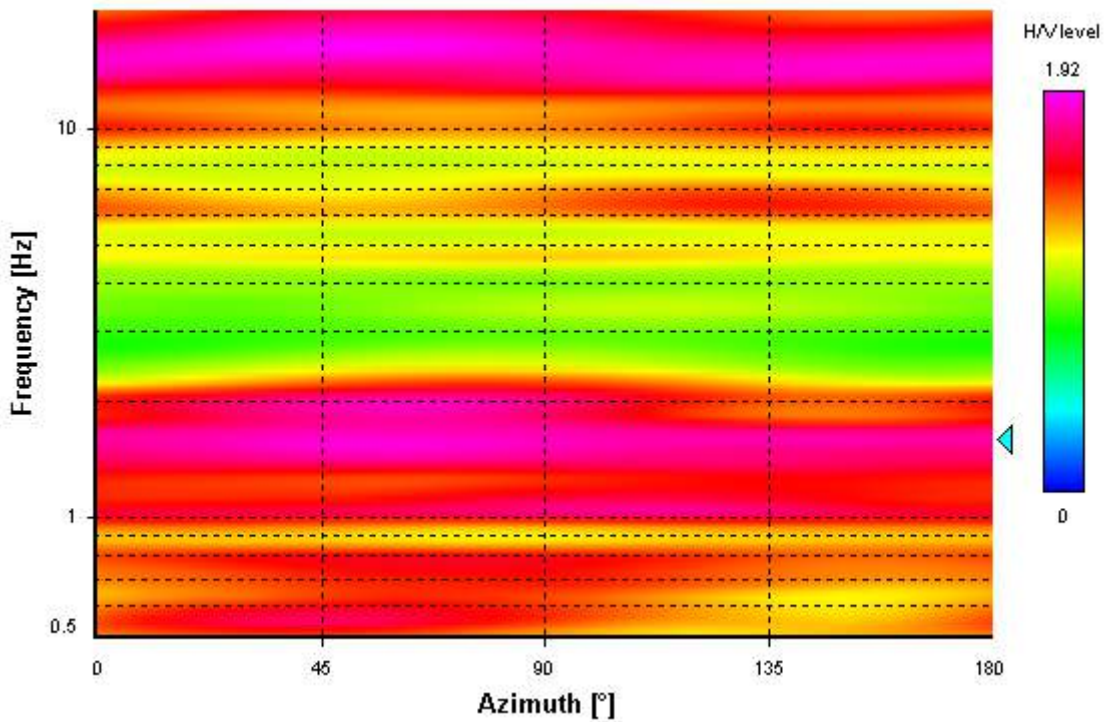*Instrumental correction:*   Disabled

HVSR average

Signal spectra average

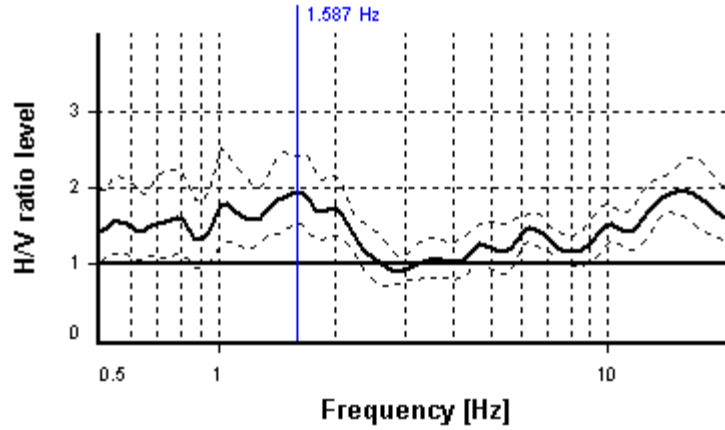## HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

0.908 Hz

A_0 amplitude = *1.899*

Average f_0 = *0.889 ± 0.188*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	37 valid windows (length > 11.02 s) out of 37	OK
$n_c(f_0) > 200$	1242.16 > 200	OK
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 35	OK
HVSR peak clarity criteria		
$\exists\, f^-$ in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0/2$	0 Hz	NO
$\exists\, f^+$ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0/2$	0 Hz	NO
$A_0 > 2$	1.9 <= 2	NO
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	10.58% > 5%	NO
$\sigma_f < \varepsilon(f_0)$	0.18751 >= 0.13614	NO
$\sigma_A(f_0) < \theta(f_0)$	1.2464 < 2	OK
Overall criteria fulfillment		NO

STATION INFORMATION

Station code: HVSR23

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Comune di Collesalvetti

Address: Guasticce - strada per Ca' Lo Spelli

Latitude: 4827969,2

Longitude: 1615282,6

Coordinate system: GB

Elevation: 12 m s.l.m.

Weather: sereno

Notes: -

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/04/14 14:24:55
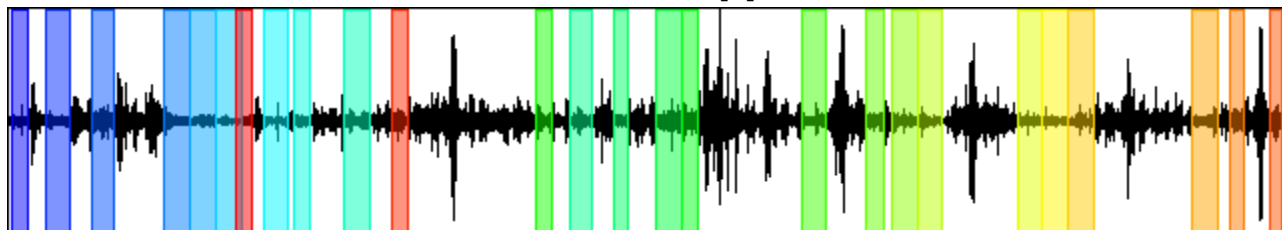
Recording length: 33.33 min

Windows count: 36

Average windows length: 36.44

Signal coverage: 65.6%

22005 Counts

CHANNEL #1 [V]

-23704 Counts

14401 Counts

CHANNEL #2 [N]

-16378 Counts

25682 Counts

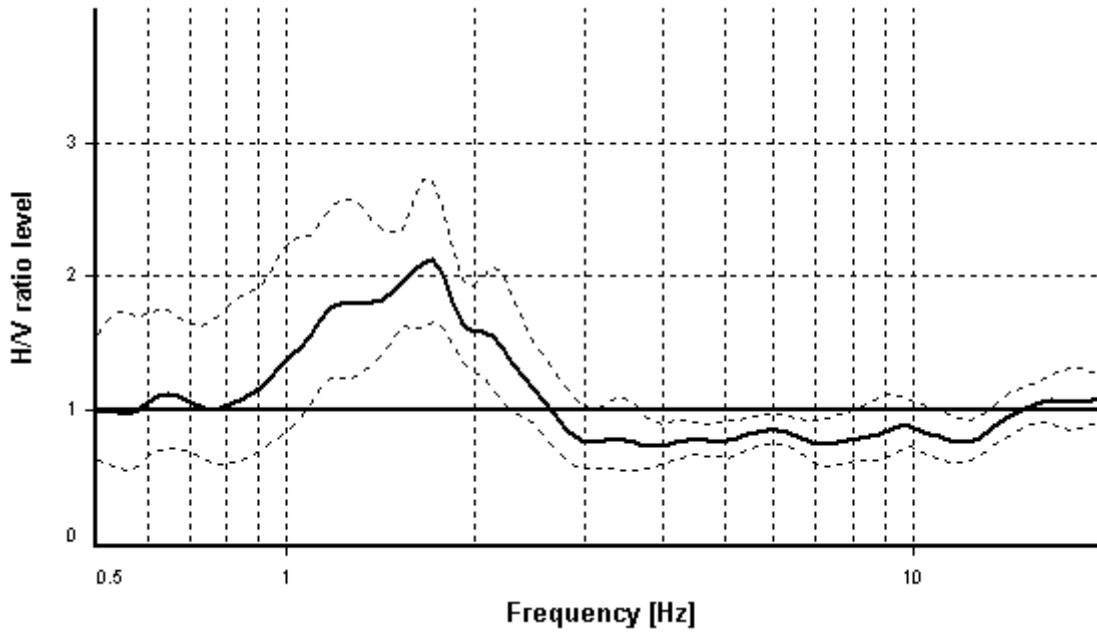**CHANNEL #3 [E]**

-21492 Counts

HVSR ANALYSIS

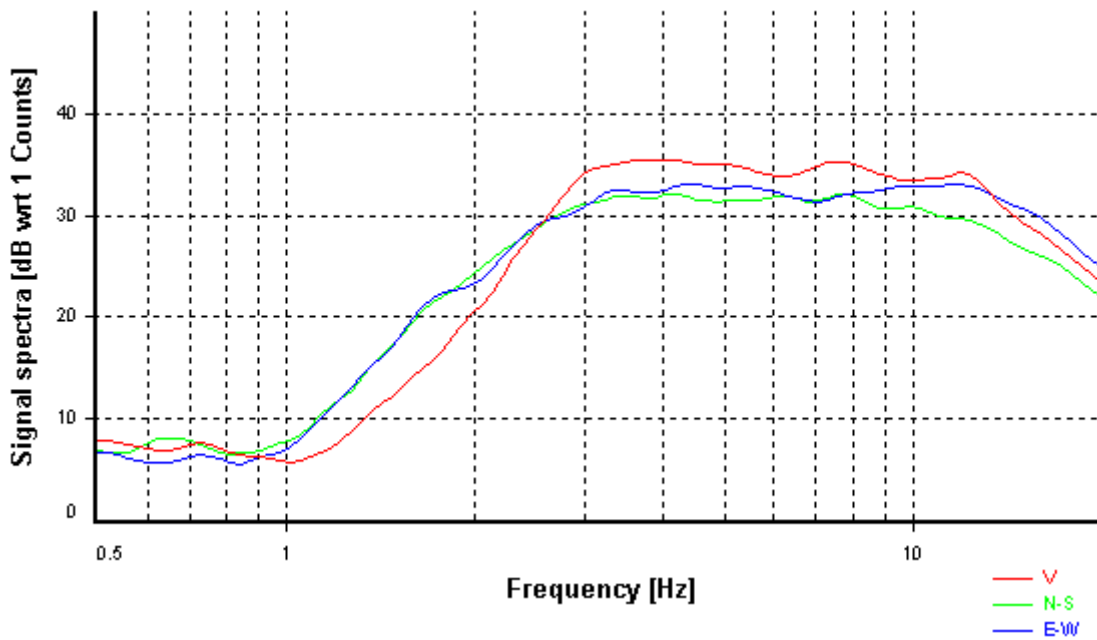*Tapering:*   Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

Instrumental correction: Disabled

HVSR average

Signal spectra average

HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

1.367 Hz

A_0 *amplitude =* *2.891*

Average f_0 = *1.294 ± 0.203*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	36 valid windows (length > 7.31 s) out of 36	OK
$n_c(f_0) > 200$	1794.01 > 200	OK
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	OK
HVSR peak clarity criteria		
$\exists f^- $ in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0/2$	0 Hz	NO
$\exists f^+ $ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0/2$	2.06017 Hz	OK
$A_0 > 2$	2.89 > 2	OK
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	7.18% > 5%	NO
$\sigma_f < \epsilon(f_0)$	0.20269 >= 0.13674	NO
$\sigma_A(f_0) < \theta(f_0)$	1.3431 < 1.78	OK
Overall criteria fulfillment		NO

STATION INFORMATION

Station code: HVSR24

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: 24

Address: Via Buchette - Collesalvetti

Latitude: 4829491,3

Longitude: 1617788,4

Coordinate system: GB

Elevation: 11 m s.l.m.

Weather: soleggiato. Vento debole

Notes: -

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/04/07 14:54:44

Recording length: 33.33 min

Windows count: 29

Average windows length: 34.1

Signal coverage: 49.45%

26622 Counts **CHANNEL #1 [V]**

-31401 Counts

60307 Counts **CHANNEL #2 [N]**

-66180 Counts

34581 Counts **CHANNEL #3 [E]**

-28470 Counts

HVSR ANALYSIS

Tapering: Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

Instrumental correction: Disabled

HVSR average

Signal spectra average

HVSR time-frequency analysis (30 seconds windows)
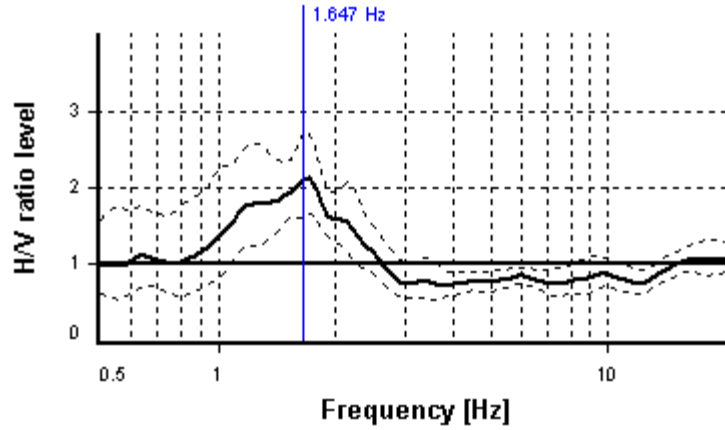

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

1.317 Hz

A_0 amplitude = *1.897*

Average f_0 = *1.312 ± 0.223*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	29 valid windows (length > 7.59 s) out of 29	**OK**
$n_c(f_0) > 200$	1302.91 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	**OK**
HVSR peak clarity criteria		
$\exists\ f^- $ in $[f_0/4, f_0]\ \|\ A_{H/V}(f^-) < A_0/2$	0 Hz	**NO**
$\exists\ f^+ $ in $[f_0, 4f_0]\ \|\ A_{H/V}(f^+) < A_0/2$	3.22175 Hz	**OK**
$A_0 > 2$	1.9 <= 2	**NO**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	3.8% <= 5%	**OK**
$\sigma_f < \varepsilon(f_0)$	0.22317 >= 0.13174	**NO**
$\sigma_A(f_0) < \theta(f_0)$	1.25003 < 1.78	**OK**
Overall criteria fulfillment		**NO**

STATION INFORMATION

Station code: HVSR25

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Collesalvetti

Address: Parrana San Martino - Pietreto/L'Aietta

Latitude: 4822077,6

Longitude: 1616538,3

Coordinate system: GB

Elevation: 100 m s.l.m.

Weather: -

Notes: -

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/05/15 12:36:05

Recording length: 33.33 min

Windows count: 31

Average windows length: 35.89

Signal coverage: 55.63%

3155 Counts   **CHANNEL #1 [V]**

-3571 Counts

3092 Counts   **CHANNEL #2 [N]**

-3457 Counts

5760 Counts   **CHANNEL #3 [E]**
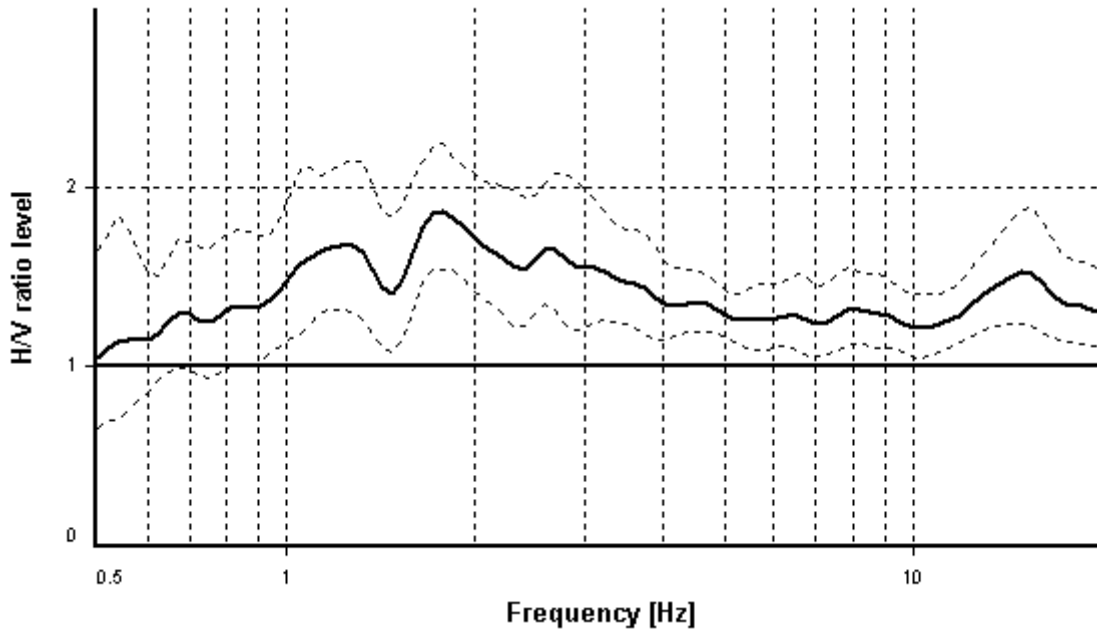

-6700 Counts

HVSR ANALYSIS

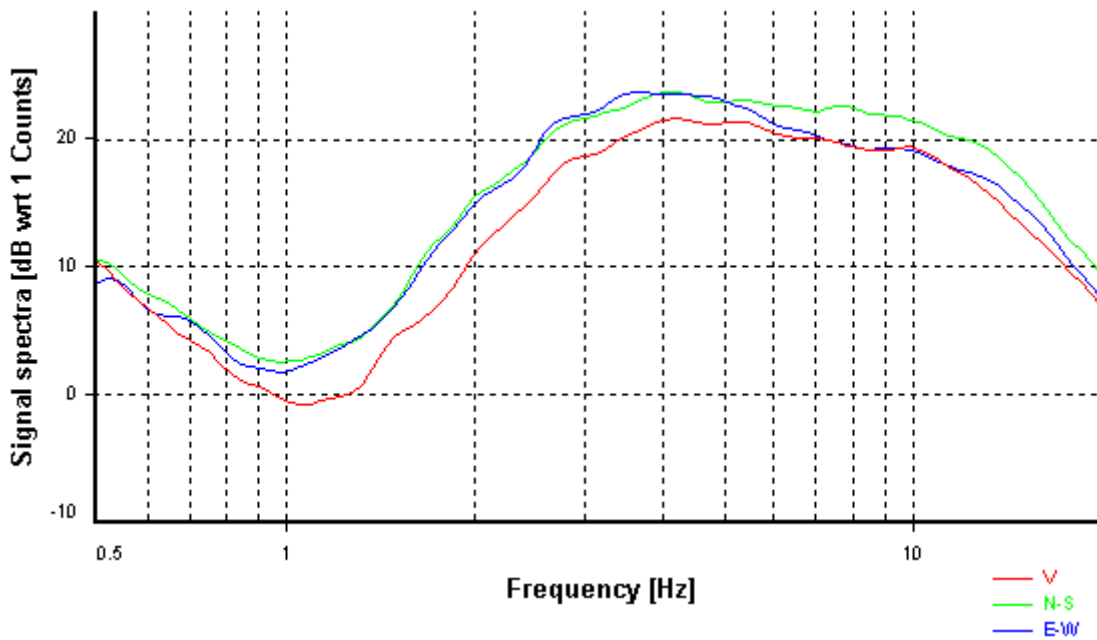*Tapering:* Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

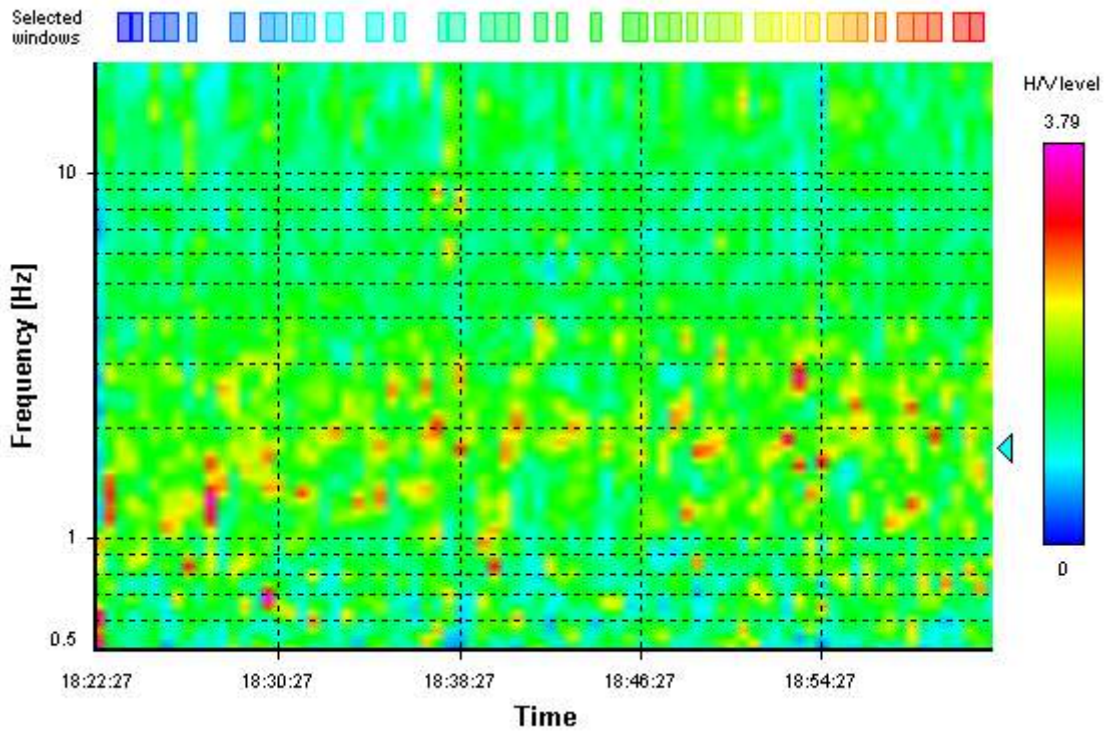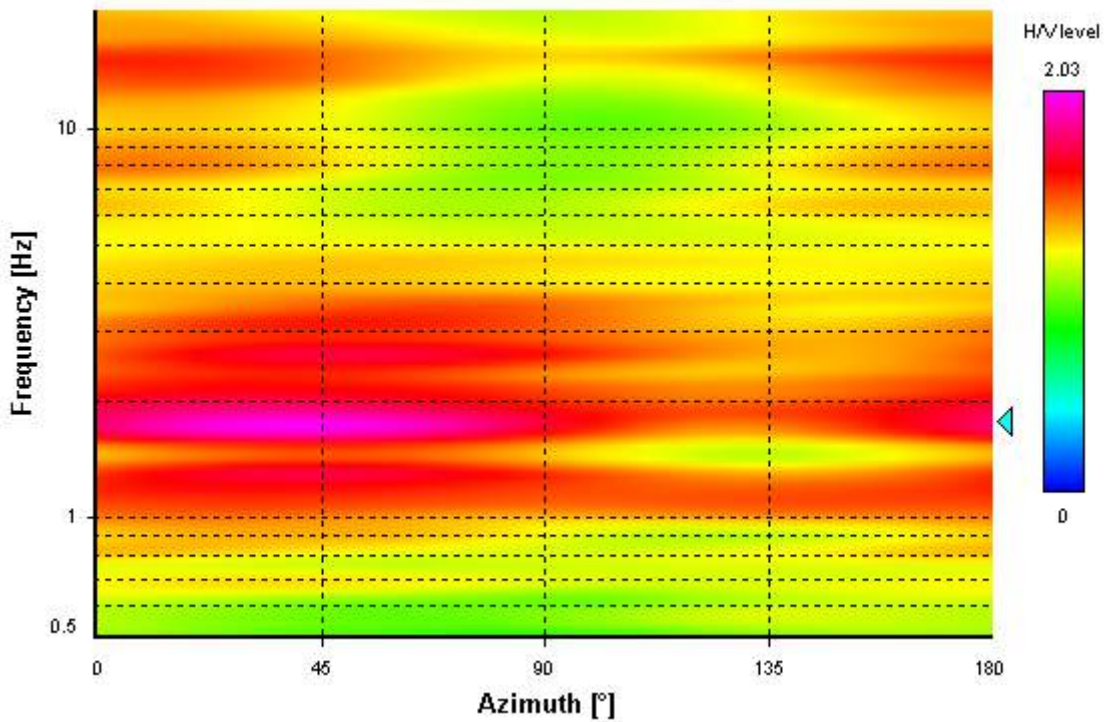*Instrumental correction:* Disabled

HVSR average

Signal spectra average

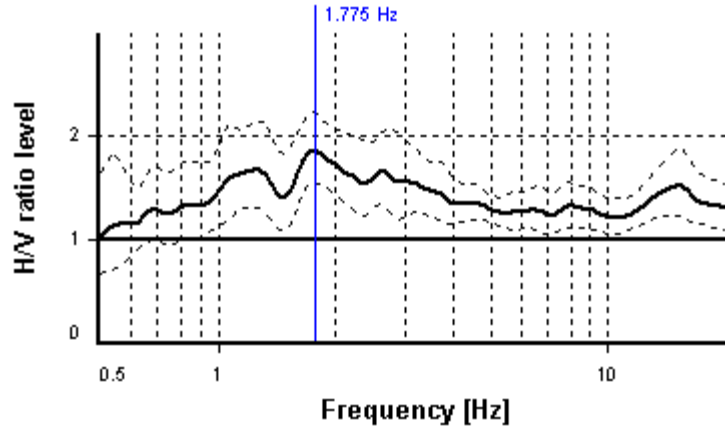## HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

1.135 Hz

A_0 amplitude = *3.321*

Average f_0 = *1.122 ± 0.244*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	31 valid windows (length > 8.81 s) out of 31	OK
$n_c(f_0) > 200$	1262.75 > 200	OK
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	OK
HVSR peak clarity criteria		
$\exists\, f^- $ in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0/2$	0 Hz	NO
$\exists\, f^+ $ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0/2$	3.47101 Hz	OK
$A_0 > 2$	3.32 > 2	OK
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	7.18% > 5%	NO
$\sigma_f < \varepsilon(f_0)$	0.24403 >= 0.1135	NO
$\sigma_A(f_0) < \theta(f_0)$	1.2998 < 1.78	OK
Overall criteria fulfillment		NO

STATION INFORMATION

Station code: HVSR26

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Collesalvetti

Address: Poggio ai Grilli

Latitude: 4825059,7

Longitude: 1615809,4

Coordinate system: GB

Elevation: 36 m s.l.m.

Weather: Sereno

Notes: -

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/04/15 11:50:08
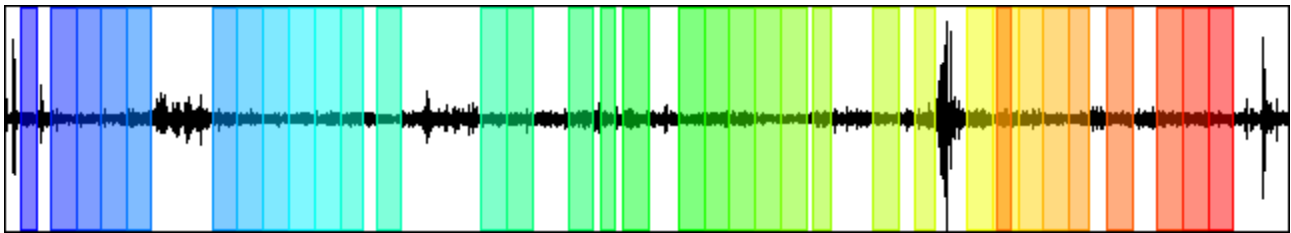
Recording length: 33.33 min

Windows count: 33

Average windows length: 36.46

Signal coverage: 60.17%
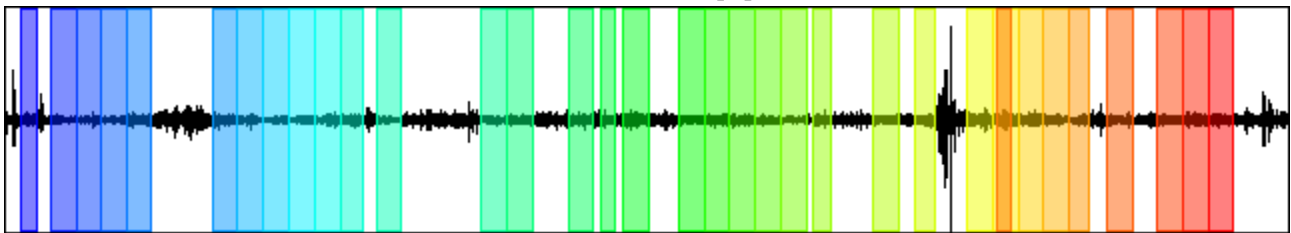
22443 Counts   **CHANNEL #1 [V]**

-15954 Counts

16993 Counts   **CHANNEL #2 [N]**

-18262 Counts

23372 Counts   **CHANNEL #3 [E]**
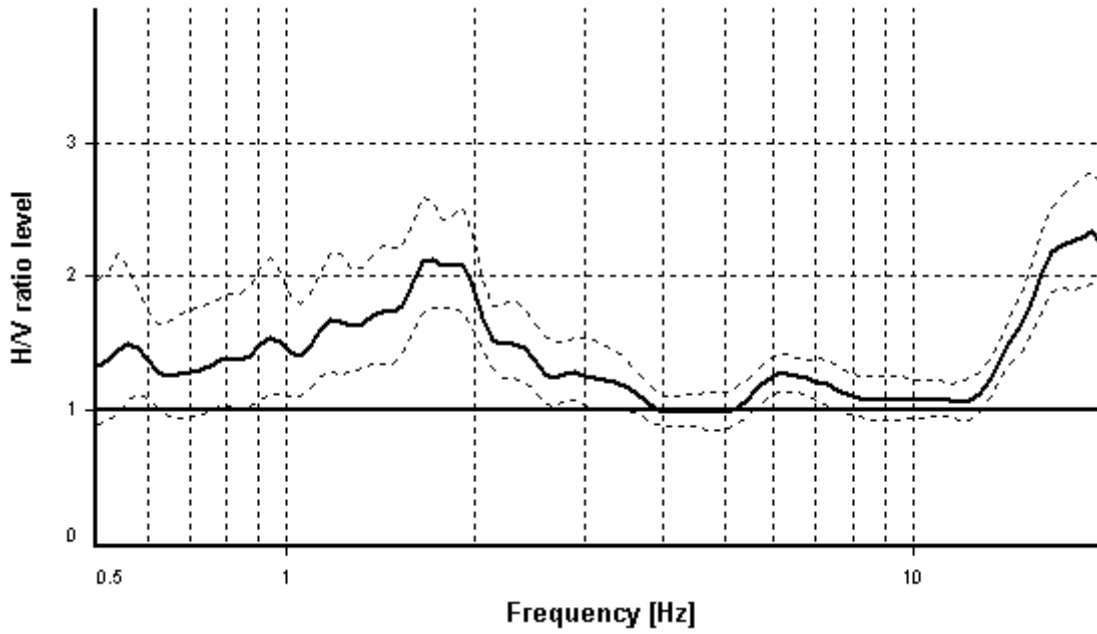

-20900 Counts

HVSR ANALYSIS
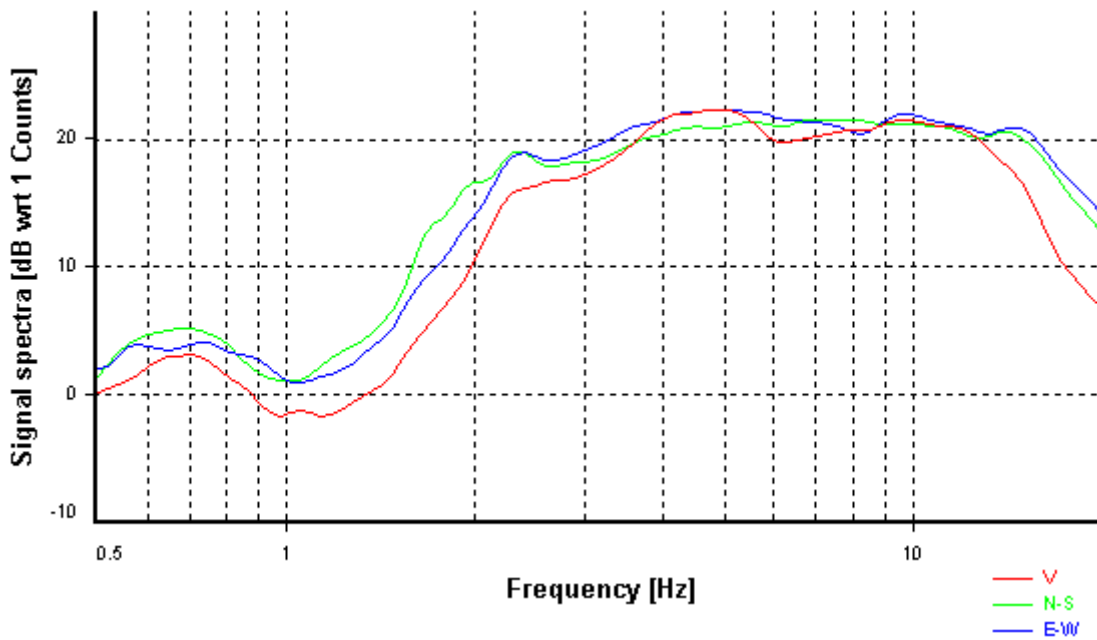
Tapering:　Disabled

Smoothing:　Konno-Ohmachi (Bandwidth coefficient = 40)

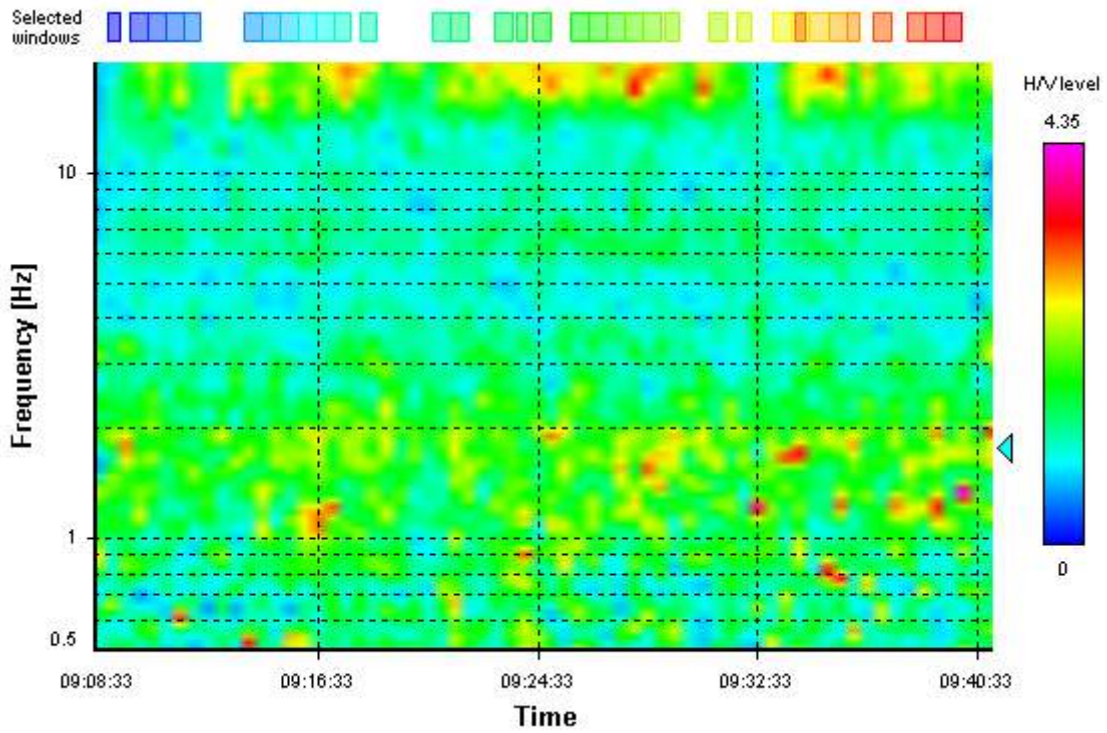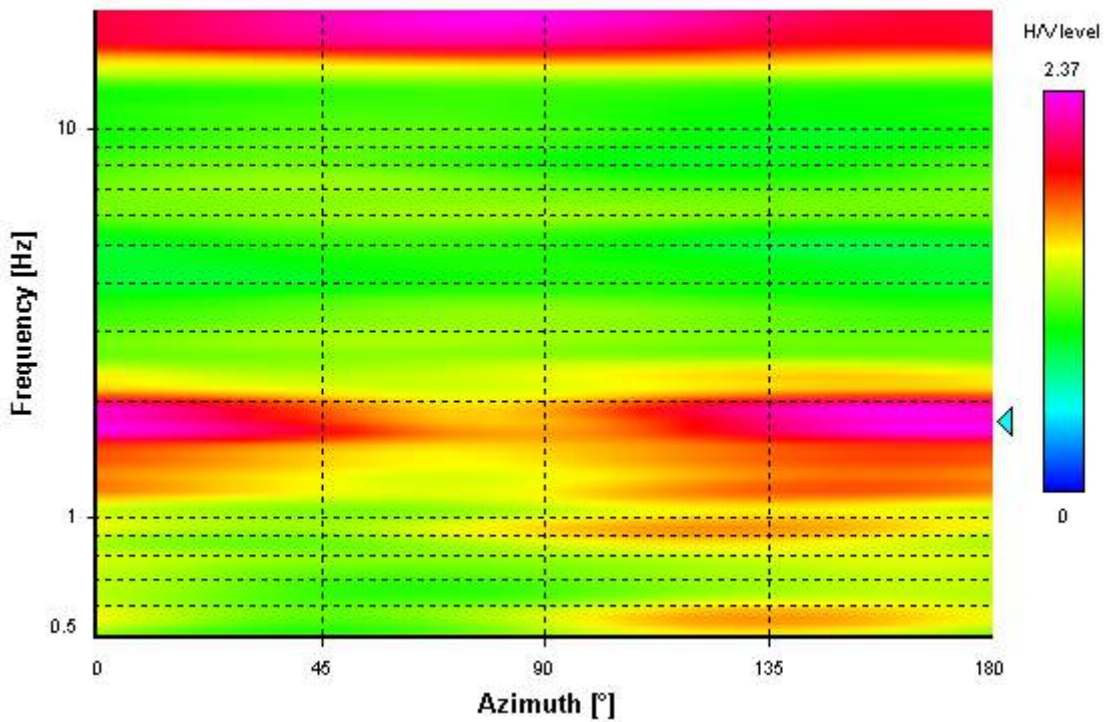*Instrumental correction:*　Disabled

HVSR average

Signal spectra average

HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

0.649 Hz

A_0 amplitude = *3.203*

Average f_0 = *0.574 ± 0.095*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	33 valid windows (length > 15.41 s) out of 33	**OK**
$n_c(f_0) > 200$	780.97 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 26	**OK**
HVSR peak clarity criteria		
$\exists\ f^- \text{ in } [f_0/4, f_0] \mid A_{H/V}(f^-) < A_0/2$	0 Hz	**NO**
$\exists\ f^+ \text{ in } [f_0, 4f_0] \mid A_{H/V}(f^+) < A_0/2$	1.01493 Hz	**OK**
$A_0 > 2$	3.2 > 2	**OK**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	22.96% > 5%	**NO**
$\sigma_f < \varepsilon(f_0)$	0.09495 < 0.09735	**OK**
$\sigma_A(f_0) < \theta(f_0)$	1.51184 < 2	**OK**
Overall criteria fulfillment		**NO**

STATION INFORMATION

Station code: HVSR27

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Collesalvetti

Address: Castell'anselmo

Latitude: 4823427,0

Longitude: 1618642,5

Coordinate system: GB

Elevation: 90 m s.l.m.

Weather: Sereno

Notes: -

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/04/07 09:27:04

Recording length: 33.33 min

Windows count: 33

Average windows length: 37.3

Signal coverage: 61.54%

26422 Counts   **CHANNEL #1 [V]**

-25851 Counts

11678 Counts   **CHANNEL #2 [N]**

-11926 Counts

26988 Counts   **CHANNEL #3 [E]**

-26905 Counts

HVSR ANALYSIS

Tapering: Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

Instrumental correction: Disabled

HVSR average

Signal spectra average

HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

2.674 Hz

A_0 amplitude = *2.139*

Average f_0 = *2.503 ± 0.283*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	33 valid windows (length > 3.74 s) out of 33	**OK**
$n_c(f_0) > 200$	3291.24 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	**OK**
HVSR peak clarity criteria		
$\exists\, f^- $ in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0/2$	0 Hz	**NO**
$\exists\, f^+ $ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0/2$	3.47101 Hz	**OK**
$A_0 > 2$	2.14 > 2	**OK**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	3.8% <= 5%	**OK**
$\sigma_f < \varepsilon(f_0)$	0.2835 >= 0.13371	**NO**
$\sigma_A(f_0) < \theta(f_0)$	1.22481 < 1.58	**OK**
Overall criteria fulfillment		**NO**

STATION INFORMATION

Station code: HVSR28

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Collesalvetti

Address: Castell'anselmo -cimitero

Latitude: 4823693,7

Longitude: 1618341,4

Coordinate system: GB

Elevation: 90 m s.l.m.

Weather: Sereno

Notes: Traffico scarso

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/04/07 10:18:37

Recording length: 33.33 min

Windows count: 40

Average windows length: 37.8

Signal coverage: 75.6%

70541 Counts

CHANNEL #1 [V]

-27774 Counts

26853 Counts

CHANNEL #2 [N]

-19314 Counts

52999 Counts

CHANNEL #3 [E]

-47561 Counts

HVSR ANALYSIS

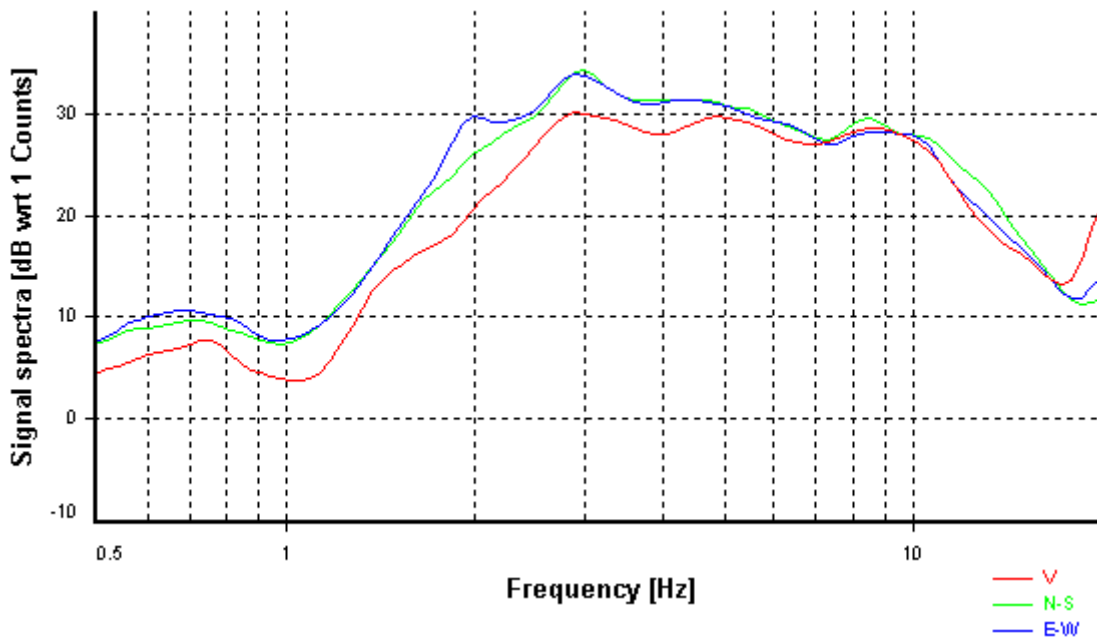*Tapering:* Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

Instrumental correction: Disabled
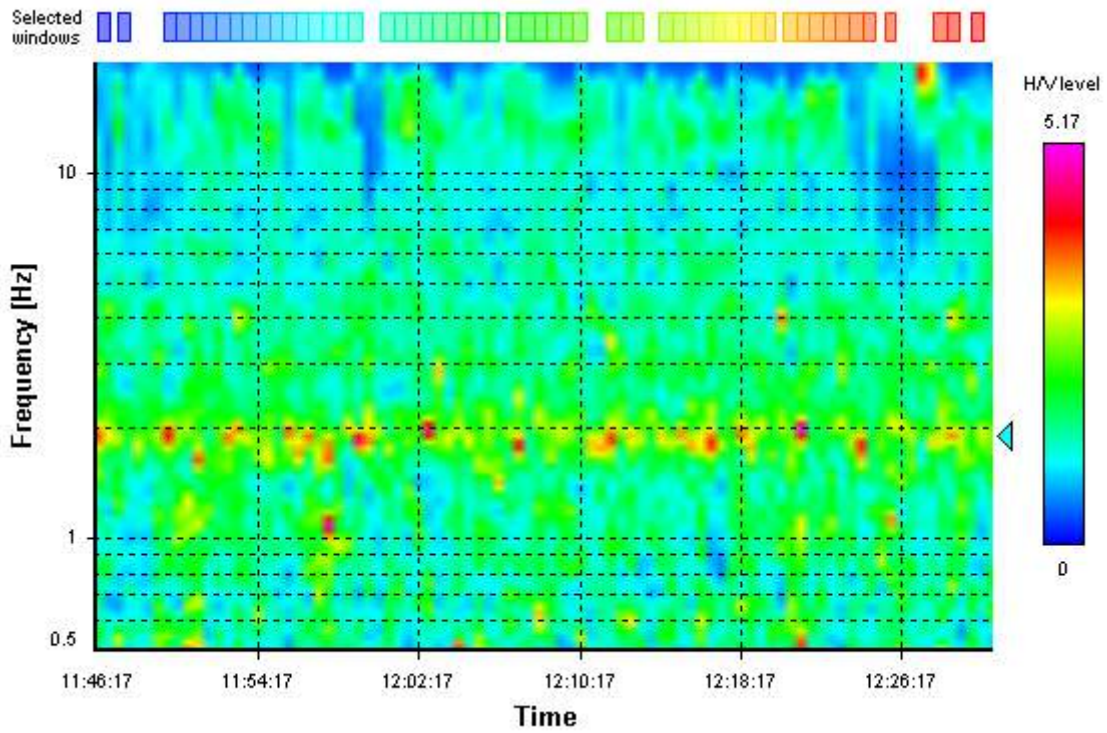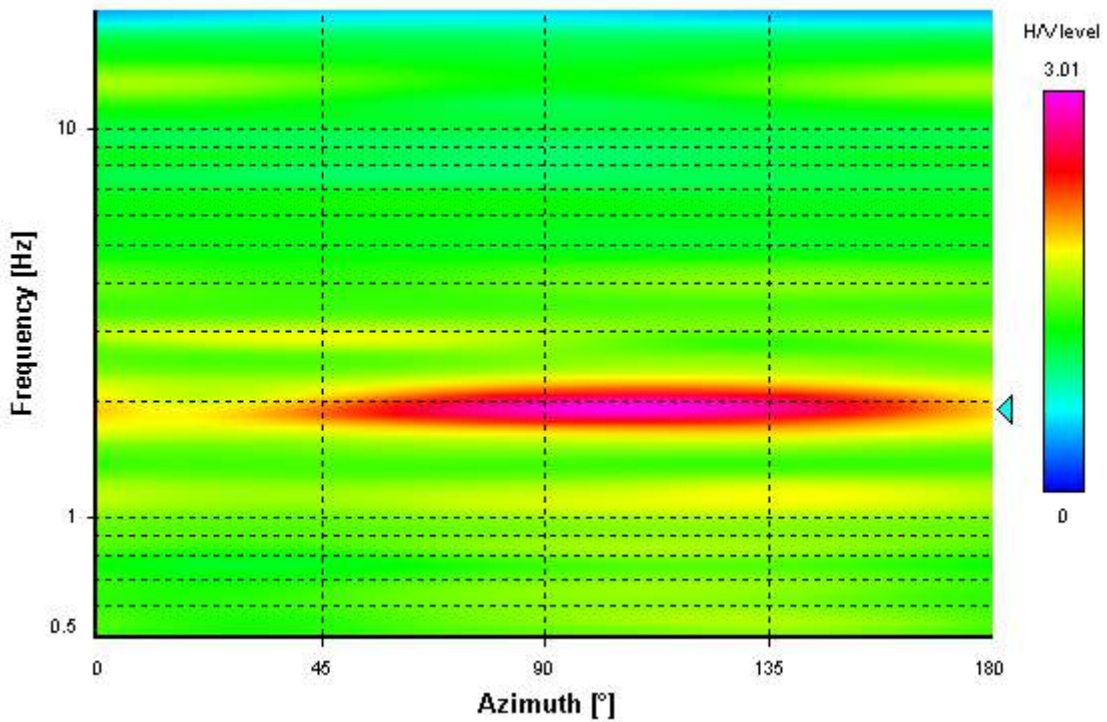
HVSR average

Signal spectra average

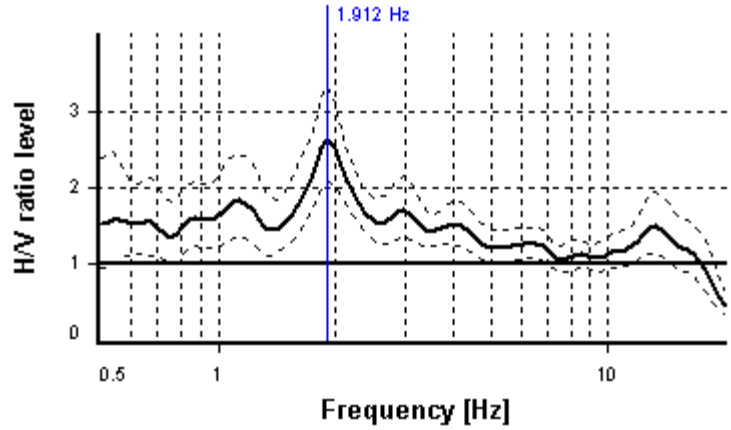## HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected *f₀* frequency

11.871 Hz

***A₀ amplitude =** 2.968*

***Average f₀ =** 11.865 ± 0.349*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	40 valid windows (length > 0.84 s) out of 40	**OK**
$n_c(f_0) > 200$	17948.96 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 33	**OK**
HVSR peak clarity criteria		
$\exists\ f^-$ in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0/2$	9.14532 Hz	**OK**
$\exists\ f^+$ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0/2$	14.30172 Hz	**OK**
$A_0 > 2$	2.97 > 2	**OK**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	0% <= 5%	**OK**
$\sigma_f < \varepsilon(f_0)$	0.34938 < 0.59353	**OK**
$\sigma_A(f_0) < \theta(f_0)$	1.1768 < 1.58	**OK**
Overall criteria fulfillment		**OK**

STATION INFORMATION

Station code: HVSR29

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Collesalvetti

Address: Montecandoli/Pozzuolo

Latitude: 4824526,7

Longitude: 1617511,6

Coordinate system: GB

Elevation: 53 m s.l.m.

Weather: Sereno

Notes: Traffico scarso

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/04/07 11:27:06
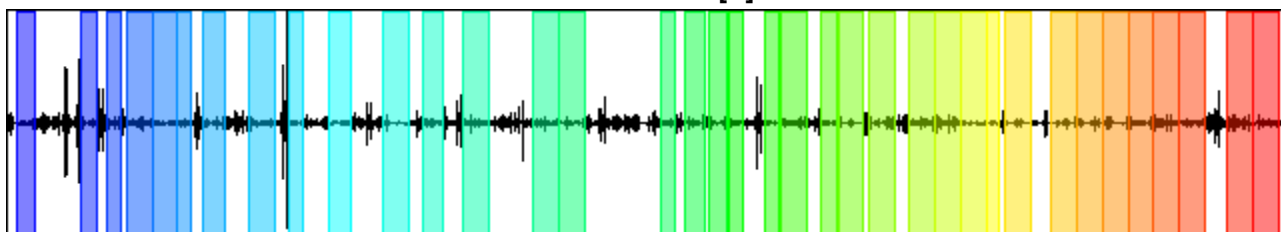
Recording length: 33.33 min

Windows count: 40

Average windows length: 37.69
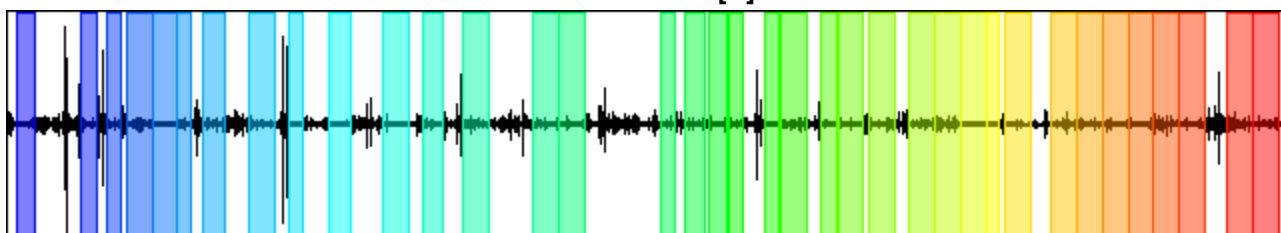
Signal coverage: 75.38%

11205 Counts **CHANNEL #1 [V]**

-8630 Counts

15051 Counts **CHANNEL #2 [N]**

-16378 Counts

15254 Counts **CHANNEL #3 [E]**
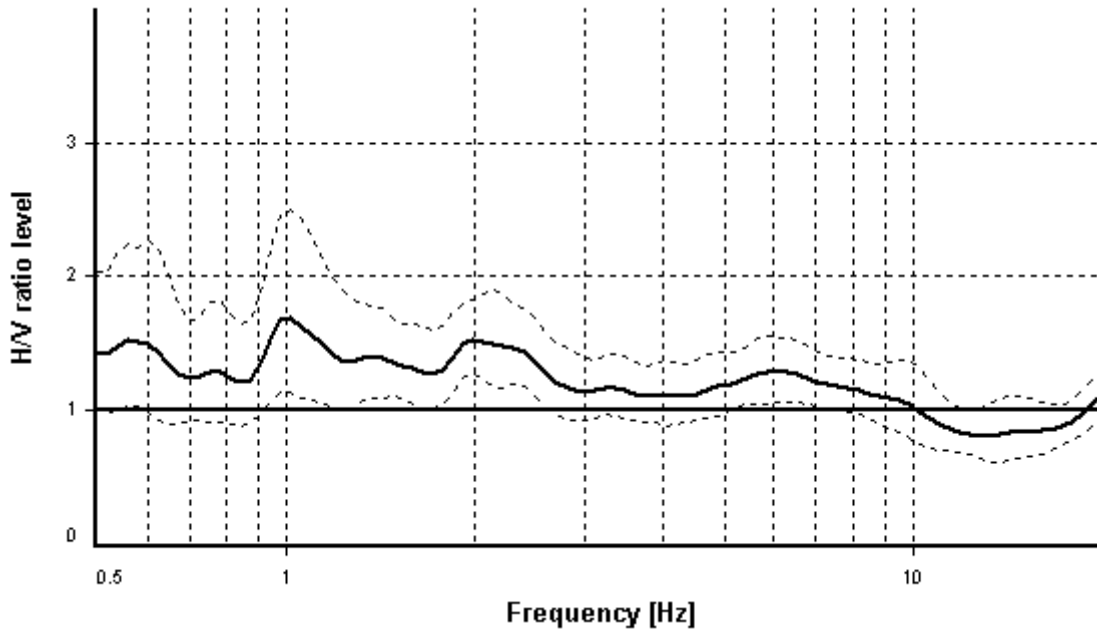

-17342 Counts

HVSR ANALYSIS

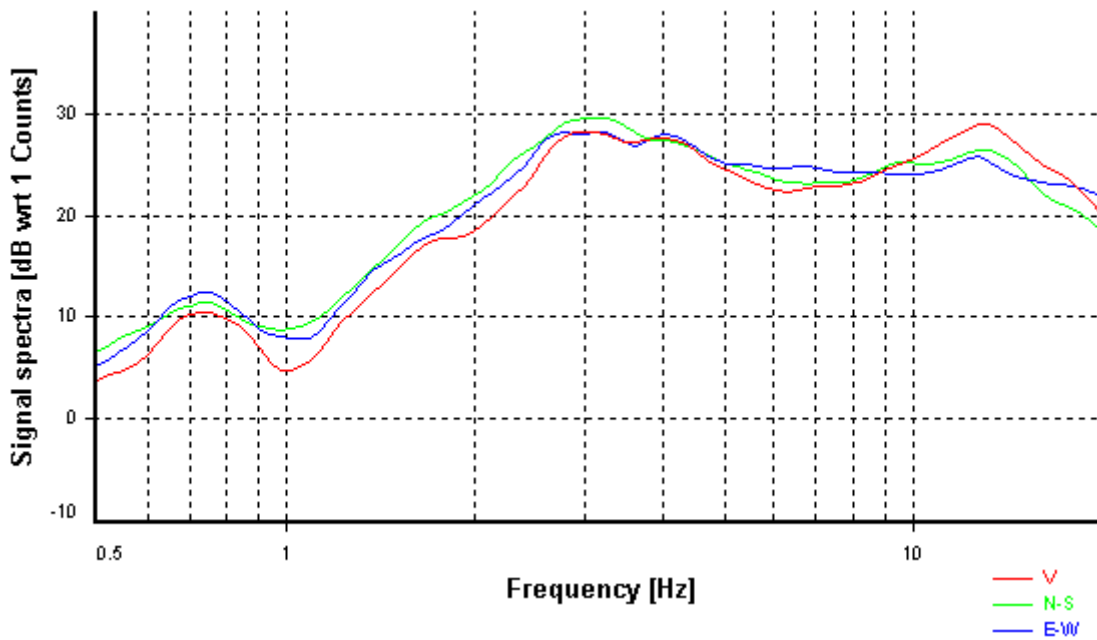*Tapering:*   Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

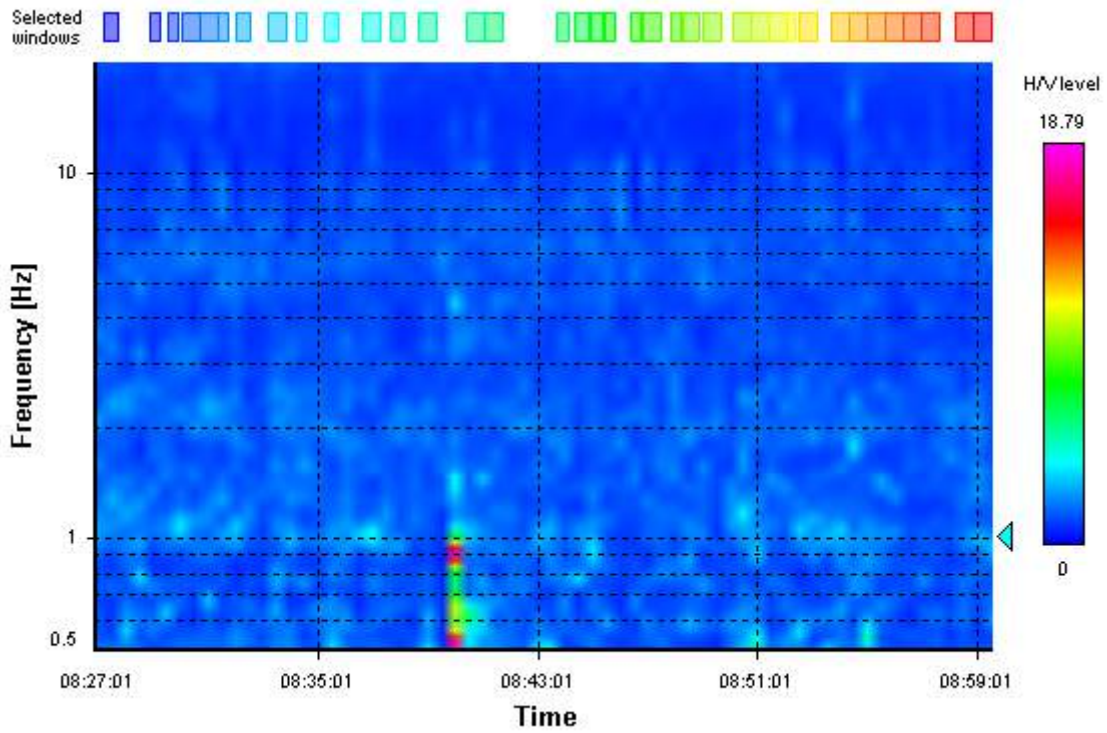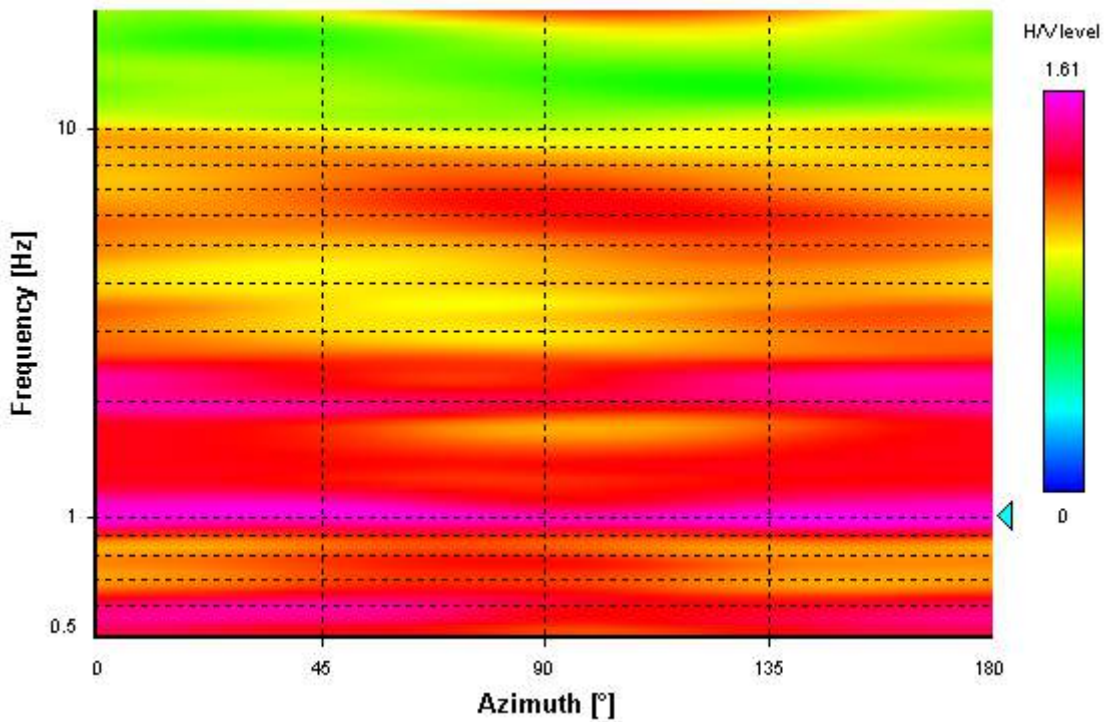*Instrumental correction:*   Disabled

HVSR average

Signal spectra average

HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

13.779 Hz

A_0 amplitude = *3.069*

Average f_0 = *13.988 ± 0.287*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	40 valid windows (length > 0.73 s) out of 40	OK
$n_c(f_0) > 200$	20772.58 > 200	OK
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 29	OK
HVSR peak clarity criteria		
$\exists\ f^-$ in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0/2$	10.61521 Hz	OK
$\exists\ f^+$ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0/2$	0 Hz	NO
$A_0 > 2$	3.07 > 2	OK
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	3.8% <= 5%	OK
$\sigma_f < \varepsilon(f_0)$	0.28679 < 0.68893	OK
$\sigma_A(f_0) < \theta(f_0)$	1.12757 < 1.58	OK
Overall criteria fulfillment		OK

STATION INFORMATION

Station code: HVSR30

Model: Geobox

Sensor: SARA SS45 (external 4.5 Hz sensors)

Notes: -

PLACE INFORMATION

Place ID: Collesalvetti

Address: Aiaccia

Latitude: 4826008,8

Longitude: 1610575,6

Coordinate system: GB

Elevation: 14 m s.l.m.

Weather: Sereno. Vento assente.

Notes: -

PHOTOGRAPHIC REFERENCES

SIGNAL AND WINDOWING

Sampling frequency: 200 Hz

Recording start time: 2018/04/15 10:56:49

Recording length: 33.33 min

Windows count: 44

Average windows length: 39.21

Signal coverage: 86.27%

31476 Counts   **CHANNEL #1 [V]**

-84777 Counts

50700 Counts   **CHANNEL #2 [N]**

-90287 Counts

41325 Counts   **CHANNEL #3 [E]**

-19244 Counts

HVSR ANALYSIS

Tapering: Disabled

Smoothing: Konno-Ohmachi (Bandwidth coefficient = 40)

Instrumental correction: Disabled

HVSR average

Signal spectra average

HVSR time-frequency analysis (30 seconds windows)

HVSR directional analysis

SESAME CRITERIA

Selected f_0 frequency

6.300 Hz

A_0 amplitude = *3.197*

Average f_0 = *6.312 ± 0.071*

HVSR curve reliability criteria		
$f_0 > 10 / L_w$	44 valid windows (length > 1.59 s) out of 44	**OK**
$n_c(f_0) > 200$	10870.82 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$	Exceeded 0 times in 37	**OK**
HVSR peak clarity criteria		
$\exists\, f^- $ in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0/2$	5.22953 Hz	**OK**
$\exists\, f^+ $ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0/2$	7.59079 Hz	**OK**
$A_0 > 2$	3.2 > 2	**OK**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	0% <= 5%	**OK**
$\sigma_f < \varepsilon(f_0)$	0.07142 < 0.31502	**OK**
$\sigma_A(f_0) < \theta(f_0)$	1.17046 < 1.58	**OK**
Overall criteria fulfillment		**OK**

Indagini di campagna 2013
Livello 1

COLLESALVETTI_MS, HV1_A1* A1_COLLESALVETTI

Instrument: TE3-0006/01-13
Start recording: 16/09/13 10:03:12   End recording: 16/09/13 10:23:12
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   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 0.25 ± 0.0 Hz. (In the range 0.0 - 10.0 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 0.25 ± 0.0 Hz (in the range 0.0 - 10.0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.25 > 0.50		**NO**
$n_c(f_0) > 200$	300.0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	Exceeded 0 out of 13 times	**OK**	

Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]

**Exists f⁻ in $[f_0/4, f_0]$	$A_{H/V}(f^-) < A_0 / 2$**	0.156 Hz	**OK**	
**Exists f⁺ in $[f_0, 4f_0]$	$A_{H/V}(f^+) < A_0 / 2$**	0.344 Hz	**OK**	
$A_0 > 2$	4.90 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0.00208| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0.00052 < 0.05	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0.5079 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, HV1_A2* A2_NUGOLA

Instrument: TE3-0006/01-13
Start recording: 16/09/13 11:42:55   End recording: 16/09/13 12:02:55
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   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 0.34 ± 0.01 Hz. (In the range 0.0 - 10.0 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**.]

<table>
<tr><td colspan="4">Max. H/V at 0.34 ± 0.01 Hz (in the range 0.0 - 10.0 Hz).</td></tr>
</table>

<table>
<tr><td colspan="4">Criteria for a reliable HVSR curve
[All 3 should be fulfilled]</td></tr>
<tr><td>$f_0 > 10 / L_w$</td><td>0,34 > 0,50</td><td></td><td>NO</td></tr>
<tr><td>$n_c(f_0) > 200$</td><td>412,5 > 200</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$</td><td>Exceeded 0 out of 18 times</td><td>OK</td><td></td></tr>
<tr><td colspan="4">Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td>Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td>0,188 Hz</td><td>OK</td><td></td></tr>
<tr><td>Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td>0,5 Hz</td><td>OK</td><td></td></tr>
<tr><td>$A_0 > 2$</td><td>4,43 > 2</td><td>OK</td><td></td></tr>
<tr><td>$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td>|0,01611| < 0.05</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_f < \varepsilon(f_0)$</td><td>0,00554 < 0,06875</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_A(f_0) < \theta(f_0)$</td><td>0,3875 < 2,5</td><td>OK</td><td></td></tr>
</table>

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

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

COLLESALVETTI_MS, HV1_A3* A3_GUASTICCE

Instrument: TE3-0006/01-13
Start recording: 16/09/13 13:30:51   End recording: 16/09/13 13:50:51
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   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 1.97 ± 0.03 Hz. (In the range 0.0 - 10.0 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**.]

<table>
<tr><td colspan="4" align="center">Max. H/V at 1.97 ± 0.03 Hz (in the range 0.0 - 10.0 Hz).</td></tr>
</table>

<table>
<tr>
<td colspan="4" align="center">Criteria for a reliable HVSR curve
[All 3 should be fulfilled]</td>
</tr>
<tr>
<td align="center">$f_0 > 10 / L_w$</td>
<td align="center">1,97 > 0,50</td>
<td align="center">OK</td>
<td></td>
</tr>
<tr>
<td align="center">$n_c(f_0) > 200$</td>
<td align="center">2362,5 > 200</td>
<td align="center">OK</td>
<td></td>
</tr>
<tr>
<td align="center">$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$</td>
<td align="center">Exceeded 0 out of 96 times</td>
<td align="center">OK</td>
<td></td>
</tr>
<tr>
<td colspan="4" align="center">Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]</td>
</tr>
<tr>
<td align="center">Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td>
<td align="center">0,969 Hz</td>
<td align="center">OK</td>
<td></td>
</tr>
<tr>
<td align="center">Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td>
<td align="center">2,594 Hz</td>
<td align="center">OK</td>
<td></td>
</tr>
<tr>
<td align="center">$A_0 > 2$</td>
<td align="center">5,02 > 2</td>
<td align="center">OK</td>
<td></td>
</tr>
<tr>
<td align="center">$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td>
<td align="center">|0,00655| < 0.05</td>
<td align="center">OK</td>
<td></td>
</tr>
<tr>
<td align="center">$\sigma_f < \varepsilon(f_0)$</td>
<td align="center">0,0129 < 0,19688</td>
<td align="center">OK</td>
<td></td>
</tr>
<tr>
<td align="center">$\sigma_A(f_0) < \theta(f_0)$</td>
<td align="center">0,2356 < 1,78</td>
<td align="center">OK</td>
<td></td>
</tr>
</table>

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

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

COLLESALVETTI_MS, HV1_A4* A4_STAGNO

Instrument: TE3-0006/01-13
Start recording: 16/09/13 15:16:40   End recording: 16/09/13 15:36:40
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   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 ± 0.11 Hz (in the range 1.0 - 10.0 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**.]

<div style="border:1px solid">

Max. H/V at 1.41 ± 0.11 Hz (in the range 1.0 - 10.0 Hz).

</div>

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1,41 > 0,50	**OK**	
$n_c(f_0) > 200$	1687,5 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz	Exceeded 0 out of 68 times	**OK**	

Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0 / 2$			**NO**
Exists f^+ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0 / 2$	2,813 Hz	**OK**	
$A_0 > 2$	2,26 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,03715| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,05224 < 0,14063	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,1316 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, HV1_A5* A5_COLOGNOLE

Instrument: TE3-0006/01-13
Start recording: 25/09/13 10:38:50   End recording: 25/09/13 10:58:50
Channel labels: NORTH SOUTH; EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   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 9.97 ± 0.69 Hz (in the range 0.0 - 10.0 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**.]

<table>
<tr><td colspan="3">**Max. H/V at 9.97 ± 0.69 Hz (in the range 0.0 - 10.0 Hz).**</td></tr>
</table>

<table>
<tr><td colspan="4">**Criteria for a reliable HVSR curve**
[All 3 should be fulfilled]</td></tr>
<tr><td>$f_0 > 10 / L_w$</td><td>9,97 > 0,50</td><td>**OK**</td><td></td></tr>
<tr><td>$n_c(f_0) > 200$</td><td>11962,5 > 200</td><td>**OK**</td><td></td></tr>
<tr><td>$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td><td>Exceeded 0 out of 480 times</td><td>**OK**</td><td></td></tr>
<tr><td colspan="4">**Criteria for a clear HVSR peak**
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td>Exists f⁻ in [$f_0/4$, f_0] | $A_{H/V}(f^-) < A_0 / 2$</td><td>5,219 Hz</td><td>**OK**</td><td></td></tr>
<tr><td>Exists f⁺ in [f_0, $4f_0$] | $A_{H/V}(f^+) < A_0 / 2$</td><td>16,875 Hz</td><td>**OK**</td><td></td></tr>
<tr><td>$A_0 > 2$</td><td>2,23 > 2</td><td>**OK**</td><td></td></tr>
<tr><td>$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td>|0,03439| < 0.05</td><td>**OK**</td><td></td></tr>
<tr><td>$\sigma_f < \varepsilon(f_0)$</td><td>0,34285 < 0,49844</td><td>**OK**</td><td></td></tr>
<tr><td>$\sigma_A(f_0) < \theta(f_0)$</td><td>0,105 < 1,58</td><td>**OK**</td><td></td></tr>
</table>

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

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

COLLESALVETTI_MS, HV1_A6* A6_LA CASA

Instrument: TE3-0006/01-13
Start recording: 25/09/13 14:48:16   End recording: 25/09/13 15:08:16
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   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 5.91 ± 0.29 Hz (in the range 0.0 - 10.0 Hz).

H/V TIME HISTORY	DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

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COLLESALVETTI_MS, HV2_A1* A1_COLLESALVETTI

Instrument: TRS-0004/00-06
Start recording: 16/09/13 10:03:32   End recording: 16/09/13 10:23:32
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   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 1.78 ± 0.11 Hz (in the range 1.0 - 10.0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Legend:
- N-S component
- E-W component
- Up-Down component

Y-axis: (mm/s) / √Hz
X-axis: frequency [Hz]

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

<table>
<tr><td colspan="4">Max. H/V at 1.78 ± 0.11 Hz (in the range 1.0 - 10.0 Hz).</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Criteria for a reliable HVSR curve
[All 3 should be fulfilled]</td></tr>
<tr><td>$f_0 > 10 / L_w$</td><td>1,78 > 0,50</td><td>OK</td><td></td></tr>
<tr><td>$n_c(f_0) > 200$</td><td>2137,5 > 200</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td><td>Exceeded 0 out of 86 times</td><td>OK</td><td></td></tr>
<tr><td colspan="4" align="center">Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td>Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td></td><td></td><td>NO</td></tr>
<tr><td>Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td>4,094 Hz</td><td>OK</td><td></td></tr>
<tr><td>$A_0 > 2$</td><td>1,98 > 2</td><td></td><td>NO</td></tr>
<tr><td>$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td>|0,03145| < 0.05</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_f < \varepsilon(f_0)$</td><td>0,05602 < 0,17813</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_A(f_0) < \theta(f_0)$</td><td>0,115 < 1,78</td><td>OK</td><td></td></tr>
</table>

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

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

COLLESALVETTI_MS, HV2_A2* A2_NUGOLA

Instrument: TRS-0004/00-06
Start recording: 16/09/13 11:41:35   End recording: 16/09/13 12:01:36
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   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 0.38 ± 4.58 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 0.38 ± 4.58 Hz (in the range 0.0 - 64.0 Hz).

Criteria for a reliable HVSR curve [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	0,38 > 0,50		**NO**
$n_c(f_0) > 200$	450,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	Exceeded 0 out of 19 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 $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	0,531 Hz	**OK**	
$A_0 > 2$	3,89 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|6,05075| < 0.05		**NO**
$\sigma_f < \varepsilon(f_0)$	2,26903 < 0,075		**NO**
$\sigma_A(f_0) < \theta(f_0)$	0,3464 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, HV2_A3* A3_GUASTICCE

Instrument: TRS-0004/00-06
Start recording: 16/09/13 13:30:10   End recording: 16/09/13 13:50:11
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00''.   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 ± 0.03 Hz (in the range 0.0 - 10.0 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**.]

<table>
<tr><td colspan="4">Max. H/V at 1.59 ± 0.03 Hz (in the range 0.0 - 10.0 Hz).</td></tr>
</table>

<table>
<tr><td colspan="4">Criteria for a reliable HVSR curve
[All 3 should be fulfilled]</td></tr>
<tr><td>$f_0 > 10 / L_w$</td><td>1,59 > 0,50</td><td>OK</td><td></td></tr>
<tr><td>$n_c(f_0) > 200$</td><td>1912,5 > 200</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td><td>Exceeded 0 out of 78 times</td><td>OK</td><td></td></tr>
<tr><td colspan="4">Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td>Exists f^- in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0 / 2$</td><td>0,938 Hz</td><td>OK</td><td></td></tr>
<tr><td>Exists f^+ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0 / 2$</td><td>2,156 Hz</td><td>OK</td><td></td></tr>
<tr><td>$A_0 > 2$</td><td>6,12 > 2</td><td>OK</td><td></td></tr>
<tr><td>$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td>|0,00964| < 0.05</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_f < \varepsilon(f_0)$</td><td>0,01536 < 0,15938</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_A(f_0) < \theta(f_0)$</td><td>0,3607 < 1,78</td><td>OK</td><td></td></tr>
</table>

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

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

COLLESALVETTI_MS, HV2_A4* A4_STAGNO

Instrument: TRS-0004/00-06
Start recording: 16/09/13 15:15:21   End recording: 16/09/13 15:35:22
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
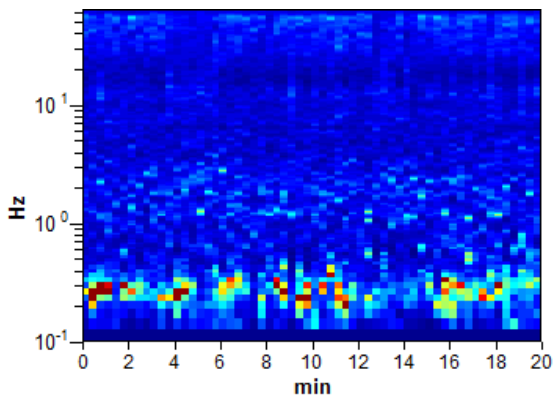GPS data not available

Trace length: 0h20'00''.   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
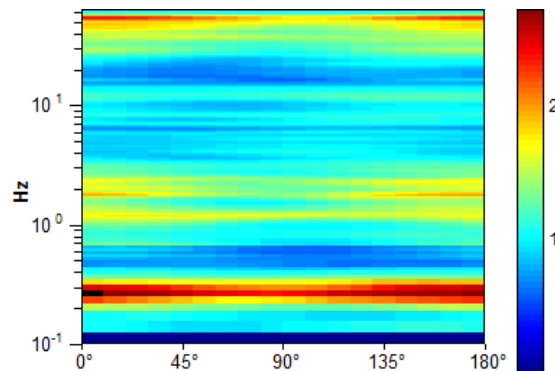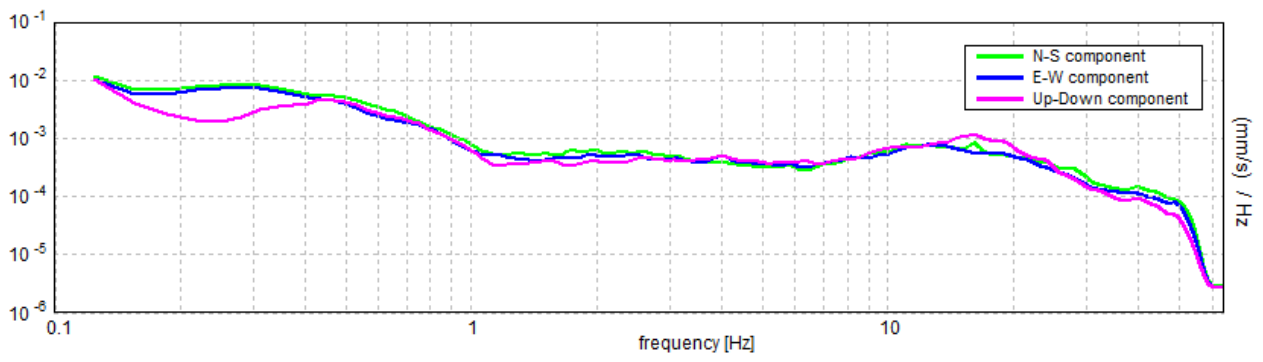Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
Max. H/V at 1.88 ± 0.11 Hz (in the range 1.0 - 10.0 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 ± 0.11 Hz (in the range 1.0 - 10.0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1,88 > 0,50	**OK**	
$n_c(f_0) > 200$	2250,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$			**NO**
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	2,438 Hz	**OK**	
$A_0 > 2$	2,06 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,02855| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,05353 < 0,1875	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,1037 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

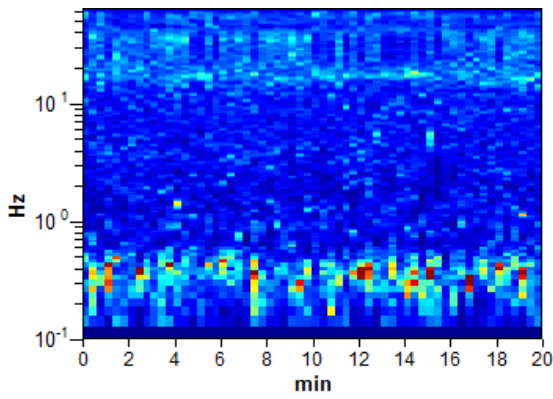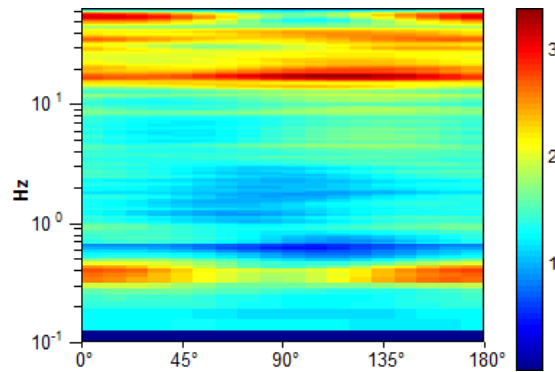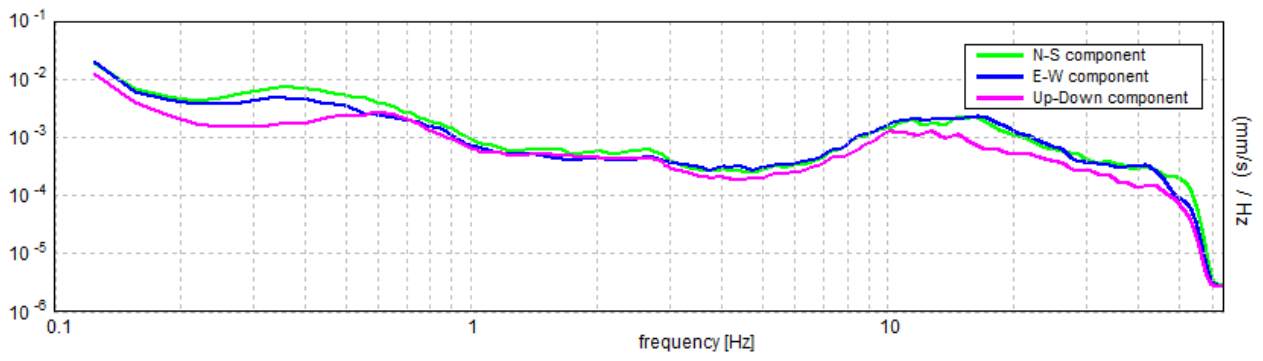| Threshold values for σ_f and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 f_0	0.2 f_0	0.15 f_0	0.10 f_0	0.05 f_0
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COLLESALVETTI_MS, HV2_A6* A6_LA CASA

Instrument: TRS-0004/00-06
Start recording: 25/09/13 14:45:14   End recording: 25/09/13 15:05:15
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   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 2.25 ± 0.15 Hz (in the range 0.0 - 10.0 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 2.25 ± 0.15 Hz (in the range 0.0 - 10.0 Hz).

Criteria for a reliable HVSR curve [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	2,25 > 0,50	**OK**	
$n_c(f_0) > 200$	2700,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	Exceeded 0 out of 109 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 $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	3,813 Hz	**OK**	
$A_0 > 2$	3,22 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,03377| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,07599 < 0,1125	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,1841 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

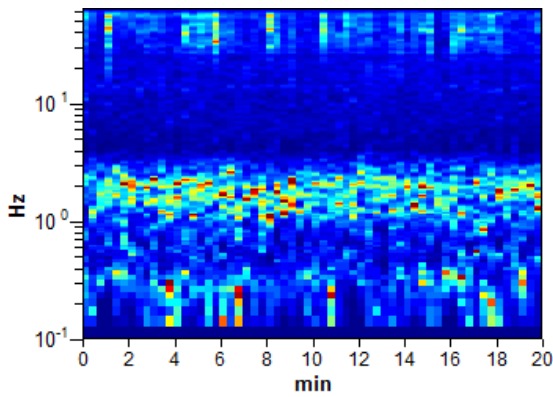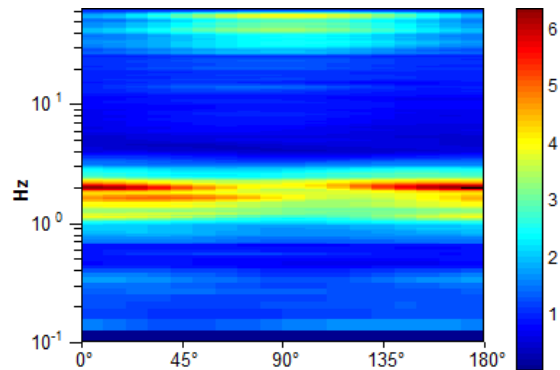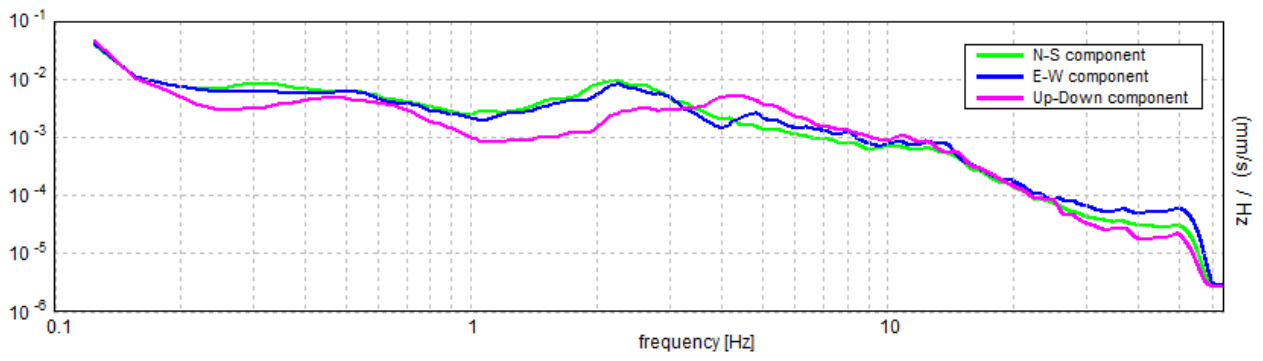| Threshold values for σ_f and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 f_0	0.2 f_0	0.15 f_0	0.10 f_0	0.05 f_0
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COLLESALVETTI_MS, M01* VIA UMBERTO I

Instrument: TRS-0004/00-06
Start recording: 08/07/13 09:22:43   End recording: 08/07/13 09:42:44
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   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 1,69 ± 0,09 Hz (in the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M01

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

Max. H/V at 1,69 ± 0,09 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**	
$n_c(f_0) > 200$	1890,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$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 $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	3,125 Hz	**OK**	
$A_0 > 2$	2,18 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,02646| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,04465 < 0,16875	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,1366 < 1,78	**OK**	

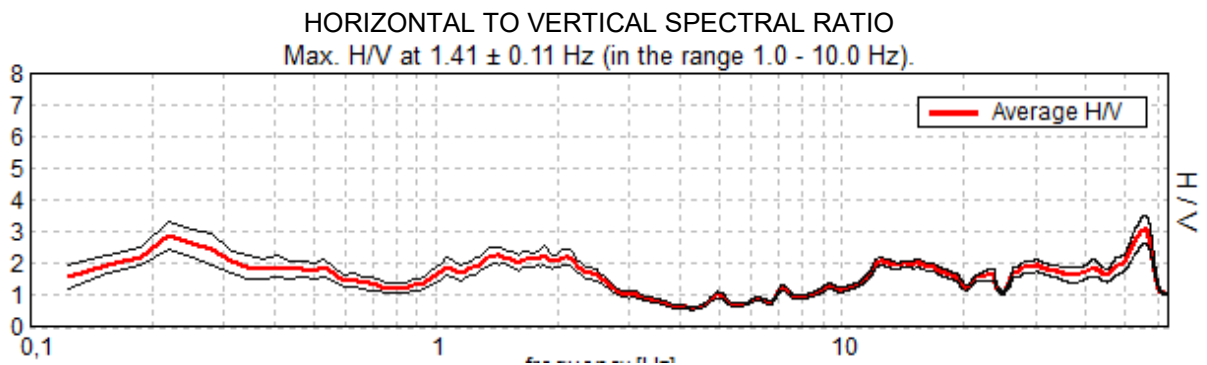|	
L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w \, n_w \, f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0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

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

COLLESALVETTI_MS, M02* VIA DON BOSCO

Strumento: TRS-0004/00-06
Formato dati: 16 byte
Fondo scala [mV]: n.a.
Inizio registrazione: 08/07/13 11:45:31   Fine registrazione: 08/07/13 12:05:32
Nomi canali: NORTH SOUTH;   EAST WEST ;   UP   DOWN
Dato GPS non disponibile

Durata registrazione: 0h20'00".   Analisi effettuata sull'intera traccia.
Freq. campionamento: 128 Hz
Lunghezza finestre: 20 s
Tipo di lisciamento: Triangular window
Lisciamento: 5%

RAPPORTO SPETTRALE ORIZZONTALE SU VERTICALE

Picco H/V a 1.16 ± 1.16 Hz (nell'intervallo 0.0 - 10.0 Hz).

SERIE TEMPORALE H/V

DIREZIONALITA' H/V

SPETTRI DELLE SINGOLE COMPONENTI

Legend:
- N-S component
- E-W component
- Up-Down component

Axes: frequency [Hz] (x-axis), (mm/s) / Hz (y-axis)

[Secondo le linee guida SESAME, 2005. **Si raccomanda di leggere attentamente il manuale di** *Grilla* **prima di interpretare la tabella seguente**].

Picco H/V a 1.16 ± 1.16 Hz (nell'intervallo 0.0 - 10.0 Hz).

Criteri per una curva H/V affidabile
[Tutti 3 dovrebbero risultare soddisfatti]

$f_0 > 10 / L_w$	1.16 > 0.50	**OK**	
$n_c(f_0) > 200$	1387.5 > 200	**OK**	
$\sigma_A(f) < 2$ per $0.5f_0 < f < 2f_0$ se $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ per $0.5f_0 < f < 2f_0$ se $f_0 < 0.5Hz$	Superato 0 volte su 56	**OK**	

Criteri per un picco H/V chiaro
[Almeno 5 su 6 dovrebbero essere soddisfatti]

Esiste f^- in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0 / 2$			**NO**
Esiste f^+ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0 / 2$	4.406 Hz	**OK**	
$A_0 > 2$	2.13 > 2	**OK**	
$f_{picco}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0.99993| < 0.05		**NO**
$\sigma_f < \varepsilon(f_0)$	1.15617 < 0.11563		**NO**
$\sigma_A(f_0) < \theta(f_0)$	0.4152 < 1.78	**OK**	

L_w	lunghezza della finestra
n_w	numero di finestre usate nell'analisi
$n_c = L_w n_w f_0$	numero di cicli significativi
f	frequenza attuale
f_0	frequenza del picco H/V
σ_f	deviazione standard della frequenza del picco H/V
$\varepsilon(f_0)$	valore di soglia per la condizione di stabilità $\sigma_f < \varepsilon(f_0)$
A_0	ampiezza della curva H/V alla frequenza f_0
$A_{H/V}(f)$	ampiezza della curva H/V alla frequenza f
f^-	frequenza tra $f_0/4$ e f_0 alla quale $A_{H/V}(f^-) < A_0/2$
f^+	frequenza tra f_0 e $4f_0$ alla quale $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	deviazione standard di $A_{H/V}(f)$, $\sigma_A(f)$ è il fattore per il quale la curva $A_{H/V}(f)$ media deve essere moltiplicata o divisa
$\sigma_{logH/V}(f)$	deviazione standard della funzione log $A_{H/V}(f)$
$\theta(f_0)$	valore di soglia per la condizione di stabilità $\sigma_A(f) < \theta(f_0)$

Valori di soglia per σ_f e $\sigma_A(f_0)$					
Intervallo di freq. [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 f_0	0.2 f_0	0.15 f_0	0.10 f_0	0.05 f_0
$\theta(f_0)$ per $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
log $\theta(f_0)$ per $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COLLESALVETTI_MS, M03* VIA ALDO MORO

Instrument: TRS-0004/00-06
Start recording: 08/07/13 12:28:27   End recording: 08/07/13 12:48:28
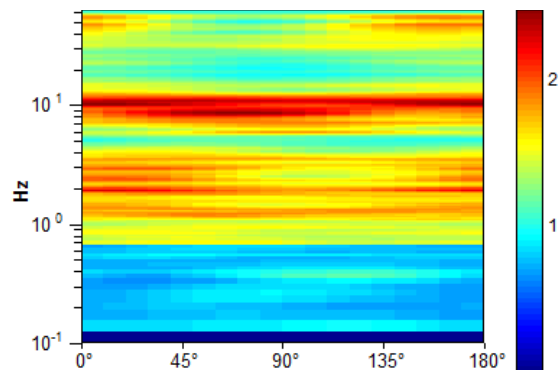Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00''.   Analyzed 85% 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 ± 0,07 Hz (in the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M03

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

<div style="text-align:center">

Max. H/V at 1,19 ± 0,07 Hz (in the range 0,0 - 30,0 Hz).

</div>

<div style="text-align:center">

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

</div>

$f_0 > 10 / L_w$	1,19 > 0,50	**OK**	
$n_c(f_0) > 200$	1211,3 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz	Exceeded 0 out of 58 times	**OK**	

<div style="text-align:center">

Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]

</div>

Exists f⁻ in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$			**NO**
Exists f⁺ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	3,781 Hz	**OK**	
$A_0 > 2$	2,14 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,02856| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,03391 < 0,11875	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,144 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f ⁻	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f ⁺	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M04* VIA PARRANE

Instrument: TRS-0004/00-06
Start recording: 08/07/13 13:13:03   End recording: 08/07/13 13:33:04
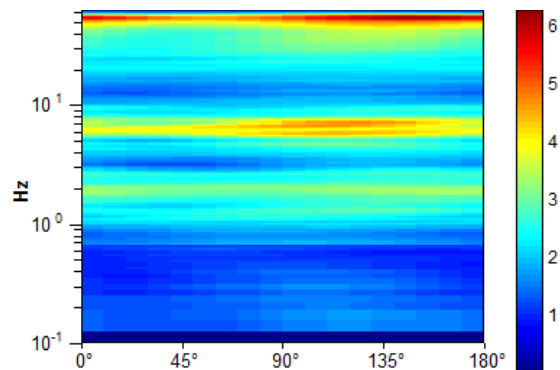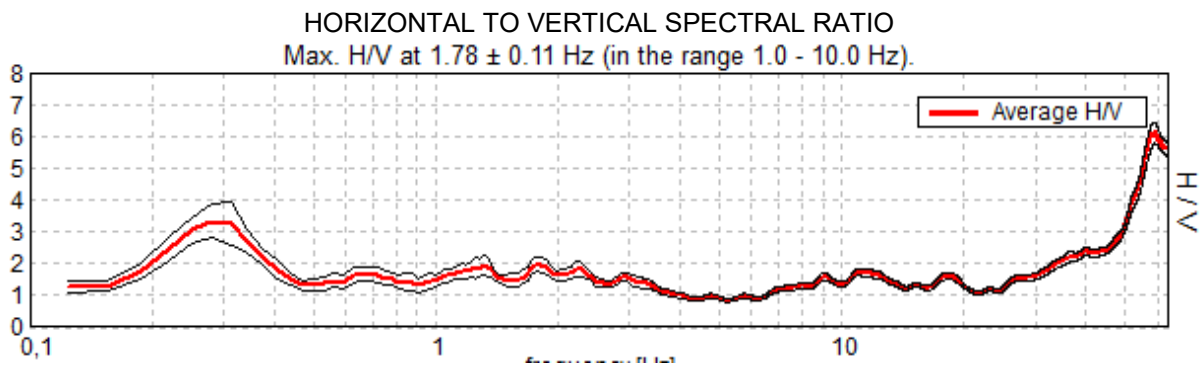Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   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 2,0 ± 0,03 Hz (in the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M04

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

Max. H/V at 2,0 ± 0,03 Hz (in the range 0,0 - 30,0 Hz).

Criteria for a reliable HVSR curve [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	2,00 > 0,50	**OK**	
$n_c(f_0) > 200$	2120,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	0,656 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	3,094 Hz	**OK**	
$A_0 > 2$	3,38 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,0062| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,0124 < 0,1	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,1962 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M05* CAMPO_SPORTIVO

Instrument: TRS-0004/00-06
Start recording: 08/07/13 13:43:40　　　End recording:　08/07/13 14:03:41
Channel labels:　NORTH SOUTH;　EAST　WEST ;　UP　DOWN
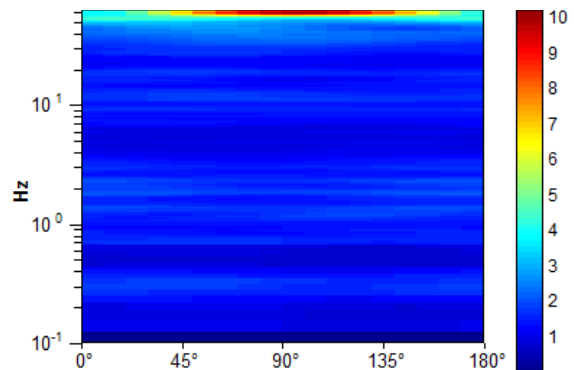GPS data not available

Trace length:　　0h20'00".　　　Analysis performed on the entire trace.
Sampling frequency:　　128 Hz
Window size:　20 s
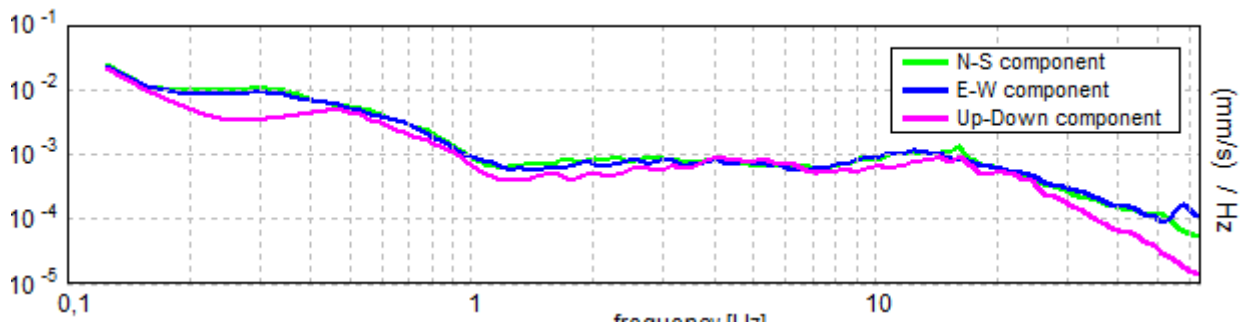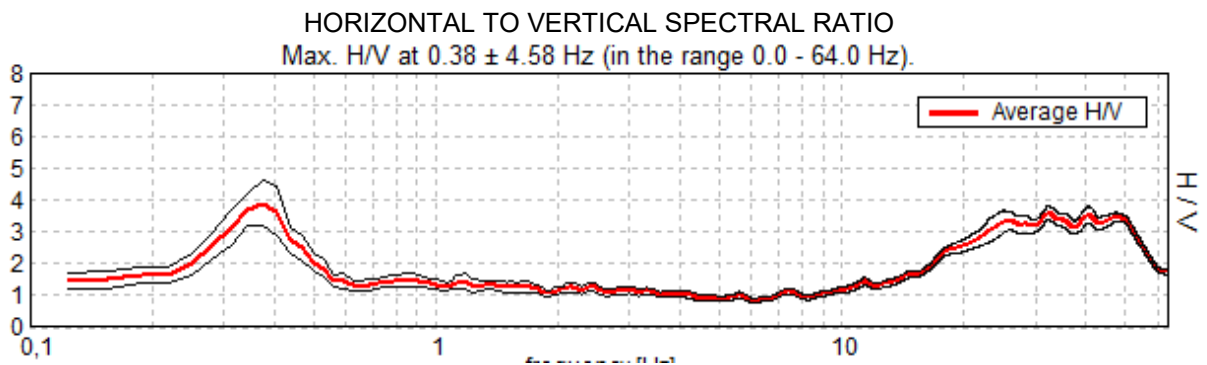Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

Max. H/V at 1,88 ± 0,03 Hz (in the range 0,0 - 30,0 Hz).

H/V TIME HISTORY　　　　　　　　　　　DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M05

[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**
$n_c(f_0) > 200$	2250,0 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	0,688 Hz	**OK**
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	2,781 Hz	**OK**
$A_0 > 2$	3,95 > 2	**OK**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,00902| < 0.05	**OK**
$\sigma_f < \varepsilon(f_0)$	0,01692 < 0,1875	**OK**
$\sigma_A(f_0) < \theta(f_0)$	0,2243 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M06* COLLE_ROMBOLI

Instrument: TRS-0004/00-06
Start recording: 08/07/13 14:16:50   End recording: 08/07/13 14:36:51
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
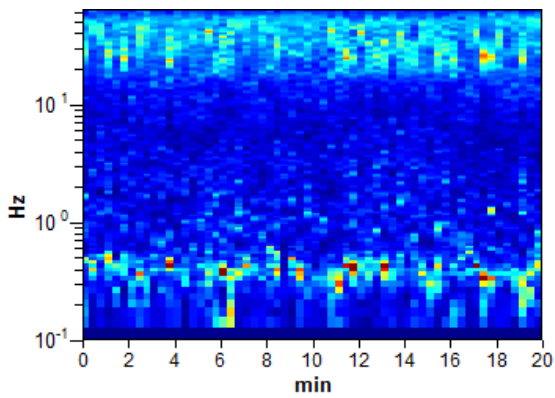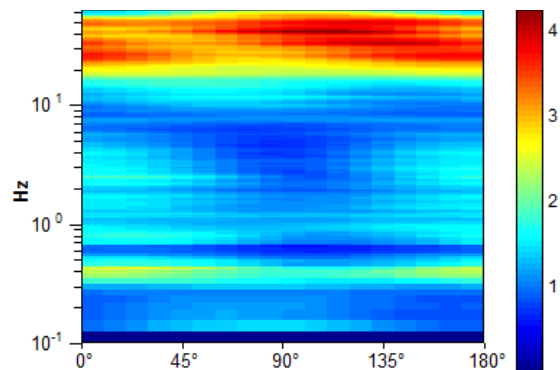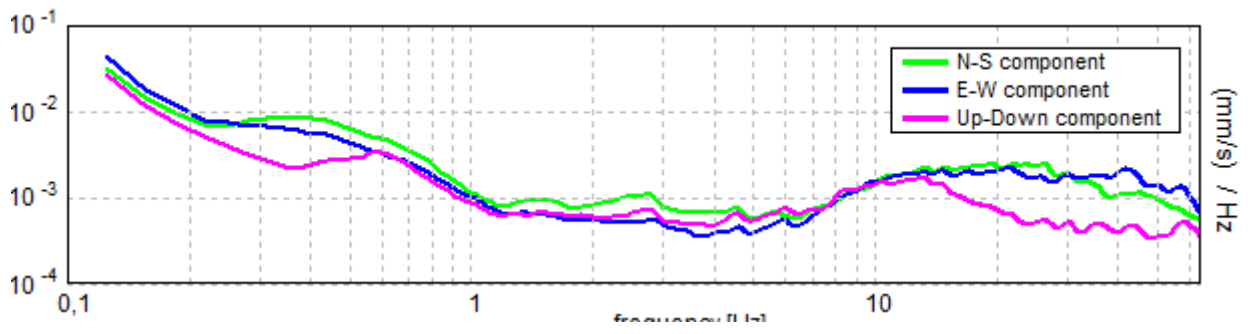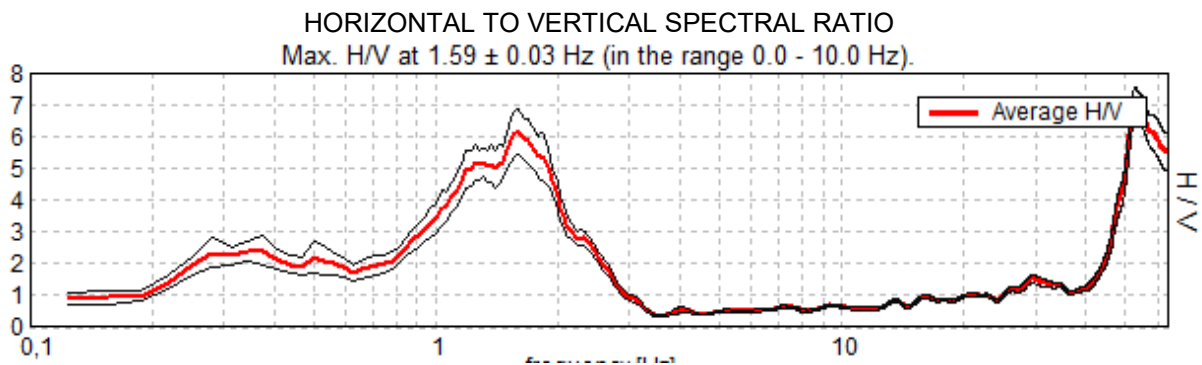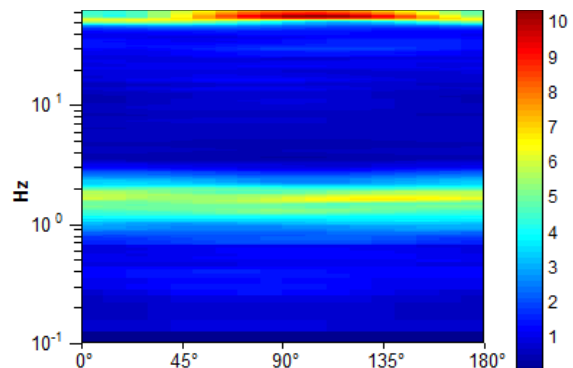Sampling frequency: 128 Hz
Window size: 20 s
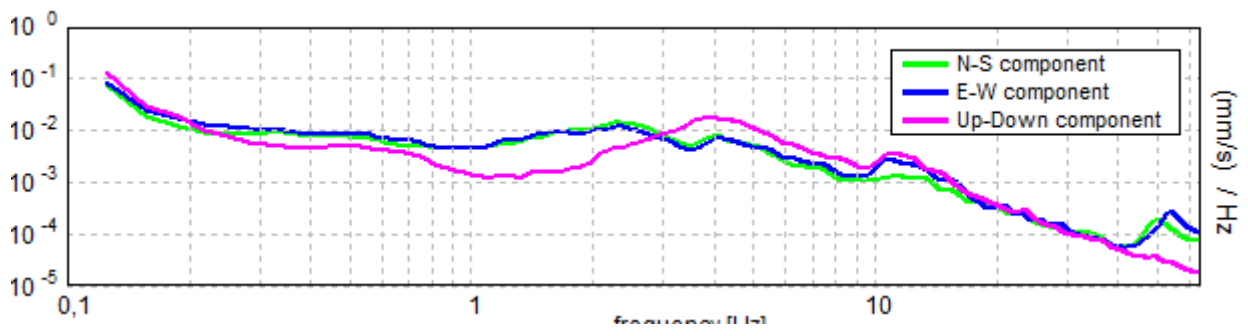Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
Max. H/V at 0,91 ± 0,14 Hz (in the range 0,0 - 64,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M06

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

<div style="border:1px solid">

Max. H/V at 0,91 ± 0,14 Hz (in the range 0,0 - 64,0 Hz).

</div>

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0,91 > 0,50	**OK**	
$n_c(f_0) > 200$	1087,5 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	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**
$A_0 > 2$	2,44 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,07411| < 0.05		**NO**
$\sigma_f < \varepsilon(f_0)$	0,06716 < 0,13594	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,1609 < 2,0	**OK**	

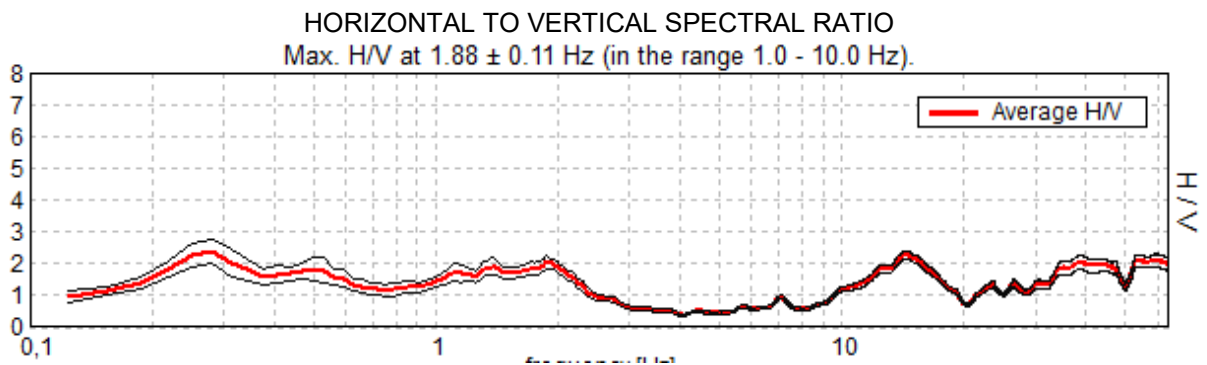|	
L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w \, n_w \, f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0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

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

COLLESALVETTI_MS, M07* VIA BADIA

Instrument: TRS-0004/00-06
Start recording: 08/07/13 14:51:18   End recording: 08/07/13 15:11:19
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
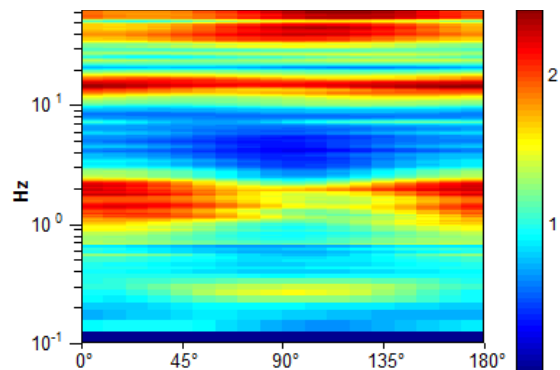GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
Window size: 20 s
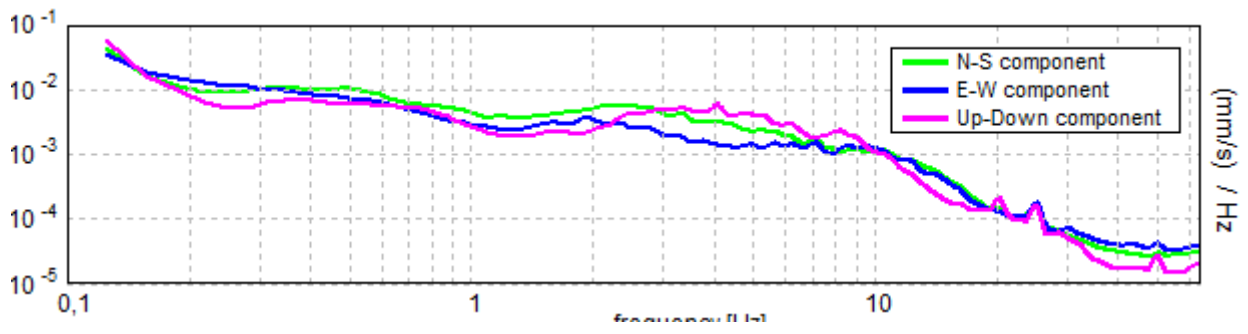Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
Max. H/V at 1,78 ± 0,2 Hz. (In the range 0,6 - 10,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M07

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

<table>
<tr><td colspan="4" align="center">Max. H/V at 1,78 ± 0,2 Hz (in the range 0,6 - 10,0 Hz).</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Criteria for a reliable HVSR curve
[All 3 should be fulfilled]</td></tr>
<tr><td align="center">$f_0 > 10 / L_w$</td><td align="center">1,78 > 0,50</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$n_c(f_0) > 200$</td><td align="center">2137,5 > 200</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td><td align="center">Exceeded 0 out of 86 times</td><td align="center">OK</td><td></td></tr>
<tr><td colspan="4" align="center">Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td align="center">Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td></td><td></td><td align="center">NO</td></tr>
<tr><td align="center">Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td align="center">5,5 Hz</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$A_0 > 2$</td><td align="center">2,17 > 2</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td align="center">|0,05505| < 0.05</td><td></td><td align="center">NO</td></tr>
<tr><td align="center">$\sigma_f < \varepsilon(f_0)$</td><td align="center">0,09806 < 0,17813</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$\sigma_A(f_0) < \theta(f_0)$</td><td align="center">0,1105 < 1,78</td><td align="center">OK</td><td></td></tr>
</table>

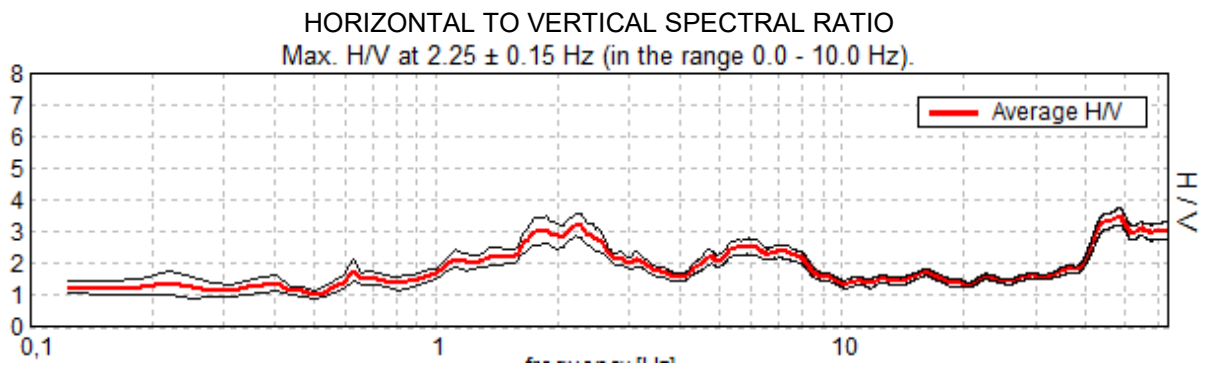|	
L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V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

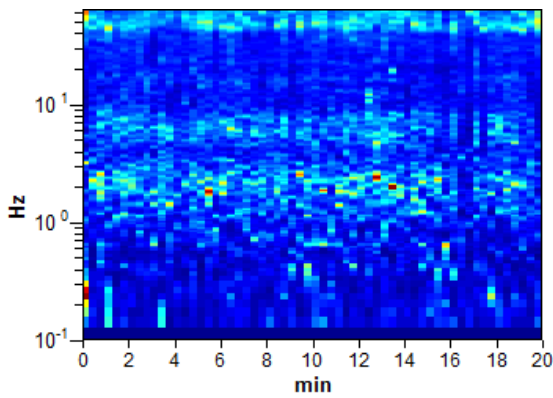| Threshold values for σ_f and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	$0.25 f_0$	$0.2 f_0$	$0.15 f_0$	$0.10 f_0$	$0.05 f_0$
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30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

COLLESALVETTI_MS, M08* STRADA_LIVORNO-PISANA

Instrument: TRS-0004/00-06
Start recording: 08/07/13 15:22:43   End recording: 08/07/13 15:42:44
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
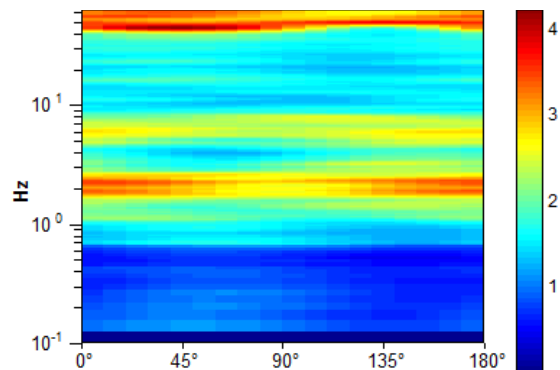GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
Window size: 20 s
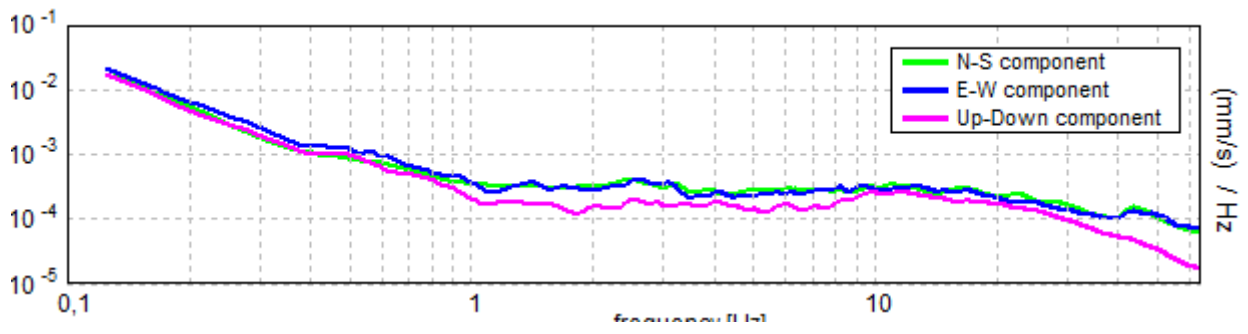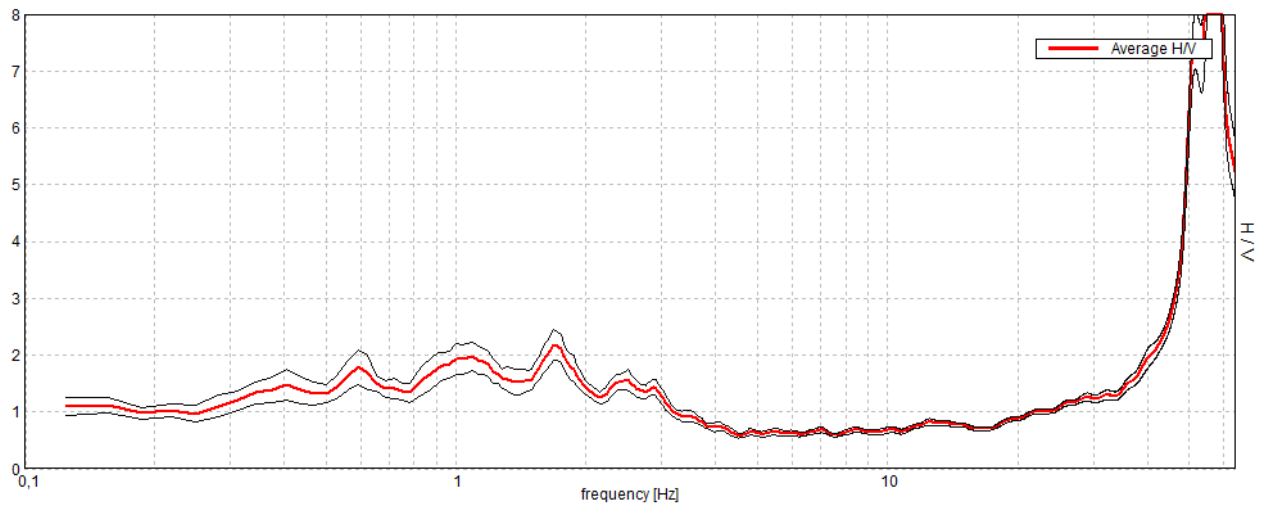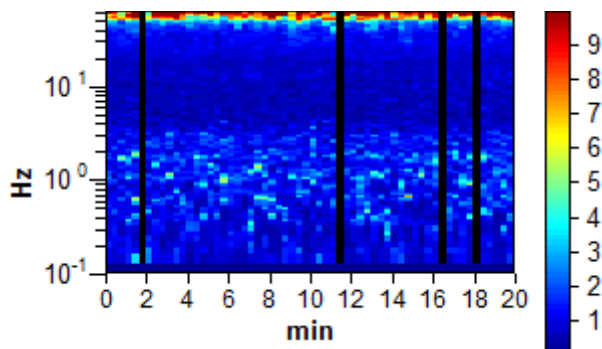Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

Max. H/V at 1,72 ± 0,06 Hz (in the range 0,0 - 30,0 Hz).

H/V TIME HISTORY	DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M08

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

Max. H/V at 1,72 ± 0,06 Hz (in the range 0,0 - 30,0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1,72 > 0,50	**OK**	
$n_c(f_0) > 200$	2062,5 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	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 $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0 / 2$	0,531 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0 / 2$	2,313 Hz	**OK**	
$A_0 > 2$	4,03 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,01818| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,03125 < 0,17188	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,2773 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M09* VIA ROMA

Instrument: TRS-0004/00-06
Start recording: 08/07/13 15:53:18   End recording: 08/07/13 16:13:19
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
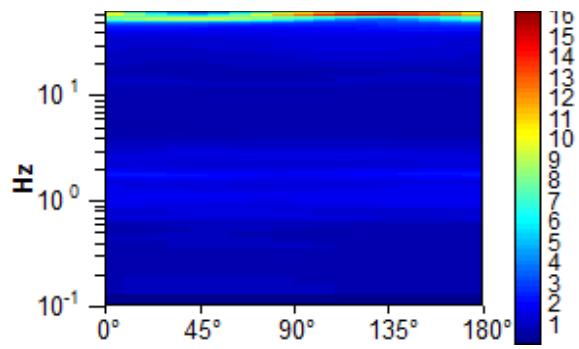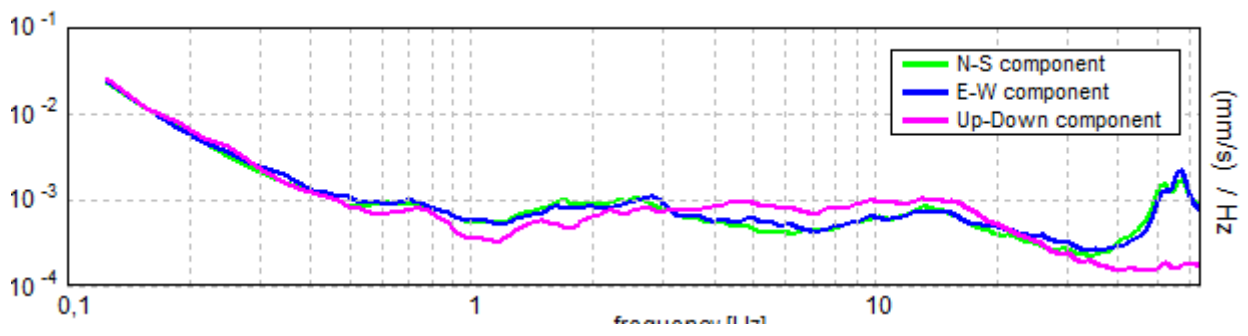Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
Max. H/V at 1,88 ± 0,17 Hz (in the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M09

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

<table>
<tr><td colspan="4" align="center">**Max. H/V at 1,88 ± 0,17 Hz (in the range 0,0 - 30,0 Hz).**</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">**Criteria for a reliable HVSR curve**
[All 3 should be fulfilled]</td></tr>
<tr><td>$f_0 > 10 / L_w$</td><td>1,88 > 0,50</td><td>**OK**</td><td></td></tr>
<tr><td>$n_c(f_0) > 200$</td><td>2250,0 > 200</td><td>**OK**</td><td></td></tr>
<tr><td>$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$</td><td>Exceeded 0 out of 91 times</td><td>**OK**</td><td></td></tr>
<tr><td colspan="4" align="center">**Criteria for a clear HVSR peak**
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td>Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td></td><td></td><td>**NO**</td></tr>
<tr><td>Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td>4,094 Hz</td><td>**OK**</td><td></td></tr>
<tr><td>$A_0 > 2$</td><td>2,29 > 2</td><td>**OK**</td><td></td></tr>
<tr><td>$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td>|0,04605| < 0.05</td><td>**OK**</td><td></td></tr>
<tr><td>$\sigma_f < \varepsilon(f_0)$</td><td>0,08634 < 0,1875</td><td>**OK**</td><td></td></tr>
<tr><td>$\sigma_A(f_0) < \theta(f_0)$</td><td>0,1353 < 1,78</td><td>**OK**</td><td></td></tr>
</table>

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

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

COLLESALVETTI_MS, M10* VIA EUROPA

Instrument: TRS-0004/00-06
Start recording: 08/07/13 16:37:21   End recording: 08/07/13 16:57:21
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
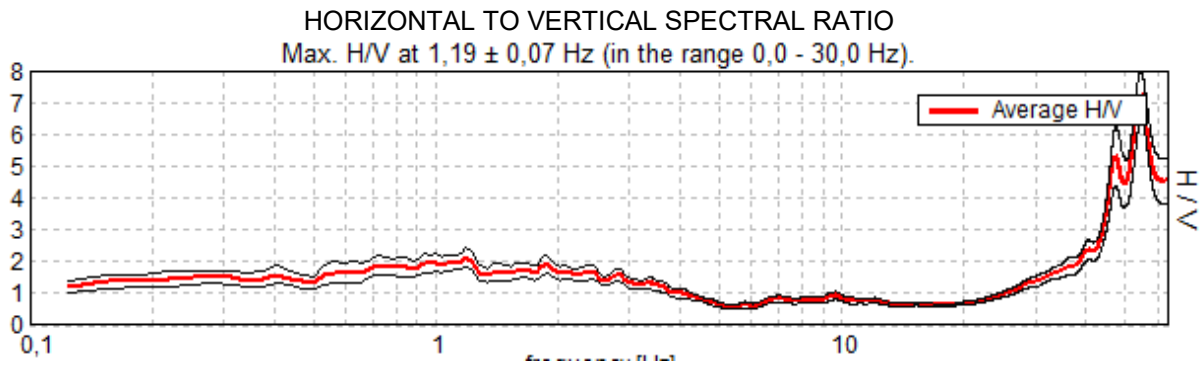GPS data not available

Trace length: 0h20'00''.   Analyzed 92% trace (manual window selection)
Sampling frequency: 128 Hz
Window size: 20 s
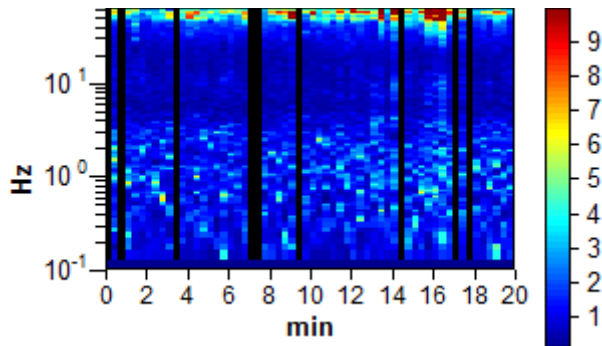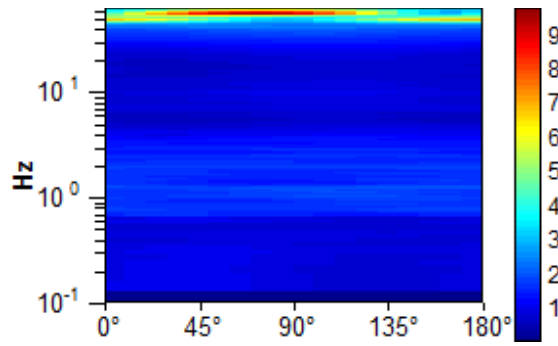Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

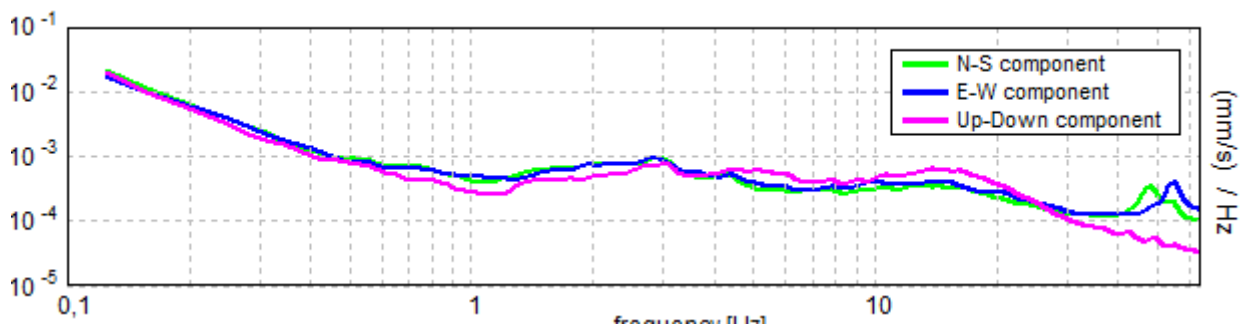Max. H/V at 1,66 ± 0,09 Hz (in the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M10

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

<table>
<tr><td colspan="3">Max. H/V at 1,66 ± 0,09 Hz (in the range 0,0 - 30,0 Hz).</td></tr>
</table>

<table>
<tr><td colspan="4">Criteria for a reliable HVSR curve
[All 3 should be fulfilled]</td></tr>
<tr><td>$f_0 > 10 / L_w$</td><td>1,66 > 0,50</td><td>OK</td><td></td></tr>
<tr><td>$n_c(f_0) > 200$</td><td>1821,9 > 200</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td><td>Exceeded 0 out of 80 times</td><td>OK</td><td></td></tr>
<tr><td colspan="4">Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td>Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td>0,469 Hz</td><td>OK</td><td></td></tr>
<tr><td>Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td>4,094 Hz</td><td>OK</td><td></td></tr>
<tr><td>$A_0 > 2$</td><td>2,25 > 2</td><td>OK</td><td></td></tr>
<tr><td>$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td>|0,02614| < 0.05</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_f < \varepsilon(f_0)$</td><td>0,0433 < 0,16563</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_A(f_0) < \theta(f_0)$</td><td>0,1526 < 1,78</td><td>OK</td><td></td></tr>
</table>

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

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

COLLESALVETTI_MS, M11* VICARELLO_CIMITERO

Instrument: TRS-0004/00-06
Start recording: 08/07/13 17:13:57   End recording: 08/07/13 17:33:58
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   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 1,06 ± 0,03 Hz (in the range 0,0 - 10,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M11

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

<table>
<tr><td>**Max. H/V at 1,06 ± 0,03 Hz (in the range 0,0 - 10,0 Hz).**</td></tr>
</table>

Criteria for a reliable HVSR curve [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	1,06 > 0,50	**OK**	
$n_c(f_0) > 200$	1275,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz	Exceeded 0 out of 52 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 $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	2,781 Hz	**OK**	
$A_0 > 2$	2,43 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,01469| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,01561 < 0,10625	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,1816 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M12* VICARELLO_VIA VOLTERRANA

Instrument: TRS-0004/00-06
Start recording: 08/07/13 18:02:33   End recording: 08/07/13 18:22:34
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
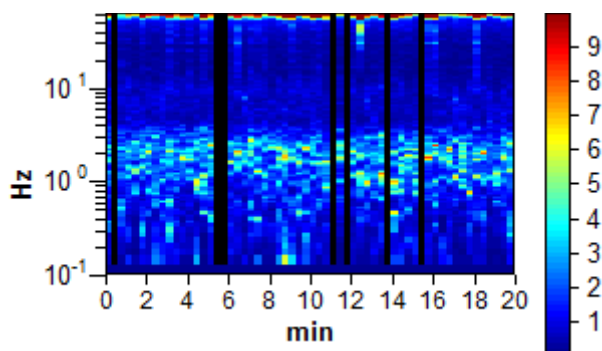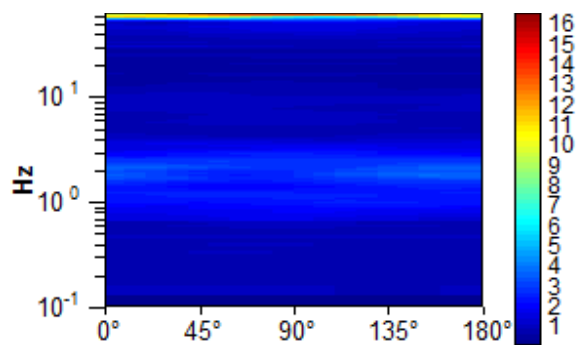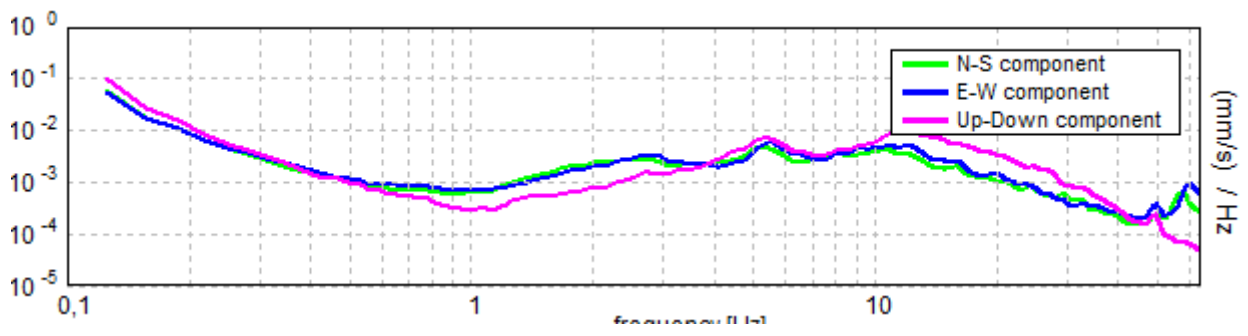GPS data not available

Trace length: 0h20'00".   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 1,0 ± 0,11 Hz (in the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M12

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

<div style="border:1px solid">

Max. H/V at 1,0 ± 0,11 Hz (in the range 0,0 - 30,0 Hz).

</div>

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1,00 > 0,50	OK	
$n_c(f_0) > 200$	1080,0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	0,5 Hz	OK	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	2,45 > 2	OK	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,05395| < 0.05		NO
$\sigma_f < \varepsilon(f_0)$	0,05395 < 0,1	OK	
$\sigma_A(f_0) < \theta(f_0)$	0,1372 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M13* VICARELLO_VIA FALCONE

Instrument: TRS-0004/00-06
Start recording: 09/07/13 08:15:26   End recording: 09/07/13 08:35:27
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
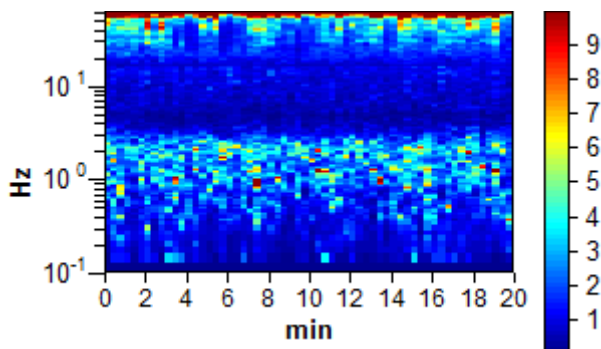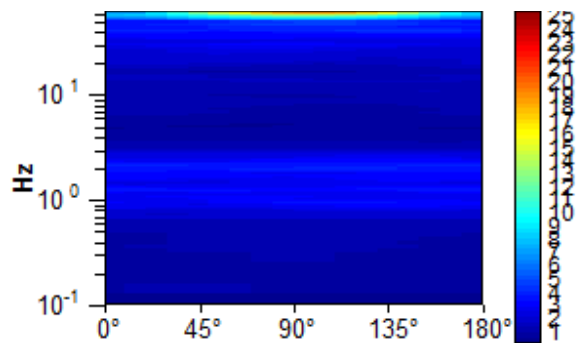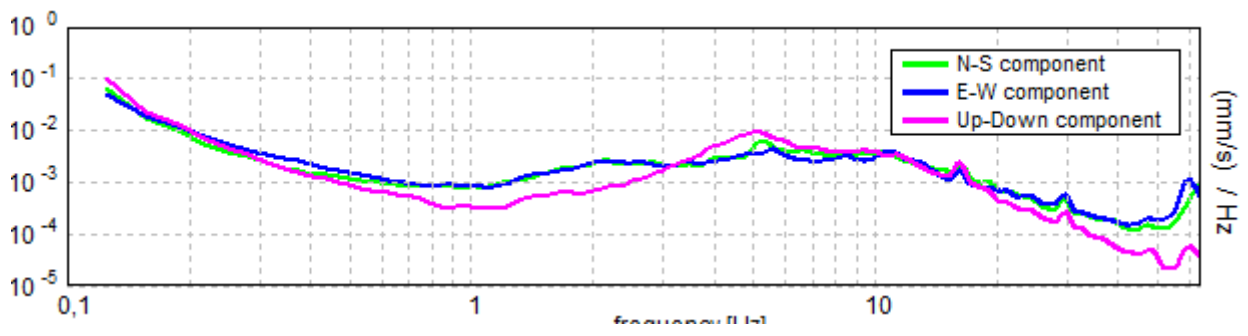GPS data not available

Trace length: 0h20'00''.   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 0,97 ± 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**.]

<table>
<tr><td colspan="2">**Max. H/V at 0,97 ± 0,02 Hz (in the range 0,0 - 30,0 Hz).**</td></tr>
</table>

<table>
<tr><td colspan="4">**Criteria for a reliable HVSR curve**
[All 3 should be fulfilled]</td></tr>
<tr><td>$f_0 > 10 / L_w$</td><td>0,97 > 0,50</td><td>OK</td><td></td></tr>
<tr><td>$n_c(f_0) > 200$</td><td>1162,5 > 200</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$</td><td>Exceeded 0 out of 48 times</td><td>OK</td><td></td></tr>
<tr><td colspan="4">**Criteria for a clear HVSR peak**
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td>Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td>0,313 Hz</td><td>OK</td><td></td></tr>
<tr><td>Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td>2,531 Hz</td><td>OK</td><td></td></tr>
<tr><td>$A_0 > 2$</td><td>2,73 > 2</td><td>OK</td><td></td></tr>
<tr><td>$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td>|0,01123| < 0.05</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_f < \varepsilon(f_0)$</td><td>0,01088 < 0,14531</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_A(f_0) < \theta(f_0)$</td><td>0,2069 < 2,0</td><td>OK</td><td></td></tr>
</table>

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

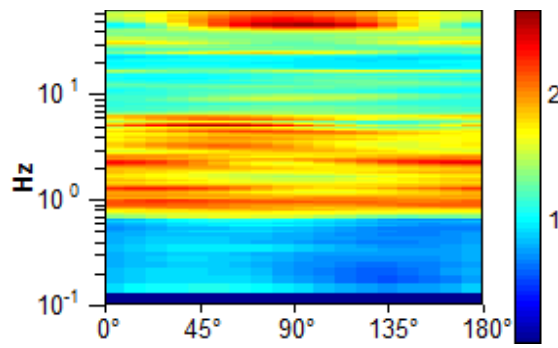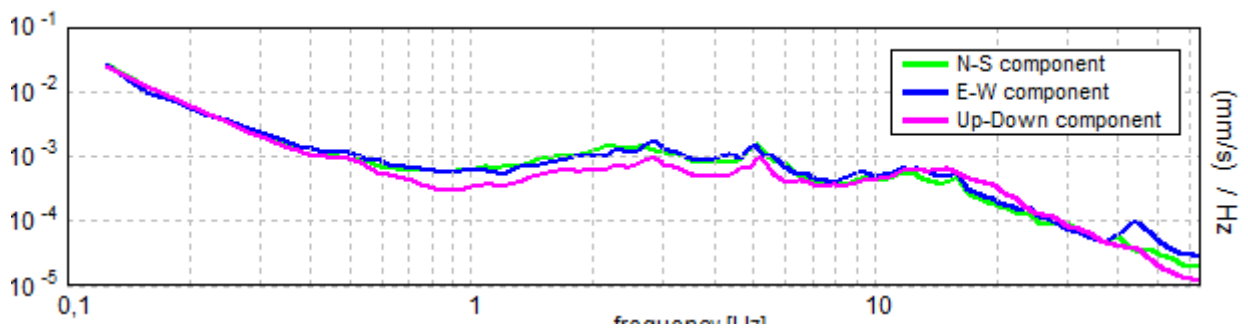| Threshold values for σ_f and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 f_0	0.2 f_0	0.15 f_0	0.10 f_0	0.05 f_0
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COLLESALVETTI_MS, M14* VICARELLO_VIA_GALILEO

Instrument: TRS-0004/00-06
Start recording: 09/07/13 08:58:10   End recording: 09/07/13 09:18:11
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00''.   Analyzed 85% 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 ± 0,07 Hz (in the range 0,0 - 30,0 Hz).

H/V TIME HISTORY	DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M14

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

<table>
<tr><td colspan="4" align="center">Max. H/V at 1,03 ± 0,07 Hz (in the range 0,0 - 30,0 Hz).</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Criteria for a reliable HVSR curve
[All 3 should be fulfilled]</td></tr>
<tr><td>$f_0 > 10 / L_w$</td><td>1,03 > 0,50</td><td>OK</td><td></td></tr>
<tr><td>$n_c(f_0) > 200$</td><td>1051,9 > 200</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$</td><td>Exceeded 0 out of 50 times</td><td>OK</td><td></td></tr>
<tr><td colspan="4" align="center">Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td>Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td>0,5 Hz</td><td>OK</td><td></td></tr>
<tr><td>Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td>2,625 Hz</td><td>OK</td><td></td></tr>
<tr><td>$A_0 > 2$</td><td>2,73 > 2</td><td>OK</td><td></td></tr>
<tr><td>$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td>|0,03447| < 0.05</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_f < \varepsilon(f_0)$</td><td>0,03554 < 0,10313</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_A(f_0) < \theta(f_0)$</td><td>0,1749 < 1,78</td><td>OK</td><td></td></tr>
</table>

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

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

COLLESALVETTI_MS, M15* VICARELLO_LIVORNESE-PI

Instrument: TRS-0004/00-06
Start recording: 09/07/13 09:30:58   End recording: 09/07/13 09:50:59
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
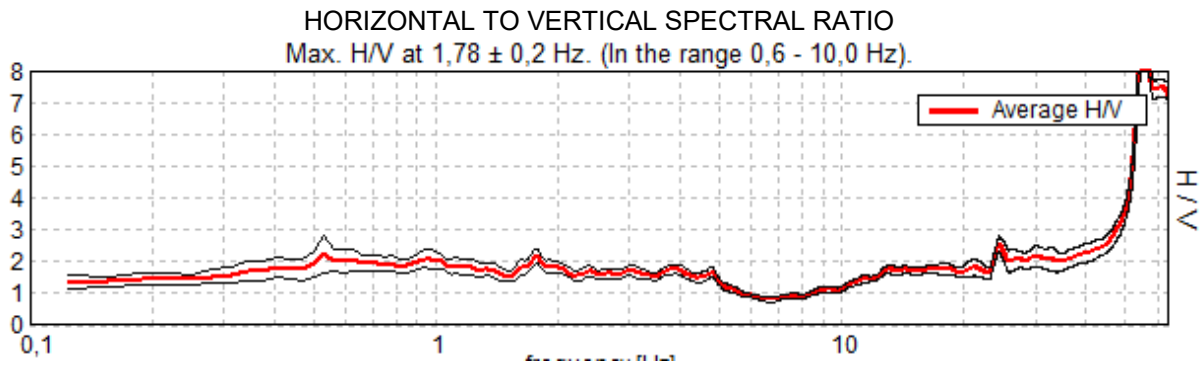GPS data not available

Trace length: 0h20'00''.   Analysis performed on the entire trace.
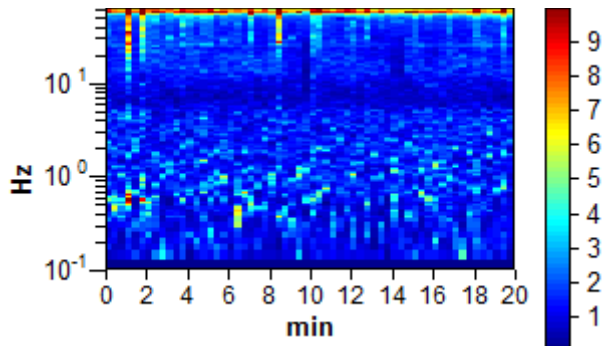Sampling frequency: 128 Hz
Window size: 20 s
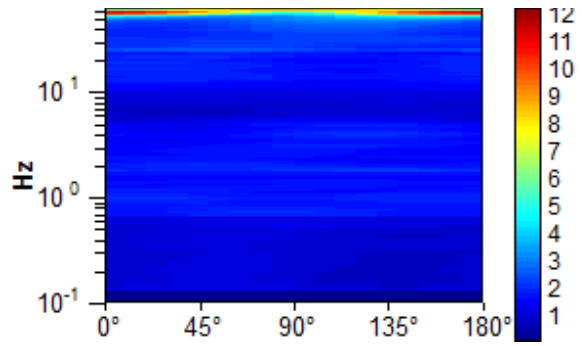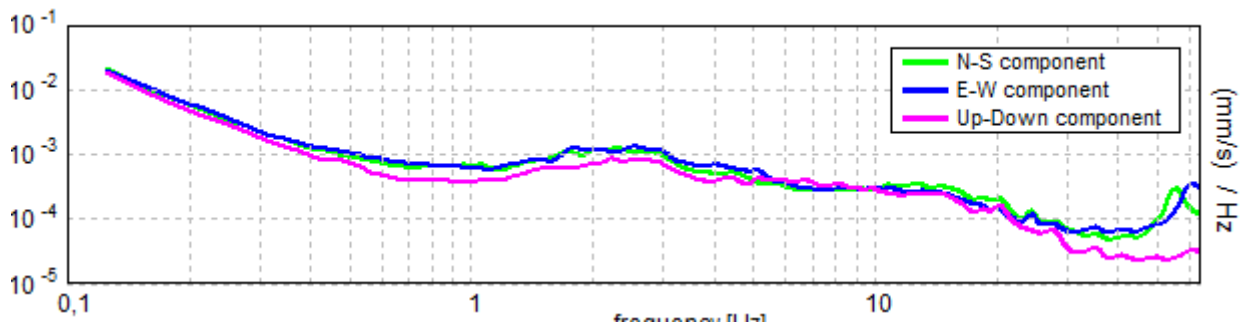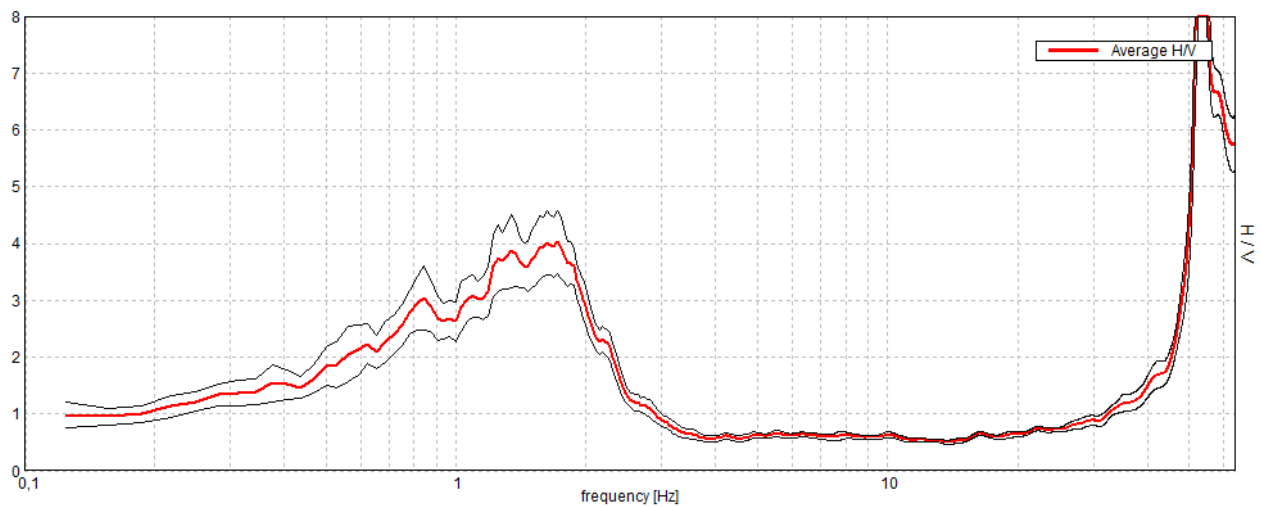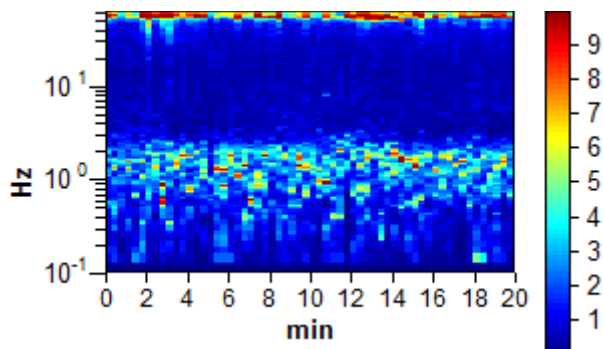Smoothing window: Triangular window
Smoothing: 5%
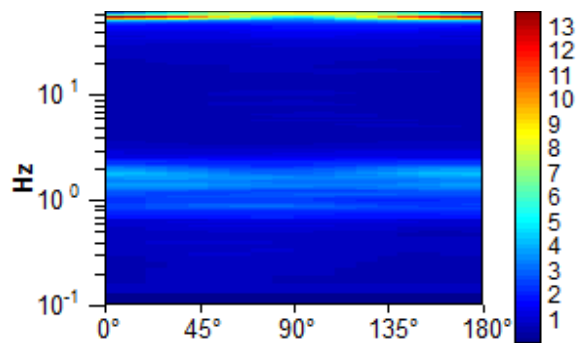
HORIZONTAL TO VERTICAL SPECTRAL RATIO
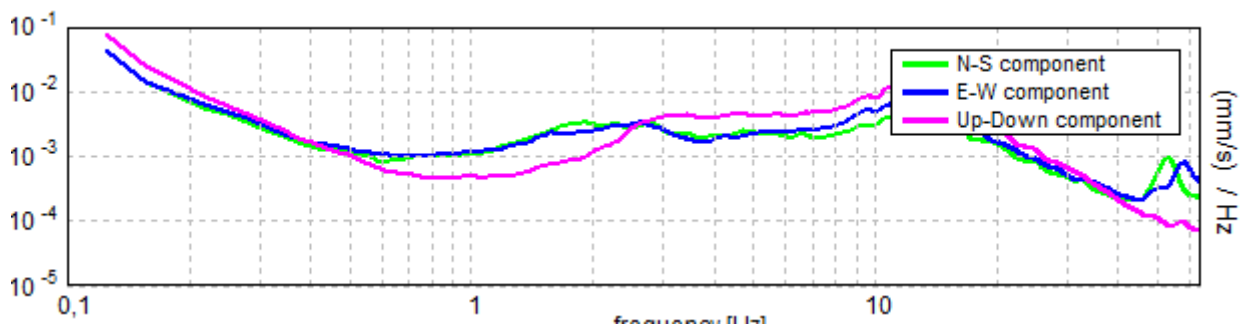Max. H/V at 1,03 ± 0,0 Hz (in the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M15

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

Max. H/V at 1,03 ± 0,0 Hz (in the range 0,0 - 30,0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1,03 > 0,50	**OK**	
$n_c(f_0) > 200$	1237,5 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	0,594 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	1,344 Hz	**OK**	
$A_0 > 2$	5,53 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,00226| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,00233 < 0,10313	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,3529 < 1,78	**OK**	

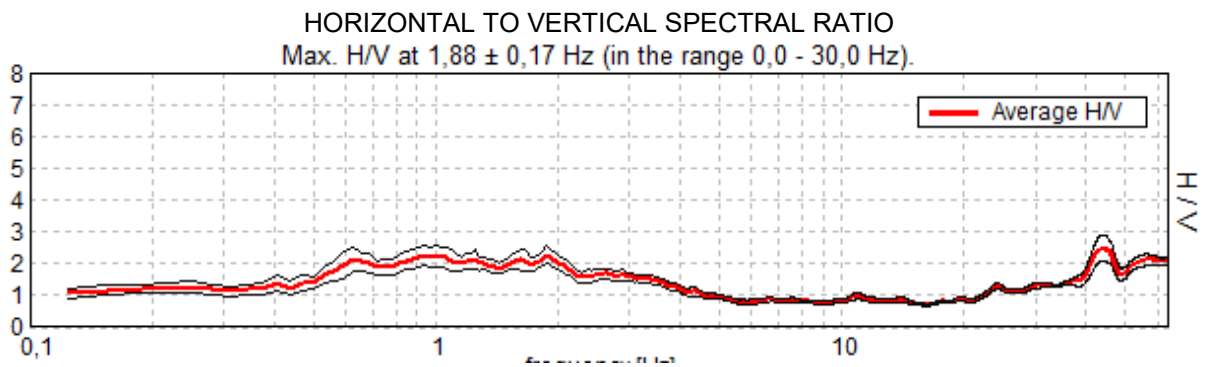|	
L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w\, n_w\, f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0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

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

COLLESALVETTI_MS, M16* STAGNO_VIA DON VERITÀ

Instrument: TRS-0004/00-06
Start recording: 09/07/13 11:32:58   End recording: 09/07/13 11:52:59
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
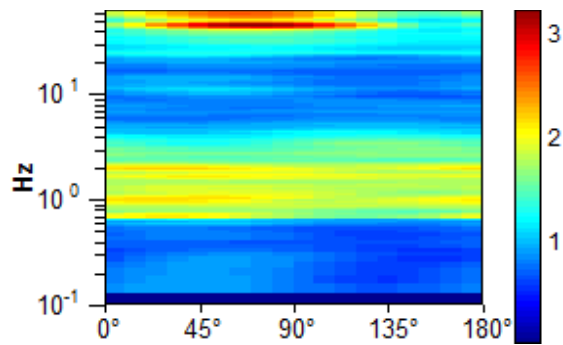GPS data not available

Trace length: 0h20'00".   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 1,22 ± 0,03 Hz (in the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M16

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

<table>
<tr><td colspan="3" align="center">**Max. H/V at 1,22 ± 0,03 Hz (in the range 0,0 - 30,0 Hz).**</td></tr>
</table>

Criteria for a reliable HVSR curve [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	1,22 > 0,50	**OK**	
$n_c(f_0) > 200$	1145,6 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	0,438 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	2,531 Hz	**OK**	
$A_0 > 2$	2,85 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,01391| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,01695 < 0,12188	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,1815 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M17* STAGNO_VIA_C.PAVESE

Instrument: TRS-0004/00-06
Start recording: 09/07/13 12:13:02   End recording: 09/07/13 12:33:03
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
Window size: 20 s
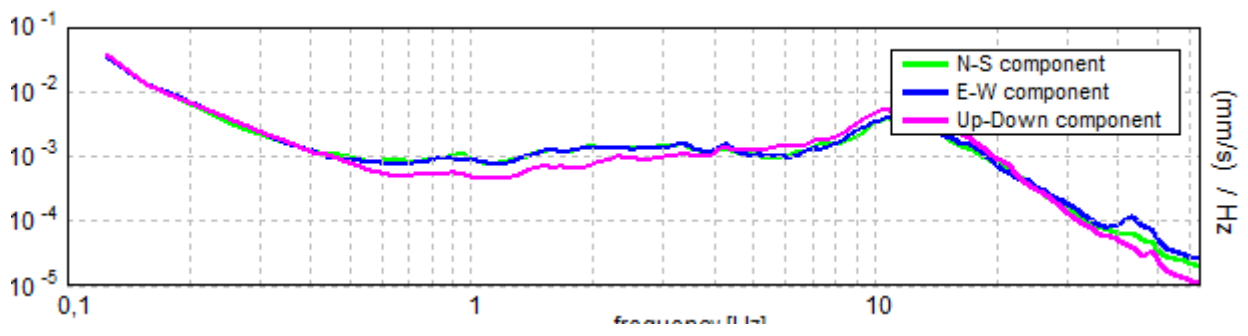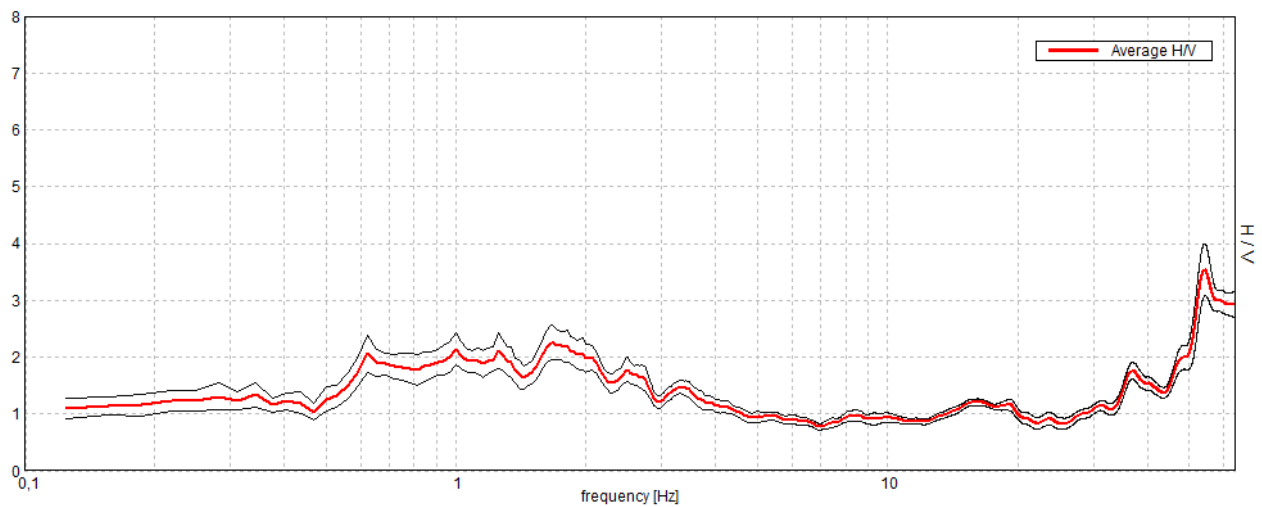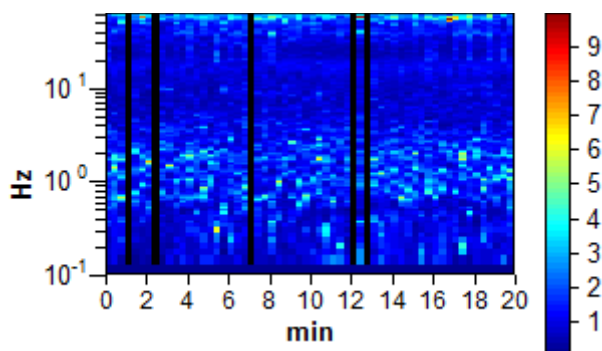Smoothing window: Triangular window
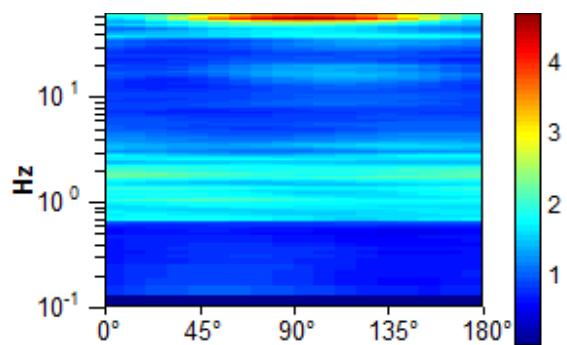Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
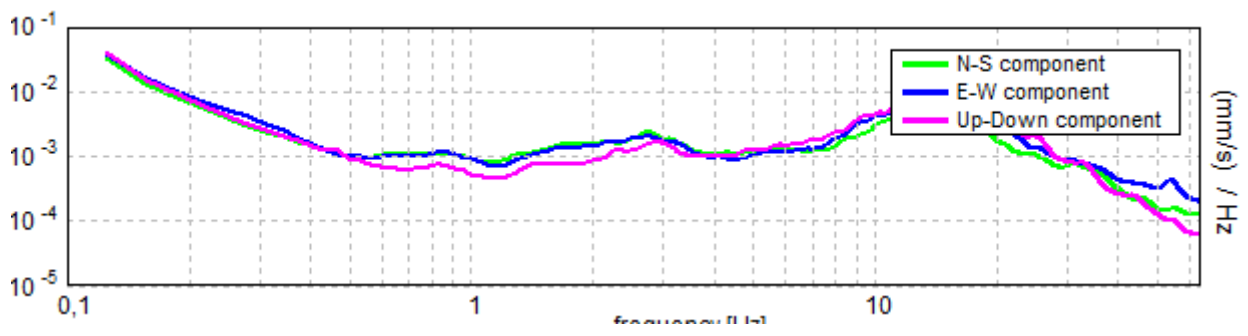Max. H/V at 0,72 ± 0,02 Hz (in the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M17

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

<table>
<tr><td colspan="4" align="center">**Max. H/V at 0,72 ± 0,02 Hz (in the range 0,0 - 30,0 Hz).**</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">**Criteria for a reliable HVSR curve**
[All 3 should be fulfilled]</td></tr>
<tr><td align="center">$f_0 > 10 / L_w$</td><td align="center">0,72 > 0,50</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$n_c(f_0) > 200$</td><td align="center">862,5 > 200</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td><td align="center">Exceeded 0 out of 36 times</td><td align="center">**OK**</td><td></td></tr>
<tr><td colspan="4" align="center">**Criteria for a clear HVSR peak**
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td align="center">Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td align="center">0,313 Hz</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td align="center">1,469 Hz</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$A_0 > 2$</td><td align="center">2,90 > 2</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td align="center">|0,01518| < 0.05</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$\sigma_f < \varepsilon(f_0)$</td><td align="center">0,01091 < 0,10781</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$\sigma_A(f_0) < \theta(f_0)$</td><td align="center">0,1901 < 2,0</td><td align="center">**OK**</td><td></td></tr>
</table>

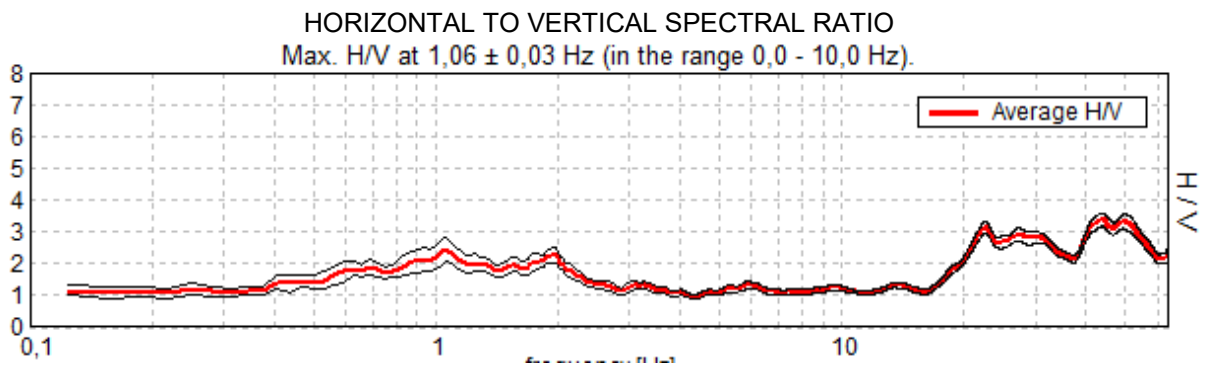|	
L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w\, n_w\, f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0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

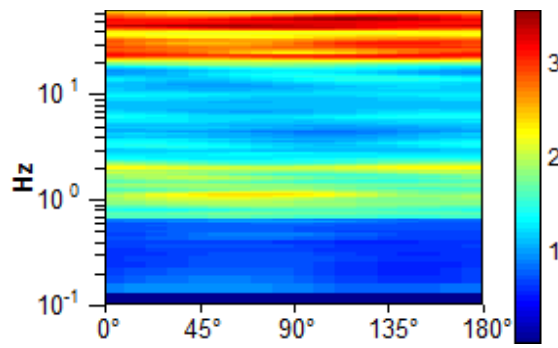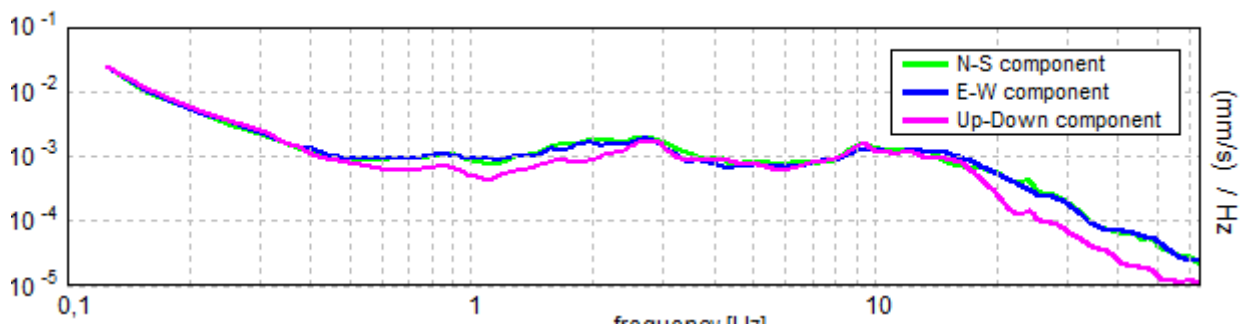| Threshold values for σ_f and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 f_0	0.2 f_0	0.15 f_0	0.10 f_0	0.05 f_0
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COLLESALVETTI_MS, M18* STAGNO_VIA SUESE

Instrument: TRS-0004/00-06
Start recording: 09/07/13 13:00:31   End recording: 09/07/13 13:20:32
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00''.   Analyzed 92% trace (manual window selection)
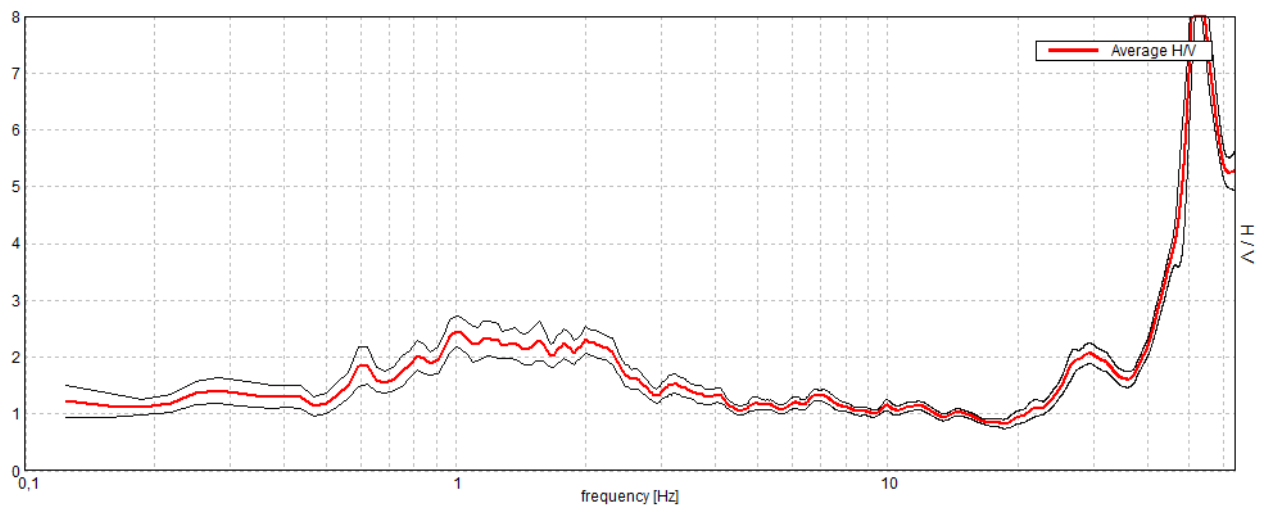Sampling frequency: 128 Hz
Window size: 20 s
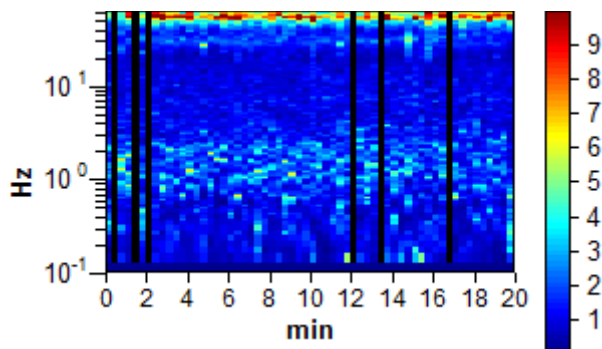Smoothing window: Triangular window
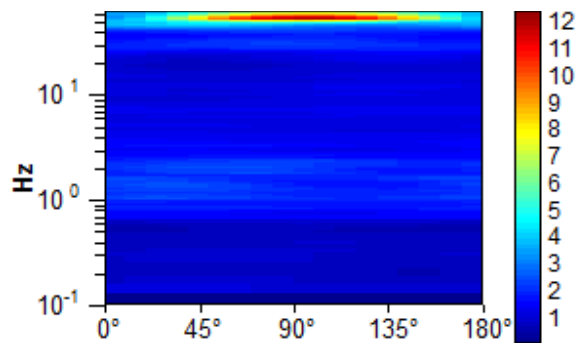Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

Max. H/V at 2,44 ± 0,95 Hz (in the range 0,0 - 30,0 Hz).
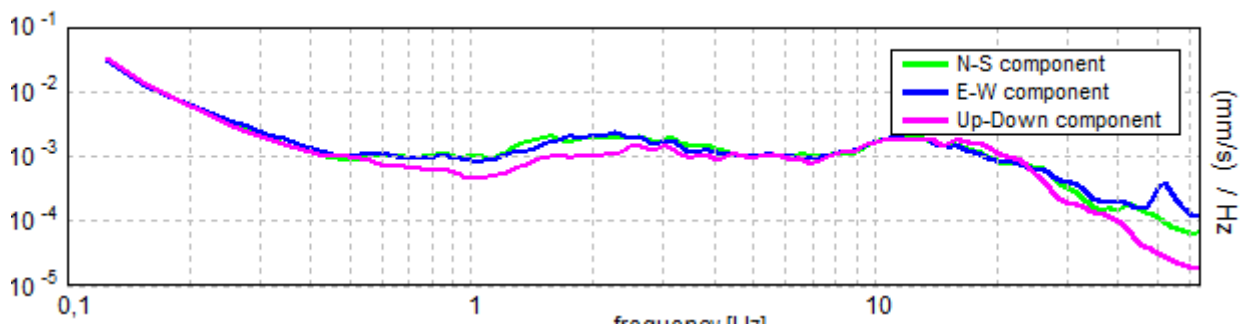

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M18

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

Max. H/V at 2,44 ± 0,95 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**	
$n_c(f_0) > 200$	2681,3 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	1,344 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	4,063 Hz	**OK**	
$A_0 > 2$	3,59 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,1923| < 0.05		**NO**
$\sigma_f < \varepsilon(f_0)$	0,46874 < 0,12188		**NO**
$\sigma_A(f_0) < \theta(f_0)$	0,1671 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M19* GUASTICCE_S. DELLE COLLINE

Instrument: TRS-0004/00-06
Start recording: 09/07/13 13:39:25   End recording: 09/07/13 13:59:26
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00''.   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 1,25 ± 0,02 Hz (in the range 0,0 - 30,0 Hz).

H/V TIME HISTORY   DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M19

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

<table>
<tr><td colspan="3">**Max. H/V at 1,25 ± 0,02 Hz (in the range 0,0 - 30,0 Hz).**</td></tr>
</table>

<table>
<tr>
<td colspan="4">**Criteria for a reliable HVSR curve**
[All 3 should be fulfilled]</td>
</tr>
<tr>
<td>$f_0 > 10 / L_w$</td>
<td>1,25 > 0,50</td>
<td>**OK**</td>
<td></td>
</tr>
<tr>
<td>$n_c(f_0) > 200$</td>
<td>1500,0 > 200</td>
<td>**OK**</td>
<td></td>
</tr>
<tr>
<td>$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td>
<td>Exceeded 0 out of 61 times</td>
<td>**OK**</td>
<td></td>
</tr>
<tr>
<td colspan="4">**Criteria for a clear HVSR peak**
[At least 5 out of 6 should be fulfilled]</td>
</tr>
<tr>
<td>Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td>
<td>0,563 Hz</td>
<td>**OK**</td>
<td></td>
</tr>
<tr>
<td>Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td>
<td>1,75 Hz</td>
<td>**OK**</td>
<td></td>
</tr>
<tr>
<td>$A_0 > 2$</td>
<td>5,85 > 2</td>
<td>**OK**</td>
<td></td>
</tr>
<tr>
<td>$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td>
<td>|0,00852| < 0.05</td>
<td>**OK**</td>
<td></td>
</tr>
<tr>
<td>$\sigma_f < \varepsilon(f_0)$</td>
<td>0,01065 < 0,125</td>
<td>**OK**</td>
<td></td>
</tr>
<tr>
<td>$\sigma_A(f_0) < \theta(f_0)$</td>
<td>0,3794 < 1,78</td>
<td>**OK**</td>
<td></td>
</tr>
</table>

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

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

COLLESALVETTI_MS, M20* GUASTICCE_P.ZZA I MAGGIO

Instrument: TRS-0004/00-06
Start recording: 09/07/13 14:16:26   End recording: 09/07/13 14:36:27
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
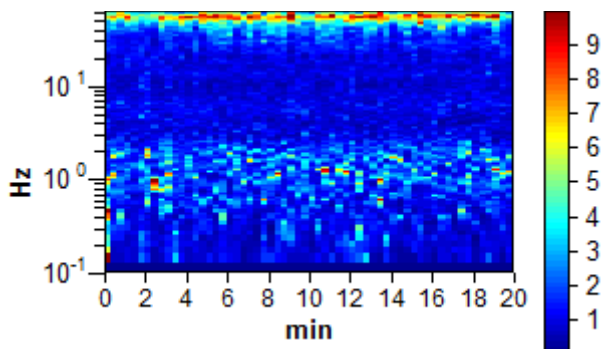GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
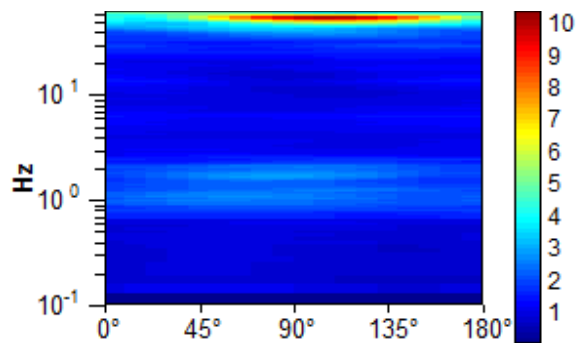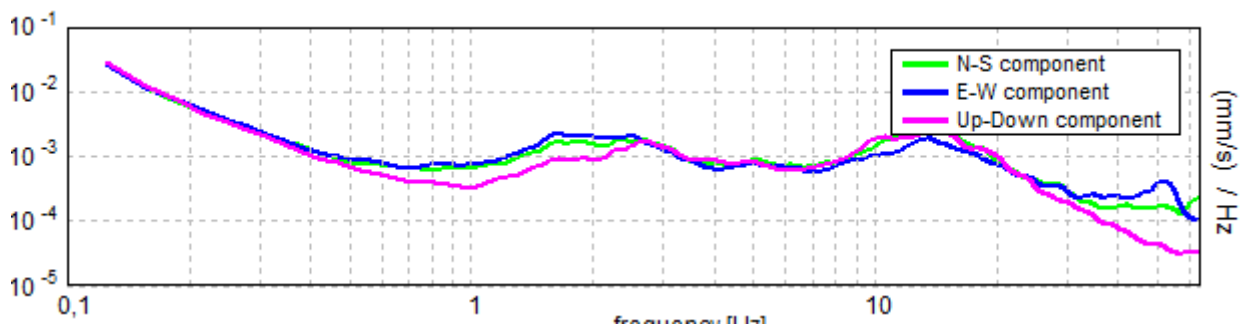Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
Max. H/V at 0,94 ± 0,01 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M20

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

<table>
<tr><td colspan="4" align="center">**Max. H/V at 0,94 ± 0,01 Hz (in the range 0,0 - 30,0 Hz).**</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">**Criteria for a reliable HVSR curve**
[All 3 should be fulfilled]</td></tr>
<tr><td>$f_0 > 10 / L_w$</td><td>0,94 > 0,50</td><td>**OK**</td><td></td></tr>
<tr><td>$n_c(f_0) > 200$</td><td>1125,0 > 200</td><td>**OK**</td><td></td></tr>
<tr><td>$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td><td>Exceeded 0 out of 46 times</td><td>**OK**</td><td></td></tr>
<tr><td colspan="4" align="center">**Criteria for a clear HVSR peak**
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td>Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td>0,594 Hz</td><td>**OK**</td><td></td></tr>
<tr><td>Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td>1,25 Hz</td><td>**OK**</td><td></td></tr>
<tr><td>$A_0 > 2$</td><td>7,14 > 2</td><td>**OK**</td><td></td></tr>
<tr><td>$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td>|0,00655| < 0.05</td><td>**OK**</td><td></td></tr>
<tr><td>$\sigma_f < \varepsilon(f_0)$</td><td>0,00614 < 0,14063</td><td>**OK**</td><td></td></tr>
<tr><td>$\sigma_A(f_0) < \theta(f_0)$</td><td>0,4224 < 2,0</td><td>**OK**</td><td></td></tr>
</table>

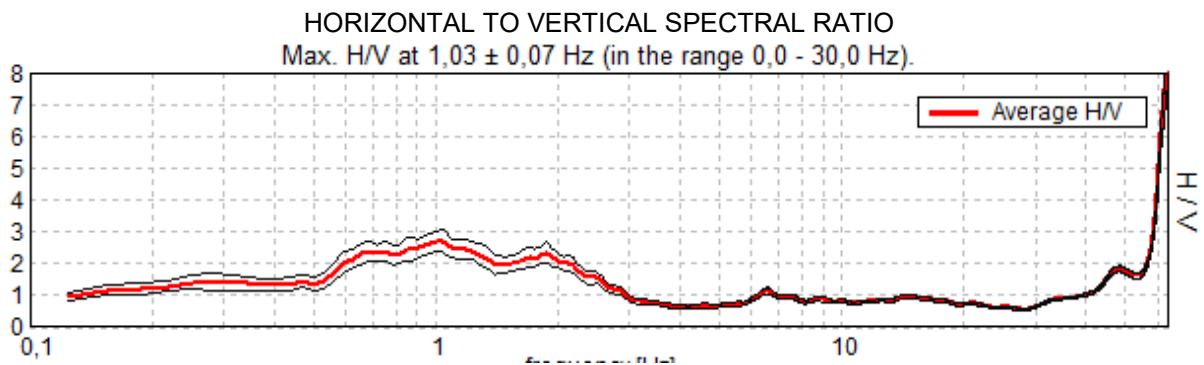|	
L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V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

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

COLLESALVETTI_MS, M21* GUASTICCE_VIA MAZZINI

Instrument: TRS-0004/00-06
Start recording: 09/07/13 14:47:51   End recording: 09/07/13 15:07:52
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
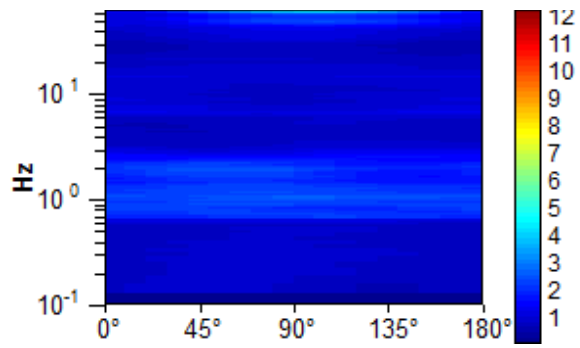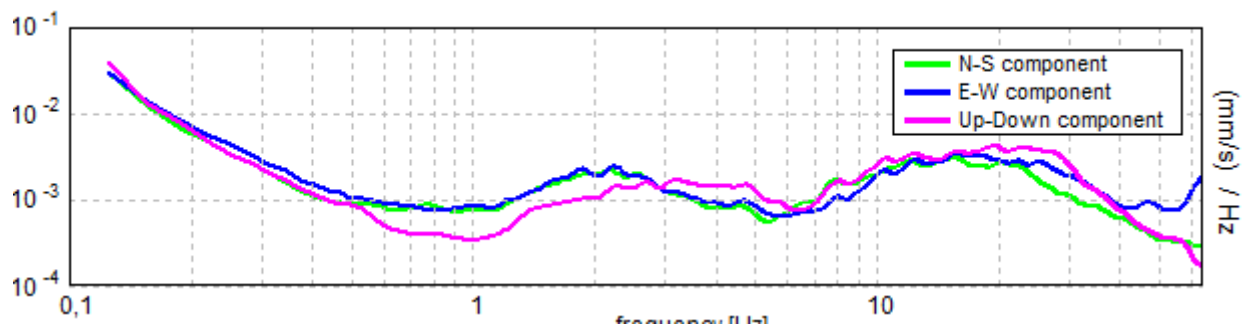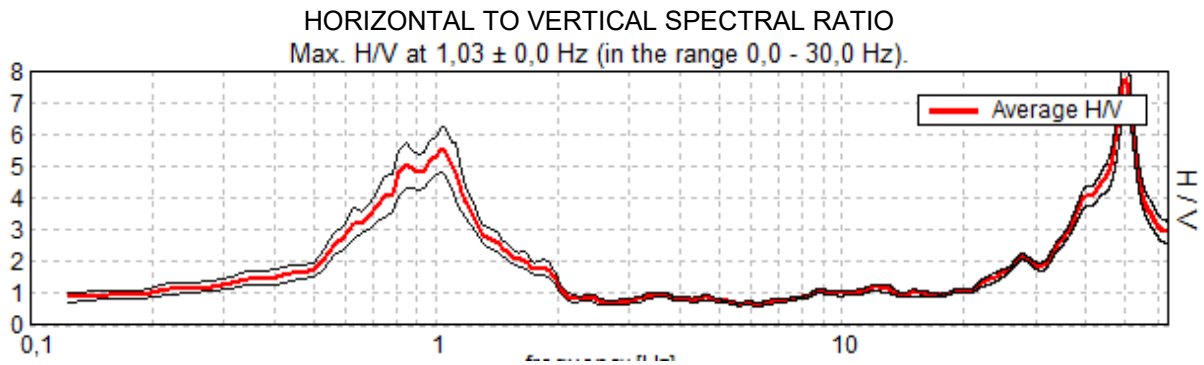GPS data not available

Trace length: 0h20'00''.   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 0,94 ± 0,02 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M21

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

<table>
<tr><td colspan="4" align="center">Max. H/V at 0,94 ± 0,02 Hz (in the range 0,0 - 30,0 Hz).</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Criteria for a reliable HVSR curve
[All 3 should be fulfilled]</td></tr>
<tr><td align="center">$f_0 > 10 / L_w$</td><td align="center">0,94 > 0,50</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$n_c(f_0) > 200$</td><td align="center">1125,0 > 200</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$</td><td align="center">Exceeded 0 out of 46 times</td><td align="center">OK</td><td></td></tr>
<tr><td colspan="4" align="center">Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td align="center">Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td align="center">0,563 Hz</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td align="center">1,531 Hz</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$A_0 > 2$</td><td align="center">5,80 > 2</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td align="center">|0,01047| < 0.05</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$\sigma_f < \varepsilon(f_0)$</td><td align="center">0,00981 < 0,14063</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$\sigma_A(f_0) < \theta(f_0)$</td><td align="center">0,3605 < 2,0</td><td align="center">OK</td><td></td></tr>
</table>

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

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

COLLESALVETTI_MS, M22* GUASTICCE_CHIESA

Instrument: TRS-0004/00-06
Start recording: 09/07/13 15:29:23   End recording: 09/07/13 15:49:24
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
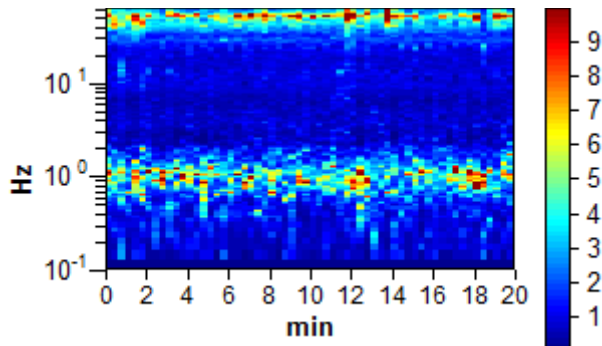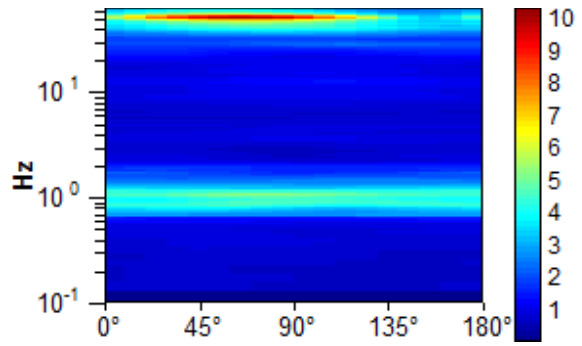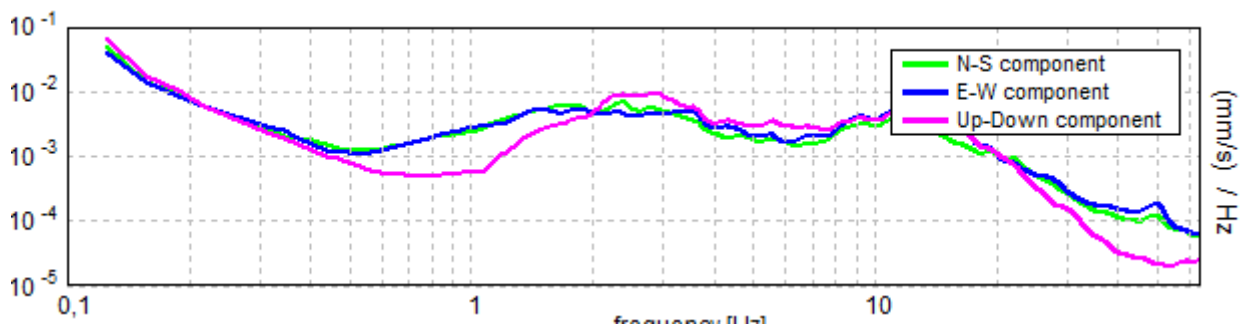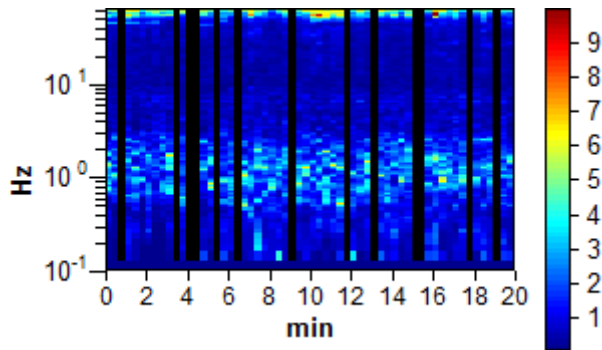Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
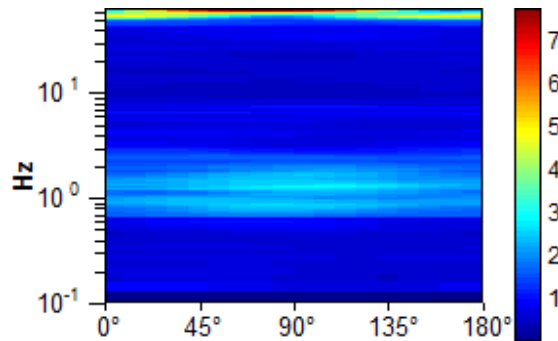Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

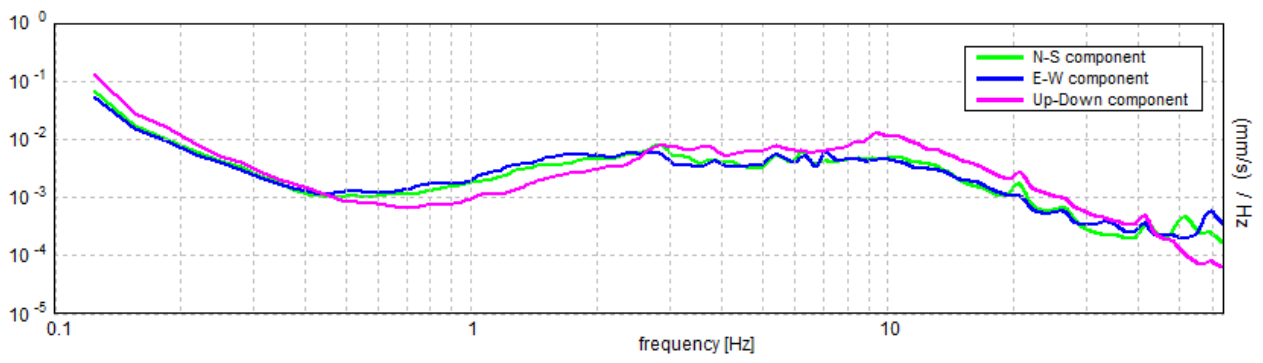Max. H/V at 1,53 ± 0,01 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY	DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M22

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

<div style="border:1px solid">

Max. H/V at 1,53 ± 0,01 Hz (in the range 0,0 - 30,0 Hz).

</div>

Criteria for a reliable HVSR curve [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	1,53 > 0,50	**OK**	
$n_c(f_0) > 200$	1837,5 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz	Exceeded 0 out of 74 times	**OK**	

Criteria for a clear HVSR peak [At least 5 out of 6 should be fulfilled]			
Exists f^- in $[f_0/4, f_0]$	$A_{H/V}(f^-) < A_0 / 2$	0,531 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$	$A_{H/V}(f^+) < A_0 / 2$	2,0 Hz	**OK**	
$A_0 > 2$	4,16 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,00189| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,0029 < 0,15313	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,2233 < 1,78	**OK**	

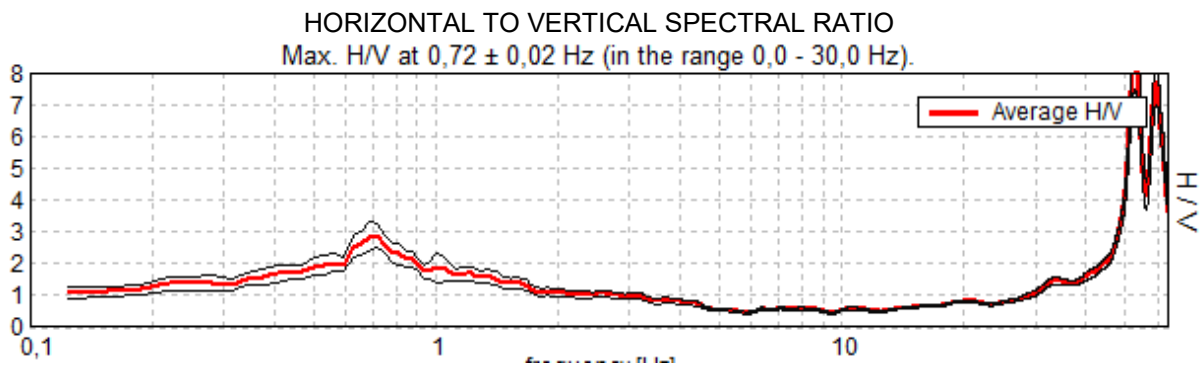|	
L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V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

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

COLLESALVETTI_MS, M23* GUASTICCE_VIA FRANCIA

Instrument: TRS-0004/00-06
Start recording: 09/07/13 16:38:35   End recording: 09/07/13 16:58:36
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
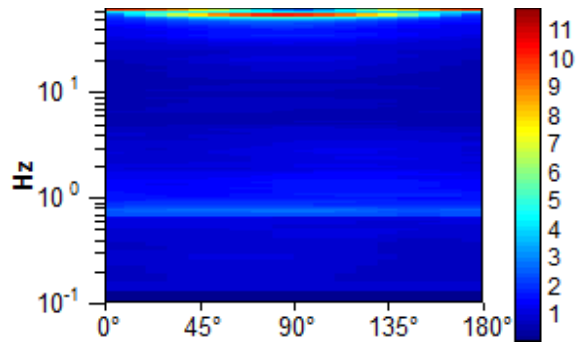GPS data not available

Trace length: 0h20'00''.   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
Window size: 20 s
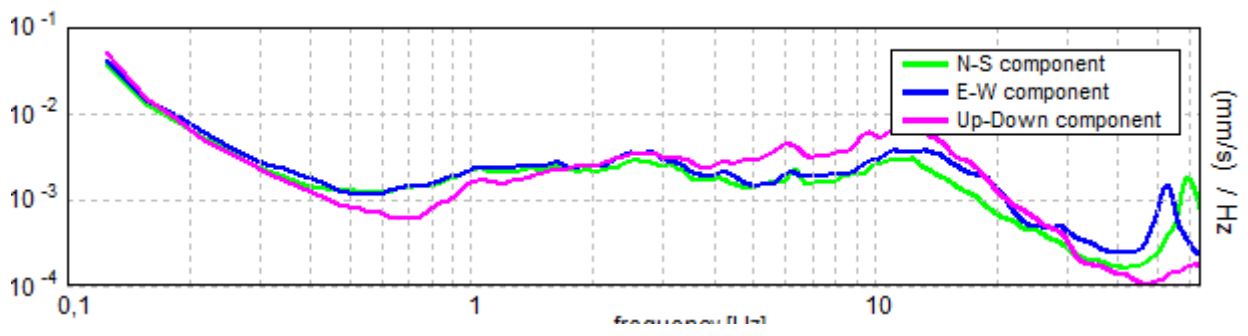Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

Max. H/V at 2,72 ± 0,11 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY	DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M23

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

Max. H/V at 2,72 ± 0,11 Hz (in the range 0,0 - 30,0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2,72 > 0,50	**OK**	
$n_c(f_0) > 200$	3262,5 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	Exceeded 0 out of 132 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 $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	5,75 Hz	**OK**	
$A_0 > 2$	3,10 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,01968| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,05352 < 0,13594	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,1408 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M24* GUASTICCE_PODERE BERETTA

Instrument: TRS-0004/00-06
Start recording: 09/07/13 17:11:22   End recording: 09/07/13 17:31:23
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
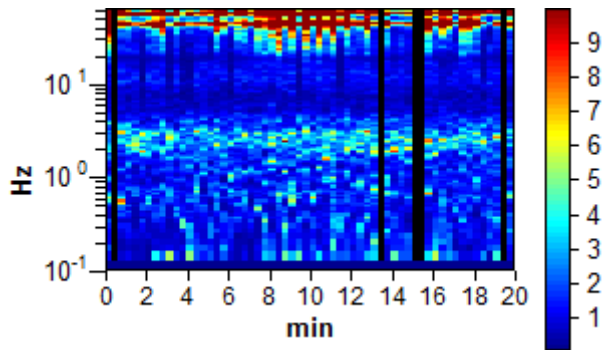GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
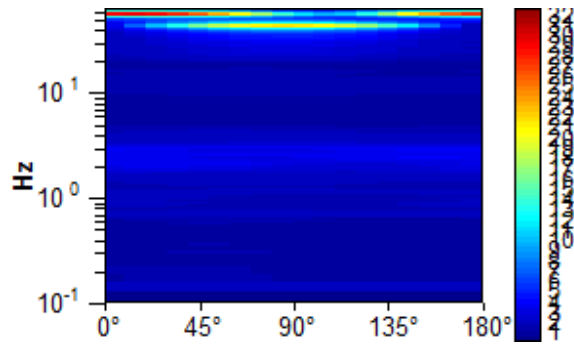Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

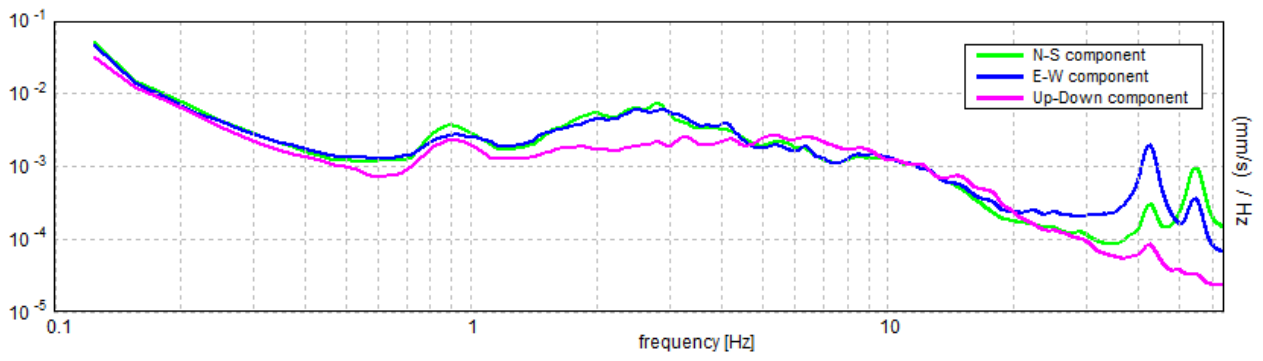Max. H/V at 1,81 ± 0,02 Hz (in the range 0,0 - 64,0 Hz).

H/V TIME HISTORY	DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M24

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

<table>
<tr><td colspan="3" align="center">**Max. H/V at 1,81 ± 0,02 Hz (in the range 0,0 - 64,0 Hz).**</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">**Criteria for a reliable HVSR curve**
[All 3 should be fulfilled]</td></tr>
<tr><td align="center">$f_0 > 10 / L_w$</td><td align="center">1,81 > 0,50</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$n_c(f_0) > 200$</td><td align="center">2175,0 > 200</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td><td align="center">Exceeded 0 out of 88 times</td><td align="center">**OK**</td><td></td></tr>
<tr><td colspan="4" align="center">**Criteria for a clear HVSR peak**
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td align="center">Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td align="center">1,188 Hz</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td align="center">2,531 Hz</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$A_0 > 2$</td><td align="center">6,42 > 2</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td align="center">|0,00589| < 0.05</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$\sigma_f < \varepsilon(f_0)$</td><td align="center">0,01067 < 0,18125</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$\sigma_A(f_0) < \theta(f_0)$</td><td align="center">0,3516 < 1,78</td><td align="center">**OK**</td><td></td></tr>
</table>

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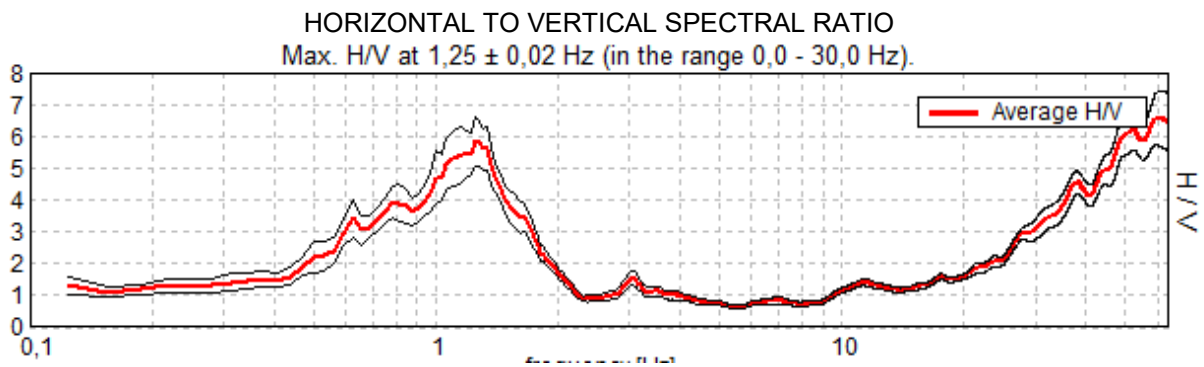</table>

<table>
<tr><td colspan="6" align="center">Threshold values for σ_f and $\sigma_A(f_0)$</td></tr>
<tr><td align="center">Freq.range [Hz]</td><td align="center">< 0.2</td><td align="center">0.2 – 0.5</td><td align="center">0.5 – 1.0</td><td align="center">1.0 – 2.0</td><td align="center">> 2.0</td></tr>
<tr><td align="center">$\varepsilon(f_0)$ [Hz]</td><td align="center">0.25 f_0</td><td align="center">0.2 f_0</td><td align="center">0.15 f_0</td><td align="center">0.10 f_0</td><td align="center">0.05 f_0</td></tr>
<tr><td align="center">$\theta(f_0)$ for $\sigma_A(f_0)$</td><td align="center">3.0</td><td align="center">2.5</td><td align="center">2.0</td><td align="center">1.78</td><td align="center">1.58</td></tr>
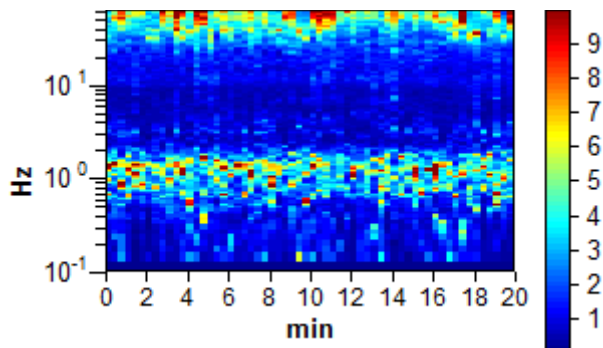<tr><td align="center">Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$</td><td align="center">0.48</td><td align="center">0.40</td><td align="center">0.30</td><td align="center">0.25</td><td align="center">0.20</td></tr>
</table>

COLLESALVETTI_MS, M25* MORTAIOLO_VIA DEL GRANI

Instrument: TRS-0004/00-06
Start recording: 09/07/13 17:57:28   End recording: 09/07/13 18:17:29
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
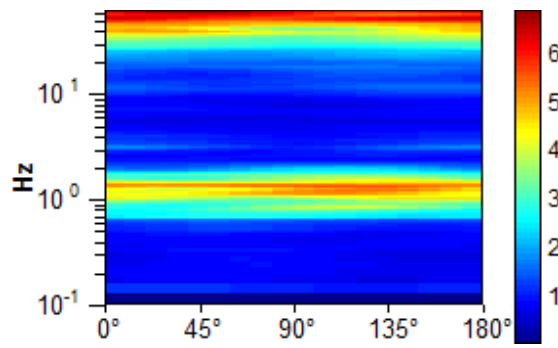GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
Window size: 20 s
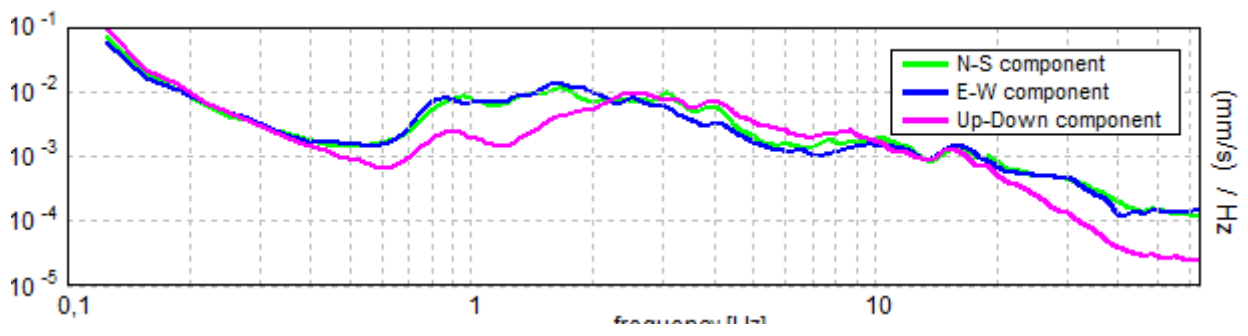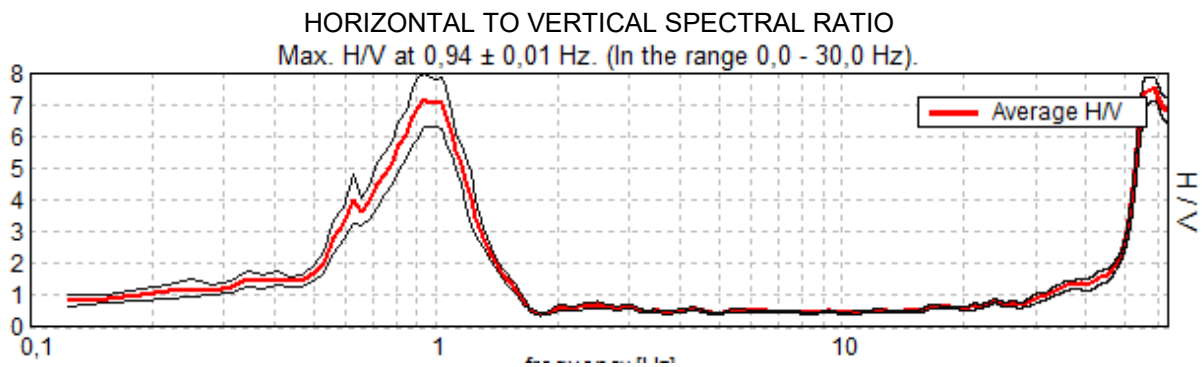Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

Max. H/V at 1,75 ± 0,08 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M25

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

<table>
<tr><td colspan="2">Max. H/V at 1,75 ± 0,08 Hz (in the range 0,0 - 30,0 Hz).</td></tr>
</table>

Criteria for a reliable HVSR curve [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	1,75 > 0,50	**OK**	
$n_c(f_0) > 200$	2100,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	0,781 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	2,938 Hz	**OK**	
$A_0 > 2$	4,23 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,02143| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,0375 < 0,175	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,2363 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M26* MORTAIOLO_A12

Instrument: TRS-0004/00-06
Start recording: 10/07/13 08:38:13   End recording: 10/07/13 08:58:14
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00''.   Analysis performed on the entire trace.
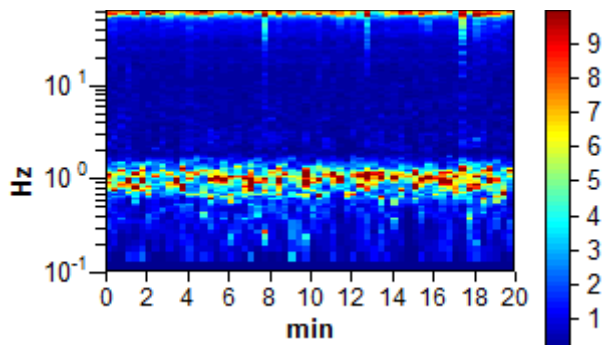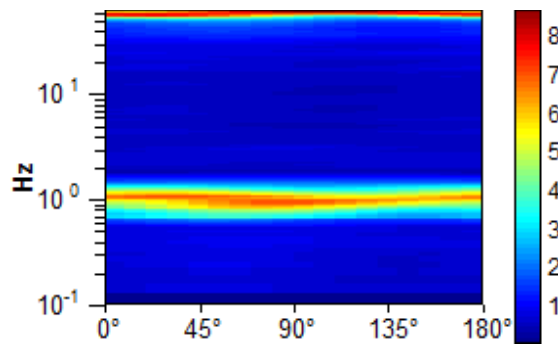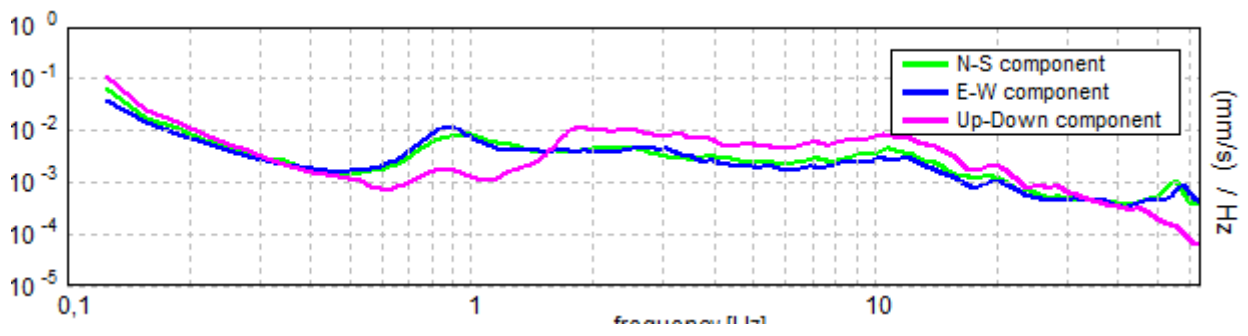Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

Max. H/V at 0,75 ± 0,03 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY	DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M26

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

<table>
<tr><td colspan="4" align="center">**Max. H/V at 0,75 ± 0,03 Hz (in the range 0,0 - 30,0 Hz).**</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">**Criteria for a reliable HVSR curve**
[All 3 should be fulfilled]</td></tr>
<tr><td align="center">$f_0 > 10 / L_w$</td><td align="center">0,75 > 0,50</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$n_c(f_0) > 200$</td><td align="center">900,0 > 200</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td><td align="center">Exceeded 0 out of 37 times</td><td align="center">**OK**</td><td></td></tr>
<tr><td colspan="4" align="center">**Criteria for a clear HVSR peak**
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td align="center">Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td align="center">0,469 Hz</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td align="center">1,406 Hz</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$A_0 > 2$</td><td align="center">4,34 > 2</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td align="center">|0,02291| < 0.05</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$\sigma_f < \varepsilon(f_0)$</td><td align="center">0,01718 < 0,1125</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$\sigma_A(f_0) < \theta(f_0)$</td><td align="center">0,2511 < 2,0</td><td align="center">**OK**</td><td></td></tr>
</table>

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

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

COLLESALVETTI_MS, M27* MORTAIOLO_PODERE S. LEOPOLDO

Instrument: TRS-0004/00-06
Start recording: 10/07/13 09:15:17   End recording: 10/07/13 09:35:18
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00''.   Analysis performed on the entire trace.
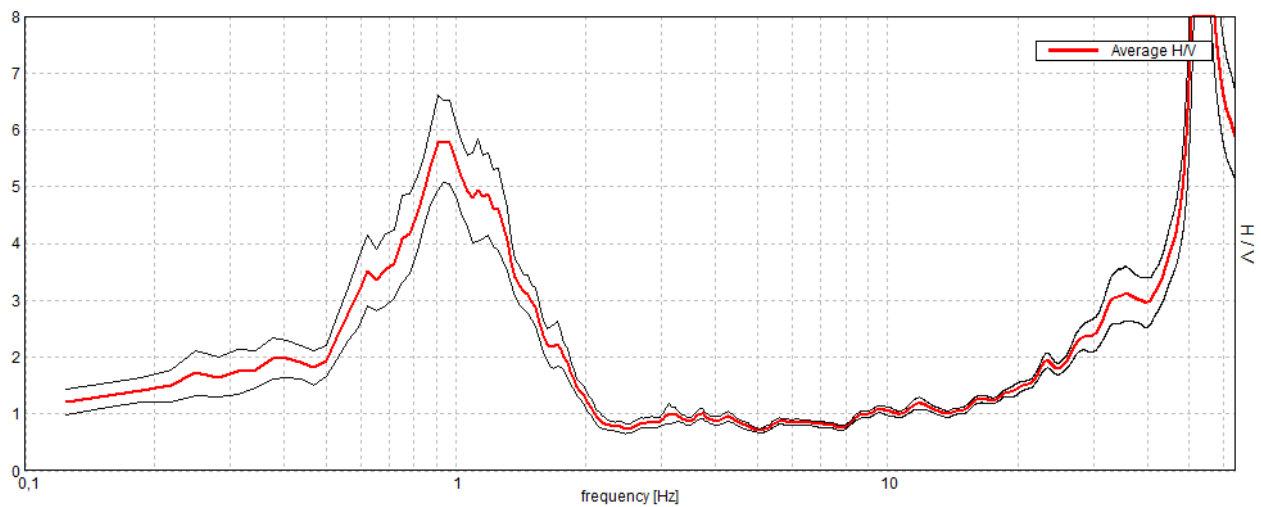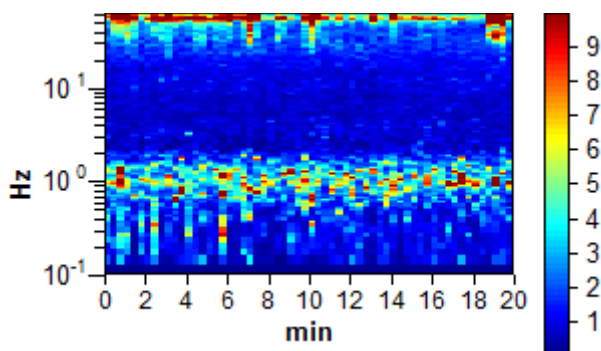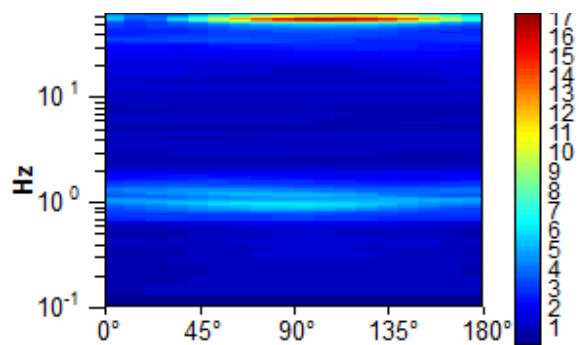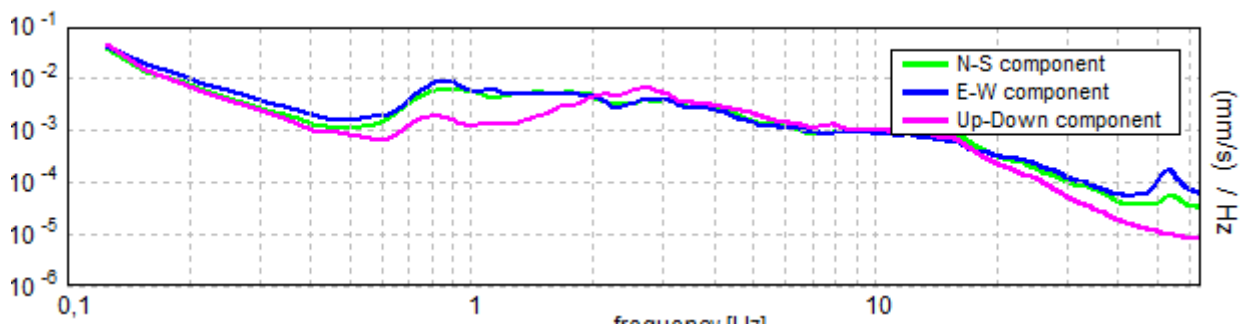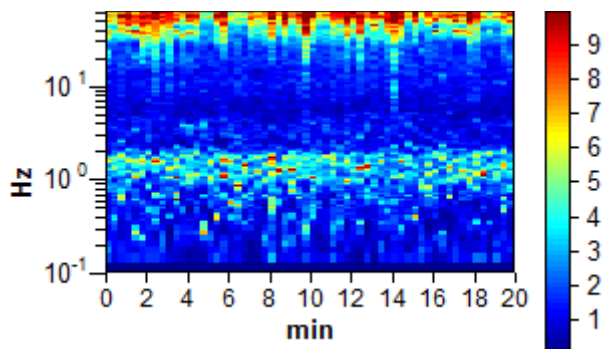Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
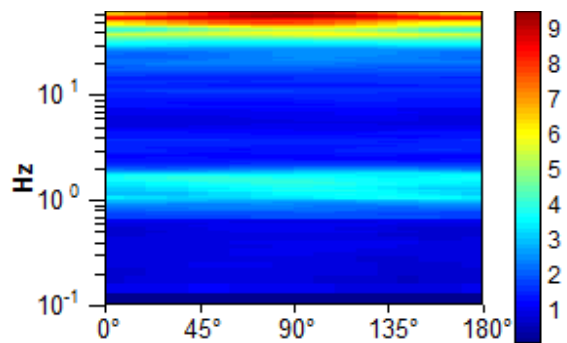Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

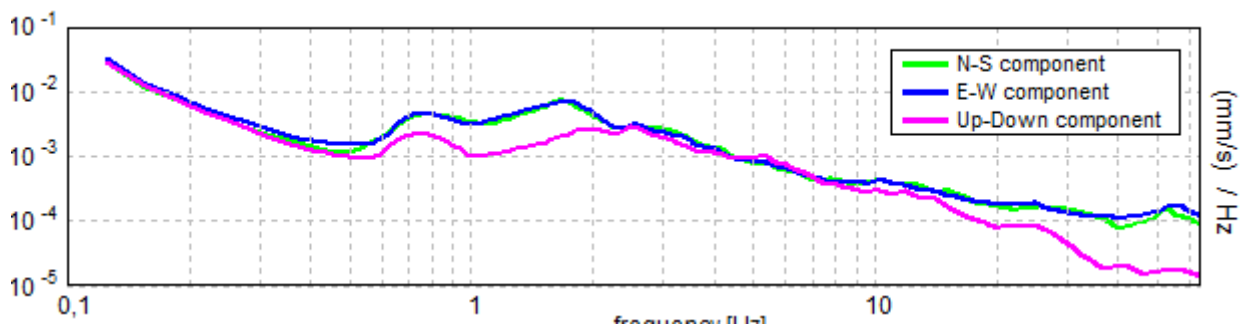Max. H/V at 1,22 ± 0,06 Hz (in the range 0,0 - 64,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M27

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

<table>
<tr><td colspan="4" align="center">Max. H/V at 1,22 ± 0,06 Hz (in the range 0,0 - 64,0 Hz).</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Criteria for a reliable HVSR curve
[All 3 should be fulfilled]</td></tr>
<tr><td align="center">$f_0 > 10 / L_w$</td><td align="center">1,22 > 0,50</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$n_c(f_0) > 200$</td><td align="center">1462,5 > 200</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td><td align="center">Exceeded 0 out of 60 times</td><td align="center">OK</td><td></td></tr>
<tr><td colspan="4" align="center">Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td align="center">Exists f^- in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0 / 2$</td><td align="center">0,781 Hz</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">Exists f^+ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0 / 2$</td><td align="center">1,594 Hz</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$A_0 > 2$</td><td align="center">7,45 > 2</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td align="center">|0,02269| < 0.05</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$\sigma_f < \varepsilon(f_0)$</td><td align="center">0,02765 < 0,12188</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$\sigma_A(f_0) < \theta(f_0)$</td><td align="center">0,6633 < 1,78</td><td align="center">OK</td><td></td></tr>
</table>

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

<table>
<tr><td colspan="6" align="center">Threshold values for σ_f and $\sigma_A(f_0)$</td></tr>
<tr><td>Freq.range [Hz]</td><td align="center">< 0.2</td><td align="center">0.2 – 0.5</td><td align="center">0.5 – 1.0</td><td align="center">1.0 – 2.0</td><td align="center">> 2.0</td></tr>
<tr><td>$\varepsilon(f_0)$ [Hz]</td><td align="center">0.25 f_0</td><td align="center">0.2 f_0</td><td align="center">0.15 f_0</td><td align="center">0.10 f_0</td><td align="center">0.05 f_0</td></tr>
<tr><td>$\theta(f_0)$ for $\sigma_A(f_0)$</td><td align="center">3.0</td><td align="center">2.5</td><td align="center">2.0</td><td align="center">1.78</td><td align="center">1.58</td></tr>
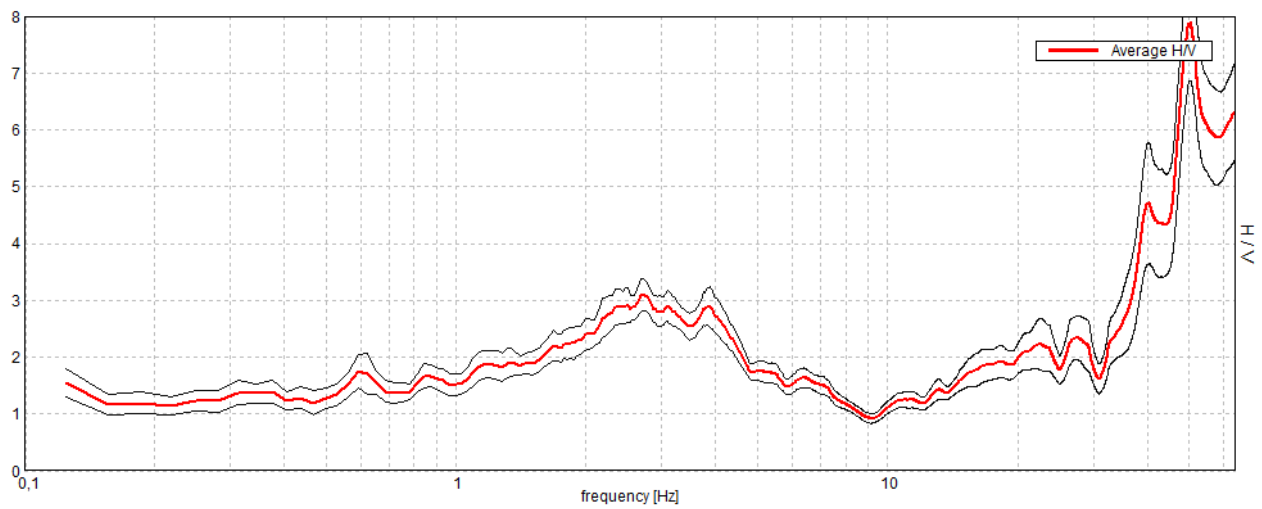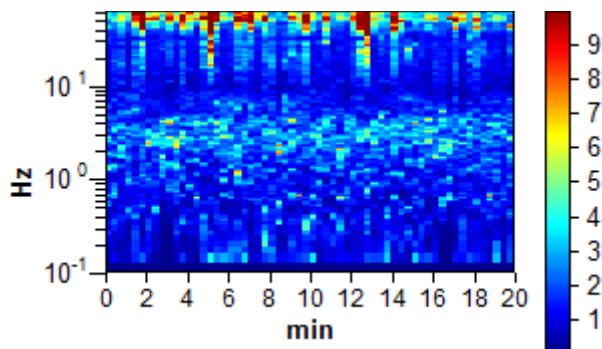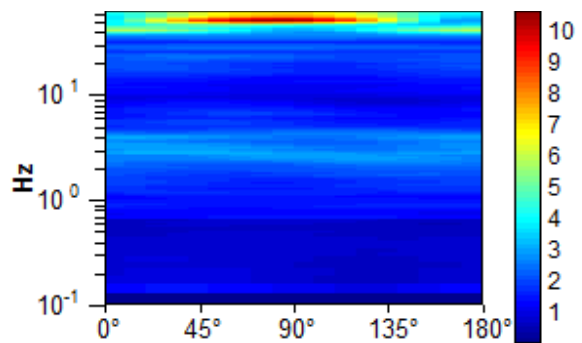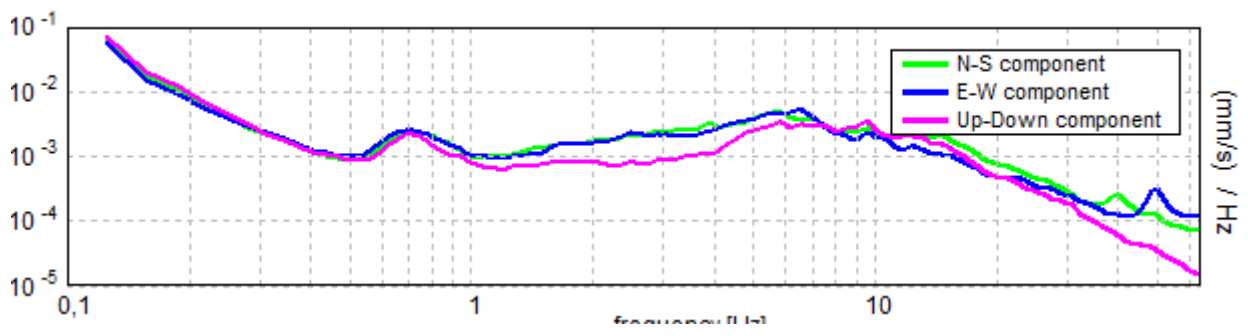<tr><td>Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$</td><td align="center">0.48</td><td align="center">0.40</td><td align="center">0.30</td><td align="center">0.25</td><td align="center">0.20</td></tr>
</table>

COLLESALVETTI_MS, M28* MORTAIOLO_VILLA BERTE

Instrument: TRS-0004/00-06
Start recording: 10/07/13 09:56:11   End recording: 10/07/13 10:16:12
Channel labels: NORTH SOUTH; EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analyzed 95% trace (manual window selection)
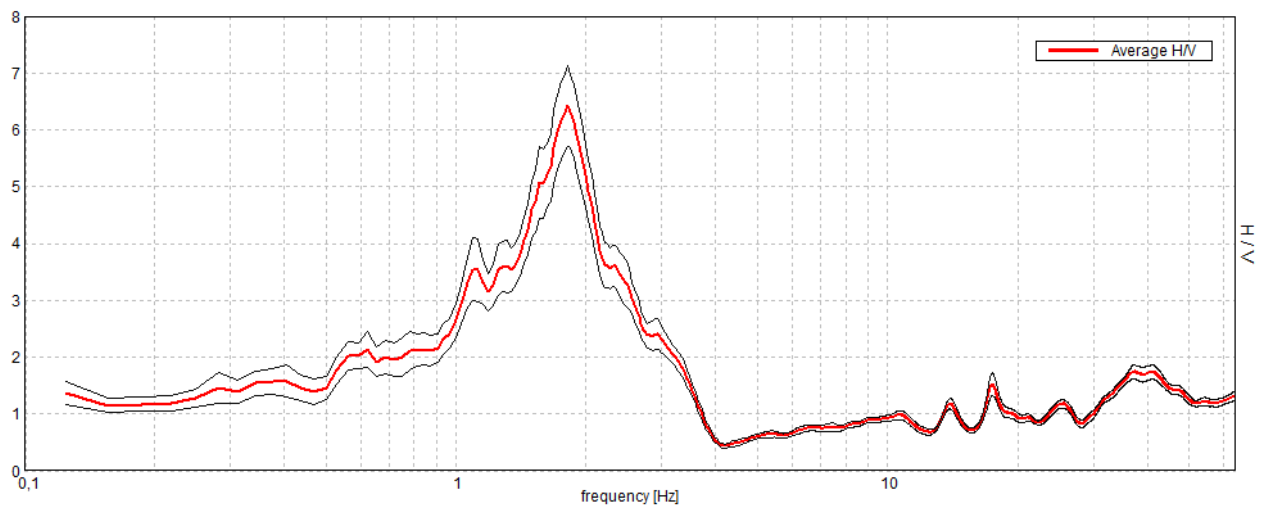Sampling frequency: 128 Hz
Window size: 20 s
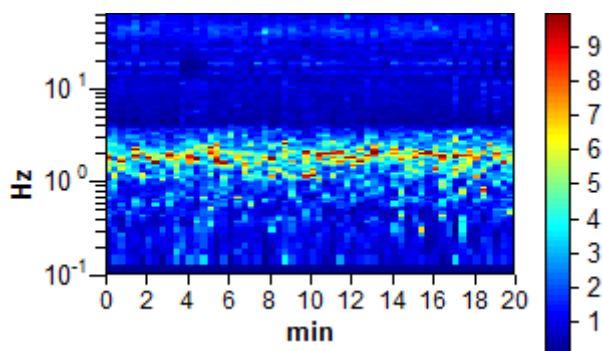Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
Max. H/V at 1,13 ± 0,14 Hz. (In the range 0,0 - 10,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M28

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

<table>
<tr><td colspan="4" align="center">Max. H/V at 1,13 ± 0,14 Hz (in the range 0,0 - 10,0 Hz).</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Criteria for a reliable HVSR curve
[All 3 should be fulfilled]</td></tr>
<tr><td align="center">$f_0 > 10 / L_w$</td><td align="center">1,13 > 0,50</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$n_c(f_0) > 200$</td><td align="center">1282,5 > 200</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$</td><td align="center">Exceeded 0 out of 55 times</td><td align="center">OK</td><td></td></tr>
<tr><td colspan="4" align="center">Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td align="center">Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td align="center">0,531 Hz</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td align="center">3,75 Hz</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$A_0 > 2$</td><td align="center">3,01 > 2</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td align="center">|0,0596| < 0.05</td><td></td><td align="center">NO</td></tr>
<tr><td align="center">$\sigma_f < \varepsilon(f_0)$</td><td align="center">0,06705 < 0,1125</td><td align="center">OK</td><td></td></tr>
<tr><td align="center">$\sigma_A(f_0) < \theta(f_0)$</td><td align="center">0,212 < 1,78</td><td align="center">OK</td><td></td></tr>
</table>

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

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

COLLESALVETTI_MS, M29* CERRETA_STRADA

Instrument: TRS-0004/00-06
Start recording: 10/07/13 10:32:25   End recording: 10/07/13 10:52:26
Channel labels: NORTH SOUTH; EAST WEST ; UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analyzed 97% trace (manual window selection)
Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
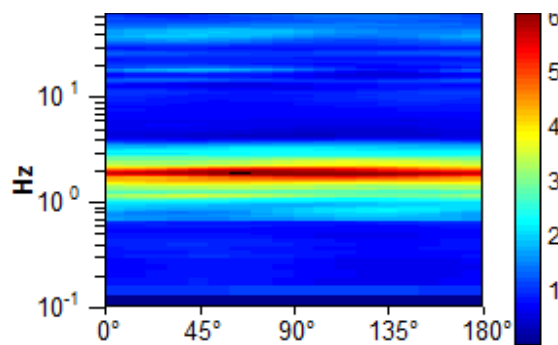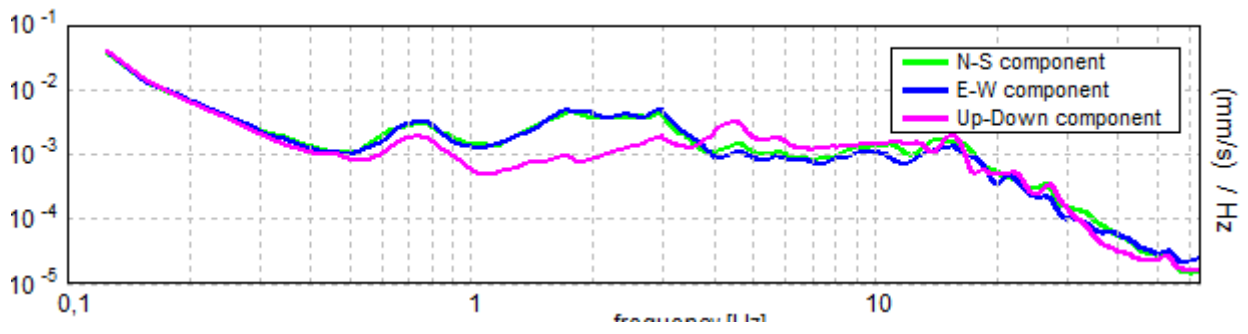Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
Max. H/V at 2,0 ± 0,25 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M29

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

<table>
<tr><td colspan="4">Max. H/V at 2,0 ± 0,25 Hz (in the range 0,0 - 30,0 Hz).</td></tr>
</table>

<table>
<tr><td colspan="4">Criteria for a reliable HVSR curve
[All 3 should be fulfilled]</td></tr>
<tr><td>$f_0 > 10 / L_w$</td><td>2,00 > 0,50</td><td><strong style="color:green">OK</td><td></td></tr>
<tr><td>$n_c(f_0) > 200$</td><td>2320,0 > 200</td><td><strong style="color:green">OK</td><td></td></tr>
<tr><td>$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td><td>Exceeded 0 out of 97 times</td><td><strong style="color:green">OK</td><td></td></tr>
<tr><td colspan="4">Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td>Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td></td><td></td><td><strong style="color:red">NO</td></tr>
<tr><td>Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td>3,688 Hz</td><td><strong style="color:green">OK</td><td></td></tr>
<tr><td>$A_0 > 2$</td><td>2,15 > 2</td><td><strong style="color:green">OK</td><td></td></tr>
<tr><td>$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td>|0,06252| < 0.05</td><td></td><td><strong style="color:red">NO</td></tr>
<tr><td>$\sigma_f < \varepsilon(f_0)$</td><td>0,12503 < 0,1</td><td></td><td><strong style="color:red">NO</td></tr>
<tr><td>$\sigma_A(f_0) < \theta(f_0)$</td><td>0,1186 < 1,58</td><td><strong style="color:green">OK</td><td></td></tr>
</table>

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

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

COLLESALVETTI_MS, M30* NUGOLA_VECCHIA

Instrument: TRS-0004/00-06
Start recording: 10/07/13 11:12:03   End recording: 10/07/13 11:32:04
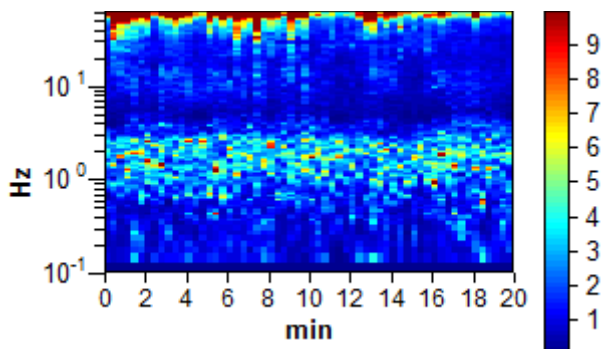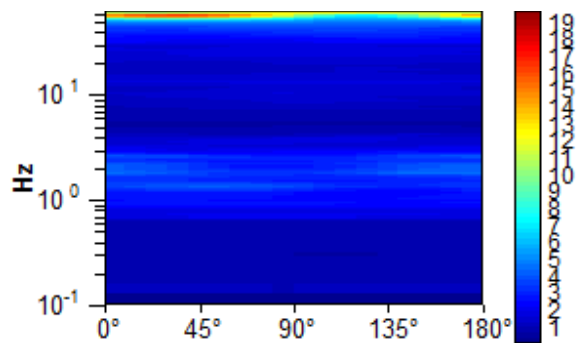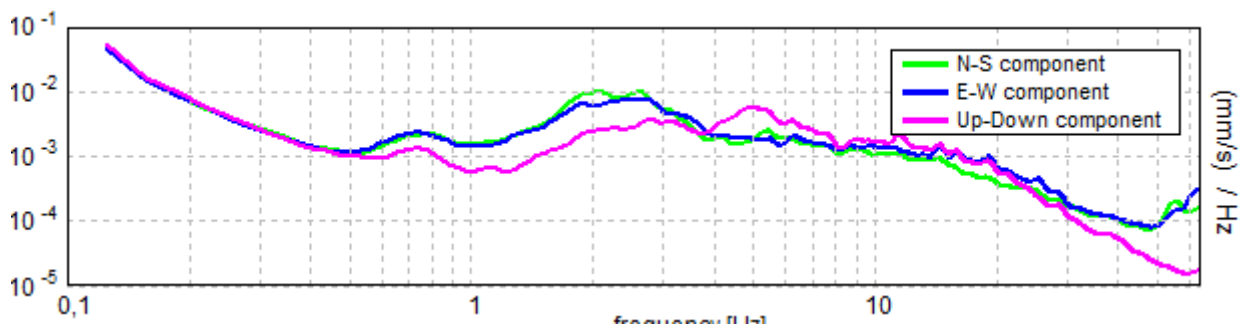Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analyzed 95% trace (manual window selection)
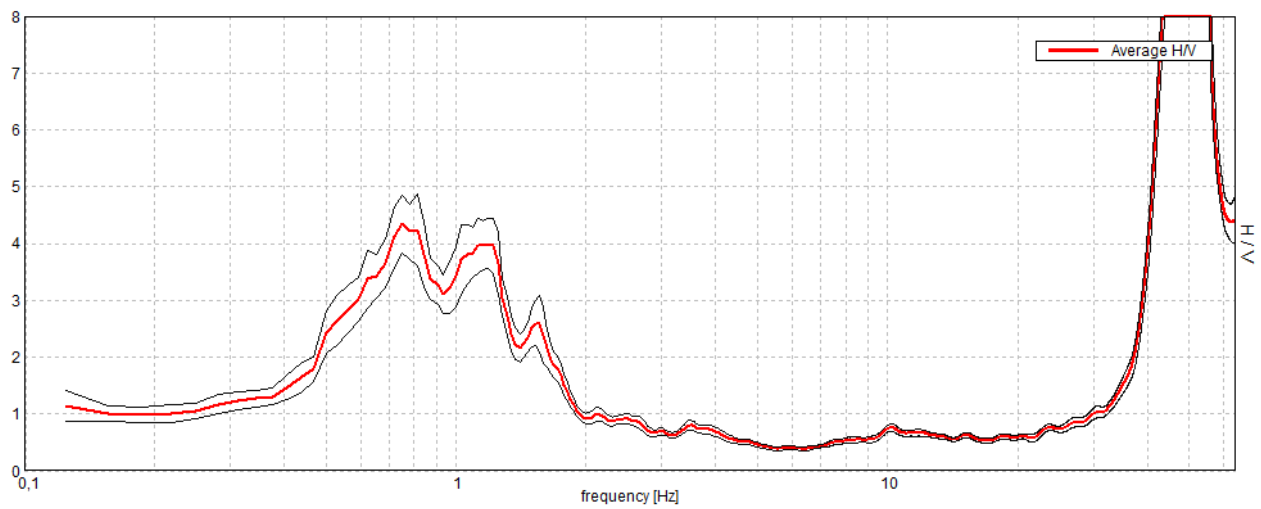Sampling frequency: 128 Hz
Window size: 20 s
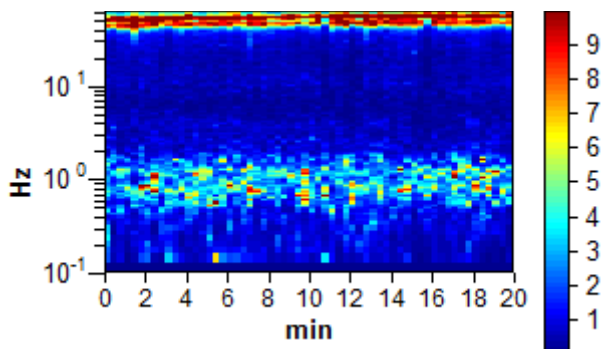Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
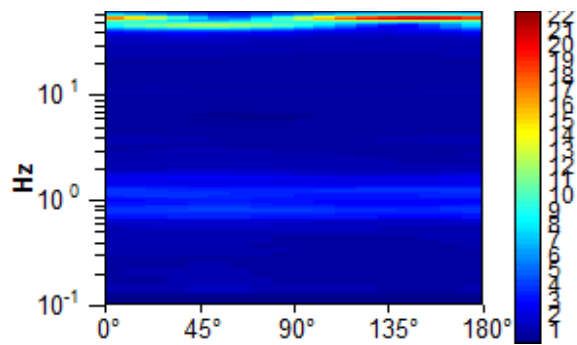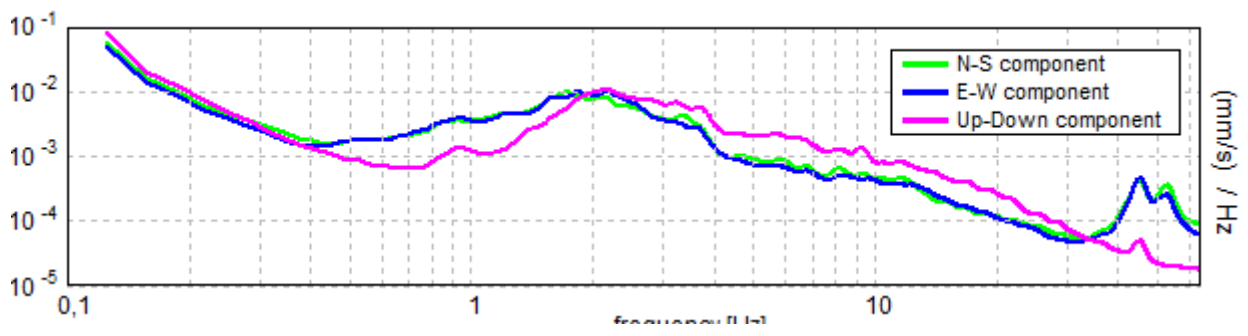Max. H/V at 1,16 ± 0,1 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M30

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

Max. H/V at 1,16 ± 0,1 Hz (in the range 0,0 - 30,0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1,16 > 0,50	**OK**	
$n_c(f_0) > 200$	1318,1 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	0,438 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	4,063 Hz	**OK**	
$A_0 > 2$	2,64 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,04284| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,04953 < 0,11563	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,1896 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M31* NUGOLA_VALLE AL BUGNO

Instrument: TRS-0004/00-06
Start recording: 10/07/13 11:44:26   End recording: 10/07/13 12:04:27
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00''.   Analyzed 93% trace (manual window selection)
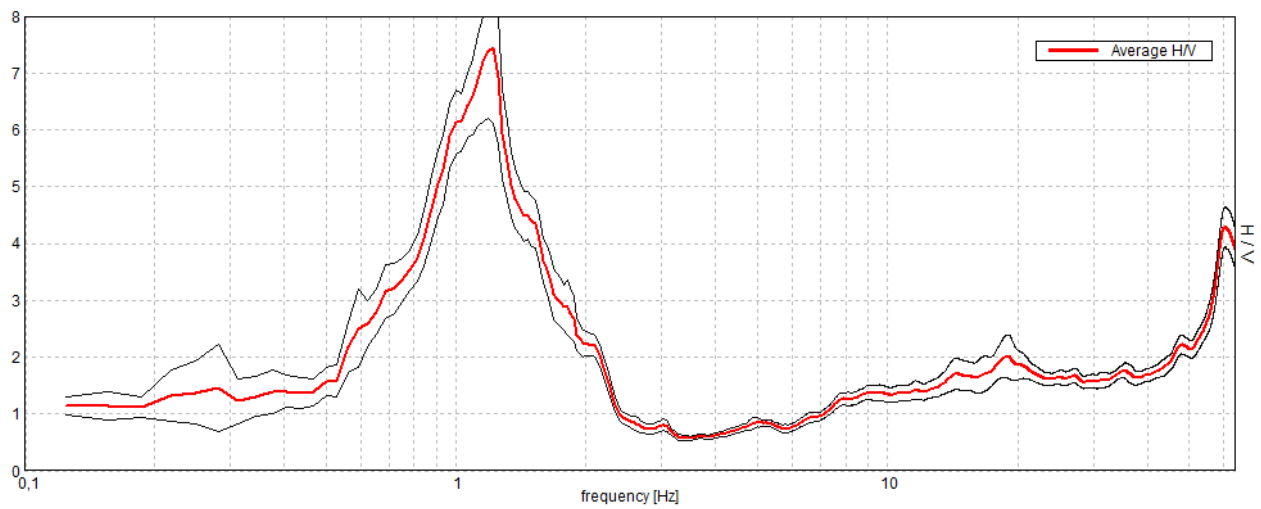Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

Max. H/V at 3,25 ± 0,39 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M31

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

Max. H/V at 3,25 ± 0,39 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**	
$n_c(f_0) > 200$	3640,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	1,563 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	6,406 Hz	**OK**	
$A_0 > 2$	2,86 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,0599| < 0.05		**NO**
$\sigma_f < \varepsilon(f_0)$	0,19468 < 0,1625		**NO**
$\sigma_A(f_0) < \theta(f_0)$	0,1343 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M33* NUGOLA_S. DELLE SORGENTI

Instrument: TRS-0004/00-06
Start recording: 10/07/13 14:08:17   End recording: 10/07/13 14:28:18
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
Window size: 20 s
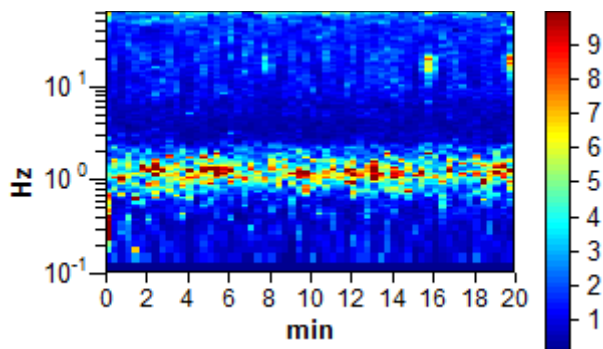Smoothing window: Triangular window
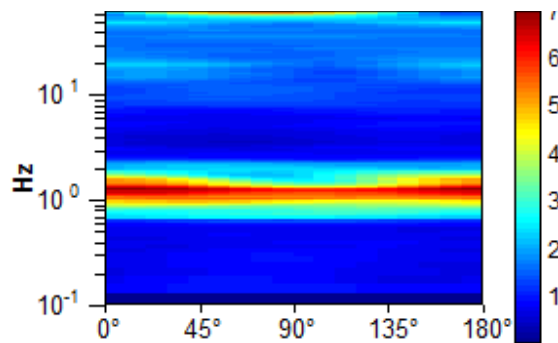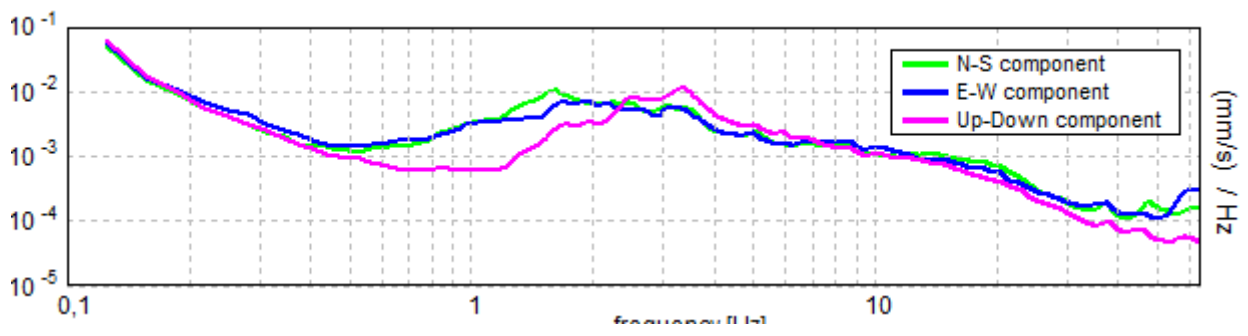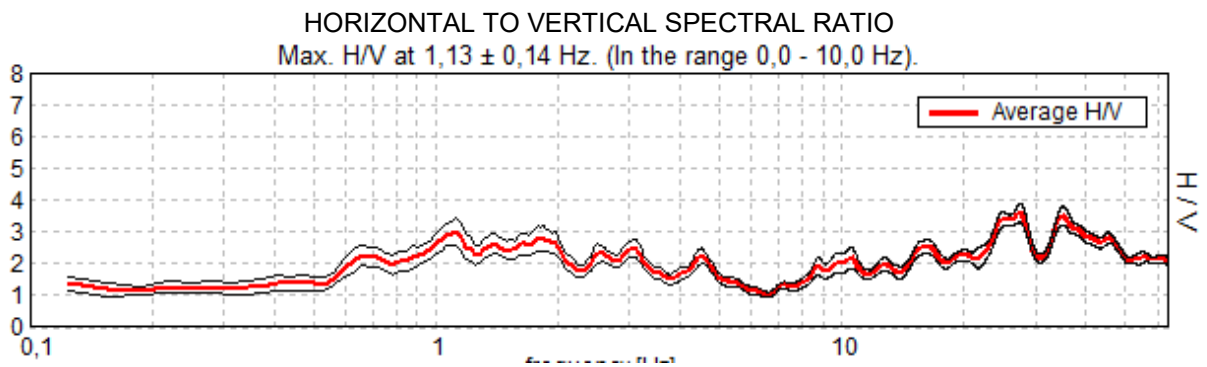Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
Max. H/V at 0,59 ± 4,47 Hz. (In the range 0,0 - 64,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M33

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

Max. H/V at 0,59 ± 4,47 Hz (in the range 0,0 - 64,0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0,59 > 0,50	**OK**	
$n_c(f_0) > 200$	712,5 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	0,313 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$			**NO**
$A_0 > 2$	3,10 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|3,73252| < 0.05		**NO**
$\sigma_f < \varepsilon(f_0)$	2,21618 < 0,08906		**NO**
$\sigma_A(f_0) < \theta(f_0)$	0,3567 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M34* CASTELL'ANSELMO_VIA PONTESANTORO PALAZZO

Instrument: TRS-0004/00-06
Start recording: 10/07/13 14:59:06   End recording: 10/07/13 15:19:07
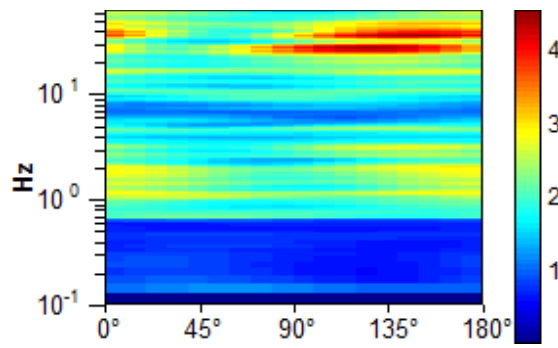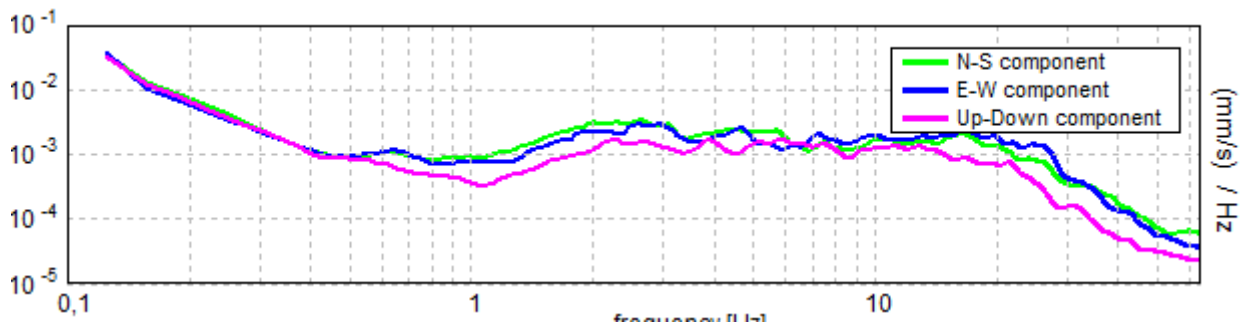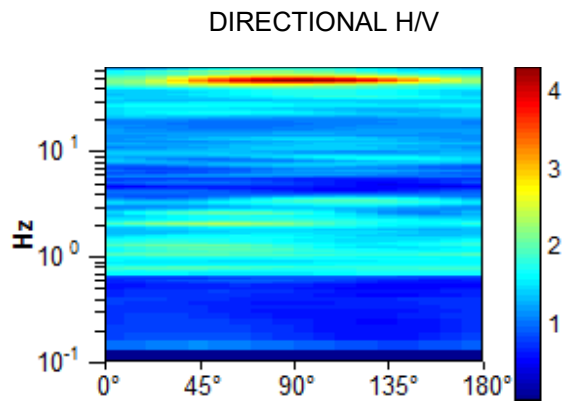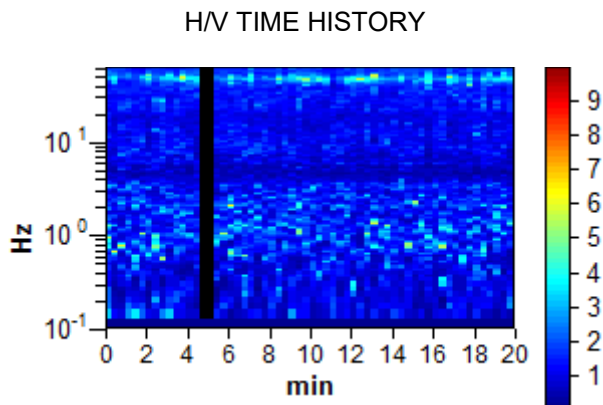Channel labels: NORTH SOUTH; EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   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 ± 0,07 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M34

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

Max. H/V at 2,22 ± 0,07 Hz (in the range 0,0 - 30,0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2,22 > 0,50	**OK**	
$n_c(f_0) > 200$	2662,5 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$			**NO**
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	2,938 Hz	**OK**	
$A_0 > 2$	3,15 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,01667| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,037 < 0,11094	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,1706 < 1,58	**OK**	

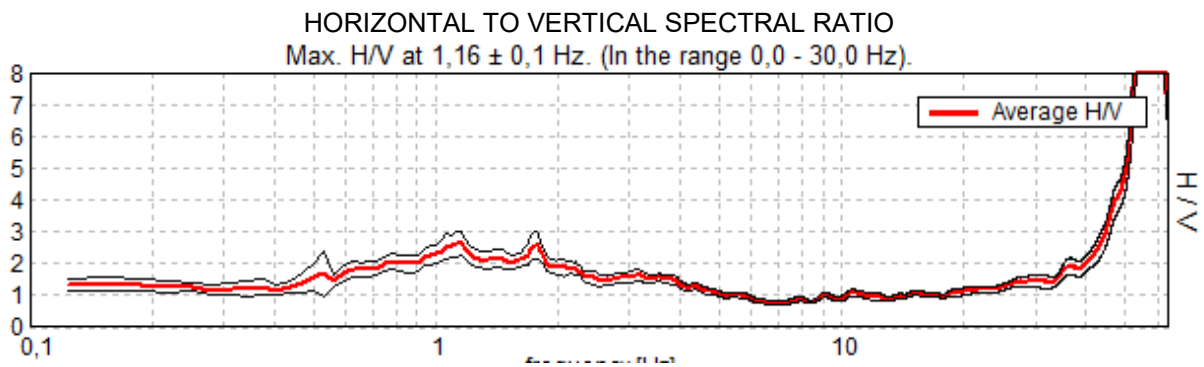|	
L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V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

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

COLLESALVETTI_MS, M36* LE CORTI_VIA LE CORTI

Instrument: TRS-0004/00-06
Start recording: 10/07/13 16:25:18   End recording: 10/07/13 16:45:19
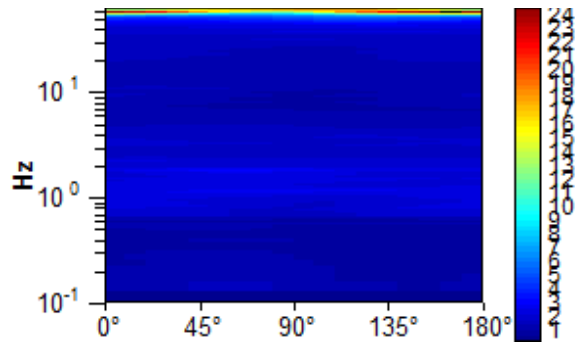Channel labels: NORTH SOUTH; EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   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 2,44 ± 0,17 Hz. (In the range 0,0 - 10,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M36

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

<table>
<tr><td colspan="4" align="center">Max. H/V at 2,44 ± 0,17 Hz (in the range 0,0 - 10,0 Hz).</td></tr>
</table>

Criteria for a reliable HVSR curve [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	2,44 > 0,50	**OK**	
$n_c(f_0) > 200$	2925,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	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 $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	4,625 Hz	**OK**	
$A_0 > 2$	2,00 > 2		**NO**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,03442| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,0839 < 0,12188	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,1274 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M37* PARRANA S. MARTINO_S.P S. MARTINO

Instrument: TRS-0004/00-06
Start recording: 11/07/13 09:08:58   End recording: 11/07/13 09:28:59
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analyzed 65% trace (manual window selection)
Sampling frequency: 128 Hz
Window size: 20 s
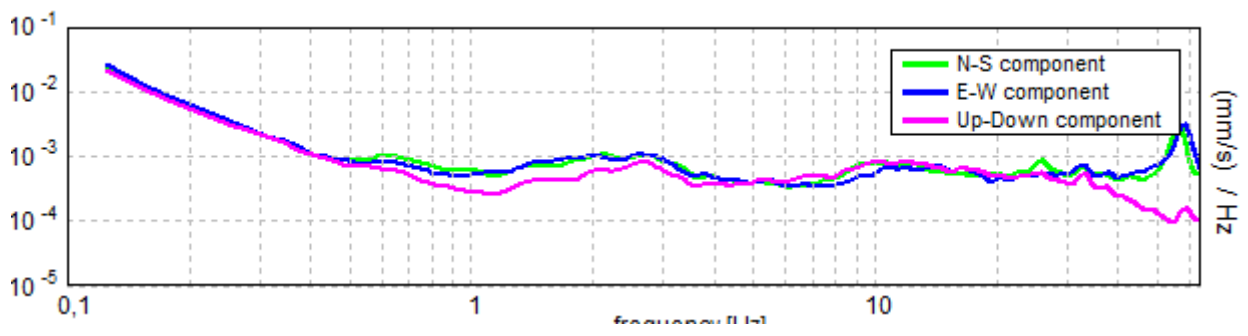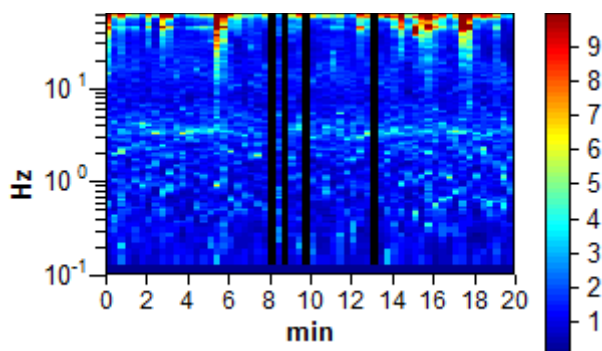Smoothing window: Triangular window
Smoothing: 5%
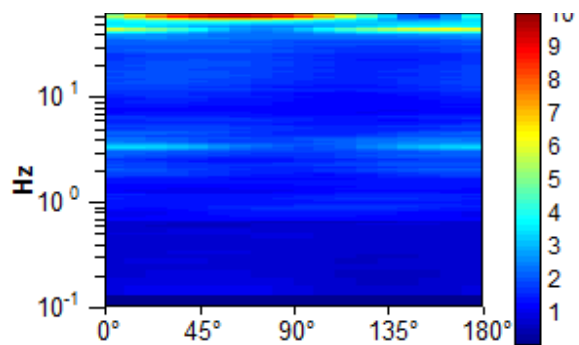
HORIZONTAL TO VERTICAL SPECTRAL RATIO
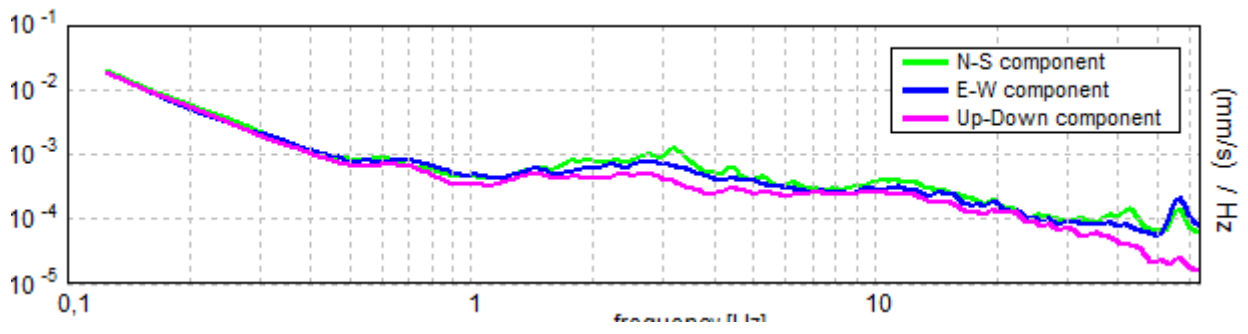Max. H/V at 2,56 ± 0,04 Hz (in the range 0,0 - 64,0 Hz).

H/V TIME HISTORY	DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M37

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

Max. H/V at 2,56 ± 0,04 Hz (in the range 0,0 - 64,0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2,56 > 0,50	**OK**	
$n_c(f_0) > 200$	1998,8 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	Exceeded 0 out of 124 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 $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	4,5 Hz	**OK**	
$A_0 > 2$	2,60 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,00754| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,01931 < 0,12813	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,1557 < 1,58	**OK**	

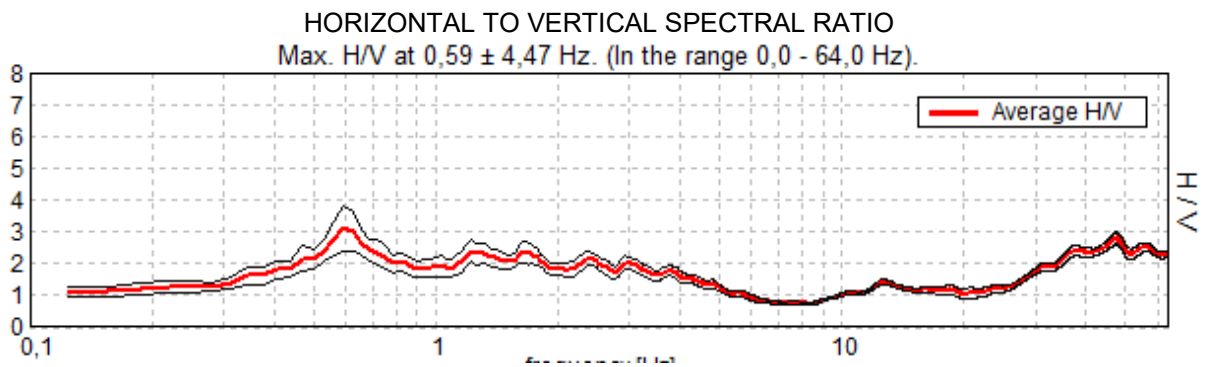|	
L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w\, n_w\, f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0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

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

COLLESALVETTI_MS, M38* PARRANA S. MARTINO_PAESE

Instrument: TRS-0004/00-06
Start recording: 11/07/13 09:46:47   End recording: 11/07/13 10:06:48
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
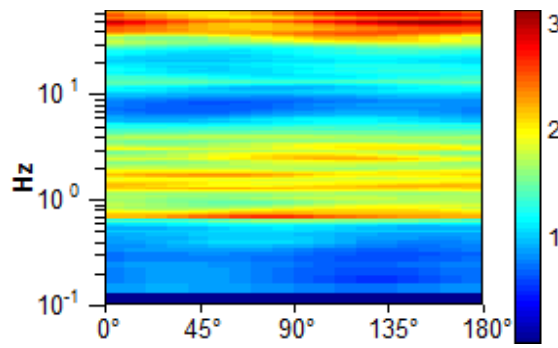GPS data not available

Trace length: 0h20'00".   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 4,63 ± 0,3 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M38

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

<div align="center">

Max. H/V at 4,63 ± 0,3 Hz (in the range 0,0 - 30,0 Hz).

</div>

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	4,63 > 0,50	**OK**	
$n_c(f_0) > 200$	4995,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	Exceeded 0 out of 223 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**
$A_0 > 2$	2,75 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,03211| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,1485 < 0,23125	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,1096 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M39* PARRANA S. MARTINO_VIA PINO

Instrument: TRS-0004/00-06
Start recording: 11/07/13 10:23:41   End recording: 11/07/13 10:43:42
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
Window size: 20 s
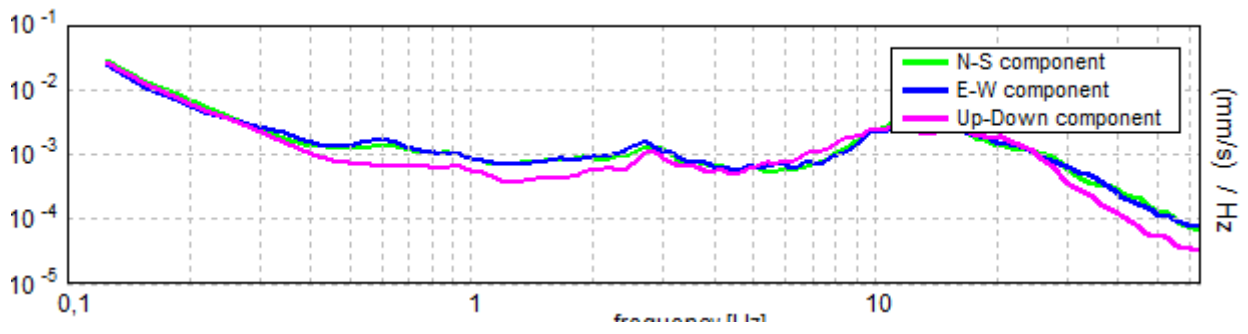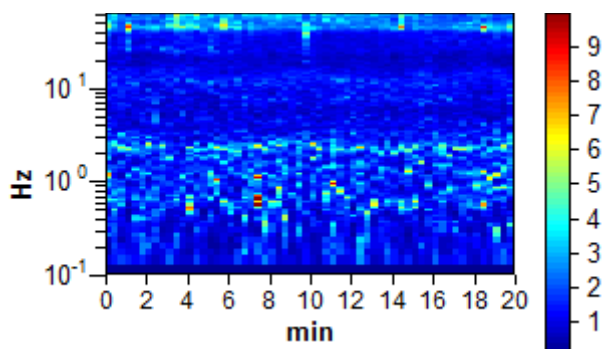Smoothing window: Triangular window
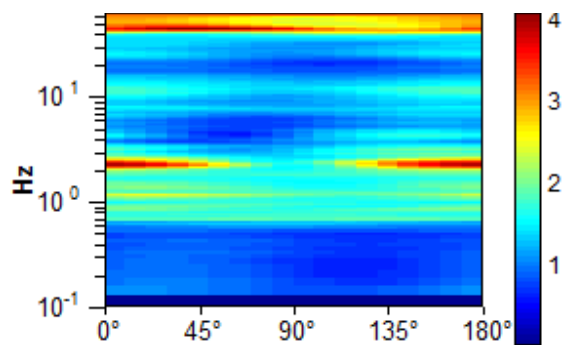Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
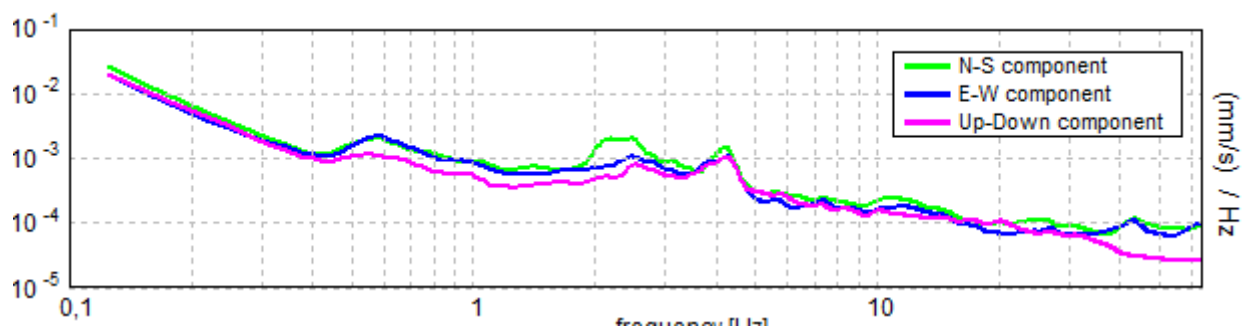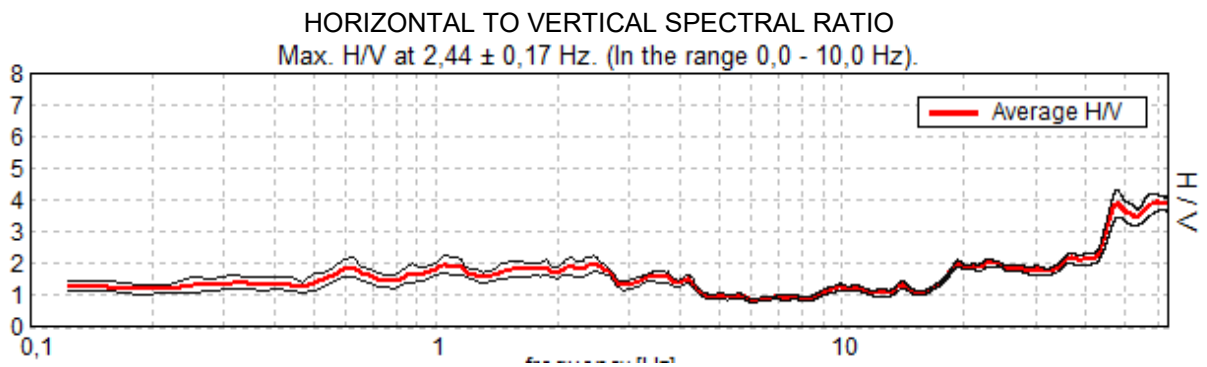Max. H/V at 16,88 ± 0,63 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M39

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

Max. H/V at 16,88 ± 0,63 Hz (in the range 0,0 - 30,0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	16,88 > 0,50	**OK**
$n_c(f_0) > 200$	20250,0 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	Exceeded 0 out of 811 times	**OK**

Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	11,156 Hz	**OK**
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	29,844 Hz	**OK**
$A_0 > 2$	5,01 > 2	**OK**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,01862| < 0.05	**OK**
$\sigma_f < \varepsilon(f_0)$	0,31416 < 0,84375	**OK**
$\sigma_A(f_0) < \theta(f_0)$	0,1964 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M41* PIETRETO_L'AIETTA

Instrument: TRS-0004/00-06
Start recording: 11/07/13 11:31:58   End recording: 11/07/13 11:51:58
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00''.   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
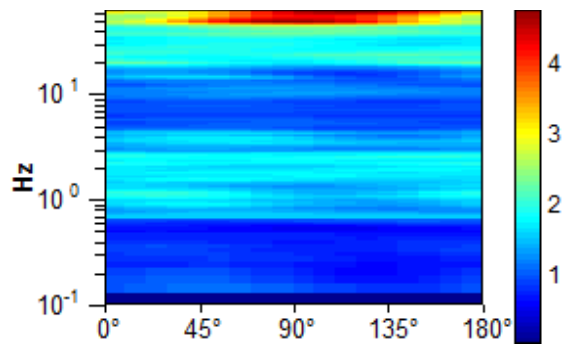Max. H/V at 1,19 ± 0,06 Hz. (In the range 0,0 - 30,0 Hz).
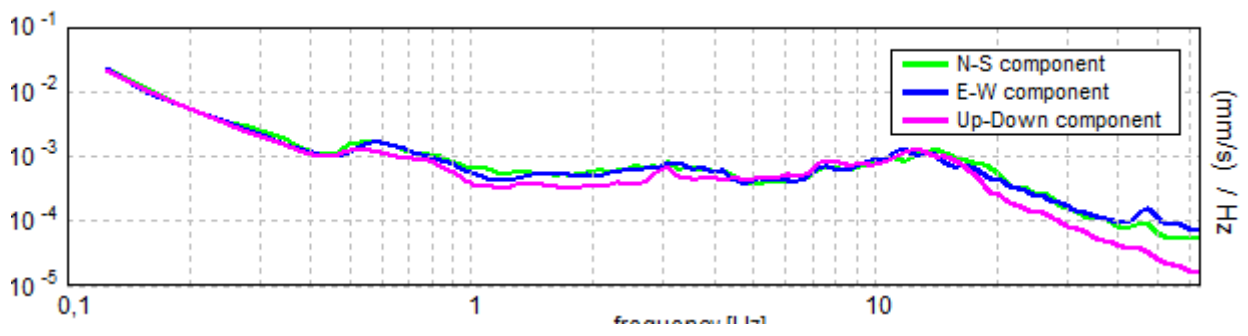

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M41

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

<table>
<tr><td colspan="4">Max. H/V at 1,19 ± 0,06 Hz (in the range 0,0 - 30,0 Hz).</td></tr>
</table>

Criteria for a reliable HVSR curve [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	1,19 > 0,50	OK	
$n_c(f_0) > 200$	1330,0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	0,469 Hz	OK	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	3,813 Hz	OK	
$A_0 > 2$	3,25 > 2	OK	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,02695| < 0.05	OK	
$\sigma_f < \varepsilon(f_0)$	0,032 < 0,11875	OK	
$\sigma_A(f_0) < \theta(f_0)$	0,2156 < 1,78	OK	

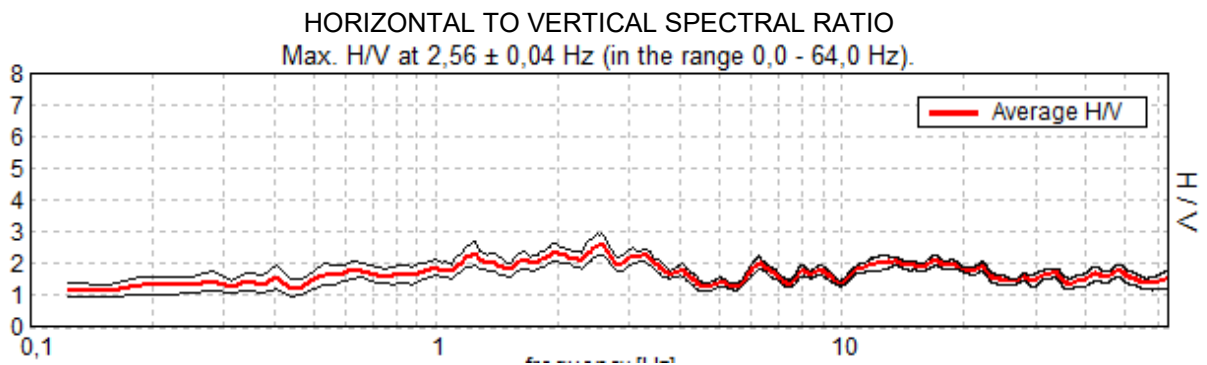|	
L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w \, n_w \, f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0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

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

COLLESALVETTI_MS, M42* PIETRETO_VIA S. MARTINO

Instrument: TRS-0004/00-06
Start recording: 11/07/13 12:07:20   End recording: 11/07/13 12:27:20
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
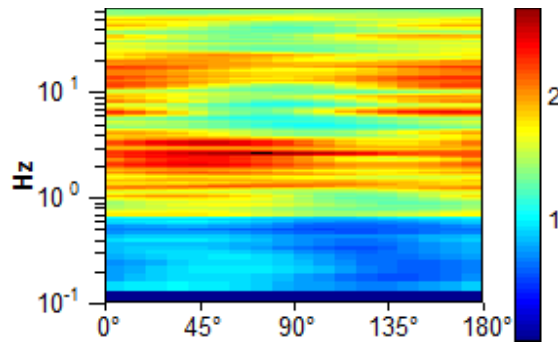GPS data not available

Trace length: 0h20'00".   Analyzed 70% trace (manual window selection)
Sampling frequency: 128 Hz
Window size: 20 s
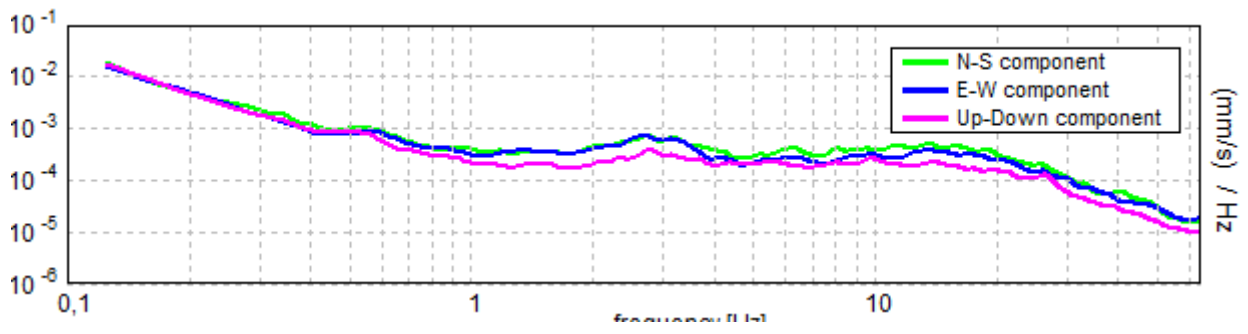Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
Max. H/V at 4,06 ± 0,24 Hz (in the range 0,0 - 64,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M42

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

Max. H/V at 4,06 ± 0,24 Hz (in the range 0,0 - 64,0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	4,06 > 0,50	**OK**	
$n_c(f_0) > 200$	3412,5 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz	Exceeded 0 out of 196 times	**OK**	

Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	1,531 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	6,375 Hz	**OK**	
$A_0 > 2$	4,36 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,02921| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,11866 < 0,20313	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,2247 < 1,58	**OK**	

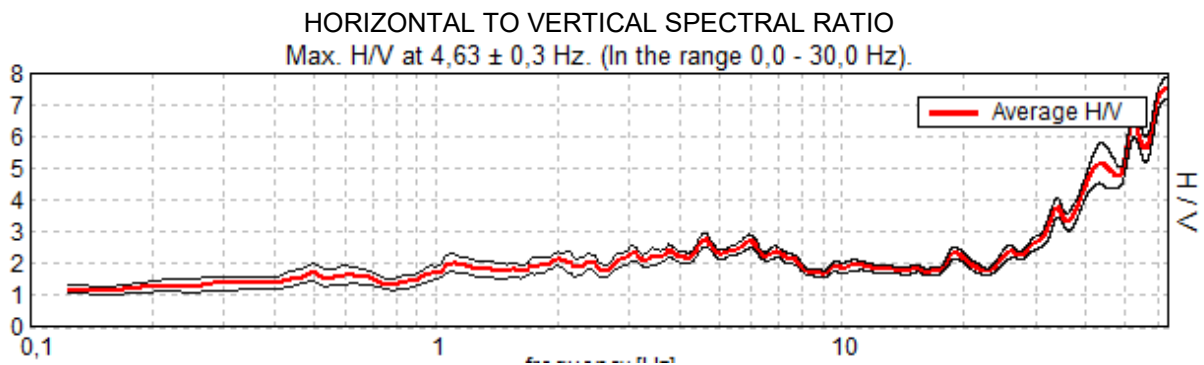|	
L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V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

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

COLLESALVETTI_MS, M44* PIETRETO_COLDECIMO

Instrument: TRS-0004/00-06
Start recording: 11/07/13 13:20:31   End recording: 11/07/13 13:40:32
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
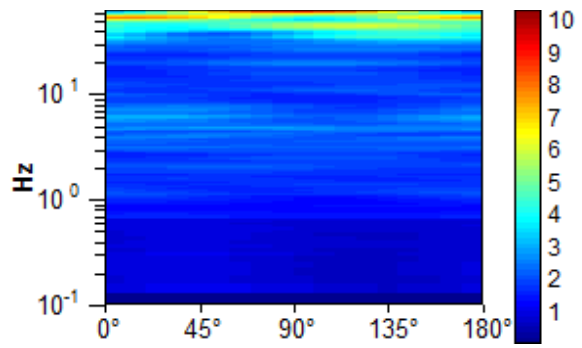GPS data not available

Trace length: 0h20'00".   Analyzed 97% trace (manual window selection)
Sampling frequency: 128 Hz
Window size: 20 s
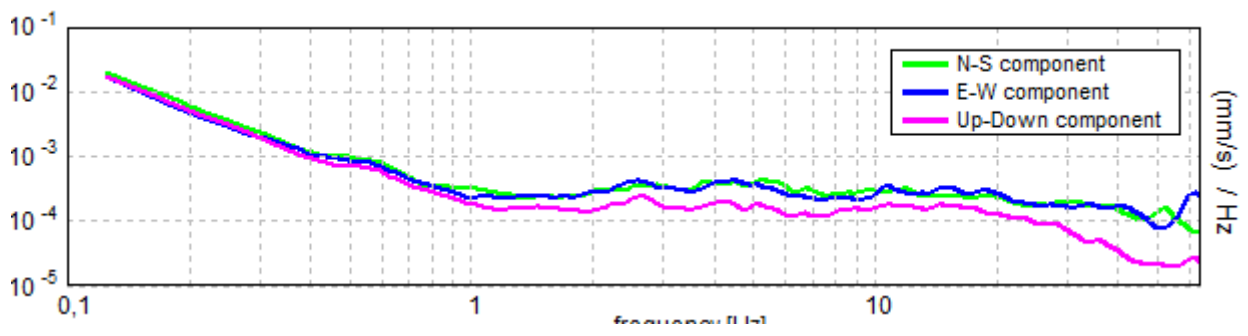Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
Max. H/V at 2,47 ± 0,05 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY	DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M44

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

<div style="border:1px solid">

Max. H/V at 2,47 ± 0,05 Hz (in the range 0,0 - 30,0 Hz).

</div>

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2,47 > 0,50	**OK**	
$n_c(f_0) > 200$	2863,8 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	0,938 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	4,188 Hz	**OK**	
$A_0 > 2$	4,22 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,01096| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,02706 < 0,12344	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,225 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M45* PARRANA S. GIUSTO_CASTELLACCIO

Instrument: TRS-0004/00-06
Start recording: 11/07/13 14:07:20   End recording: 11/07/13 14:27:21
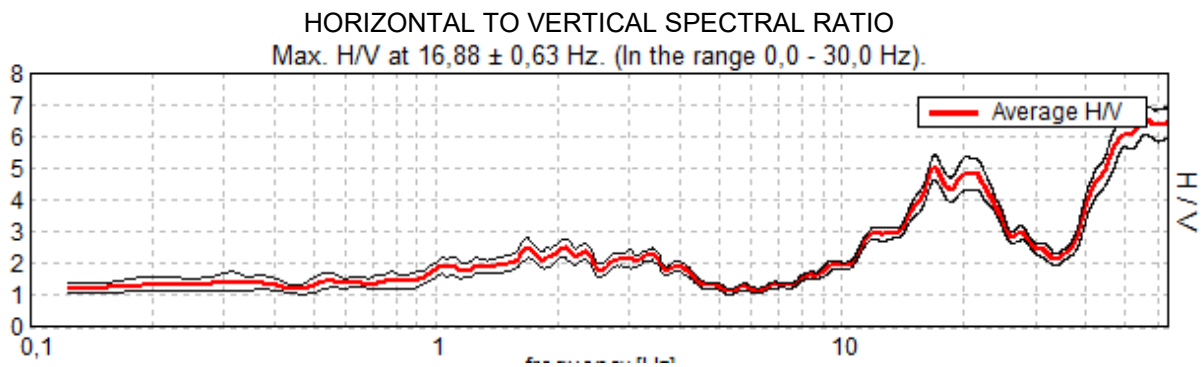Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00''.   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 7,47 ± 0,3 Hz. (In the range 0,0 - 30,0 Hz).

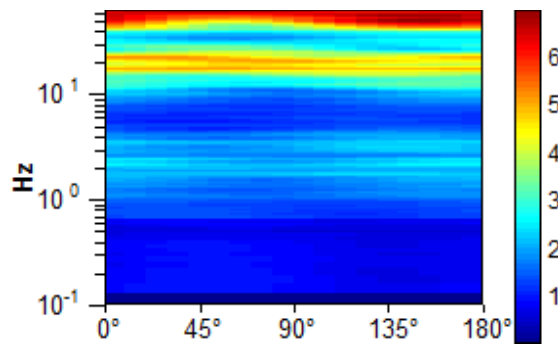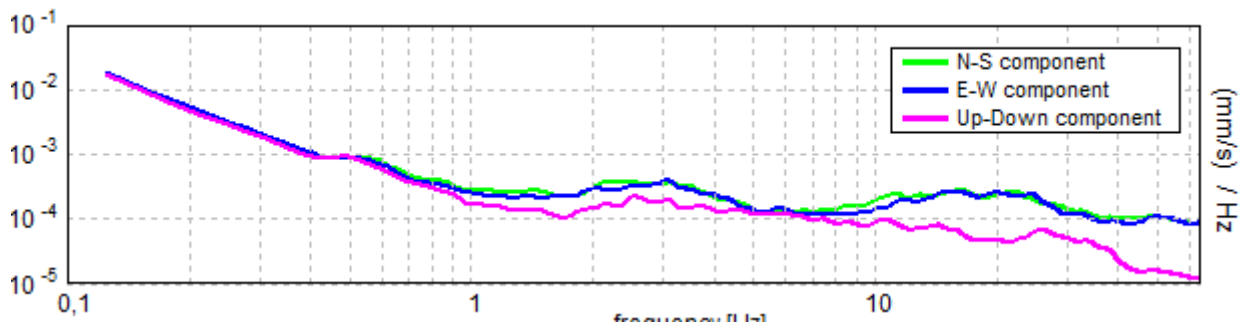### H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M45

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

Max. H/V at 7,47 ± 0,3 Hz (in the range 0,0 - 30,0 Hz).

Criteria for a reliable HVSR curve [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	7,47 > 0,50	**OK**	
$n_c(f_0) > 200$	8215,6 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	Exceeded 0 out of 360 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**
$A_0 > 2$	3,48 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,0199| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,14863 < 0,37344	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,1991 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M46* PARRANA S.GIUSTO_CEPPETO

Instrument: TRS-0004/00-06
Start recording: 11/07/13 14:46:54   End recording: 11/07/13 15:06:54
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
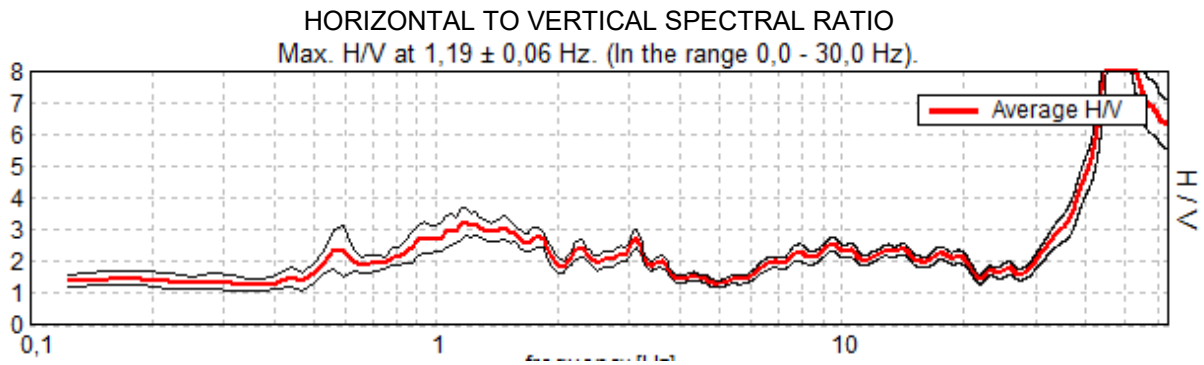GPS data not available

Trace length: 0h20'00".   Analyzed 90% trace (manual window selection)
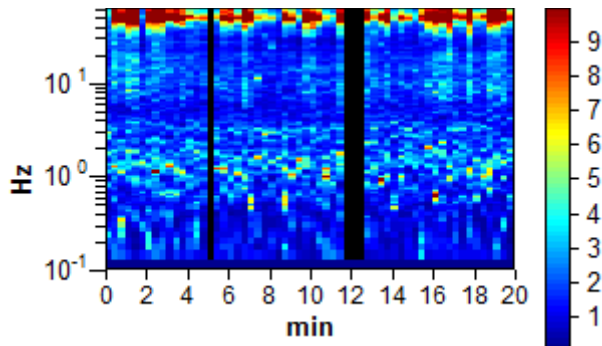Sampling frequency: 128 Hz
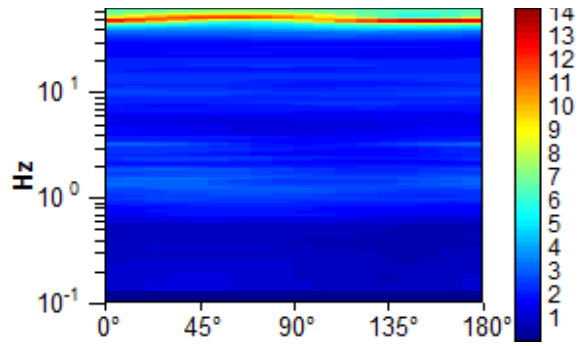Window size: 20 s
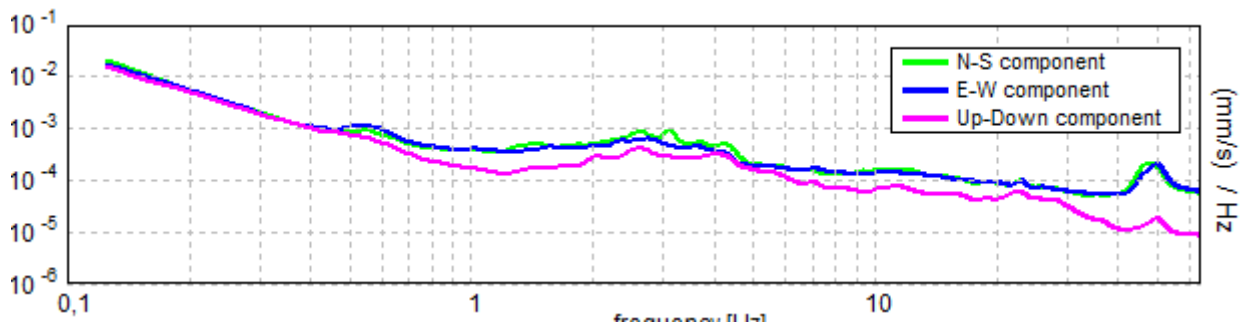Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
Max. H/V at 2,31 ± 0,12 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M46

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

<table>
<tr><td colspan="2" align="center">Max. H/V at 2,31 ± 0,12 Hz (in the range 0,0 - 30,0 Hz).</td></tr>
</table>

<table>
<tr>
<td colspan="4" align="center">Criteria for a reliable HVSR curve
[All 3 should be fulfilled]</td>
</tr>
<tr>
<td align="center">$f_0 > 10 / L_w$</td>
<td align="center">2,31 > 0,50</td>
<td align="center">OK</td>
<td></td>
</tr>
<tr>
<td align="center">$n_c(f_0) > 200$</td>
<td align="center">2497,5 > 200</td>
<td align="center">OK</td>
<td></td>
</tr>
<tr>
<td align="center">$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td>
<td align="center">Exceeded 0 out of 112 times</td>
<td align="center">OK</td>
<td></td>
</tr>
<tr>
<td colspan="4" align="center">Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]</td>
</tr>
<tr>
<td align="center">Exists f^- in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0 / 2$</td>
<td align="center">0,969 Hz</td>
<td align="center">OK</td>
<td></td>
</tr>
<tr>
<td align="center">Exists f^+ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0 / 2$</td>
<td align="center">5,438 Hz</td>
<td align="center">OK</td>
<td></td>
</tr>
<tr>
<td align="center">$A_0 > 2$</td>
<td align="center">2,72 > 2</td>
<td align="center">OK</td>
<td></td>
</tr>
<tr>
<td align="center">$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td>
<td align="center">|0,02553| < 0.05</td>
<td align="center">OK</td>
<td></td>
</tr>
<tr>
<td align="center">$\sigma_f < \varepsilon(f_0)$</td>
<td align="center">0,05903 < 0,11563</td>
<td align="center">OK</td>
<td></td>
</tr>
<tr>
<td align="center">$\sigma_A(f_0) < \theta(f_0)$</td>
<td align="center">0,1503 < 1,58</td>
<td align="center">OK</td>
<td></td>
</tr>
</table>

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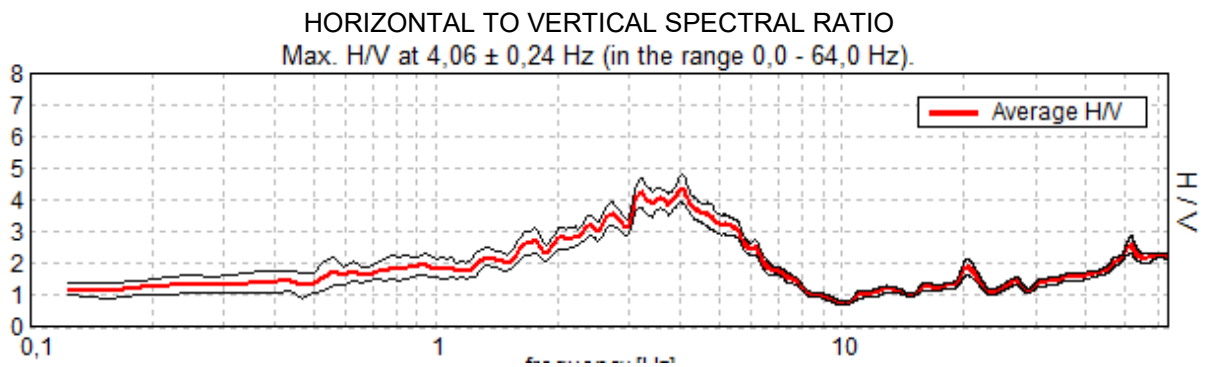</table>

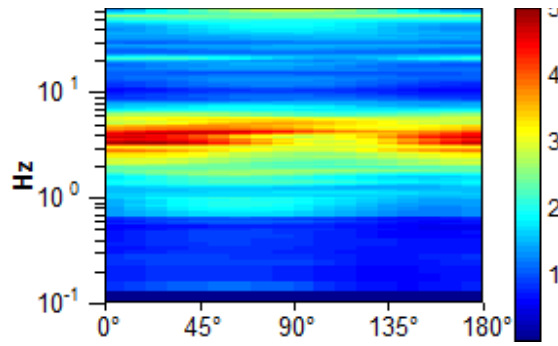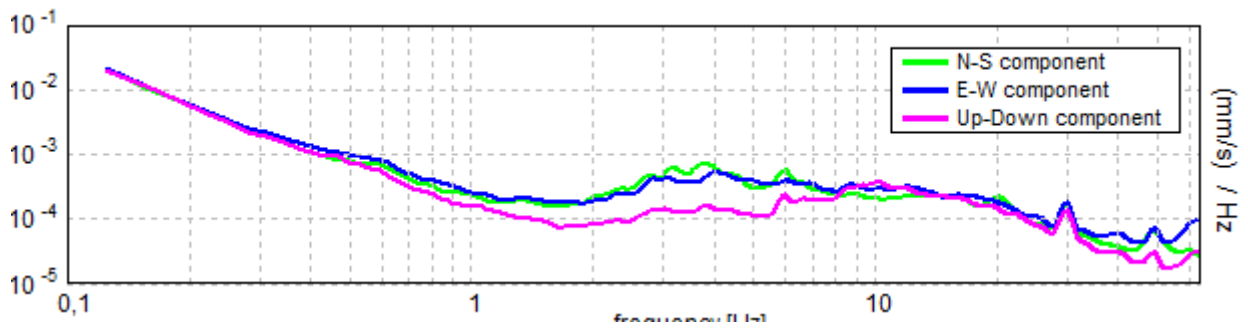| Threshold values for σ_f and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 f_0	0.2 f_0	0.15 f_0	0.10 f_0	0.05 f_0
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COLLESALVETTI_MS, M47BIS* PARRANA NUOVA VIA S.GIUSTO

Instrument: TRS-0004/00-06
Start recording: 25/09/13 13:05:40   End recording: 25/09/13 13:25:41
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   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 2.63 ± 0.24 Hz. (In the range 0.0 - 10.0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M47bis

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

Max. H/V at 2.63 ± 0.24 Hz (in the range 0.0 - 10.0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.63 > 0.50	**OK**	
$n_c(f_0) > 200$	3150.0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz	Exceeded 0 out of 127 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 $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	3.75 Hz	**OK**	
$A_0 > 2$	2.60 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0.04594| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0.12059 < 0.13125	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0.1398 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M48* CROCINO_VIA DEL POGGIONE

Instrument: TRS-0004/00-06
Start recording: 11/07/13 16:15:05   End recording: 11/07/13 16:35:06
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
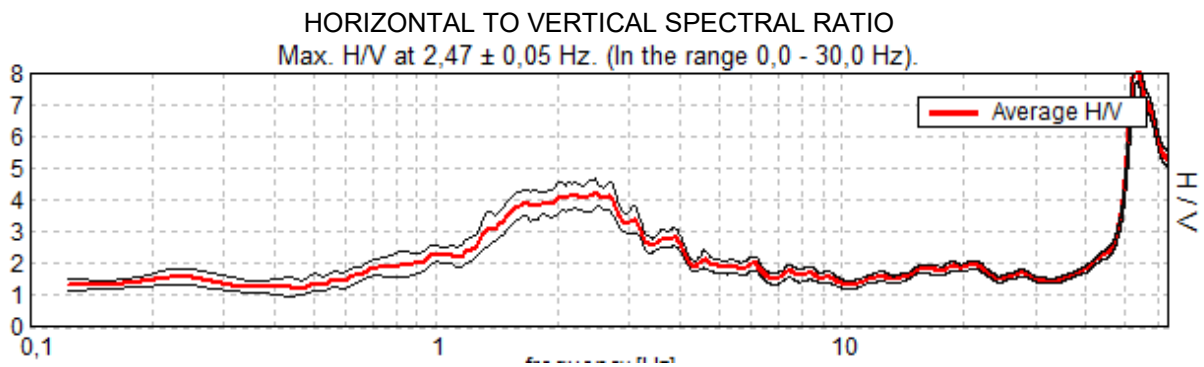GPS data not available

Trace length: 0h20'00''.   Analysis performed on the entire trace.
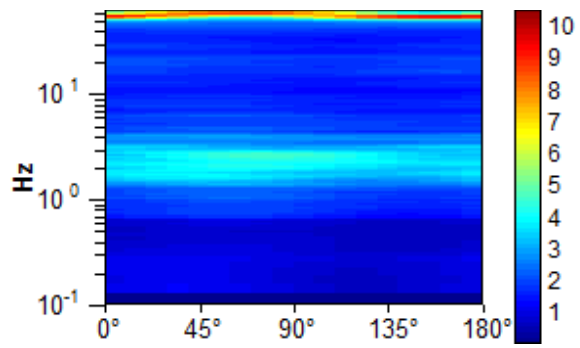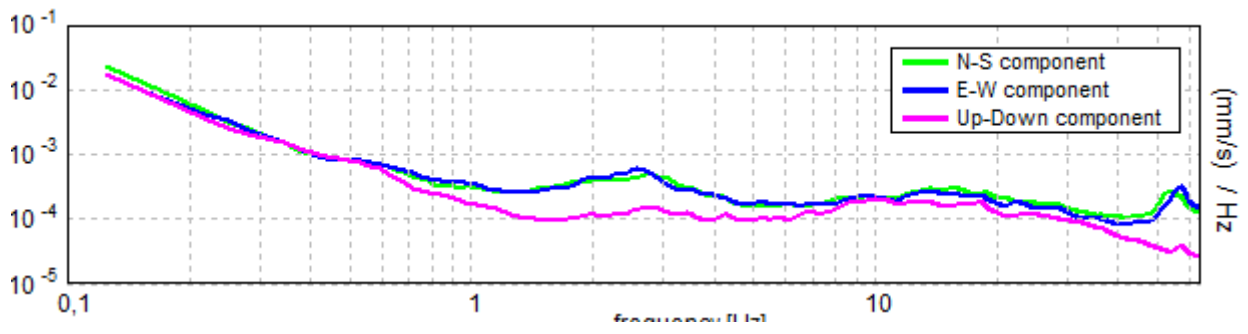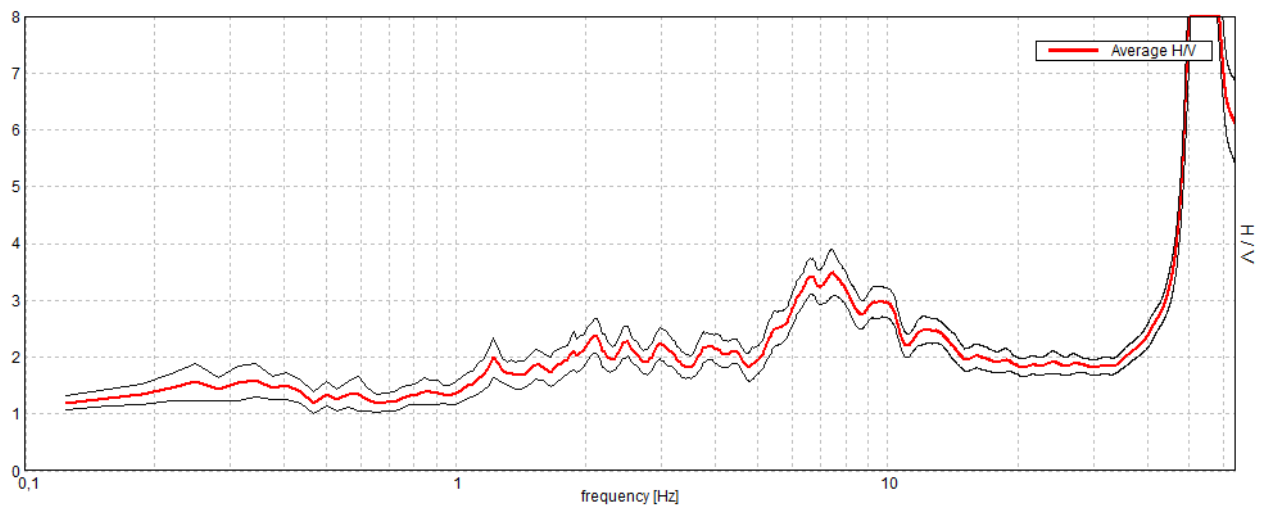Sampling frequency: 128 Hz
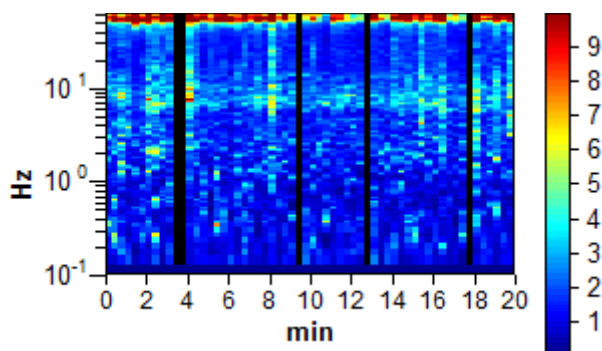Window size: 20 s
Smoothing window: Triangular window
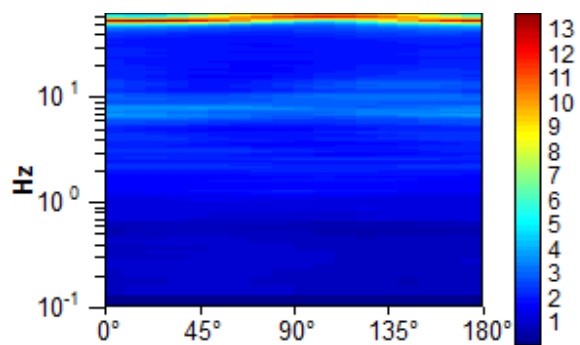Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
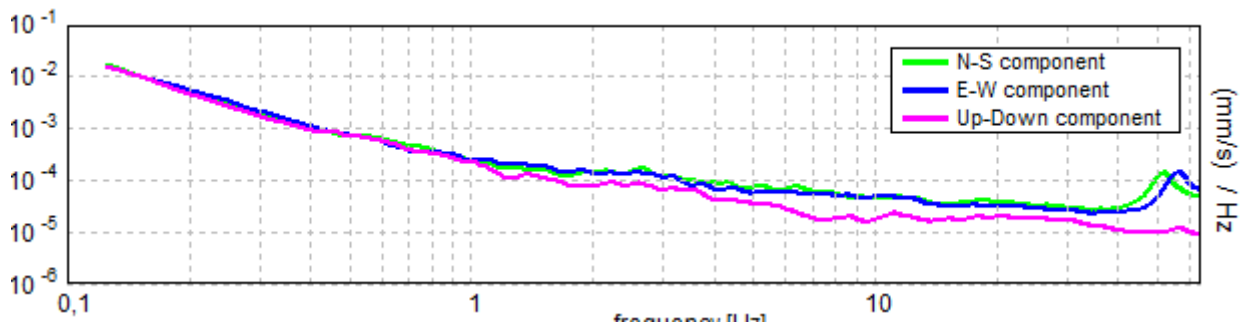Max. H/V at 4,53 ± 6,01 Hz (in the range 0,0 - 64,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M48

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

Max. H/V at 4,53 ± 6,01 Hz (in the range 0,0 - 64,0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	4,53 > 0,50	**OK**	
$n_c(f_0) > 200$	5437,5 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	Exceeded 0 out of 218 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 $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	7,969 Hz	**OK**	
$A_0 > 2$	2,77 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,65706| < 0.05		**NO**
$\sigma_f < \varepsilon(f_0)$	2,97731 < 0,22656		**NO**
$\sigma_A(f_0) < \theta(f_0)$	0,185 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M49BIS* CROCINO_DEBBIACCI

Instrument: TRS-0004/00-06
Start recording: 25/09/13 12:33:26   End recording: 25/09/13 12:53:27
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   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 1.56 ± 0.1 Hz. (In the range 0.0 - 10.0 Hz).

H/V TIME HISTORY	DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M49bis

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

Max. H/V at 1.56 ± 0.1 Hz (in the range 0.0 - 10.0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.56 > 0.50	**OK**
$n_c(f_0) > 200$	1875.0 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	Exceeded 0 out of 76 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**
$A_0 > 2$	2.54 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0.03105| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0.04852 < 0.15625	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0.1467 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M51BIS* COLOGNOLE_VIA DEL CASTELLO

Instrument: TRS-0004/00-06
Start recording: 25/09/13 11:52:44   End recording: 25/09/13 12:12:45
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
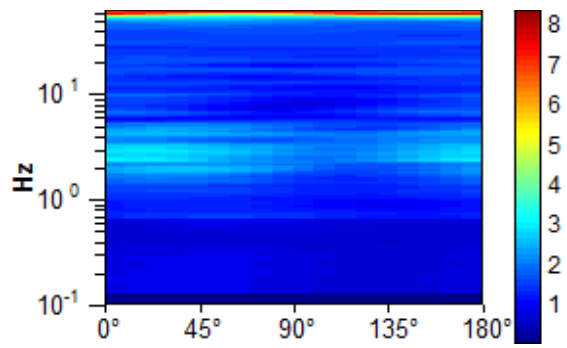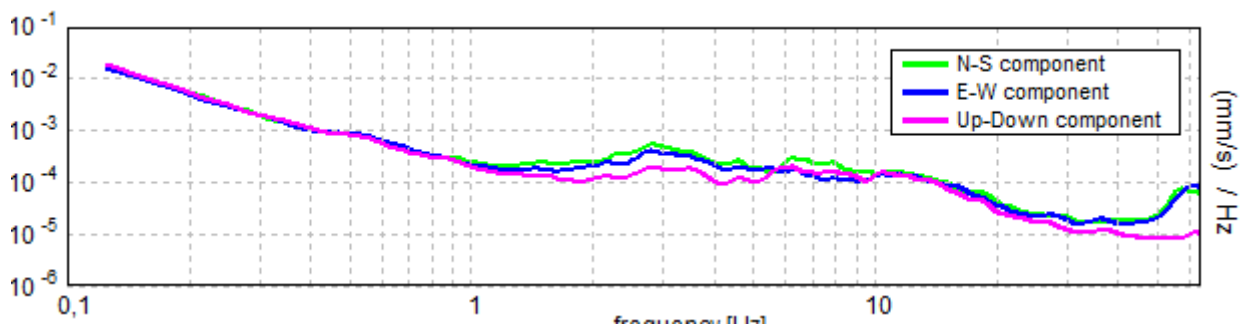GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
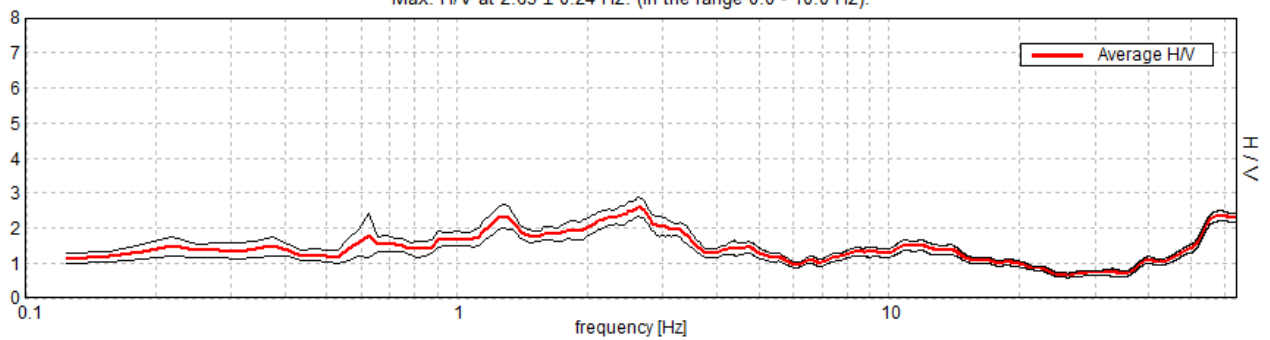Window size: 20 s
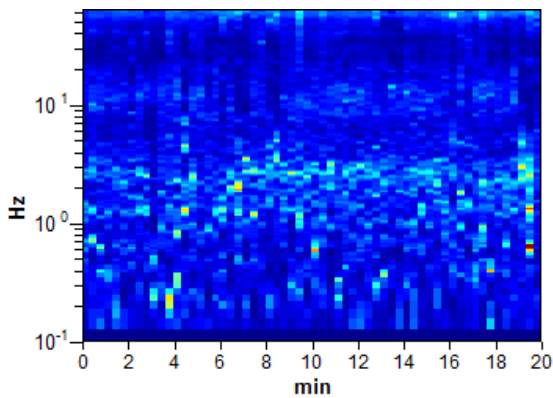Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

Max. H/V at 1.88 ± 0.06 Hz. (In the range 0.0 - 10.0 Hz).
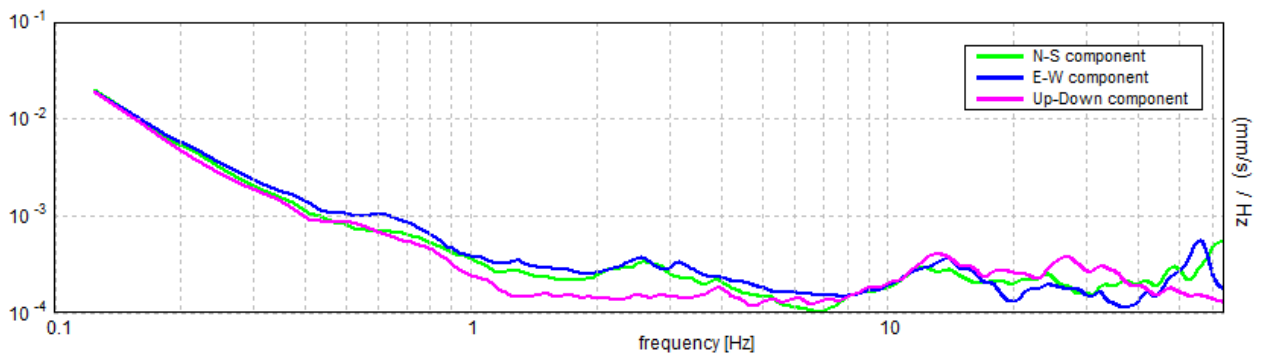

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Legend:
- N-S component
- E-W component
- Up-Down component

Axes: frequency [Hz] (horizontal), (mm/s) / Hz (vertical)

Stazione di misura M51bis

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

Max. H/V at 1.88 ± 0.06 Hz (in the range 0.0 - 10.0 Hz).

<table>
<tr><td colspan="4"><div align="center">Criteria for a reliable HVSR curve
[All 3 should be fulfilled]</div></td></tr>
<tr><td>$f_0 > 10 / L_w$</td><td>1.88 > 0.50</td><td>OK</td><td></td></tr>
<tr><td>$n_c(f_0) > 200$</td><td>2250.0 > 200</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td><td>Exceeded 0 out of 91 times</td><td>OK</td><td></td></tr>
<tr><td colspan="4"><div align="center">Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]</div></td></tr>
<tr><td>Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td>0.531 Hz</td><td>OK</td><td></td></tr>
<tr><td>Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td>3.969 Hz</td><td>OK</td><td></td></tr>
<tr><td>$A_0 > 2$</td><td>2.55 > 2</td><td>OK</td><td></td></tr>
<tr><td>$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td>|0.01648| < 0.05</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_f < \varepsilon(f_0)$</td><td>0.03091 < 0.1875</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_A(f_0) < \theta(f_0)$</td><td>0.1274 < 1.78</td><td>OK</td><td></td></tr>
</table>

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

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

COLLESALVETTI_MS, M52* COLOGNOLE_VIA DEL GIGLIO

Instrument: TRS-0004/00-06
Start recording: 12/07/13 09:17:56   End recording: 12/07/13 09:37:57
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
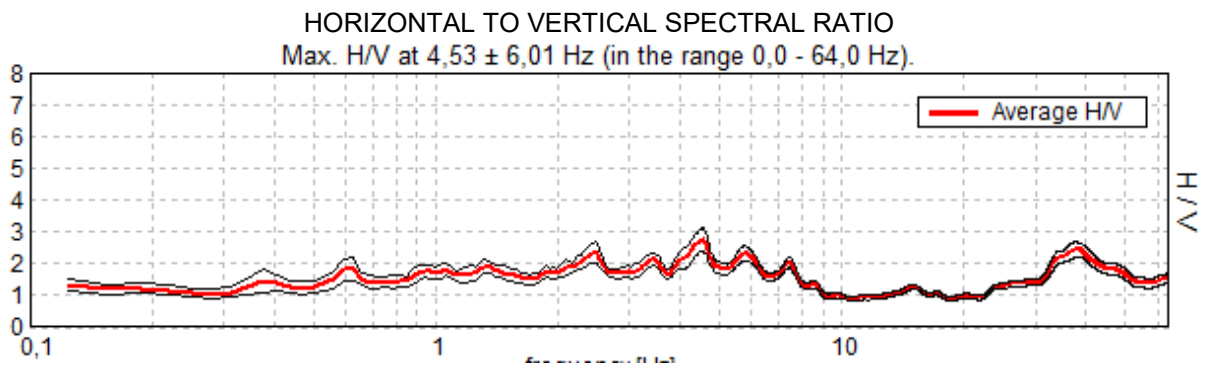GPS data not available

Trace length: 0h20'00".   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 7,03 ± 0,12 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY	DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M52

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

Max. H/V at 7,03 ± 0,12 Hz (in the range 0,0 - 30,0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	7,03 > 0,50	**OK**	
$n_c(f_0) > 200$	8156,3 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	Exceeded 0 out of 338 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 $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	12,875 Hz	**OK**	
$A_0 > 2$	2,95 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,00846| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,05946 < 0,35156	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,1262 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M53* LE CASE_VIA LE CASE_60

Instrument: TRS-0004/00-06
Start recording: 12/07/13 10:08:42   End recording: 12/07/13 10:28:43
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00''.   Analyzed 93% trace (manual window selection)
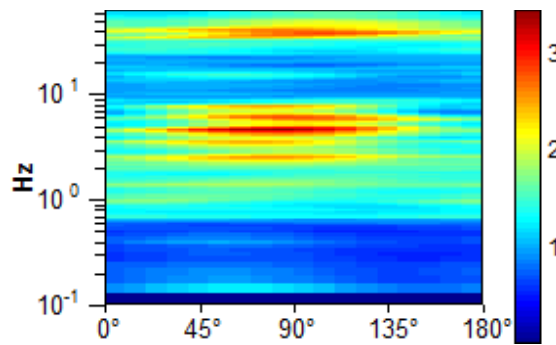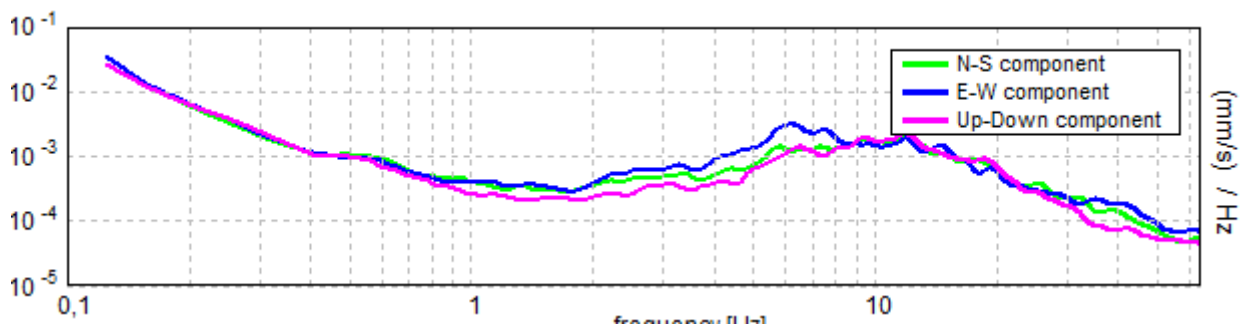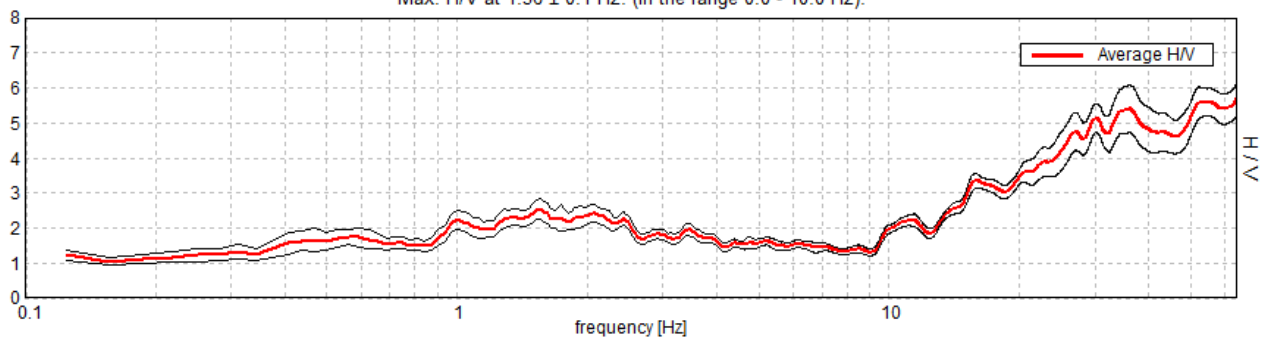Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
Max. H/V at 9,03 ± 0,48 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY	DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M53

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

<table>
<tr><td colspan="2">Max. H/V at 9,03 ± 0,48 Hz (in the range 0,0 - 30,0 Hz).</td></tr>
</table>

Criteria for a reliable HVSR curve [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	9,03 > 0,50	**OK**	
$n_c(f_0) > 200$	10115,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	Exceeded 0 out of 434 times	**OK**	

Criteria for a clear HVSR peak [At least 5 out of 6 should be fulfilled]			
Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	4,188 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	11,281 Hz	**OK**	
$A_0 > 2$	3,85 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,02627| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,23723 < 0,45156	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,157 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M54BIS* LE CASE

Instrument: TRS-0004/00-06
Start recording: 25/09/13 10:39:45   End recording: 25/09/13 10:59:46
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
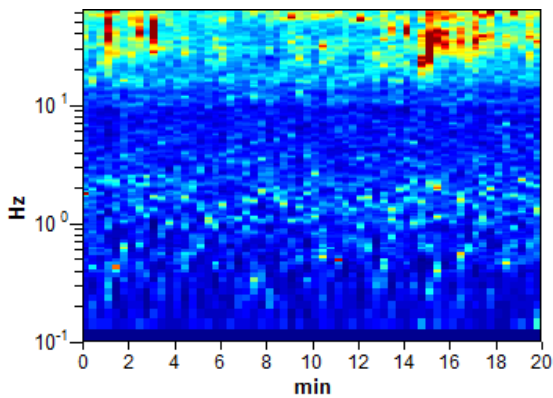Window size: 20 s
Smoothing window: Triangular window
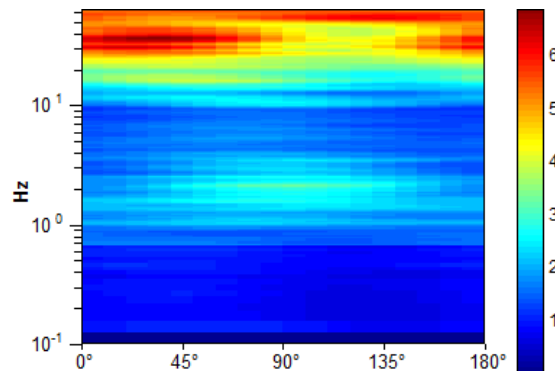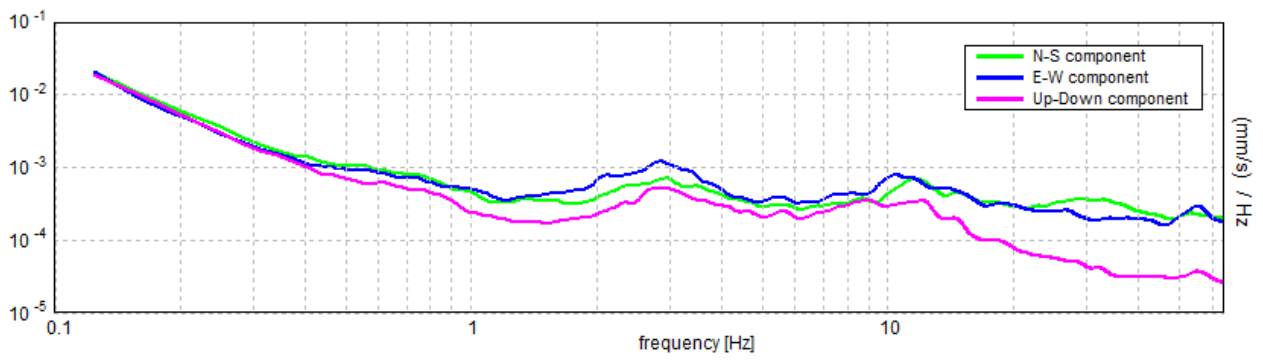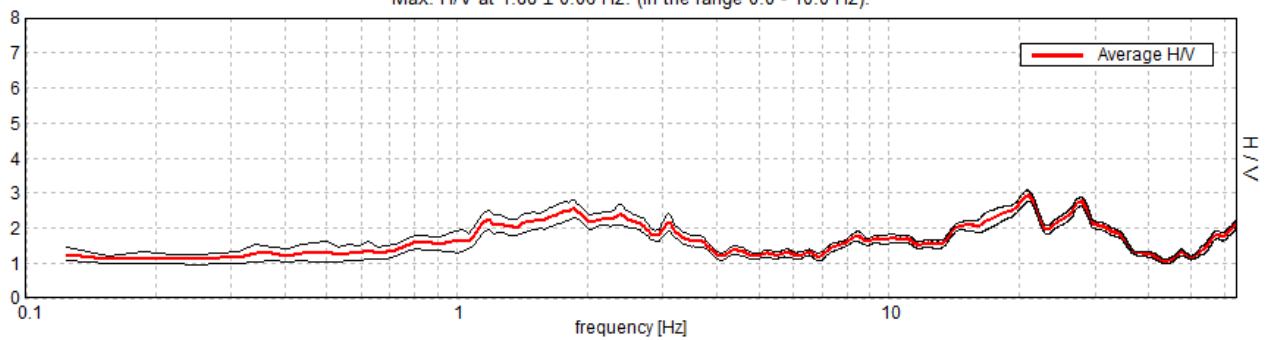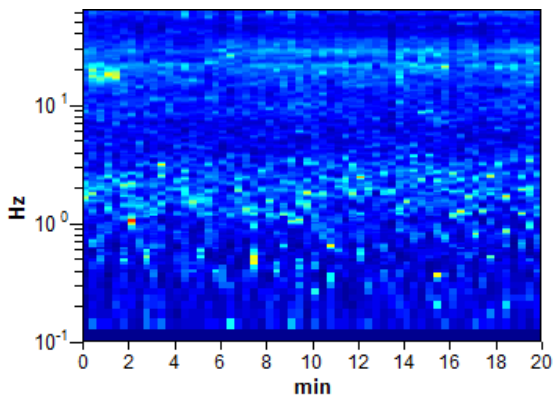Smoothing: 5%

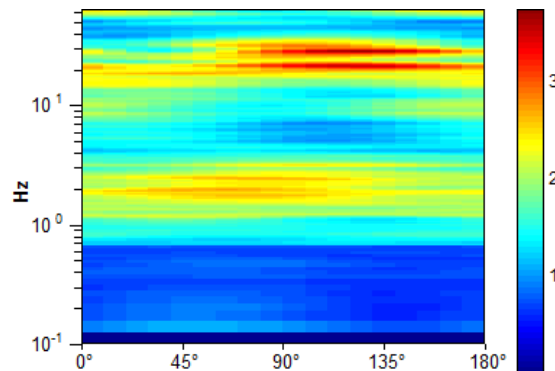## HORIZONTAL TO VERTICAL SPECTRAL RATIO

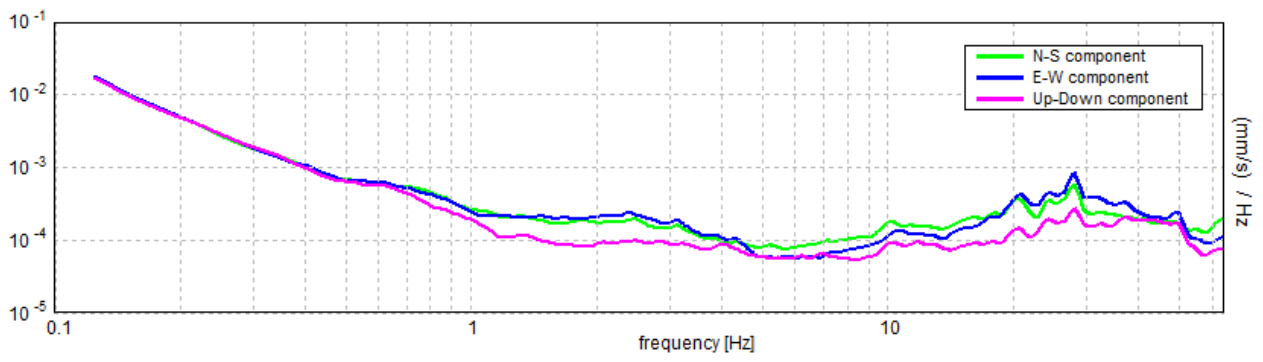Max. H/V at 6.97 ± 0.41 Hz. (In the range 0.0 - 10.0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M54bis

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

<div style="border:1px solid">

Max. H/V at 6.97 ± 0.41 Hz (in the range 0.0 - 10.0 Hz).

</div>

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	6.97 > 0.50	**OK**	
$n_c(f_0) > 200$	8362.5 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	Exceeded 0 out of 336 times	**OK**	

Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]

Exists f⁻ in [f₀/4, f₀] | A_{H/V}(f⁻) < A₀ / 2			**NO**
Exists f⁺ in [f₀, 4f₀] | A_{H/V}(f⁺) < A₀ / 2	11.281 Hz	**OK**	
A₀ > 2	3.37 > 2	**OK**	
f_{peak}[A_{H/V}(f) ± σ_A(f)] = f₀ ± 5%	|0.02925| < 0.05	**OK**	
σ_f < ε(f₀)	0.20381 < 0.34844	**OK**	
σ_A(f₀) < θ(f₀)	0.135 < 1.58	**OK**	

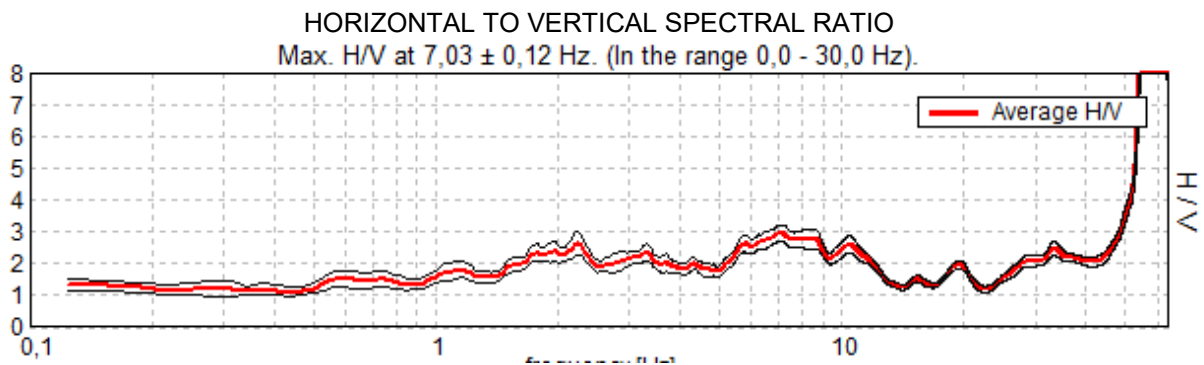|	
L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w\, n_w\, f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0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

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

COLLESALVETTI_MS, M55* LE CASE_PODERE DEL CILIEGIO

Instrument: TRS-0004/00-06
Start recording: 12/07/13 11:33:03   End recording: 12/07/13 11:53:04
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   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 3,28 ± 0,35 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M55

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

<div style="border:1px solid">

Max. H/V at 3,28 ± 0,35 Hz (in the range 0,0 - 30,0 Hz).

</div>

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	3,28 > 0,50	**OK**	
$n_c(f_0) > 200$	3937,5 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	1,219 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	4,844 Hz	**OK**	
$A_0 > 2$	3,58 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,05273| < 0.05		**NO**
$\sigma_f < \varepsilon(f_0)$	0,17303 < 0,16406		**NO**
$\sigma_A(f_0) < \theta(f_0)$	0,1511 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M57BIS* LE CASE_PONTINO

Instrument: TRS-0004/00-06
Start recording: 25/09/13 11:12:39   End recording: 25/09/13 11:32:40
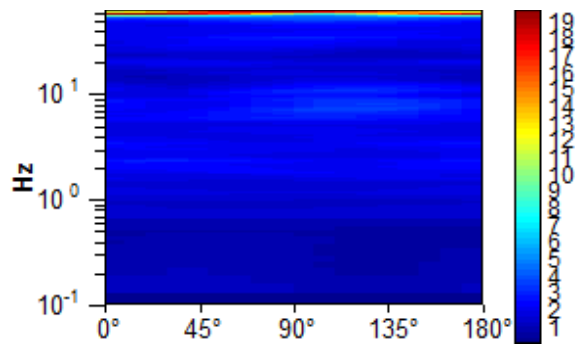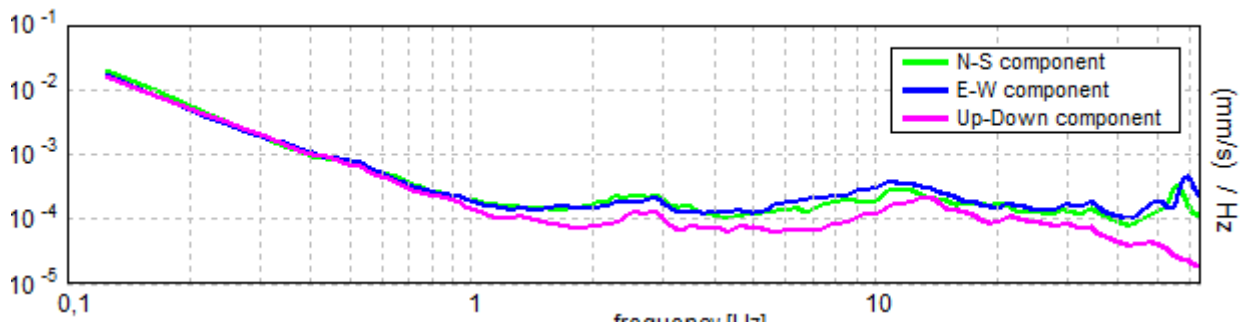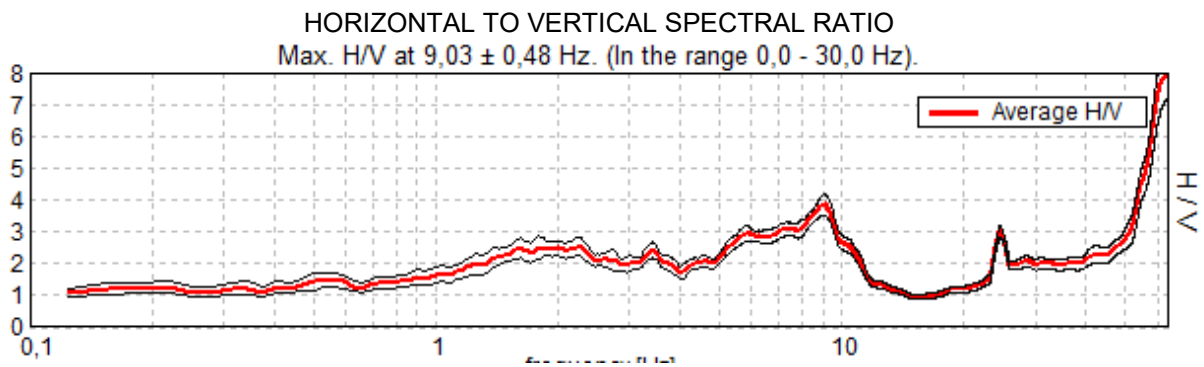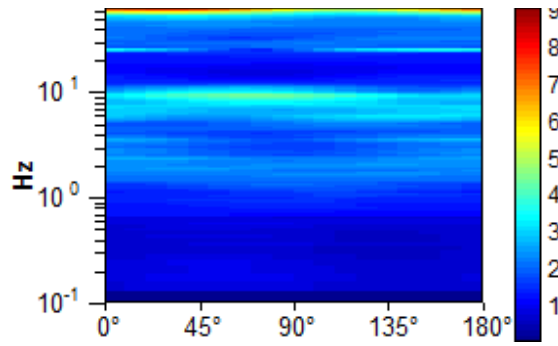Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   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 0.63 ± 0.01 Hz. (In the range 0.0 - 10.0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M57bis

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

Max. H/V at 0.63 ± 0.01 Hz (in the range 0.0 - 10.0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0.63 > 0.50	**OK**	
$n_c(f_0) > 200$	750.0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	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 $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0 / 2$			**NO**
Exists f^+ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0 / 2$			**NO**
$A_0 > 2$	1.79 > 2		**NO**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0.01014| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0.00634 < 0.09375	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0.1395 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M58* CASINO_RIPETITORE

Instrument: TRS-0004/00-06
Start recording: 12/07/13 13:12:31   End recording: 12/07/13 13:32:32
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analyzed 82% trace (manual window selection)
Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
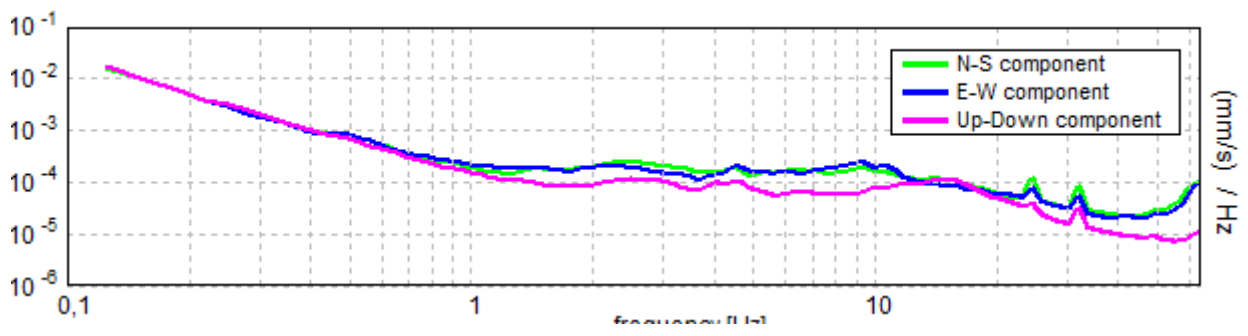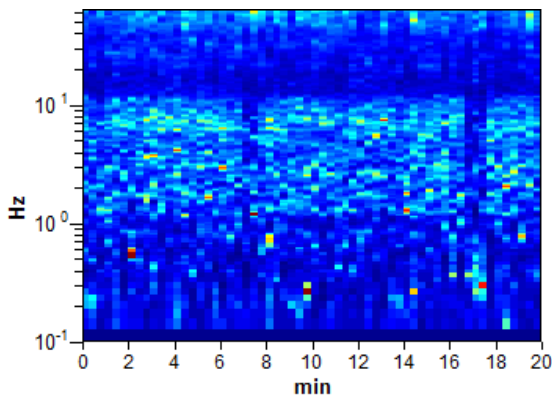Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
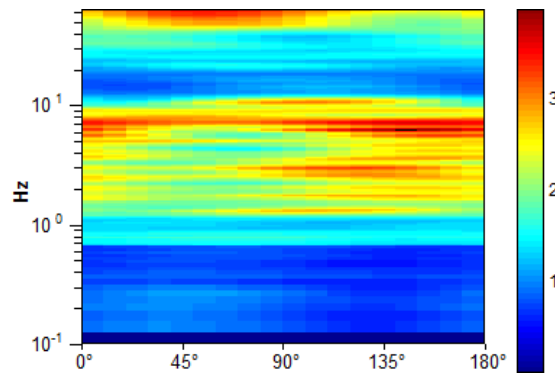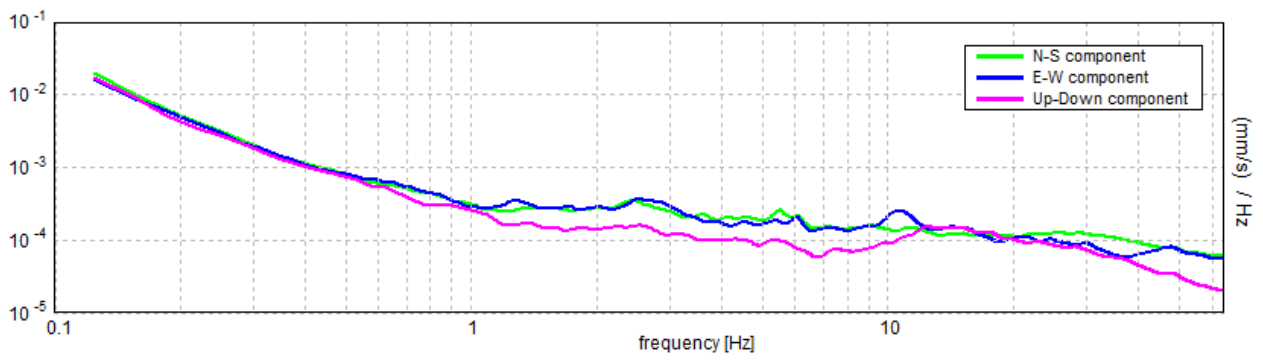Max. H/V at 0,91 ± 4,22 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M58

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

<div style="border:1px solid">

Max. H/V at 0,91 ± 4,22 Hz (in the range 0,0 - 30,0 Hz).

</div>

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0,91 > 0,50	**OK**	
$n_c(f_0) > 200$	888,1 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	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 $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	1,5 Hz	**OK**	
$A_0 > 2$	3,81 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|2,28966| < 0.05		**NO**
$\sigma_f < \varepsilon(f_0)$	2,07501 < 0,13594		**NO**
$\sigma_A(f_0) < \theta(f_0)$	0,4371 < 2,0	**OK**	

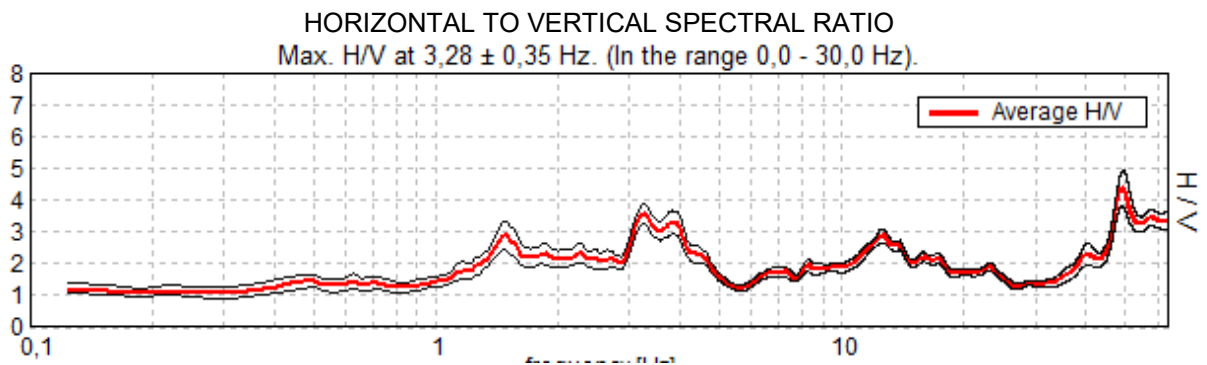|	
L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V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

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

COLLESALVETTI_MS, M59* VICARELLO_DISTRIBUTORE

Instrument: TRS-0004/00-06
Start recording: 07/08/13 11:51:29   End recording: 07/08/13 12:11:30
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
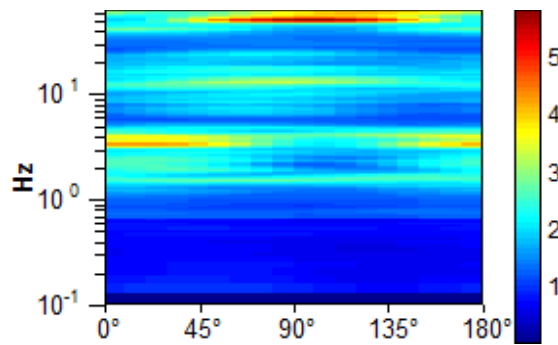GPS data not available

Trace length: 0h20'00''.   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
Window size: 20 s
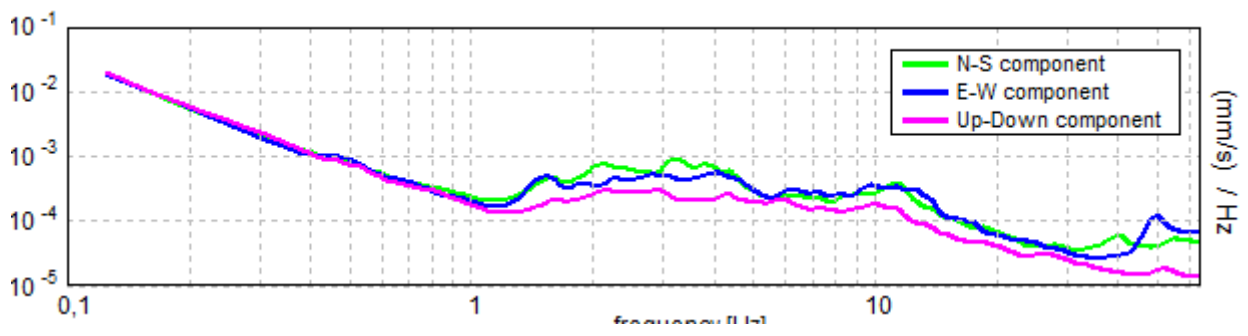Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
Max. H/V at 1,06 ± 0,01 Hz (in the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M59

[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 - 30,0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1,06 > 0,50	**OK**	
$n_c(f_0) > 200$	1275,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz	Exceeded 0 out of 52 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 $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	2,844 Hz	**OK**	
$A_0 > 2$	2,71 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,00468| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,00497 < 0,10625	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,2481 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M60* VICARELLO_VIA_MORTAIOLO

Instrument: TRS-0004/00-06
Start recording: 07/08/13 12:32:34   End recording: 07/08/13 12:52:35
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
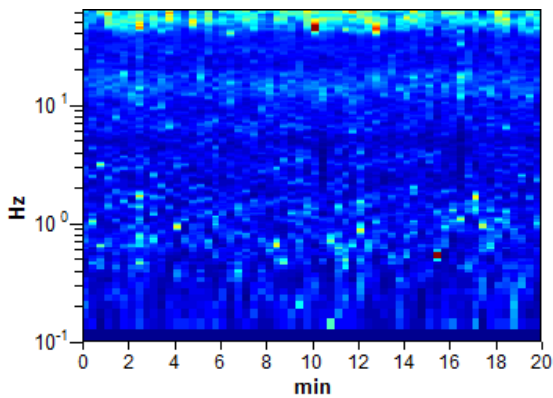GPS data not available

Trace length: 0h20'00''.   Analyzed 88% trace (manual window selection)
Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
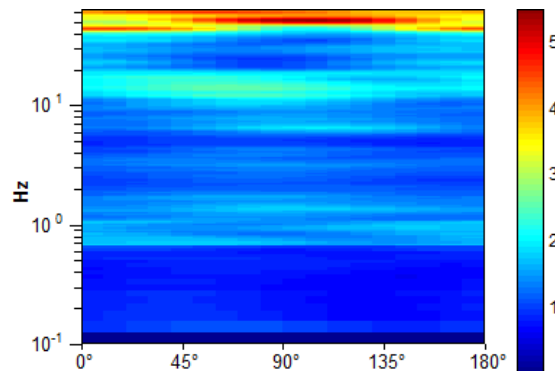Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
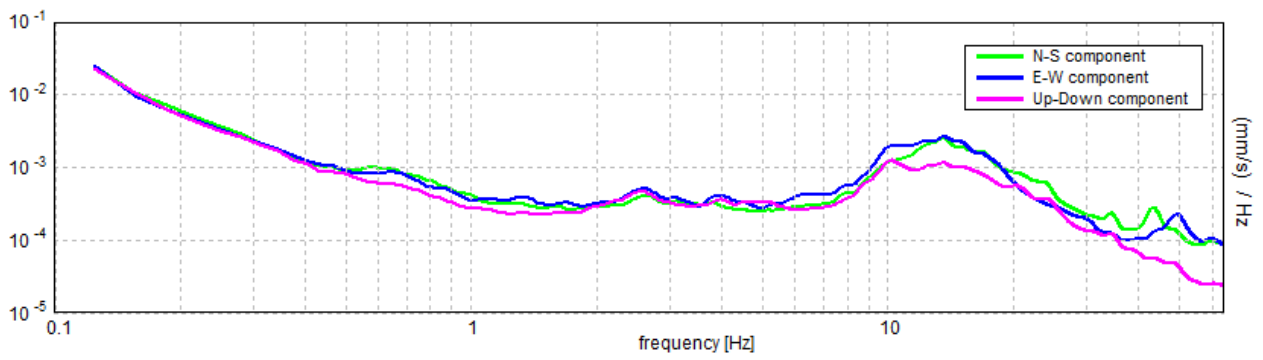Max. H/V at 1,19 ± 0,01 Hz. (In the range 0,0 - 64,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M60

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

Max. H/V at 1,19 ± 0,01 Hz (in the range 0,0 - 64,0 Hz).

Criteria for a reliable HVSR curve [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	1,19 > 0,50	**OK**	
$n_c(f_0) > 200$	1258,8 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	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 $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0 / 2$	0,438 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0 / 2$	2,125 Hz	**OK**	
$A_0 > 2$	2,92 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,00421| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,005 < 0,11875	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,277 < 1,78	**OK**	

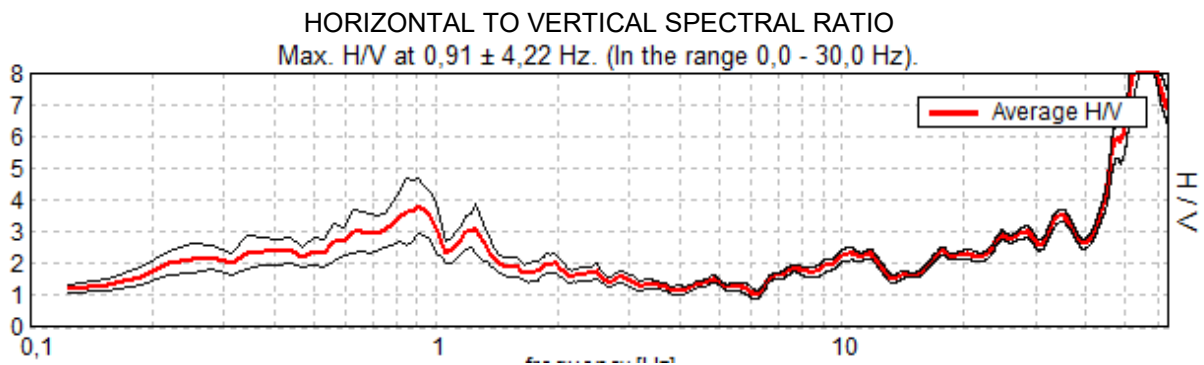|	
L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w\, n_w\, f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0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

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

COLLESALVETTI_MS, M61* VICARELLO_VILLA MARCACCI

Instrument: TRS-0004/00-06
Start recording: 07/08/13 13:12:37   End recording: 07/08/13 13:32:38
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
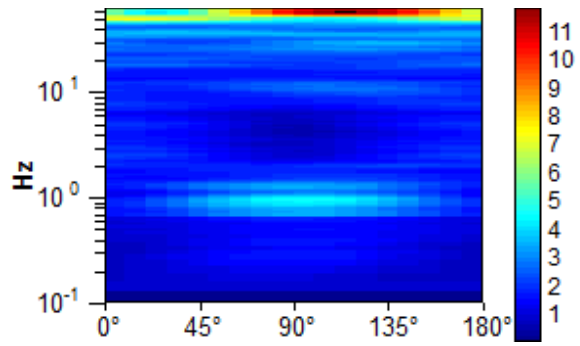GPS data not available

Trace length: 0h20'00".   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 1,13 ± 0,07 Hz. (In the range 0,0 - 20,0 Hz).
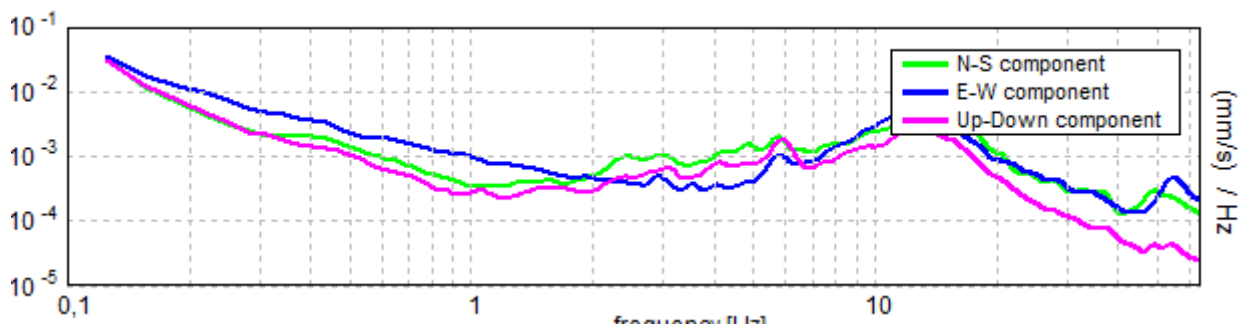

H/V TIME HISTORY	DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M61

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

<div style="text-align:center">

Max. H/V at 1,13 ± 0,07 Hz (in the range 0,0 - 20,0 Hz).

</div>

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1,13 > 0,50	**OK**
$n_c(f_0) > 200$	1350,0 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz	Exceeded 0 out of 55 times	**OK**

Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	0,5 Hz	**OK**
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	2,031 Hz	**OK**
$A_0 > 2$	3,82 > 2	**OK**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,0324| < 0.05	**OK**
$\sigma_f < \varepsilon(f_0)$	0,03645 < 0,1125	**OK**
$\sigma_A(f_0) < \theta(f_0)$	0,2724 < 1,78	**OK**

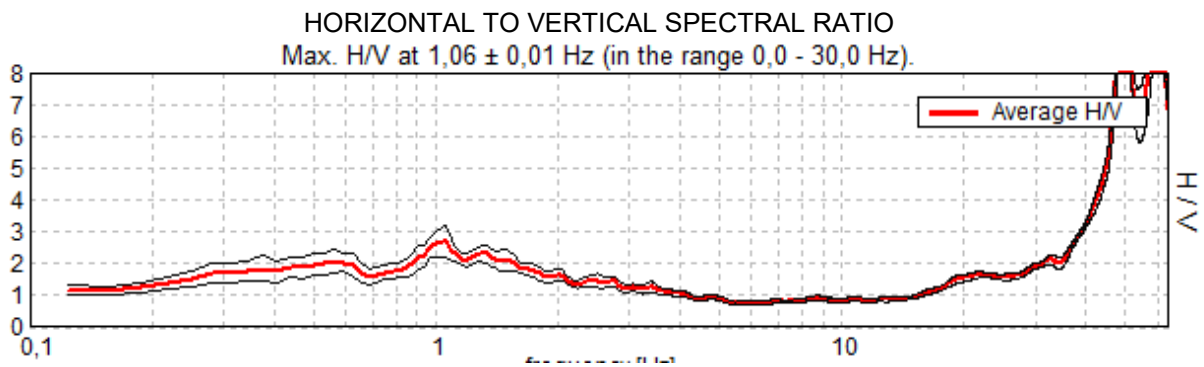|	
L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V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

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

COLLESALVETTI_MS, M62* VICARELLO_CASA VANNOZZI

Instrument: TRS-0004/00-06
Start recording: 07/08/13 14:15:47   End recording: 07/08/13 14:35:48
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
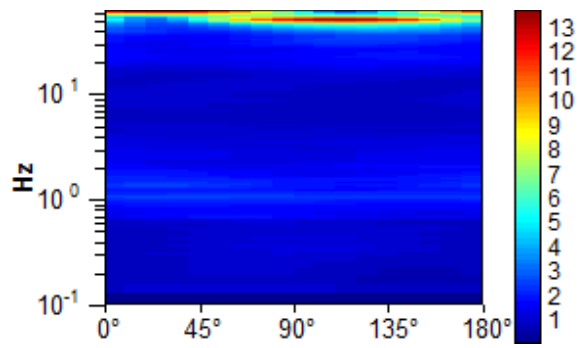GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
Window size: 20 s
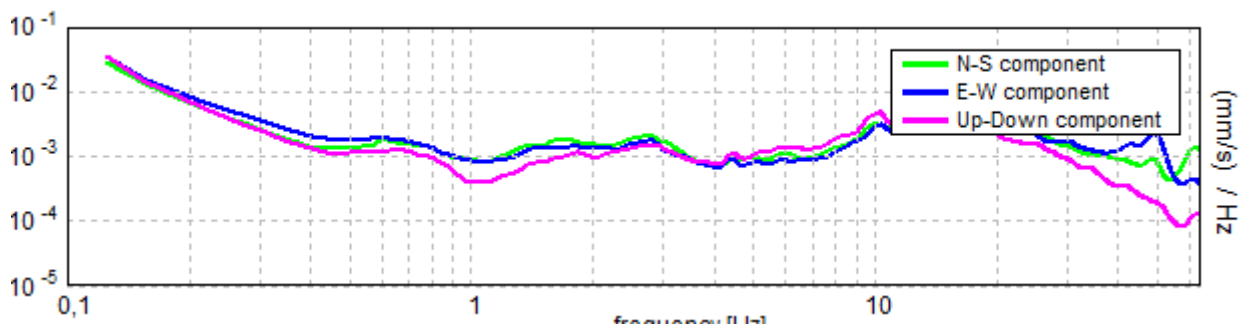Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

Max. H/V at 1,06 ± 0,06 Hz. (In the range 0,0 - 20,0 Hz).

H/V TIME HISTORY	DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M62

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

<div style="text-align:center">

Max. H/V at 1,06 ± 0,06 Hz (in the range 0,0 - 20,0 Hz).

</div>

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1,06 > 0,50	**OK**	
$n_c(f_0) > 200$	1275,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz	Exceeded 0 out of 52 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**	
$A_0 > 2$	2,59 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,02603| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,02766 < 0,10625	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,1799 < 1,78	**OK**	

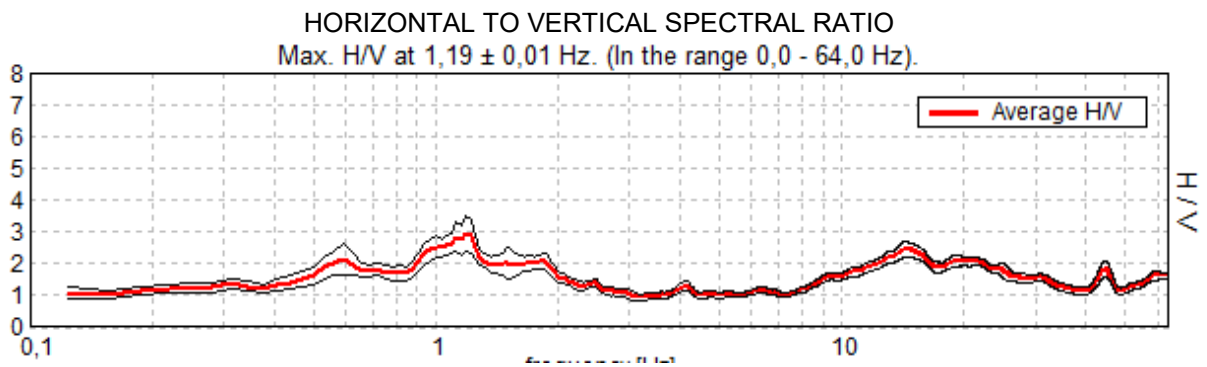|	
L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w\, n_w\, f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0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

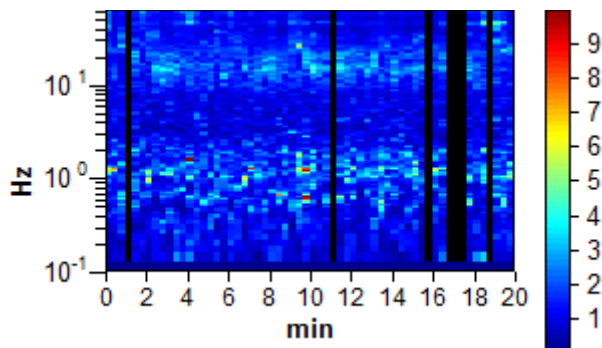| Threshold values for σ_f and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 f_0	0.2 f_0	0.15 f_0	0.10 f_0	0.05 f_0
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COLLESALVETTI_MS, M63* VICARELLO_GRECCIANO

Instrument: TRS-0004/00-06
Start recording: 07/08/13 14:56:51   End recording: 07/08/13 15:16:51
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
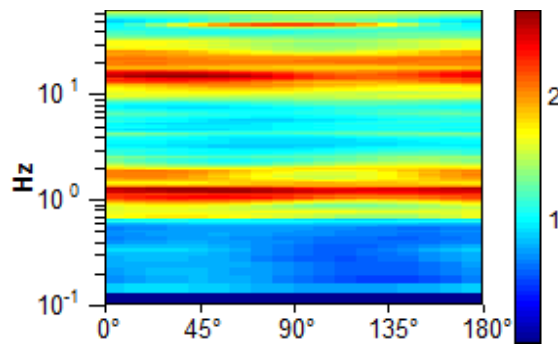GPS data not available

Trace length: 0h20'00".   Analyzed 95% trace (manual window selection)
Sampling frequency: 128 Hz
Window size: 20 s
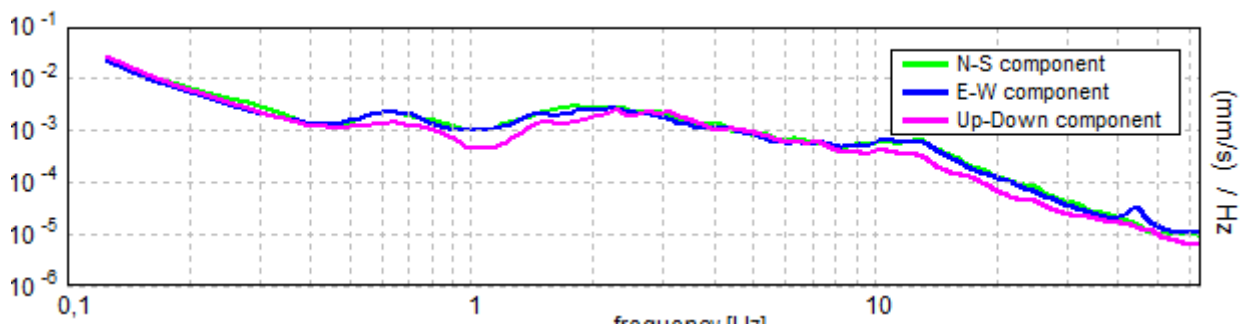Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

Max. H/V at 0,59 ± 0,36 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M63

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

<table>
<tr><td colspan="2" align="center">**Max. H/V at 0,59 ± 0,36 Hz (in the range 0,0 - 30,0 Hz).**</td></tr>
</table>

<table>
<tr>
<td colspan="4" align="center">**Criteria for a reliable HVSR curve**
[All 3 should be fulfilled]</td>
</tr>
<tr>
<td align="center">$f_0 > 10 / L_w$</td>
<td align="center">0,59 > 0,50</td>
<td align="center">**OK**</td>
<td></td>
</tr>
<tr>
<td align="center">$n_c(f_0) > 200$</td>
<td align="center">676,9 > 200</td>
<td align="center">**OK**</td>
<td></td>
</tr>
<tr>
<td align="center">$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td>
<td align="center">Exceeded 0 out of 30 times</td>
<td align="center">**OK**</td>
<td></td>
</tr>
<tr>
<td colspan="4" align="center">**Criteria for a clear HVSR peak**
[At least 5 out of 6 should be fulfilled]</td>
</tr>
<tr>
<td align="center">Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td>
<td align="center">0,406 Hz</td>
<td align="center">**OK**</td>
<td></td>
</tr>
<tr>
<td align="center">Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td>
<td align="center"></td>
<td align="center"></td>
<td align="center">**NO**</td>
</tr>
<tr>
<td align="center">$A_0 > 2$</td>
<td align="center">2,91 > 2</td>
<td align="center">**OK**</td>
<td></td>
</tr>
<tr>
<td align="center">$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td>
<td align="center">|0,30142| < 0.05</td>
<td align="center"></td>
<td align="center">**NO**</td>
</tr>
<tr>
<td align="center">$\sigma_f < \varepsilon(f_0)$</td>
<td align="center">0,17897 < 0,08906</td>
<td align="center"></td>
<td align="center">**NO**</td>
</tr>
<tr>
<td align="center">$\sigma_A(f_0) < \theta(f_0)$</td>
<td align="center">0,1926 < 2,0</td>
<td align="center">**OK**</td>
<td></td>
</tr>
</table>

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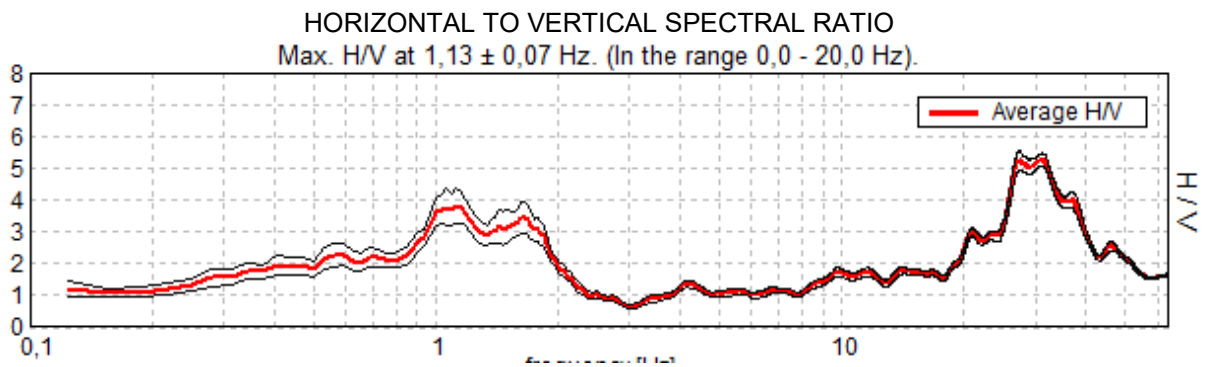</table>

<table>
<tr><td colspan="6" align="center">Threshold values for σ_f and $\sigma_A(f_0)$</td></tr>
<tr><td>Freq.range [Hz]</td><td align="center">< 0.2</td><td align="center">0.2 – 0.5</td><td align="center">0.5 – 1.0</td><td align="center">1.0 – 2.0</td><td align="center">> 2.0</td></tr>
<tr><td>$\varepsilon(f_0)$ [Hz]</td><td align="center">0.25 f_0</td><td align="center">0.2 f_0</td><td align="center">0.15 f_0</td><td align="center">0.10 f_0</td><td align="center">0.05 f_0</td></tr>
<tr><td>$\theta(f_0)$ for $\sigma_A(f_0)$</td><td align="center">3.0</td><td align="center">2.5</td><td align="center">2.0</td><td align="center">1.78</td><td align="center">1.58</td></tr>
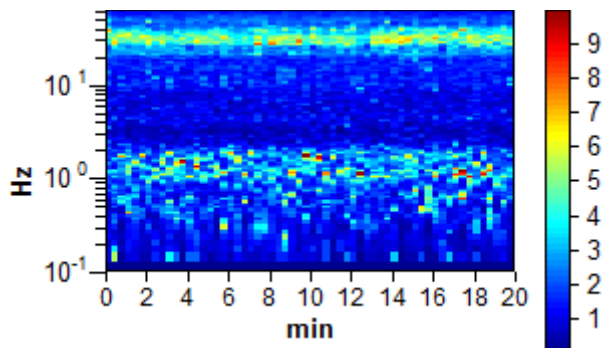<tr><td>Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$</td><td align="center">0.48</td><td align="center">0.40</td><td align="center">0.30</td><td align="center">0.25</td><td align="center">0.20</td></tr>
</table>

COLLESALVETTI_MS, M64* VICARELLO_PODERE GRILLAI

Instrument: TRS-0004/00-06
Start recording: 07/08/13 15:25:54   End recording: 07/08/13 15:45:55
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
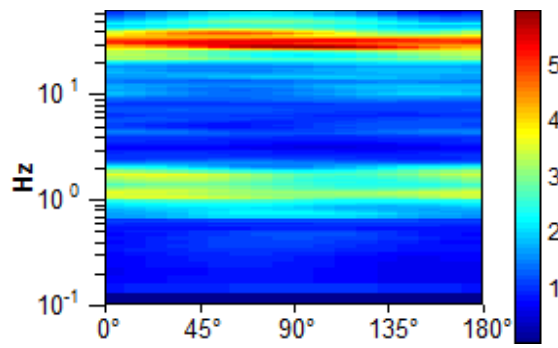GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
Window size: 20 s
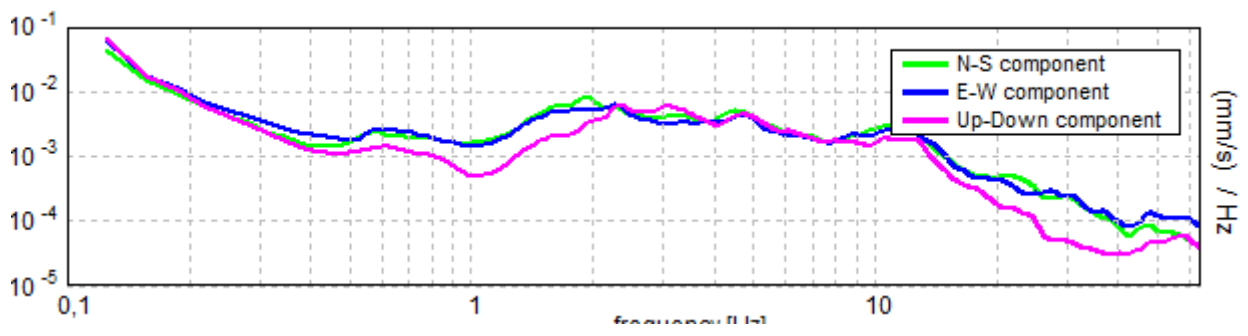Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
Max. H/V at 1,66 ± 0,06 Hz. (In the range 0,0 - 15,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M64

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

<div style="border:1px solid black">

Max. H/V at 1,66 ± 0,06 Hz (in the range 0,0 - 15,0 Hz).

</div>

Criteria for a reliable HVSR curve [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	1,66 > 0,50	**OK**	
$n_c(f_0) > 200$	1987,5 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz	Exceeded 0 out of 80 times	**OK**	

Criteria for a clear HVSR peak [At least 5 out of 6 should be fulfilled]			
Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	0,781 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	2,25 Hz	**OK**	
$A_0 > 2$	4,51 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,01866| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,03091 < 0,16563	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,2755 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M65* VICARELLO_COLMATA DI SCOTTO

Instrument: TRS-0004/00-06
Start recording: 07/08/13 16:06:33   End recording: 07/08/13 16:26:34
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
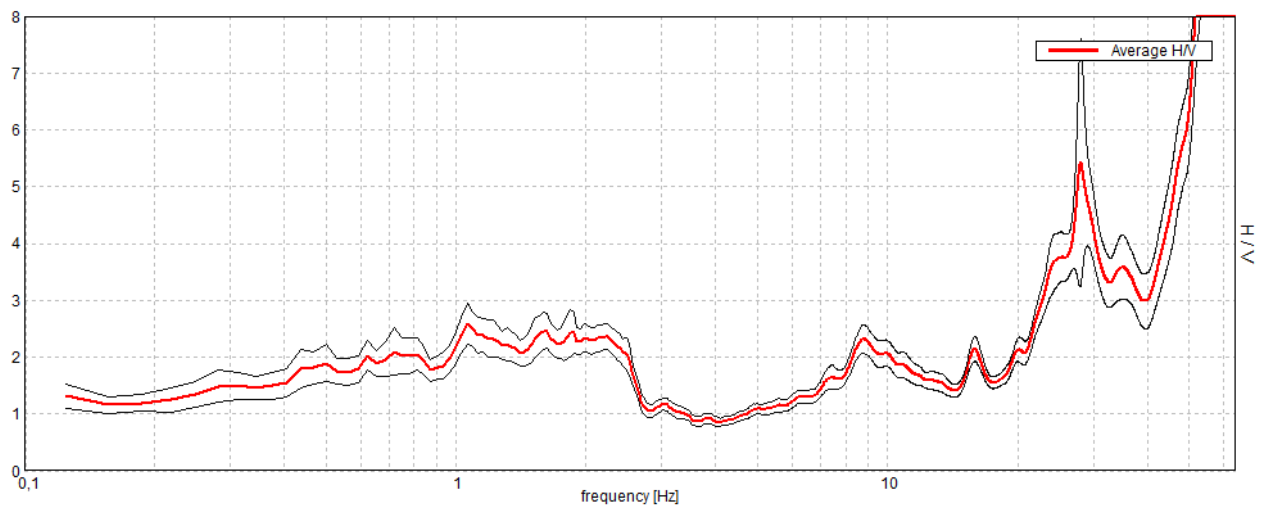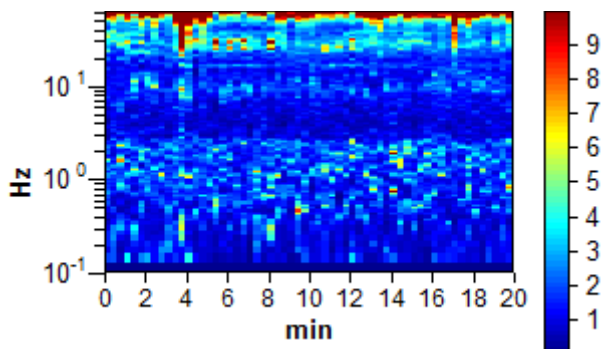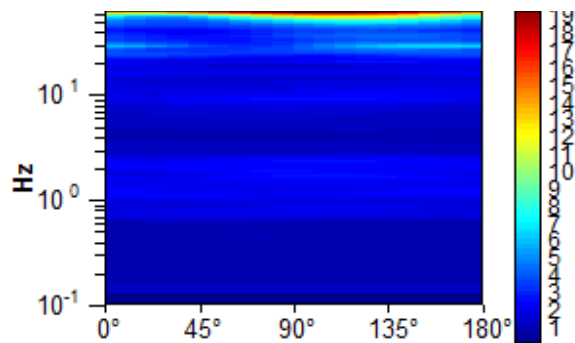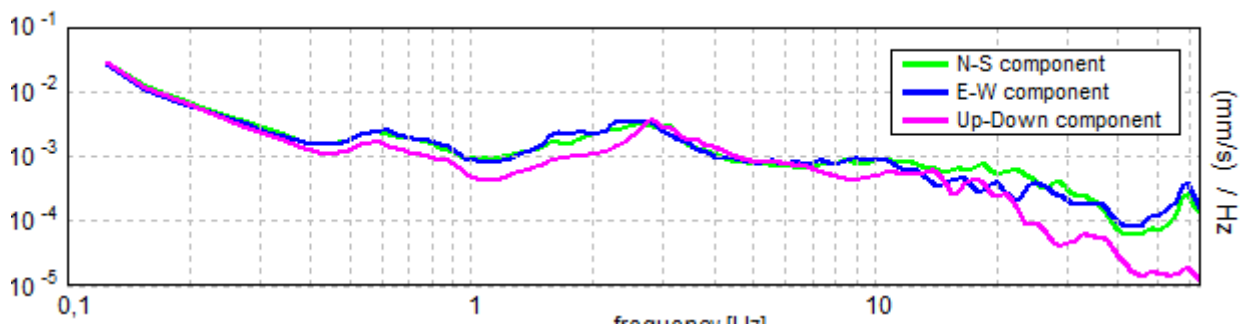Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
Max. H/V at 1,13 ± 0,02 Hz. (In the range 0,0 - 15,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M65

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

<div style="border:1px solid black">

Max. H/V at 1,13 ± 0,02 Hz (in the range 0,0 - 15,0 Hz).

</div>

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1,13 > 0,50	**OK**	
$n_c(f_0) > 200$	1350,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	Exceeded 0 out of 55 times	**OK**	

Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0 / 2$	0,375 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0 / 2$	1,719 Hz	**OK**	
$A_0 > 2$	4,93 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,00719| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,00809 < 0,1125	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,4497 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M66* VICARELLO_AUTOPARCO

Instrument: TRS-0004/00-06
Start recording: 07/08/13 16:39:40   End recording: 07/08/13 16:59:40
Channel labels: NORTH SOUTH; EAST WEST ; UP   DOWN
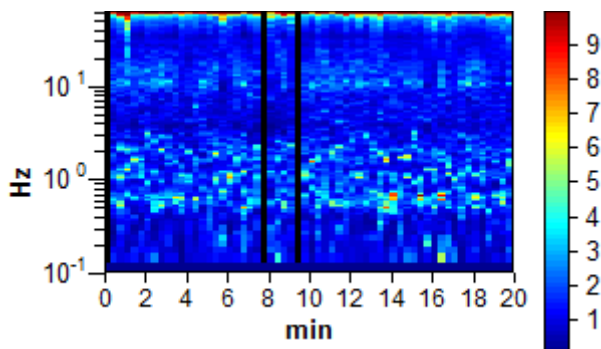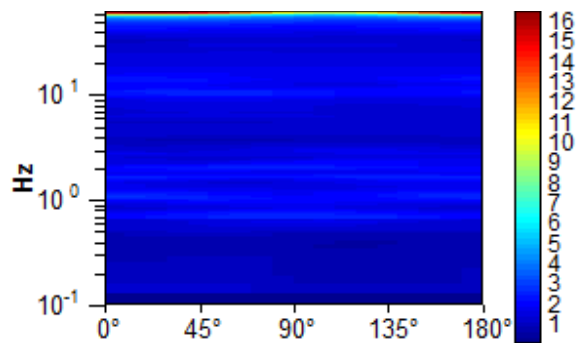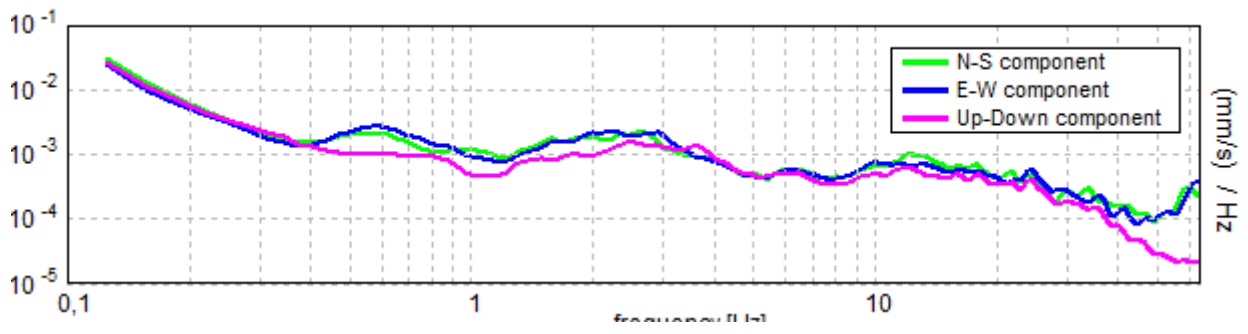GPS data not available

Trace length: 0h20'00''.   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 1,03 ± 0,01 Hz (in the range 0,0 - 64,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M66

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

<div style="border:1px solid black; padding:10px; text-align:center">

Max. H/V at 1,03 ± 0,01 Hz (in the range 0,0 - 64,0 Hz).

</div>

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1,03 > 0,50	**OK**	
$n_c(f_0) > 200$	1237,5 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	0,406 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	1,563 Hz	**OK**	
$A_0 > 2$	5,03 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,0052| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,00536 < 0,10313	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,319 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

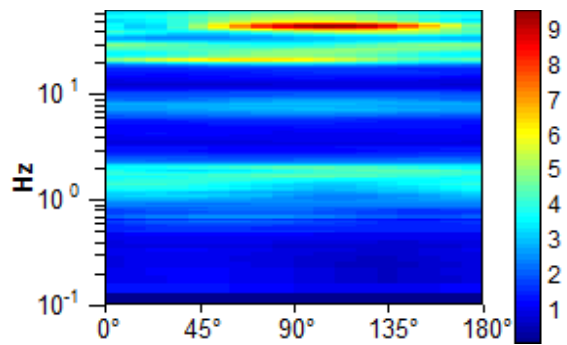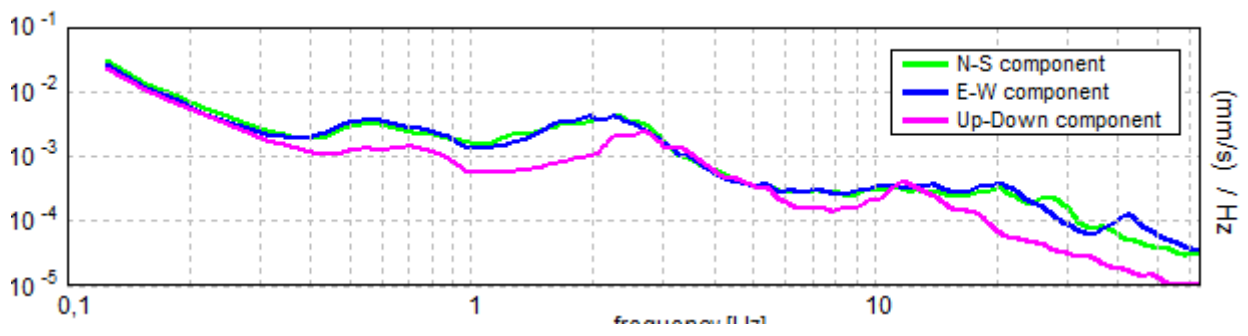| Threshold values for σ_f and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 f_0	0.2 f_0	0.15 f_0	0.10 f_0	0.05 f_0
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COLLESALVETTI_MS, M67* COLLESALVETTI_I POGGI

Instrument: TRS-0004/00-06
Start recording: 07/08/13 17:19:35   End recording: 07/08/13 17:39:36
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
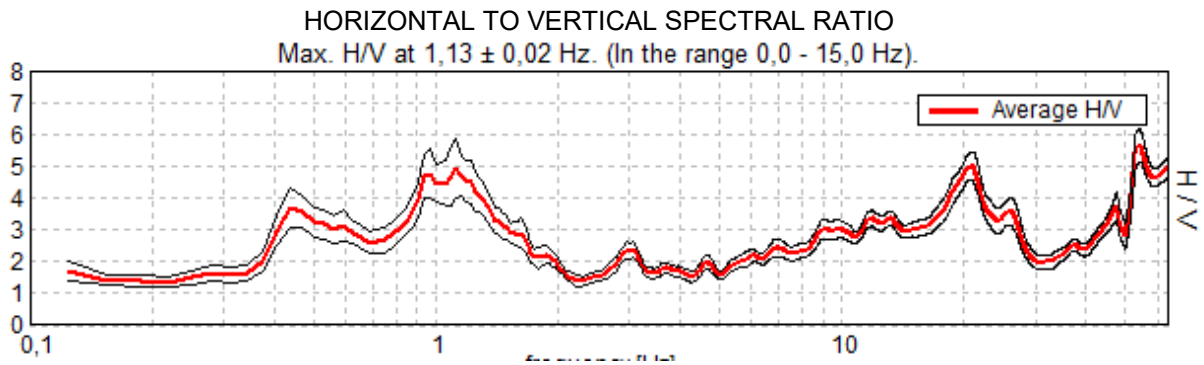GPS data not available

Trace length: 0h20'00".   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 1,88 ± 0,03 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M67

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

<table>
<tr><td colspan="4" align="center">**Max. H/V at 1,88 ± 0,03 Hz (in the range 0,0 - 30,0 Hz).**</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">**Criteria for a reliable HVSR curve**
[All 3 should be fulfilled]</td></tr>
<tr><td align="center">$f_0 > 10 / L_w$</td><td align="center">1,88 > 0,50</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$n_c(f_0) > 200$</td><td align="center">2250,0 > 200</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td><td align="center">Exceeded 0 out of 91 times</td><td align="center">**OK**</td><td></td></tr>
<tr><td colspan="4" align="center">**Criteria for a clear HVSR peak**
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td align="center">**Exists f⁻ in [f₀/4, f₀] | A_{H/V}(f⁻) < A₀ / 2**</td><td align="center">0,844 Hz</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">**Exists f⁺ in [f₀, 4f₀] | A_{H/V}(f⁺) < A₀ / 2**</td><td align="center">3,031 Hz</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">**A₀ > 2**</td><td align="center">4,22 > 2</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">**f_{peak}[A_{H/V}(f) ± σ_A(f)] = f₀ ± 5%**</td><td align="center">|0,00903| < 0.05</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">**σ_f < ε(f₀)**</td><td align="center">0,01693 < 0,1875</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">**σ_A(f₀) < θ(f₀)**</td><td align="center">0,2626 < 1,78</td><td align="center">**OK**</td><td></td></tr>
</table>

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

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

COLLESALVETTI_MS, M68* COLLESALVETTI_TANNA ALTA

Instrument: TRS-0004/00-06
Start recording: 07/08/13 17:49:37   End recording: 07/08/13 18:09:38
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00''.   Analysis performed on the entire trace.
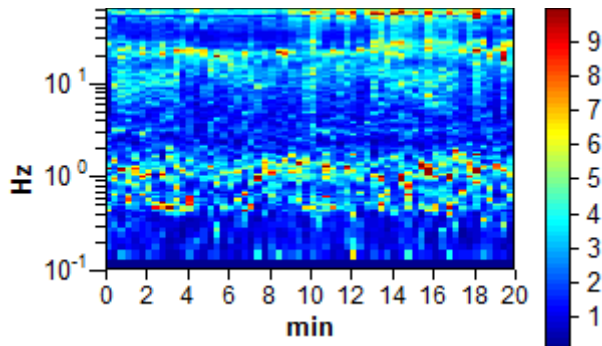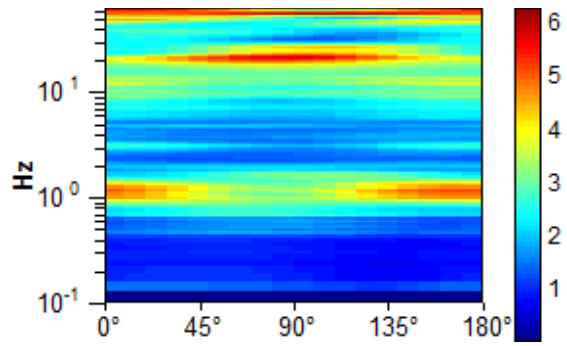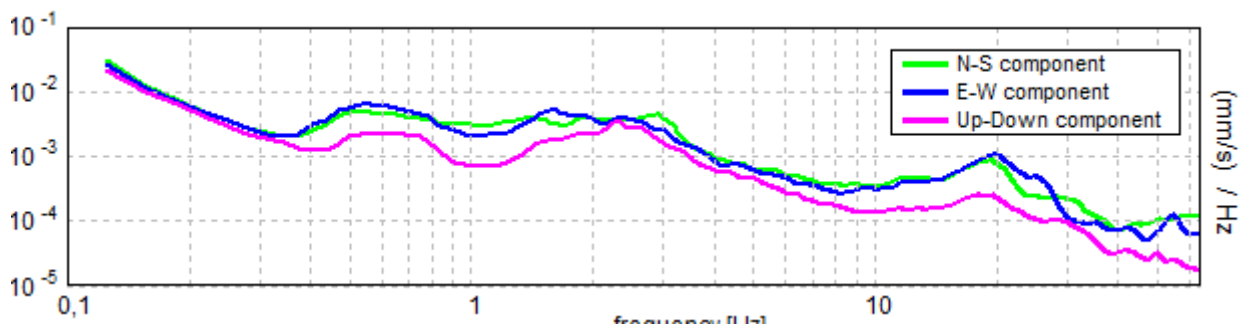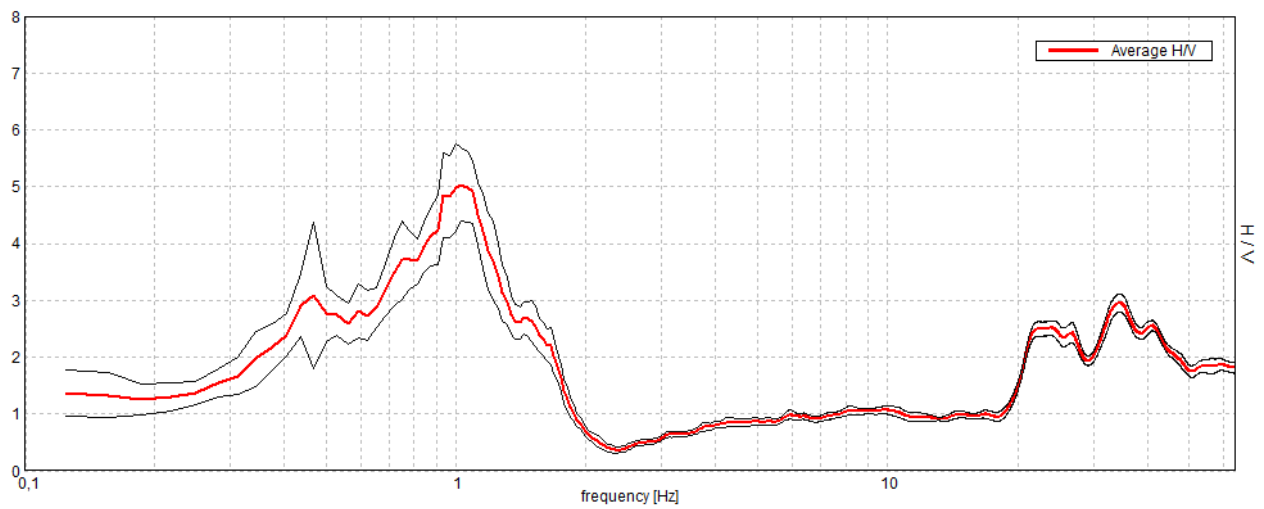Sampling frequency: 128 Hz
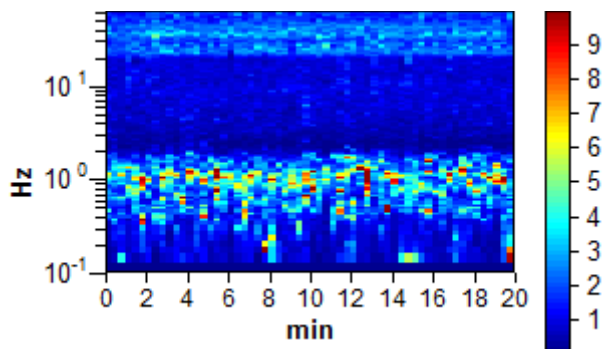Window size: 20 s
Smoothing window: Triangular window
Smoothing: 5%
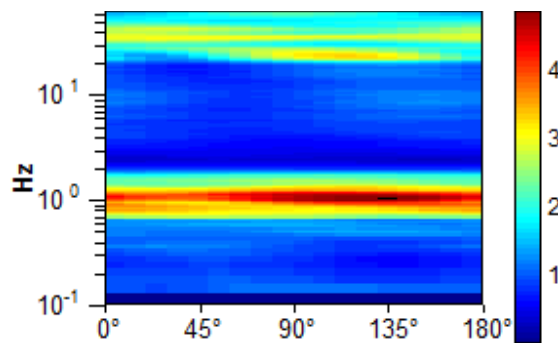
HORIZONTAL TO VERTICAL SPECTRAL RATIO

Max. H/V at 3,44 ± 0,14 Hz. (In the range 0,0 - 15,0 Hz).
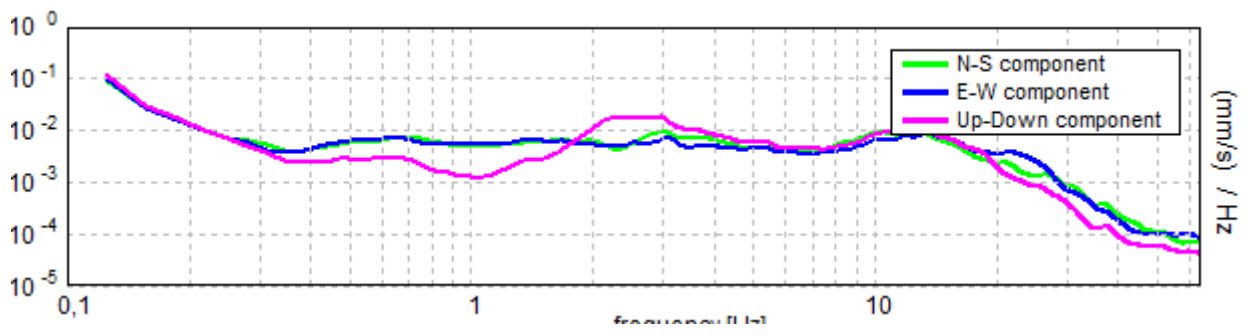

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M68

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

<table>
<tr><td colspan="4" align="center">**Max. H/V at 3,44 ± 0,14 Hz (in the range 0,0 - 15,0 Hz).**</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">**Criteria for a reliable HVSR curve**
[All 3 should be fulfilled]</td></tr>
<tr><td align="center">$f_0 > 10 / L_w$</td><td align="center">3,44 > 0,50</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$n_c(f_0) > 200$</td><td align="center">4125,0 > 200</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td><td align="center">Exceeded 0 out of 166 times</td><td align="center">**OK**</td><td></td></tr>
<tr><td colspan="4" align="center">**Criteria for a clear HVSR peak**
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td align="center">Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td></td><td></td><td align="center">**NO**</td></tr>
<tr><td align="center">Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td align="center">5,438 Hz</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$A_0 > 2$</td><td align="center">2,65 > 2</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td align="center">|0,02049| < 0.05</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$\sigma_f < \varepsilon(f_0)$</td><td align="center">0,07042 < 0,17188</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$\sigma_A(f_0) < \theta(f_0)$</td><td align="center">0,1167 < 1,58</td><td align="center">**OK**</td><td></td></tr>
</table>

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

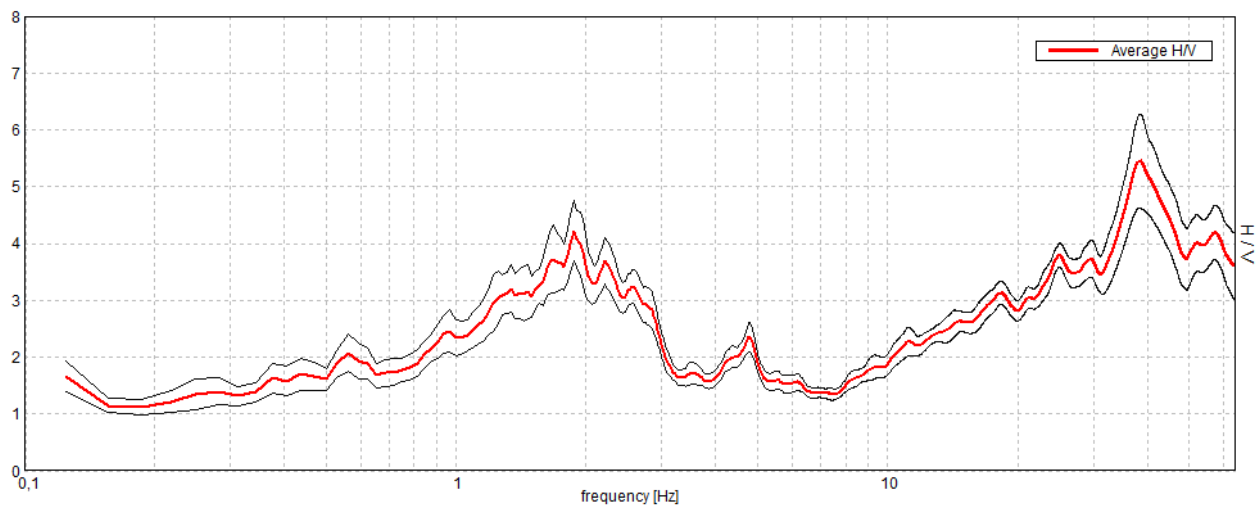| Threshold values for σ_f and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 f_0	0.2 f_0	0.15 f_0	0.10 f_0	0.05 f_0
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COLLESALVETTI_MS, M69* COLLESALVETTI_TORA

Instrument: TRS-0004/00-06
Start recording: 07/08/13 18:20:09   End recording: 07/08/13 18:40:10
Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN
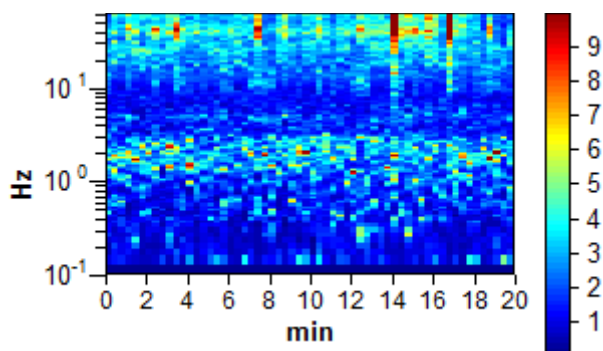GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
Smoothing: 5%
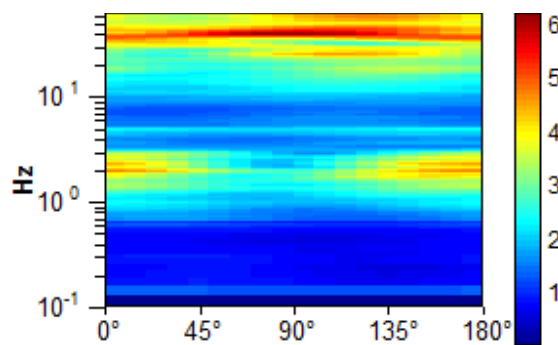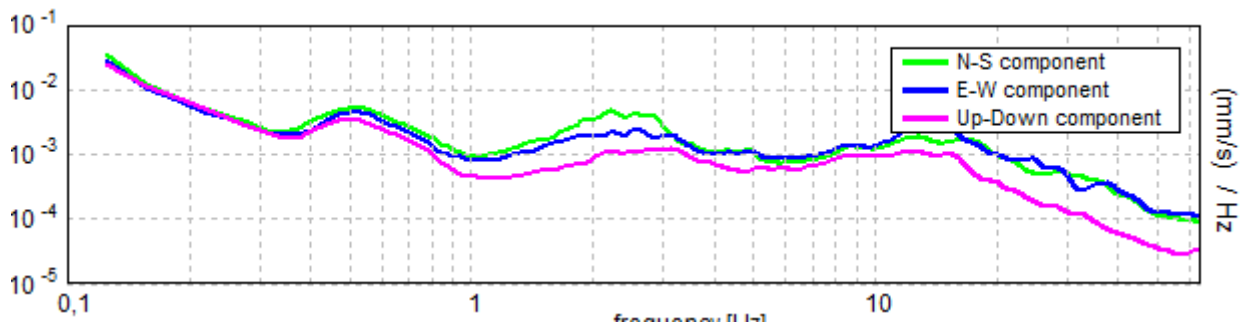
HORIZONTAL TO VERTICAL SPECTRAL RATIO
Max. H/V at 1,66 ± 1,25 Hz (in the range 0,0 - 64,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M69

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

<table>
<tr><td colspan="4" align="center">**Max. H/V at 1,66 ± 1,25 Hz (in the range 0,0 - 64,0 Hz).**</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">**Criteria for a reliable HVSR curve**
[All 3 should be fulfilled]</td></tr>
<tr><td align="center">$f_0 > 10 / L_w$</td><td align="center">1,66 > 0,50</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$n_c(f_0) > 200$</td><td align="center">1987,5 > 200</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td><td align="center">Exceeded 0 out of 80 times</td><td align="center">**OK**</td><td></td></tr>
<tr><td colspan="4" align="center">**Criteria for a clear HVSR peak**
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td align="center">Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td align="center">0,844 Hz</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td align="center">2,344 Hz</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$A_0 > 2$</td><td align="center">4,09 > 2</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td align="center">|0,37329| < 0.05</td><td></td><td align="center">**NO**</td></tr>
<tr><td align="center">$\sigma_f < \varepsilon(f_0)$</td><td align="center">0,61826 < 0,16563</td><td></td><td align="center">**NO**</td></tr>
<tr><td align="center">$\sigma_A(f_0) < \theta(f_0)$</td><td align="center">0,2647 < 1,78</td><td align="center">**OK**</td><td></td></tr>
</table>

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

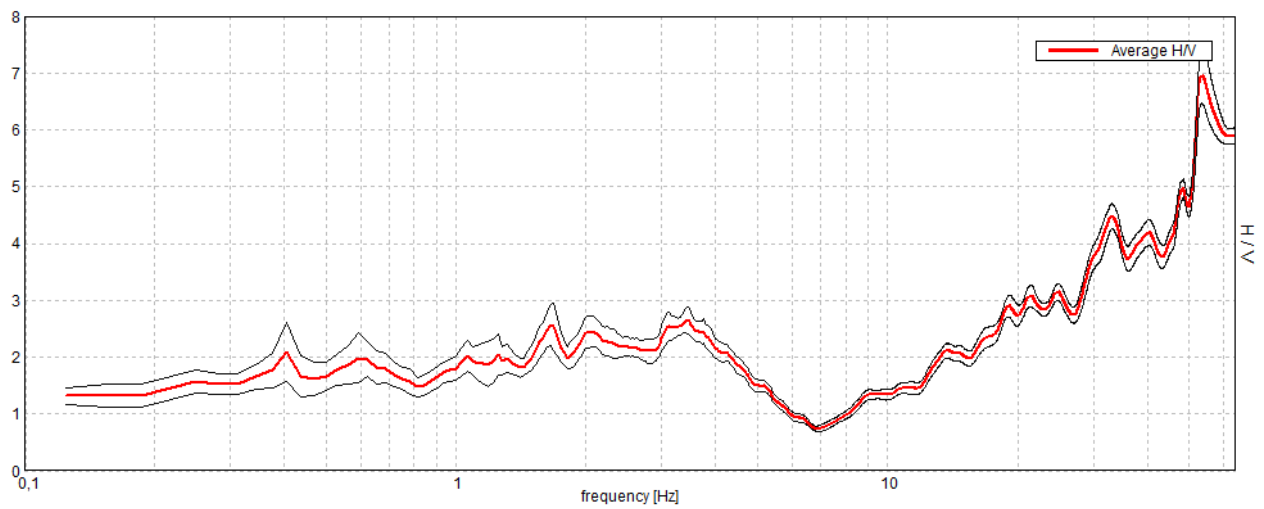| Threshold values for σ_f and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 f_0	0.2 f_0	0.15 f_0	0.10 f_0	0.05 f_0
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COLLESALVETTI_MS, M70* COLLESALVETTI_AUTOSCUOLA

Instrument: TRS-0004/00-06
Start recording: 07/08/13 18:49:50   End recording: 07/08/13 19:09:51
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
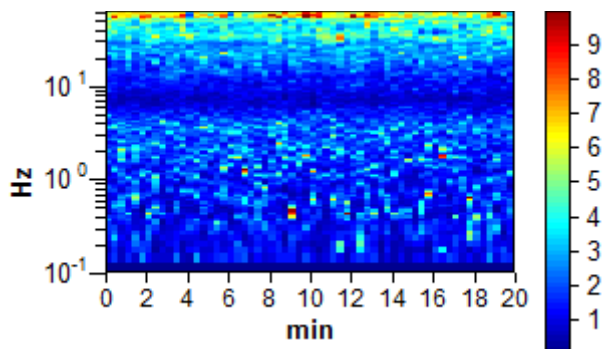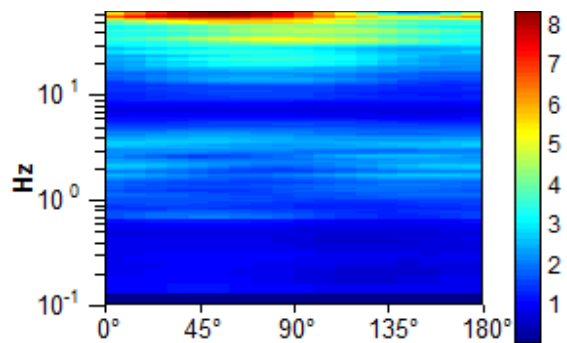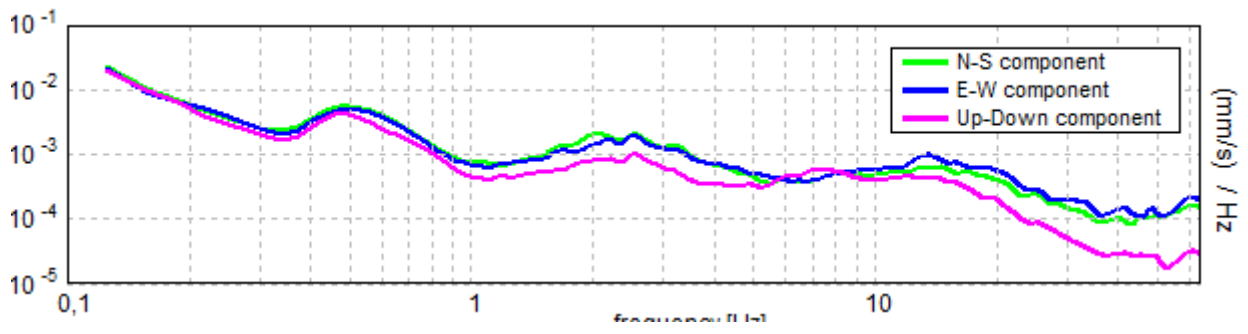GPS data not available

Trace length: 0h20'00''.   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 3,63 ± 0,96 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M70

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

Max. H/V at 3,63 ± 0,96 Hz (in the range 0,0 - 30,0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	3,63 > 0,50	**OK**	
$n_c(f_0) > 200$	4350,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz	Exceeded 0 out of 175 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 $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	8,656 Hz	**OK**	
$A_0 > 2$	2,63 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,13102| < 0.05		**NO**
$\sigma_f < \varepsilon(f_0)$	0,47496 < 0,18125		**NO**
$\sigma_A(f_0) < \theta(f_0)$	0,147 < 1,58	**OK**	

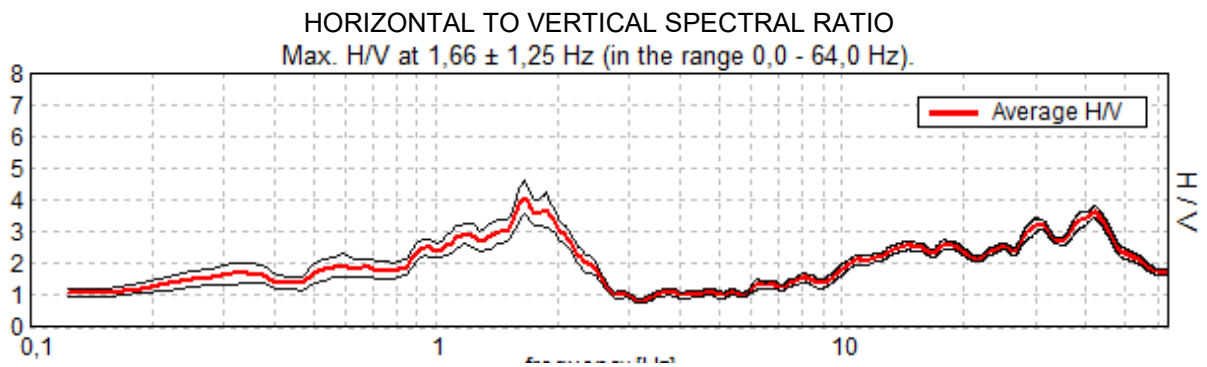|	
L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V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

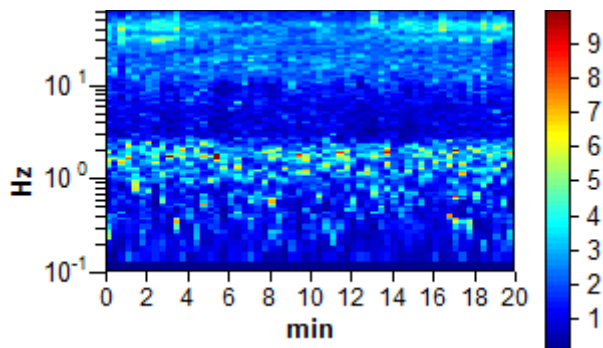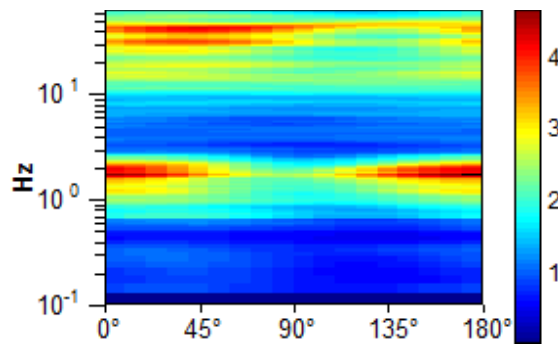| Threshold values for σ_f and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 f_0	0.2 f_0	0.15 f_0	0.10 f_0	0.05 f_0
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COLLESALVETTI_MS, M71* COLLESALVETTI_FERROVIA

Instrument: TRS-0004/00-06
Start recording: 07/08/13 19:22:27   End recording: 07/08/13 19:42:28
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
Window size: 20 s
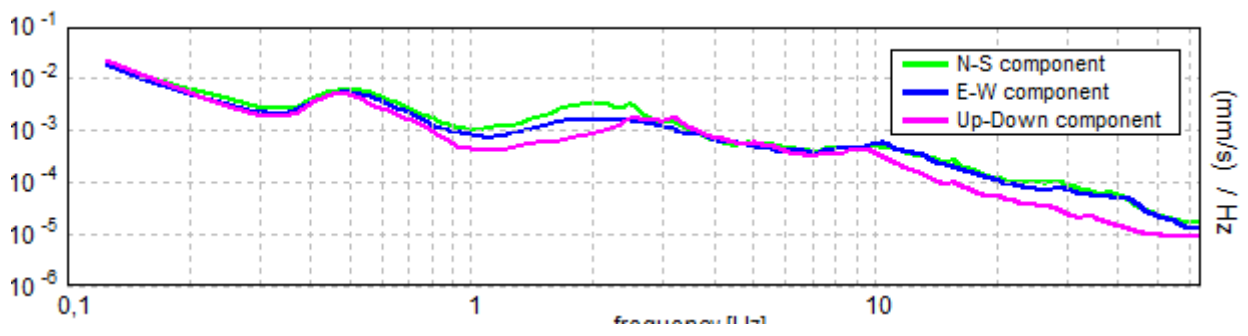Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

Max. H/V at 1,25 ± 0,07 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M71

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

Max. H/V at 1,25 ± 0,07 Hz (in the range 0,0 - 30,0 Hz).

Criteria for a reliable HVSR curve [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	1,25 > 0,50	**OK**	
$n_c(f_0) > 200$	1500,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	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 $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	2,719 Hz	**OK**	
$A_0 > 2$	2,72 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,02728| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,0341 < 0,125	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,1771 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

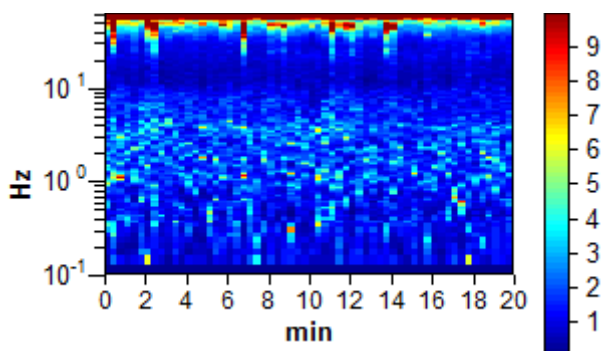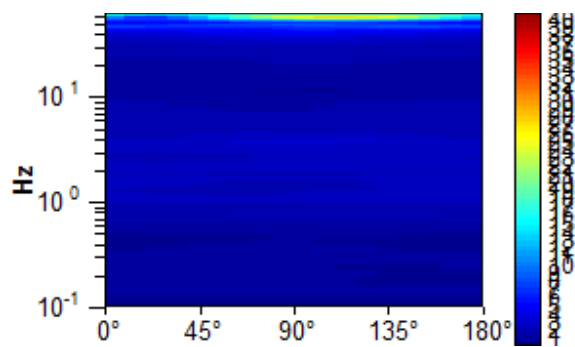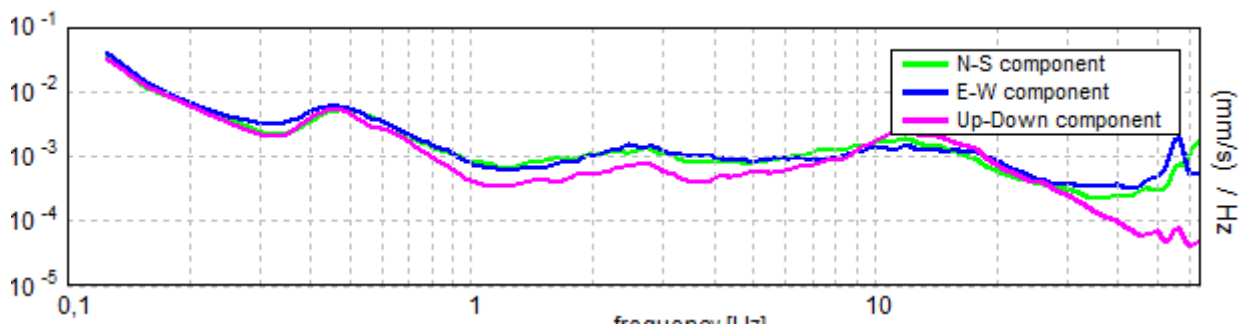| Threshold values for σ_f and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 f_0	0.2 f_0	0.15 f_0	0.10 f_0	0.05 f_0
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COLLESALVETTI_MS, M72* MORTAIOLO_RIPETITORI

Instrument: TRS-0004/00-06
Start recording: 08/08/13 10:39:33   End recording: 08/08/13 10:59:34
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   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 ± 0,0 Hz (in the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M72

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

<table>
<tr><td colspan="4" align="center">**Max. H/V at 1,19 ± 0,0 Hz (in the range 0,0 - 30,0 Hz).**</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">**Criteria for a reliable HVSR curve**
[All 3 should be fulfilled]</td></tr>
<tr><td align="center">$f_0 > 10 / L_w$</td><td align="center">1,19 > 0,50</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$n_c(f_0) > 200$</td><td align="center">1425,0 > 200</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td><td align="center">Exceeded 0 out of 58 times</td><td align="center">**OK**</td><td></td></tr>
<tr><td colspan="4" align="center">**Criteria for a clear HVSR peak**
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td align="center">Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td align="center">0,875 Hz</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td align="center">1,563 Hz</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$A_0 > 2$</td><td align="center">8,56 > 2</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td align="center">|0,00152| < 0.05</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$\sigma_f < \varepsilon(f_0)$</td><td align="center">0,0018 < 0,11875</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$\sigma_A(f_0) < \theta(f_0)$</td><td align="center">0,7468 < 1,78</td><td align="center">**OK**</td><td></td></tr>
</table>

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

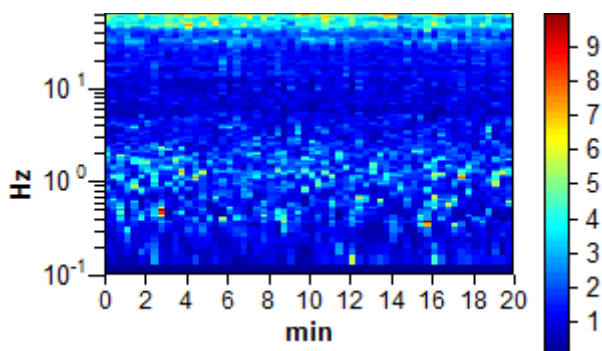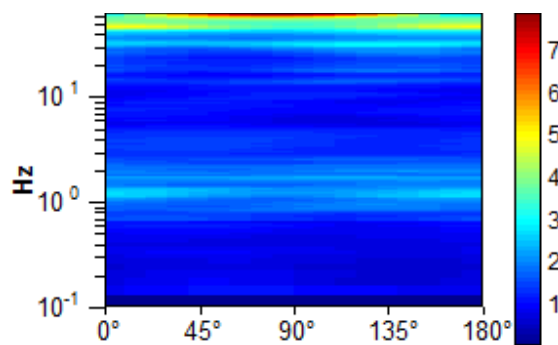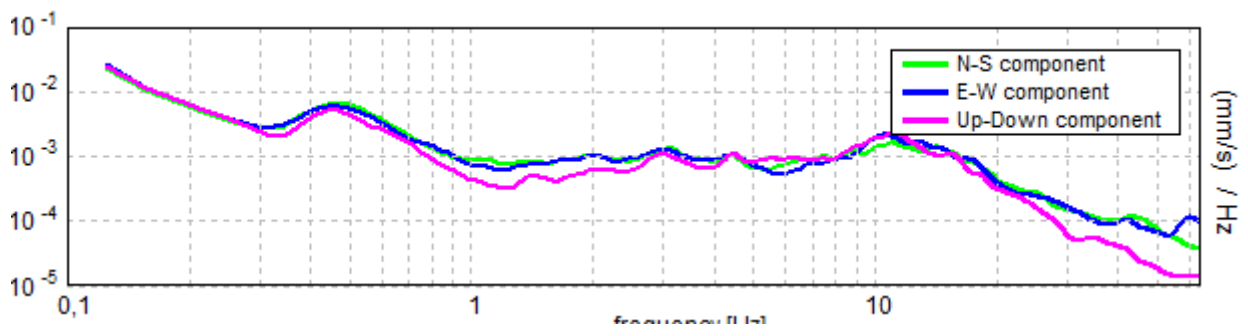| Threshold values for σ_f and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 f_0	0.2 f_0	0.15 f_0	0.10 f_0	0.05 f_0
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COLLESALVETTI_MS, M73* MORTAIOLO_CASE GIOLI

Instrument: TRS-0004/00-06
Start recording: 08/08/13 11:14:11   End recording: 08/08/13 11:34:12
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
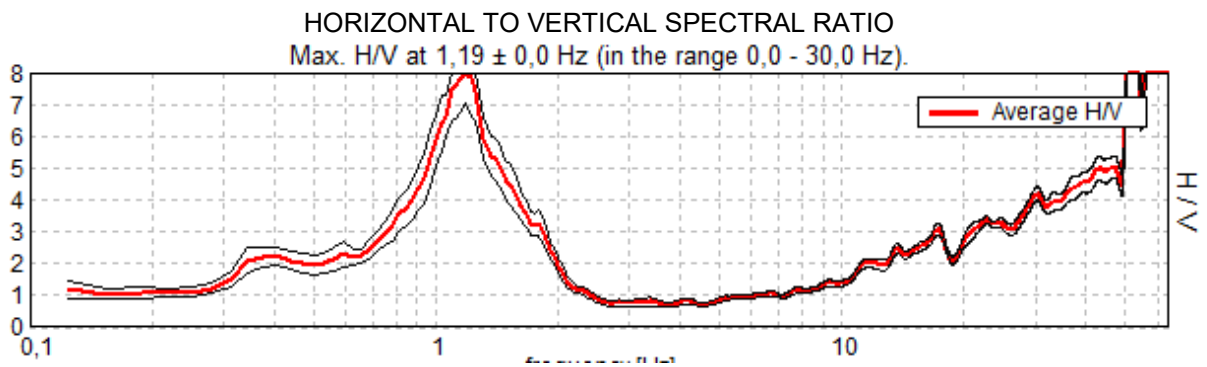GPS data not available

Trace length: 0h20'00''.   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 ± 0,18 Hz (in the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M73

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

Max. H/V at 2,5 ± 0,18 Hz (in the range 0,0 - 30,0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2,50 > 0,50	**OK**	
$n_c(f_0) > 200$	3000,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	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 $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	3,031 Hz	**OK**	
$A_0 > 2$	2,68 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,0351| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,08776 < 0,125	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,2091 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M73BIS* MORTAIOLO_CASE GIOLI

Instrument: TRS-0004/00-06
Start recording: 25/09/13 16:23:38   End recording: 25/09/13 16:43:39
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
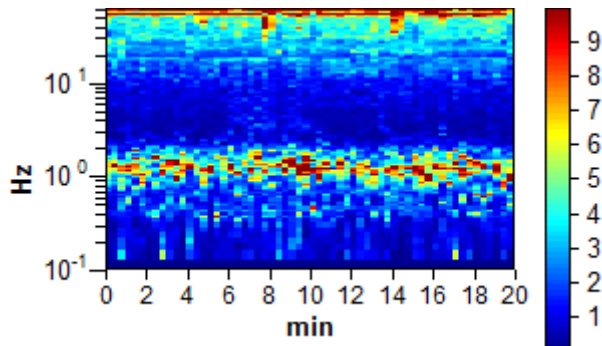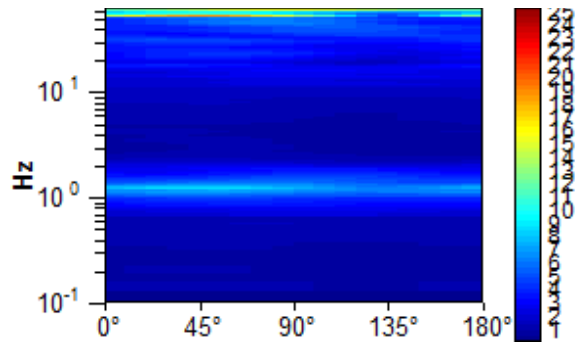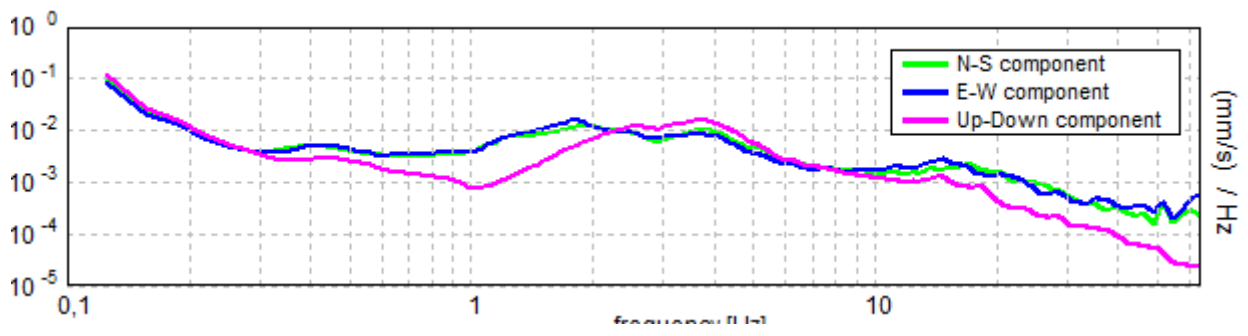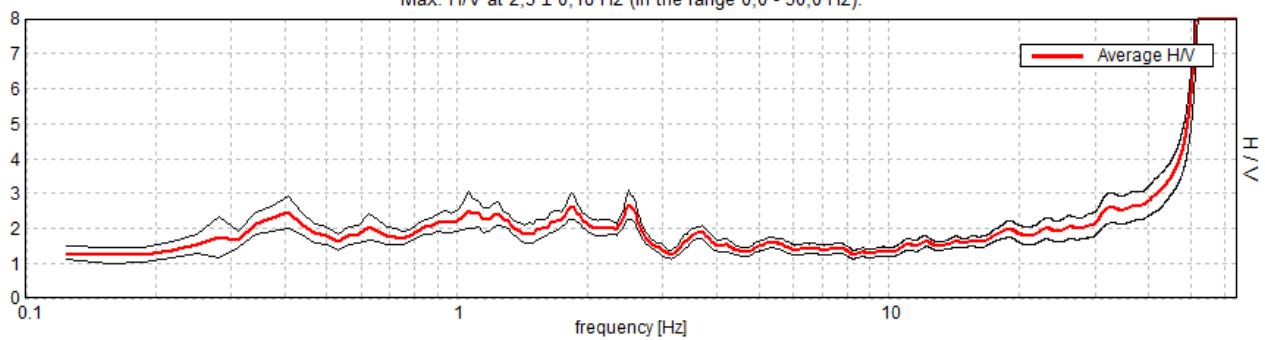Sampling frequency: 128 Hz
Window size: 20 s
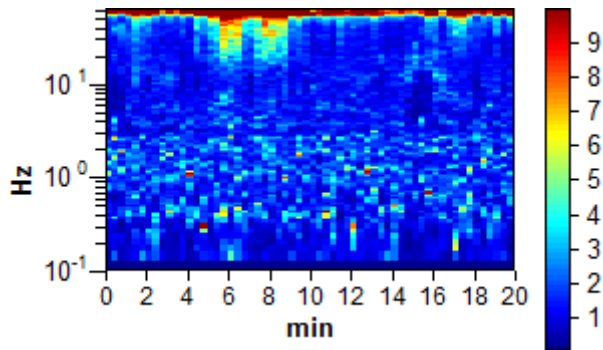Smoothing window: Triangular window
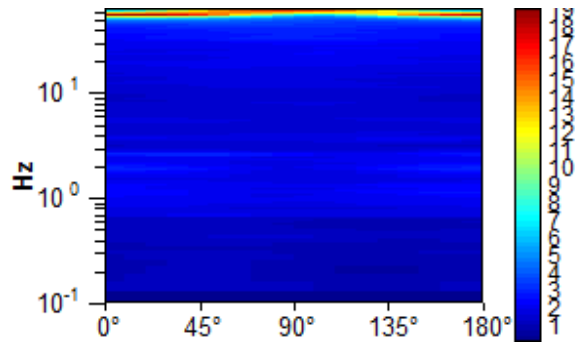Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

Max. H/V at 1.81 ± 0.13 Hz. (In the range 0.0 - 10.0 Hz).
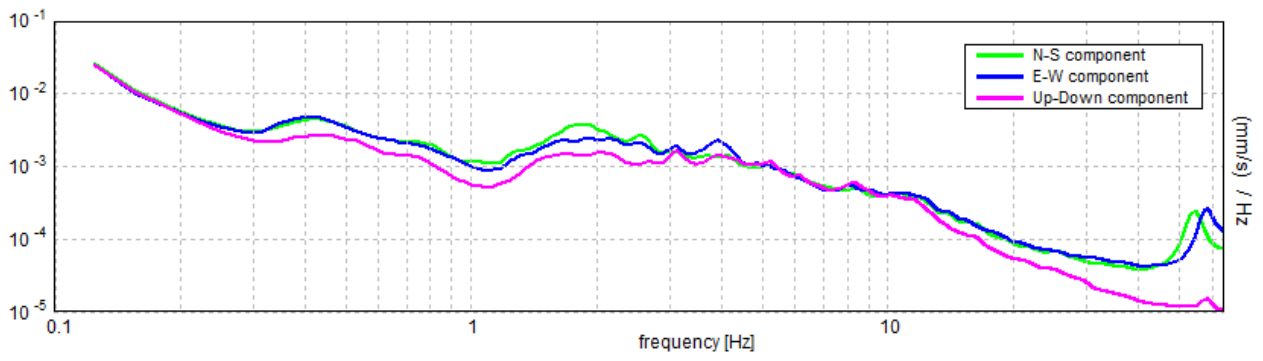

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M73bis

[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 - 10.0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1.81 > 0.50	**OK**	
$n_c(f_0) > 200$	2175.0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	Exceeded 0 out of 88 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**
$A_0 > 2$	2.43 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0.03557| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0.06447 < 0.18125	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0.1605 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M74* MORTAIOLO_EST

Instrument: TRS-0004/00-06
Start recording: 08/08/13 11:44:53   End recording: 08/08/13 12:04:54
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
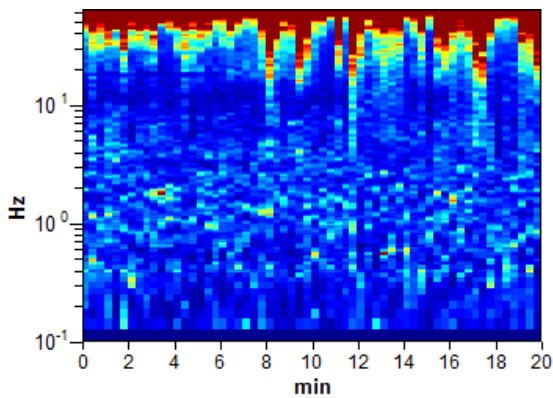GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
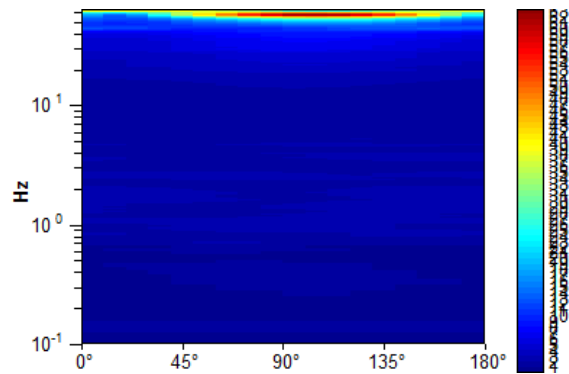Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

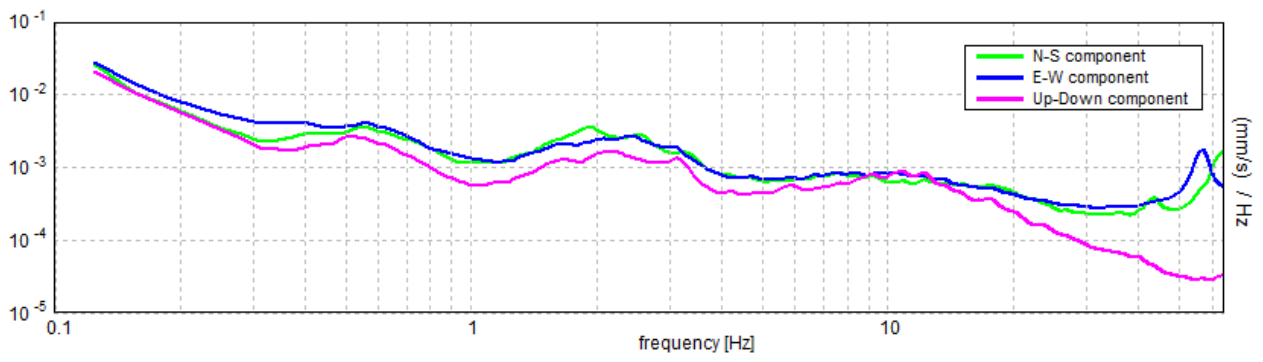Max. H/V at 1,69 ± 0,09 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY	DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M74

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

Max. H/V at 1,69 ± 0,09 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**	
$n_c(f_0) > 200$	2025,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	0,875 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	2,656 Hz	**OK**	
$A_0 > 2$	4,39 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,02629| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,04437 < 0,16875	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,225 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M75* MORTAIOLO_PODERE S. FERDINANDO

Instrument: TRS-0004/00-06
Start recording: 08/08/13 12:16:44   End recording: 08/08/13 12:36:45
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
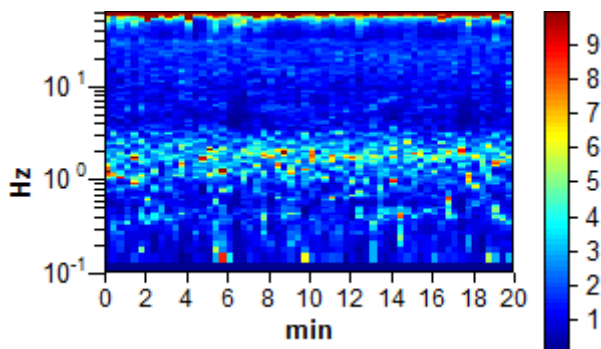GPS data not available

Trace length: 0h20'00''.   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
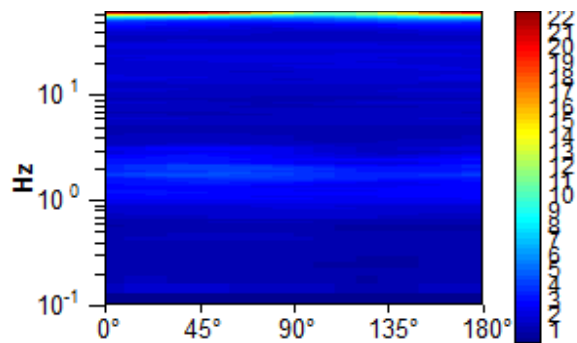Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
Max. H/V at 1,81 ± 0,07 Hz. (In the range 0,0 - 30,0 Hz).
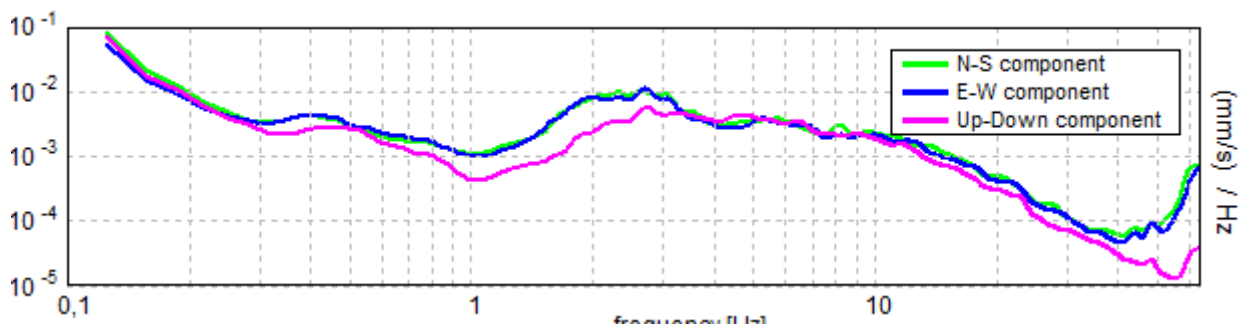

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M75

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

Max. H/V at 1,81 ± 0,07 Hz (in the range 0,0 - 30,0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1,81 > 0,50	**OK**	
$n_c(f_0) > 200$	2175,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	Exceeded 0 out of 88 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 $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	2,625 Hz	**OK**	
$A_0 > 2$	4,62 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,01896| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,03437 < 0,18125	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,3305 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M76* GUASTICCE_VIA MONTE BIANCO

Instrument: TRS-0004/00-06
Start recording: 08/08/13 12:49:45   End recording: 08/08/13 13:09:46
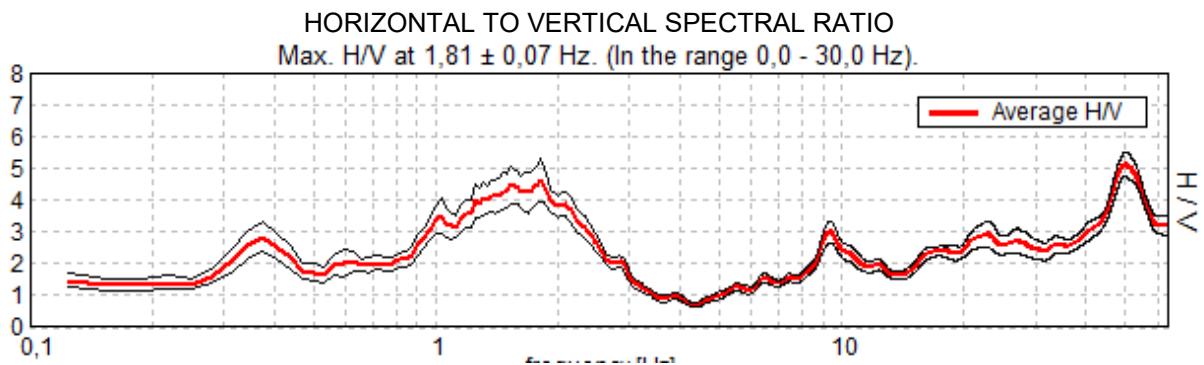Channel labels: NORTH SOUTH; EAST WEST ; UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analyzed 95% 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 1,78 ± 0,03 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M76

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

<div style="border:1px solid black">

Max. H/V at 1,78 ± 0,03 Hz (in the range 0,0 - 30,0 Hz).

</div>

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1,78 > 0,50	**OK**	
$n_c(f_0) > 200$	2030,6 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	1,156 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	2,875 Hz	**OK**	
$A_0 > 2$	4,87 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,00924| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,01646 < 0,17813	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,2996 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M77* GUASTICCE_PODERE DEL GAS

Instrument: TRS-0004/00-06
Start recording: 08/08/13 13:37:39   End recording: 08/08/13 13:57:40
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
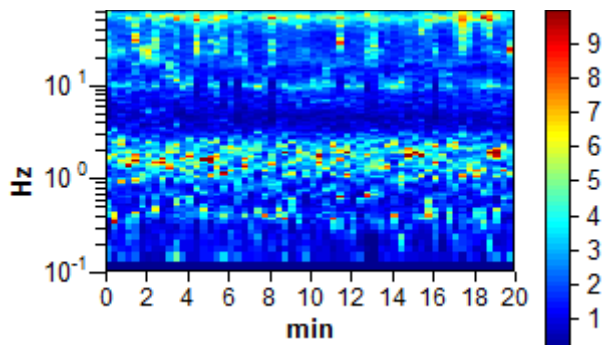Sampling frequency: 128 Hz
Window size: 20 s
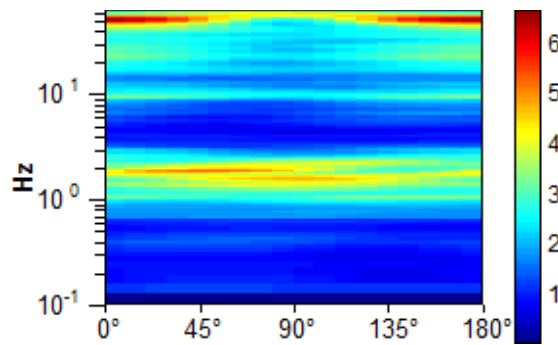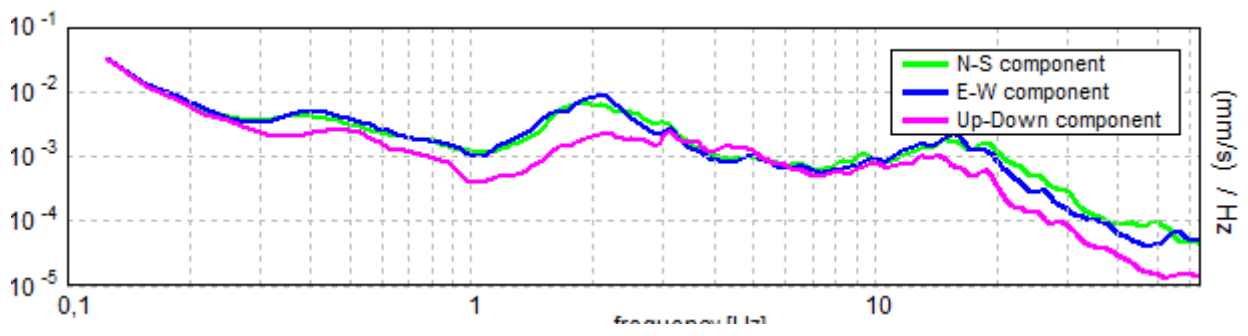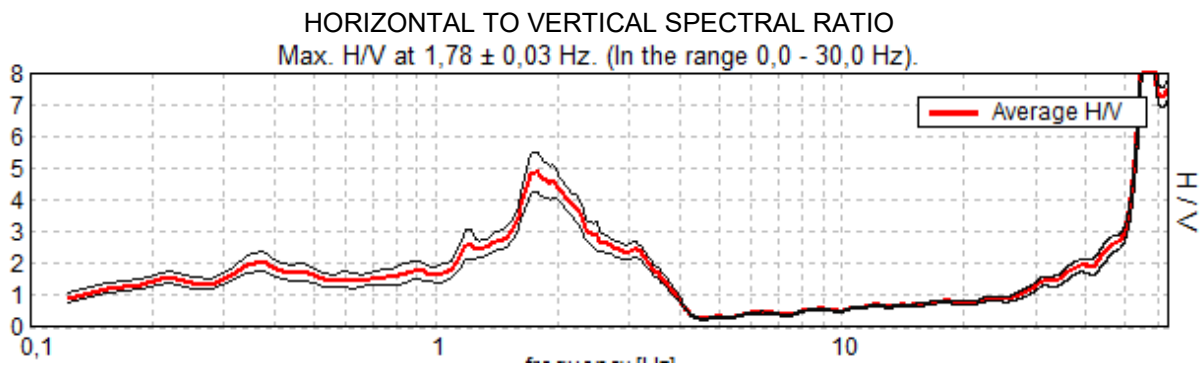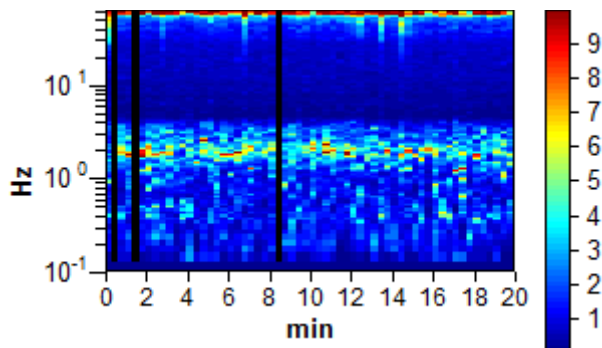Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

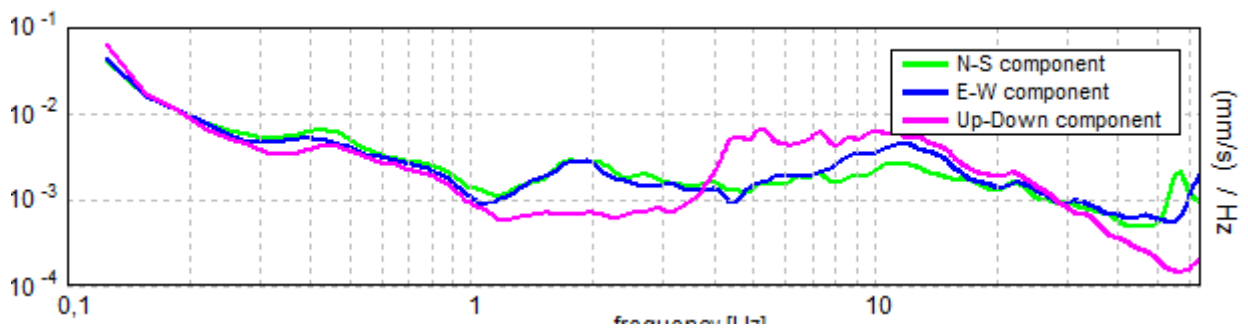Max. H/V at 0,97 ± 0,03 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M77

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

Max. H/V at 0,97 ± 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**	
$n_c(f_0) > 200$	1162,5 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	0,656 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	1,75 Hz	**OK**	
$A_0 > 2$	6,86 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,01345| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,01303 < 0,14531	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,474 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

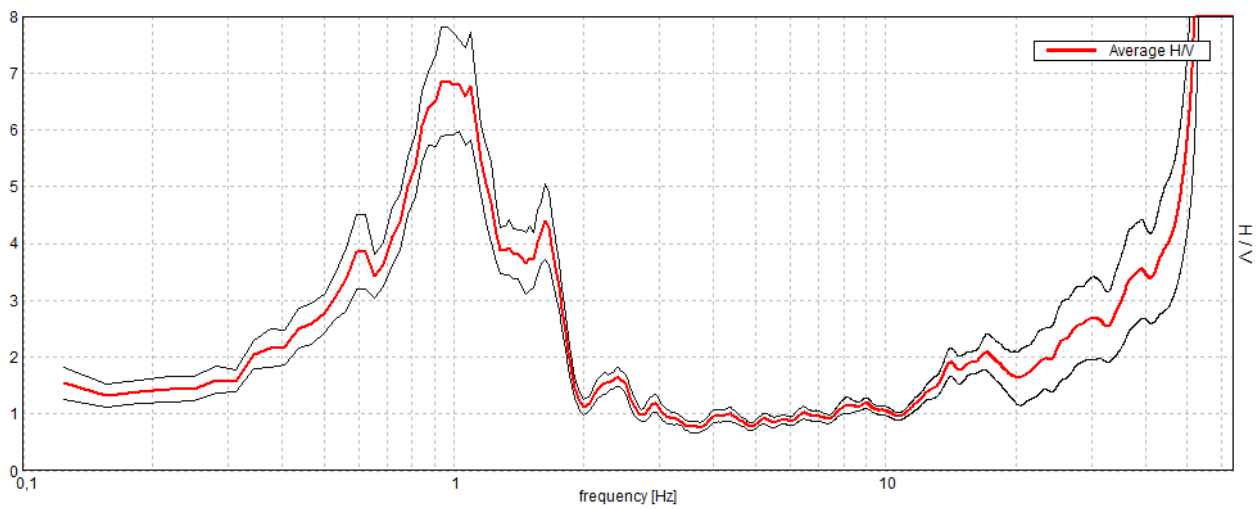| Threshold values for σ_f and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 f_0	0.2 f_0	0.15 f_0	0.10 f_0	0.05 f_0
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COLLESALVETTI_MS, M78* GUASTICCE_VIA SPAGNA

Instrument: TRS-0004/00-06
Start recording: 08/08/13 14:20:07   End recording: 08/08/13 14:40:08
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
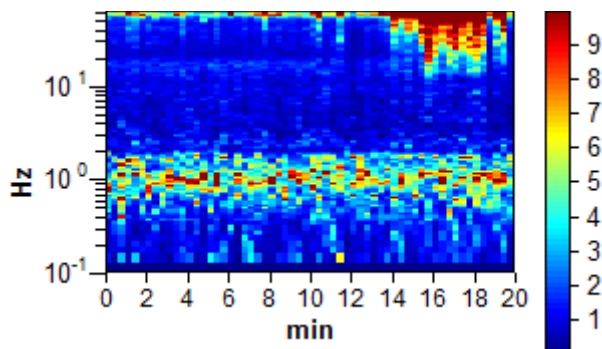GPS data not available

Trace length: 0h20'00''.   Analyzed 92% trace (manual window selection)
Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
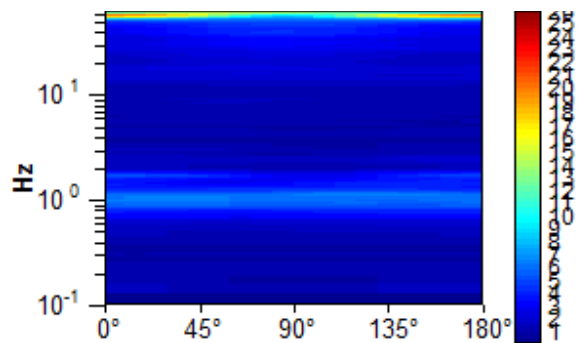Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

Max. H/V at 1,75 ± 0,03 Hz. (In the range 0,0 - 64,0 Hz).
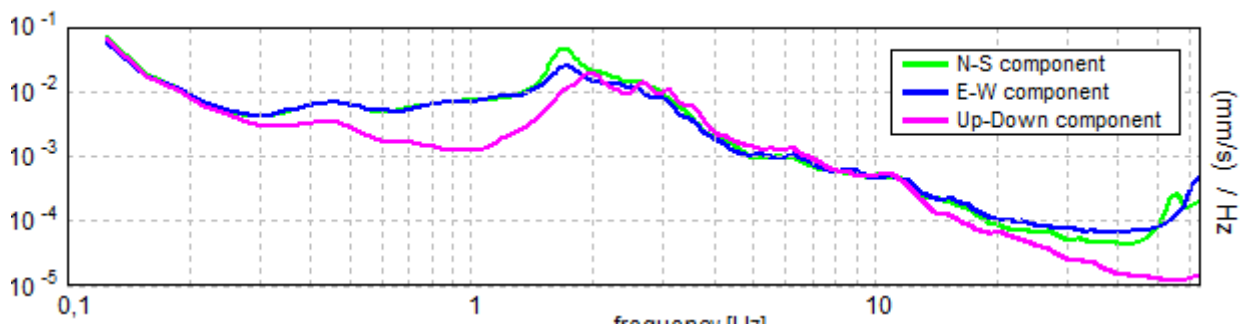

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M78

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

Max. H/V at 1,75 ± 0,03 Hz (in the range 0,0 - 64,0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1,75 > 0,50	**OK**
$n_c(f_0) > 200$	1925,0 > 200	**OK**
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	0,875 Hz	**OK**
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	2,656 Hz	**OK**
$A_0 > 2$	6,26 > 2	**OK**
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,00957| < 0.05	**OK**
$\sigma_f < \varepsilon(f_0)$	0,01675 < 0,175	**OK**
$\sigma_A(f_0) < \theta(f_0)$	0,4374 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

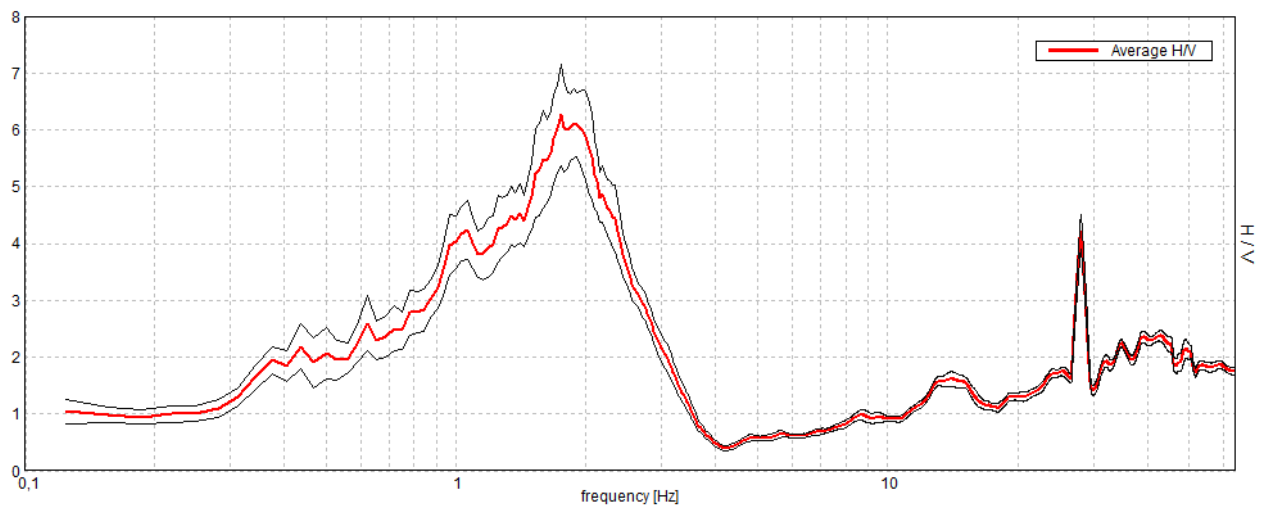| Threshold values for σ_f and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 f_0	0.2 f_0	0.15 f_0	0.10 f_0	0.05 f_0
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COLLESALVETTI_MS, M79* BISCOTTINO_EX FORNACE

Instrument: TRS-0004/00-06
Start recording: 08/08/13 14:58:06   End recording: 08/08/13 15:18:07
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
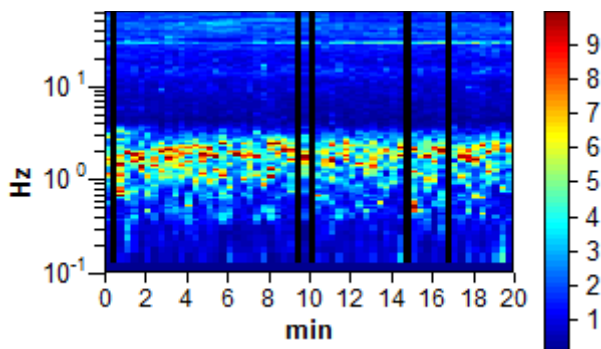GPS data not available

Trace length: 0h20'00".   Analyzed 95% trace (manual window selection)
Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
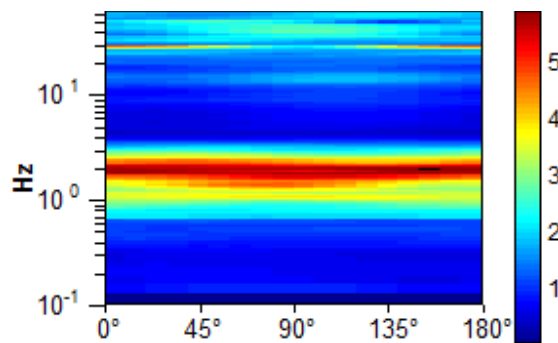Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

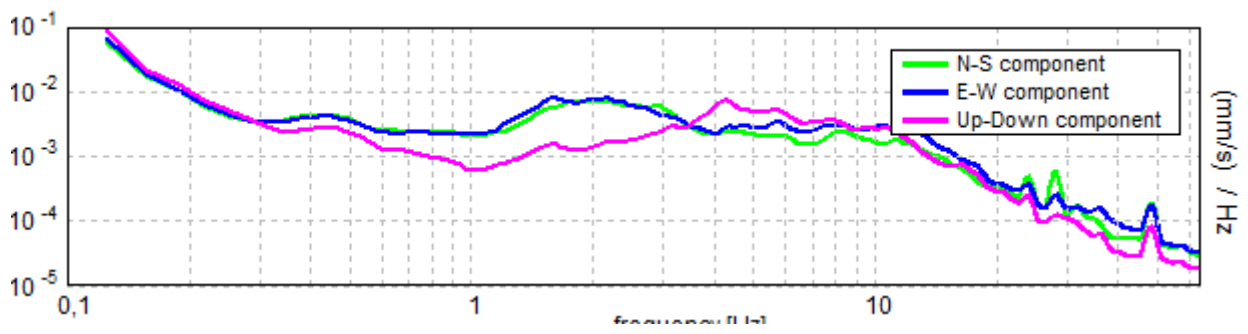Max. H/V at 2,0 ± 1,97 Hz. (In the range 0,0 - 64,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M79

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

<div style="border:1px solid black">

Max. H/V at 2,0 ± 1,97 Hz (in the range 0,0 - 64,0 Hz).

</div>

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2,00 > 0,50	**OK**	
$n_c(f_0) > 200$	2280,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	1,219 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	2,438 Hz	**OK**	
$A_0 > 2$	6,43 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,48663| < 0.05		**NO**
$\sigma_f < \varepsilon(f_0)$	0,97327 < 0,1		**NO**
$\sigma_A(f_0) < \theta(f_0)$	0,3488 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M80* BISCOTTINO_VIA ARNACCIO

Instrument: TRS-0004/00-06
Start recording: 08/08/13 15:31:36   End recording: 08/08/13 15:51:37
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00''.   Analyzed 97% trace (manual window selection)
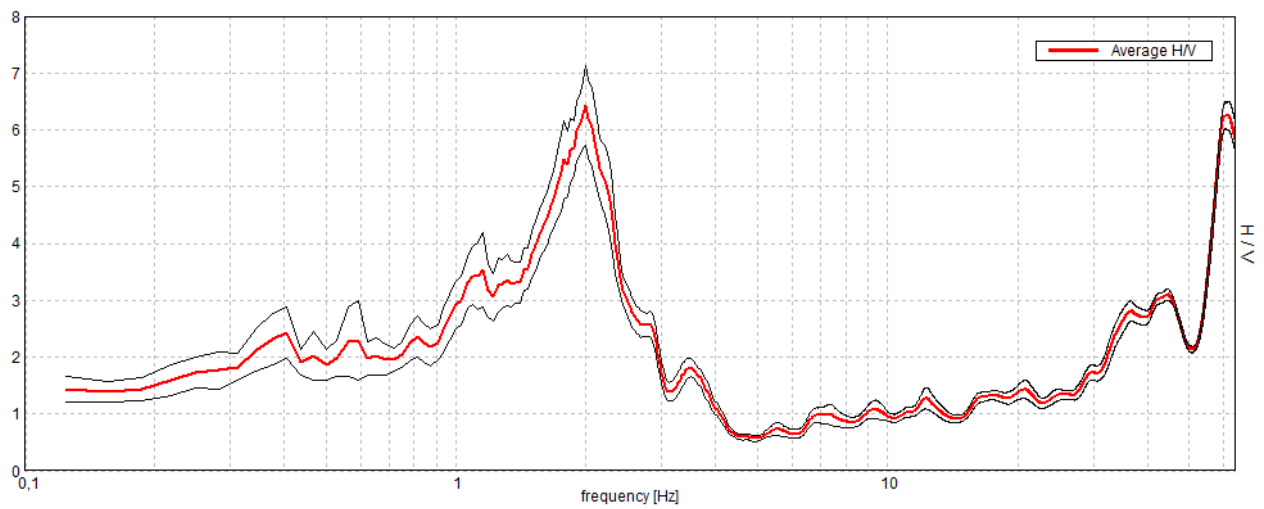Sampling frequency: 128 Hz
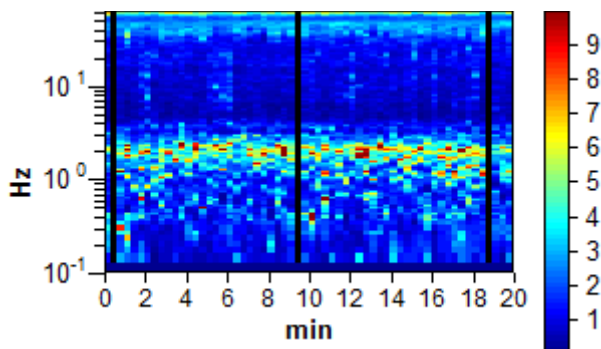Window size: 20 s
Smoothing window: Triangular window
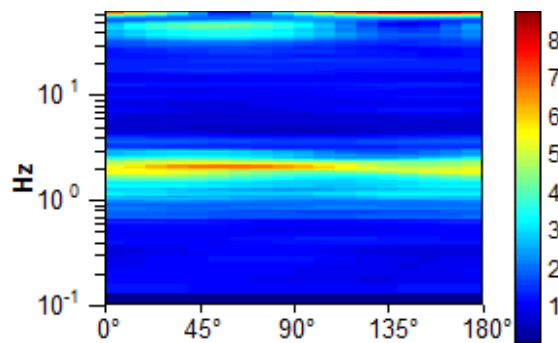Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
Max. H/V at 1,06 ± 0,02 Hz. (In the range 0,0 - 30,0 Hz).
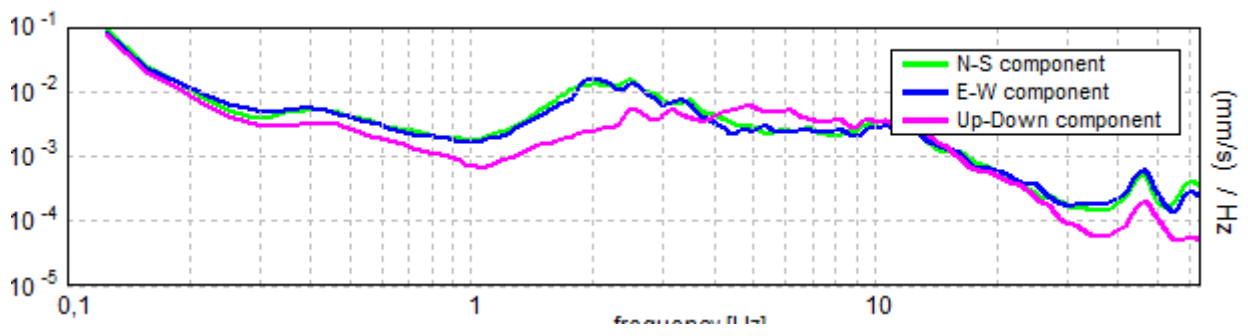

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M80

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

<div style="border:1px solid black; text-align:center">

Max. H/V at 1,06 ± 0,02 Hz (in the range 0,0 - 30,0 Hz).

</div>

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1,06 > 0,50	**OK**	
$n_c(f_0) > 200$	1232,5 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	Exceeded 0 out of 52 times	**OK**	

Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	0,656 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	1,656 Hz	**OK**	
$A_0 > 2$	3,03 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,0074| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,00786 < 0,10625	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,2859 < 1,78	**OK**	

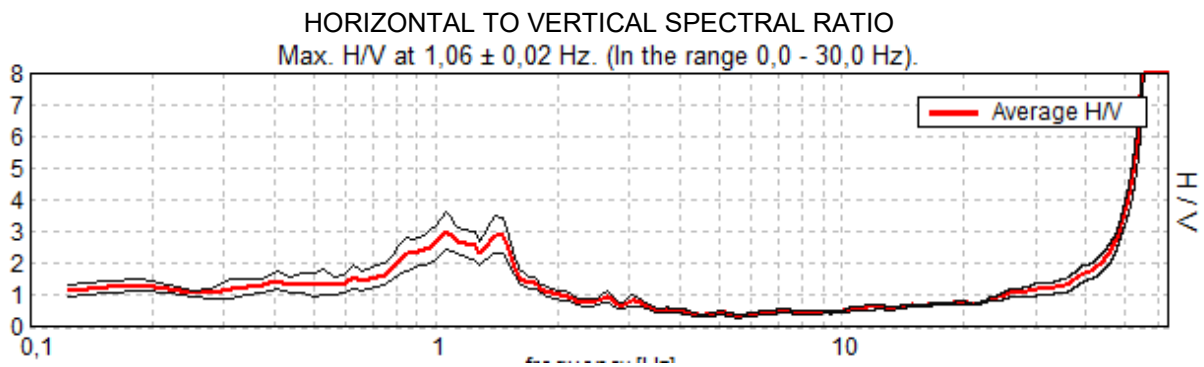|	
L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w \, n_w \, f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0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

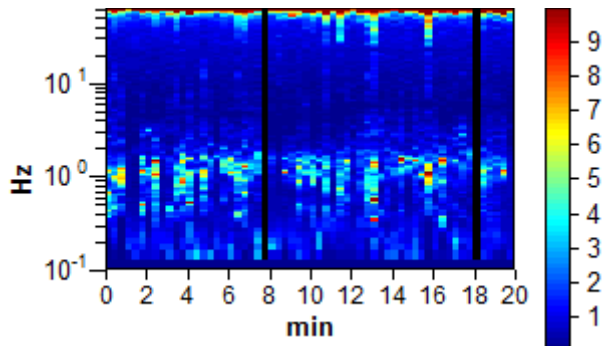| Threshold values for σ_f and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 f_0	0.2 f_0	0.15 f_0	0.10 f_0	0.05 f_0
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COLLESALVETTI_MS, M81* GUASTICCE_I PRATINI

Instrument: TRS-0004/00-06
Start recording: 08/08/13 16:14:36   End recording: 08/08/13 16:34:37
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
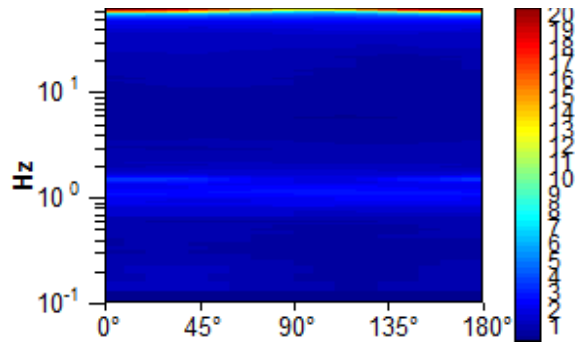GPS data not available

Trace length: 0h20'00".   Analyzed 95% trace (manual window selection)
Sampling frequency: 128 Hz
Window size: 20 s
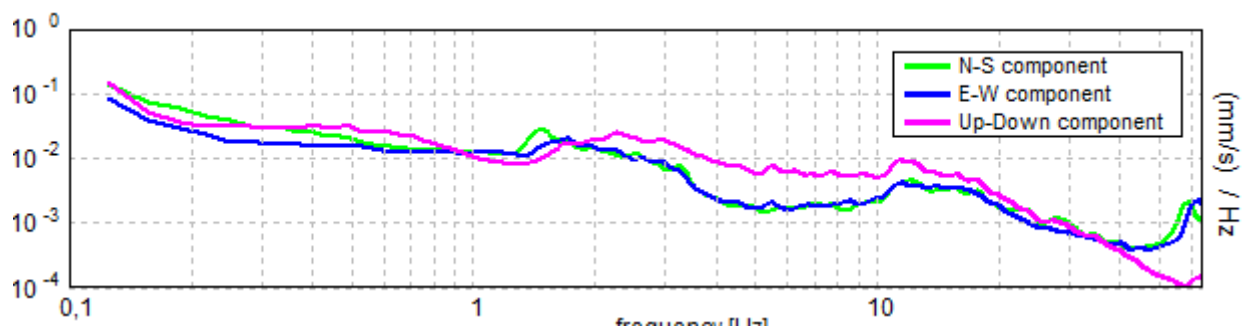Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

Max. H/V at 1,63 ± 0,13 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M81

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

Max. H/V at 1,63 ± 0,13 Hz (in the range 0,0 - 30,0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1,63 > 0,50	**OK**	
$n_c(f_0) > 200$	1852,5 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$			**NO**
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	1,906 Hz	**OK**	
$A_0 > 2$	4,89 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,03849| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,06255 < 0,1625	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,3034 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M82* STAGNO_VIA AIACCIA

Instrument: TRS-0004/00-06
Start recording: 08/08/13 16:46:13   End recording: 08/08/13 17:06:14
Channel labels: NORTH SOUTH; EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
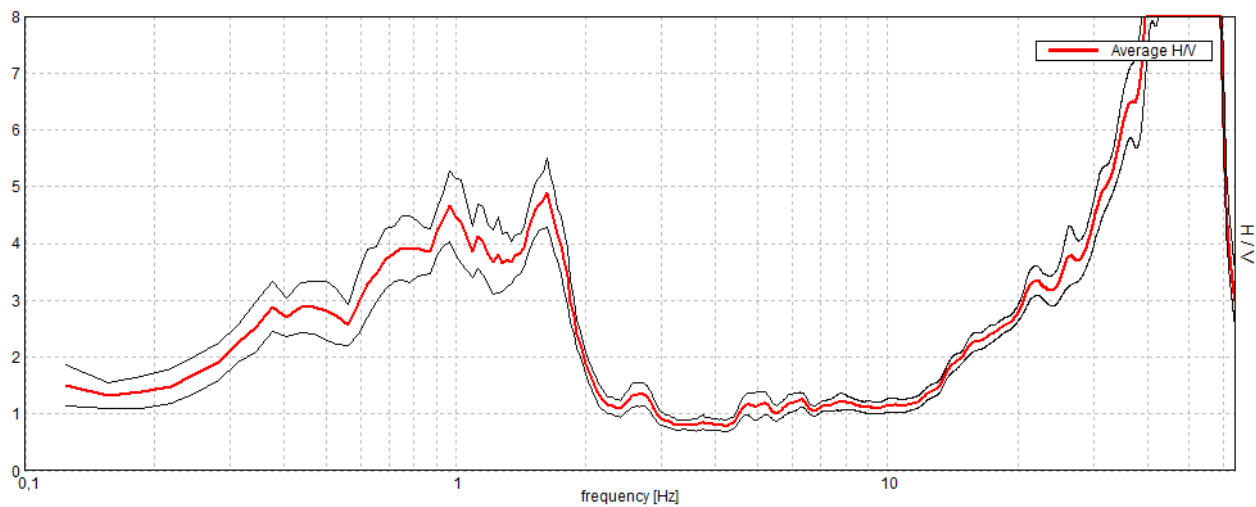Sampling frequency: 128 Hz
Window size: 20 s
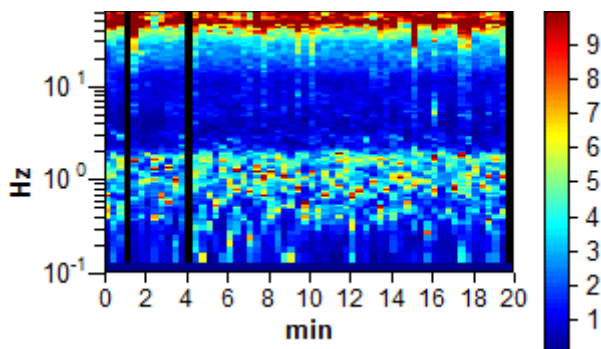Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

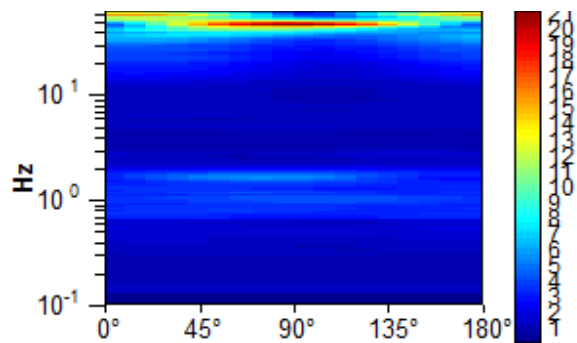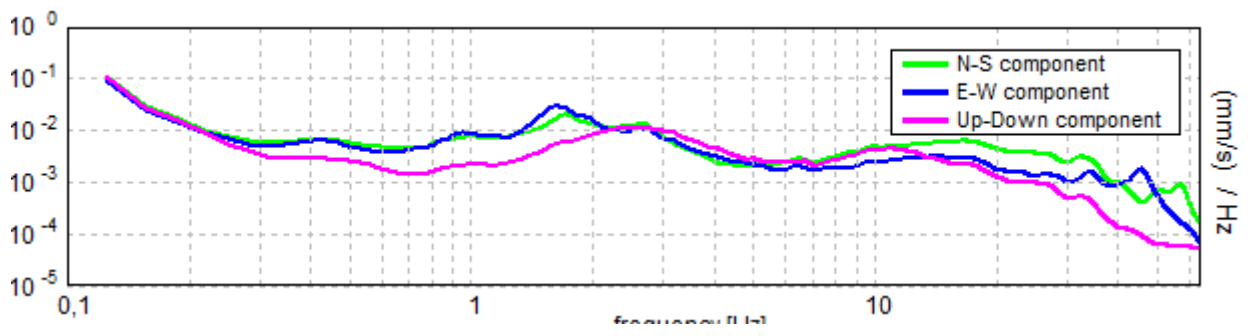Max. H/V at 1,25 ± 0,02 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY	DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M82

[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 - 30,0 Hz).

Criteria for a reliable HVSR curve [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	1,25 > 0,50	**OK**	
$n_c(f_0) > 200$	1500,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	1,0 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	2,0 Hz	**OK**	
$A_0 > 2$	4,57 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,00625| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,00781 < 0,125	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,2659 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

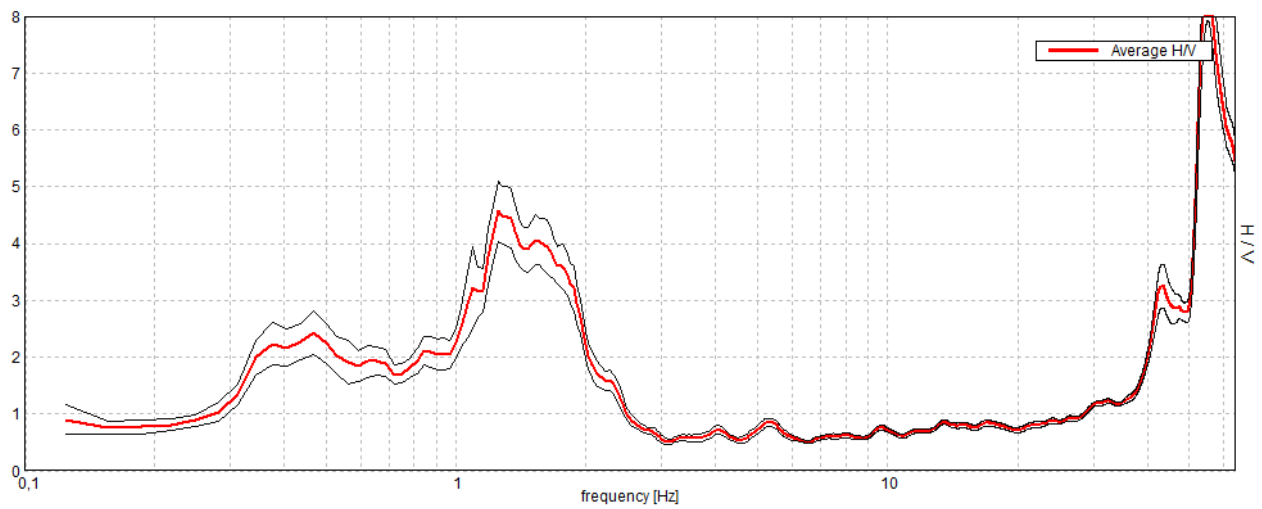| Threshold values for σ_f and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 f_0	0.2 f_0	0.15 f_0	0.10 f_0	0.05 f_0
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COLLESALVETTI_MS, M83* STAGNO_VIA AIACCIA E

Instrument: TRS-0004/00-06
Start recording: 08/08/13 17:14:21   End recording: 08/08/13 17:34:22
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
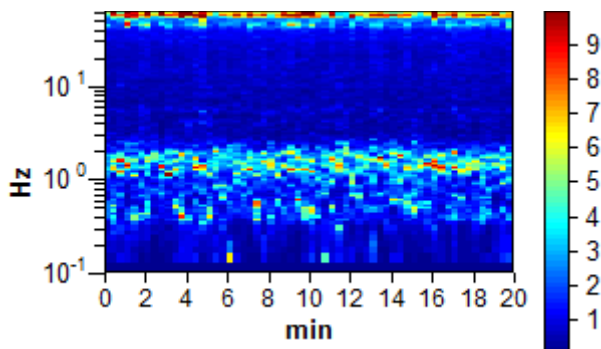GPS data not available

Trace length: 0h20'00".   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
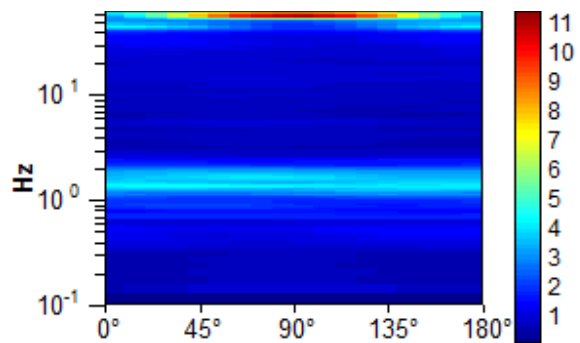
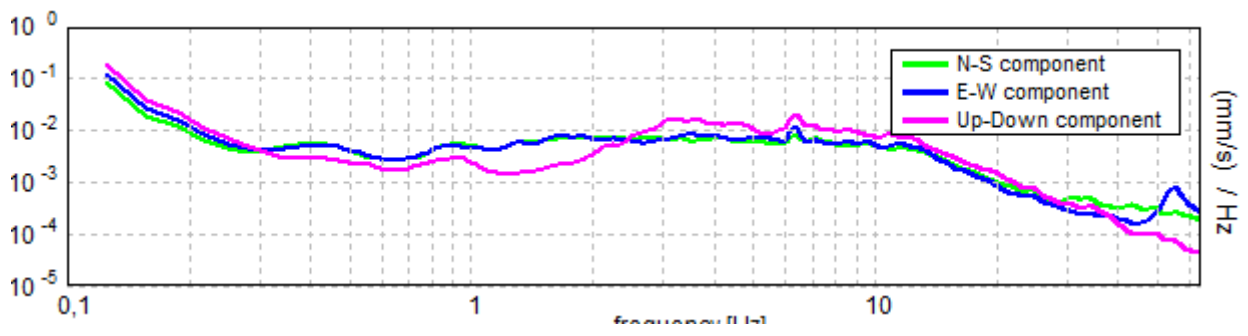Max. H/V at 0,38 ± 0,12 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M83

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

<div style="border:1px solid black;">

Max. H/V at 0,38 ± 0,12 Hz (in the range 0,0 - 30,0 Hz).

</div>

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0,38 > 0,50		**NO**
$n_c(f_0) > 200$	405,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	Exceeded 0 out of 19 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 $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$			**NO**
$A_0 > 2$	2,32 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,159| < 0.05		**NO**
$\sigma_f < \varepsilon(f_0)$	0,05962 < 0,075	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,2113 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M84* NUGOLA NUOVA_C. LUPPICHINI

Instrument: TRS-0004/00-06
Start recording: 08/08/13 17:56:05   End recording: 08/08/13 18:16:06
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
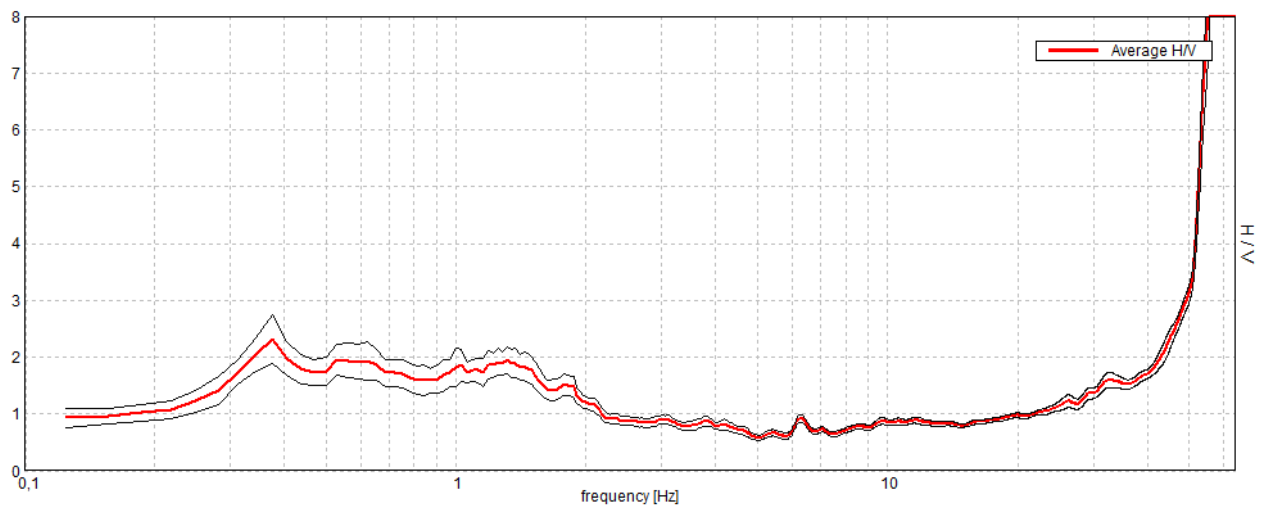Sampling frequency: 128 Hz
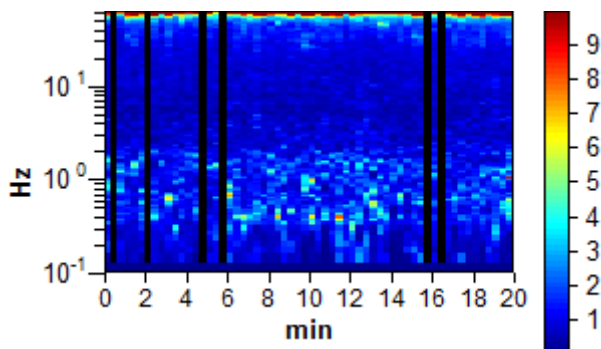Window size: 20 s
Smoothing window: Triangular window
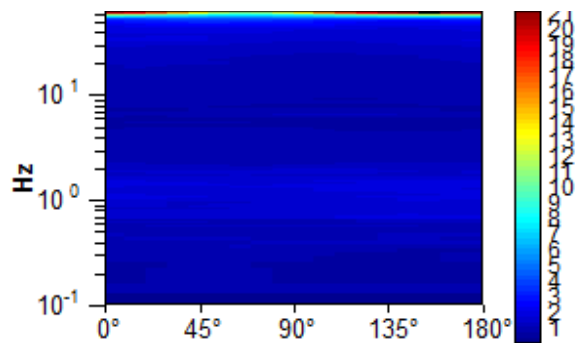Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

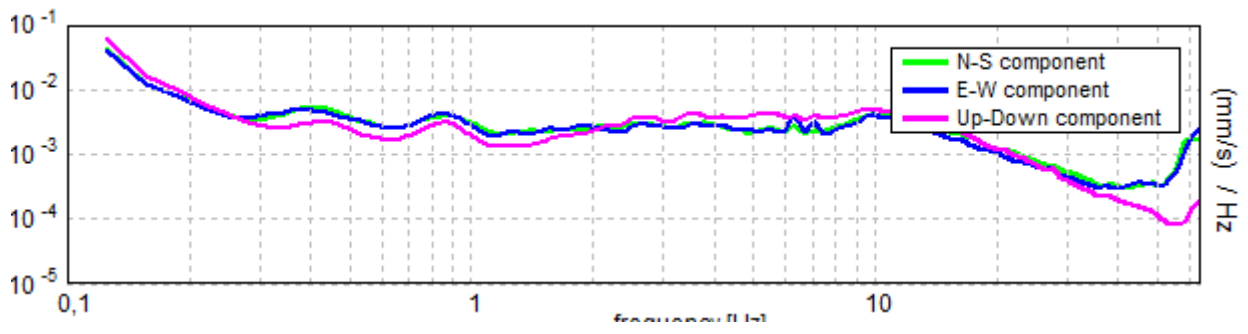Max. H/V at 0,38 ± 1,63 Hz (in the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M84

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

<table>
<tr><td colspan="4">Max. H/V at 0,38 ± 1,63 Hz (in the range 0,0 - 30,0 Hz).</td></tr>
</table>

<table>
<tr><td colspan="4">Criteria for a reliable HVSR curve
[All 3 should be fulfilled]</td></tr>
<tr><td>$f_0 > 10 / L_w$</td><td>0,38 > 0,50</td><td></td><td><b style="color:red">NO</td></tr>
<tr><td>$n_c(f_0) > 200$</td><td>450,0 > 200</td><td><b style="color:green">OK</td><td></td></tr>
<tr><td>$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$</td><td>Exceeded 0 out of 19 times</td><td><b style="color:green">OK</td><td></td></tr>
<tr><td colspan="4">Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td>Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td>0,25 Hz</td><td><b style="color:green">OK</td><td></td></tr>
<tr><td>Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td></td><td></td><td><b style="color:red">NO</td></tr>
<tr><td>$A_0 > 2$</td><td>2,86 > 2</td><td><b style="color:green">OK</td><td></td></tr>
<tr><td>$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td>|2,15452| < 0.05</td><td></td><td><b style="color:red">NO</td></tr>
<tr><td>$\sigma_f < \varepsilon(f_0)$</td><td>0,80794 < 0,075</td><td></td><td><b style="color:red">NO</td></tr>
<tr><td>$\sigma_A(f_0) < \theta(f_0)$</td><td>0,1839 < 2,5</td><td><b style="color:green">OK</td><td></td></tr>
</table>

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

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

COLLESALVETTI_MS, M85* NUGOLA NUOVA_POGGIO ALLE ROSSE

Instrument: TRS-0004/00-06
Start recording: 08/08/13 18:31:50   End recording: 08/08/13 18:51:51
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
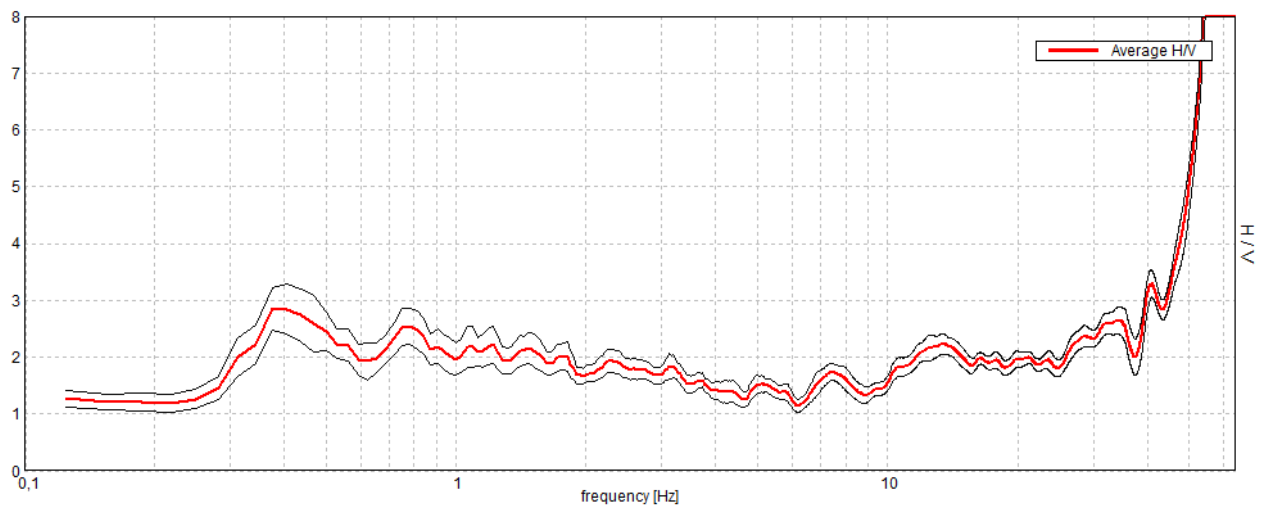Sampling frequency: 128 Hz
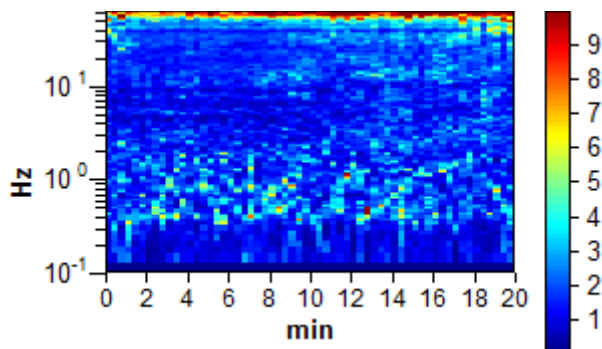Window size: 20 s
Smoothing window: Triangular window
Smoothing: 5%
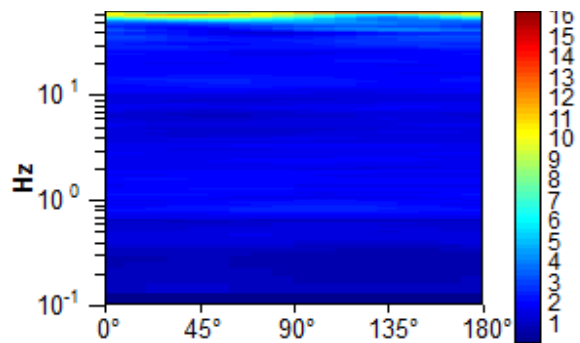
HORIZONTAL TO VERTICAL SPECTRAL RATIO

Max. H/V at 0,41 ± 0,04 Hz. (In the range 0,0 - 30,0 Hz).
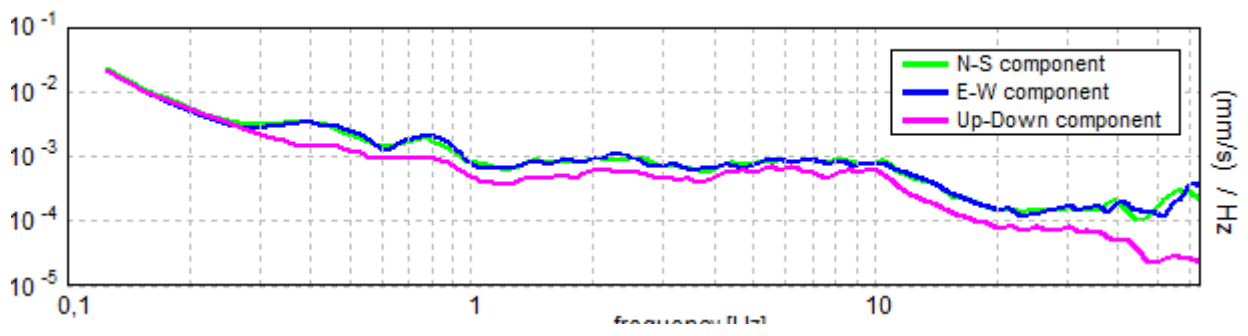

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M85

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

Max. H/V at 0,41 ± 0,04 Hz (in the range 0,0 - 30,0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0,41 > 0,50		**NO**
$n_c(f_0) > 200$	487,5 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$	0,313 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	0,781 Hz	**OK**	
$A_0 > 2$	3,95 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,04875| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,01981 < 0,08125	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,2744 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M86* CASTELL'ANSELMO_TORRETTA VECCHIA

Instrument: TRS-0004/00-06
Start recording: 09/08/13 08:53:11   End recording: 09/08/13 09:13:12
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
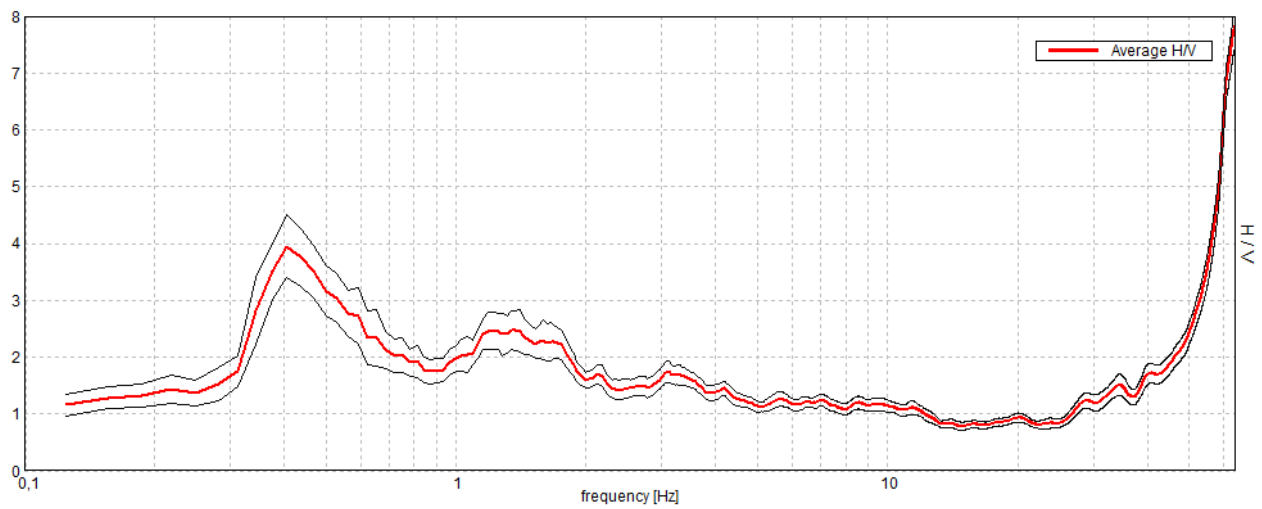Sampling frequency: 128 Hz
Window size: 20 s
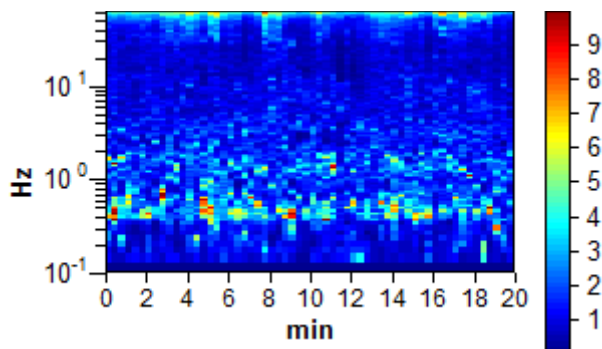Smoothing window: Triangular window
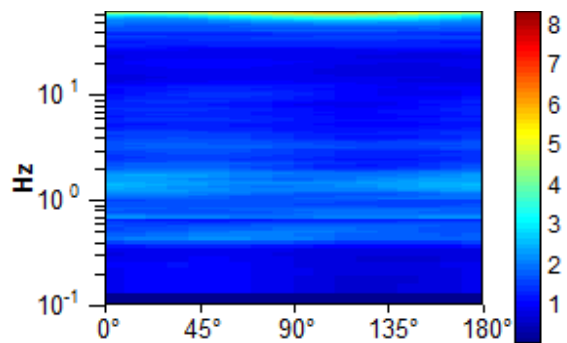Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

Max. H/V at 1,19 ± 0,12 Hz. (In the range 0,0 - 30,0 Hz).
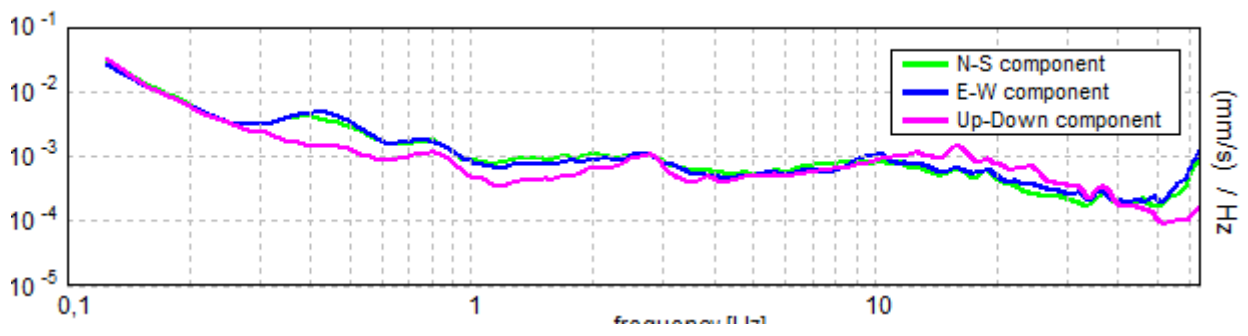

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M86

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

Max. H/V at 1,19 ± 0,12 Hz (in the range 0,0 - 30,0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1,19 > 0,50	**OK**	
$n_c(f_0) > 200$	1425,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$			**NO**
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	2,781 Hz	**OK**	
$A_0 > 2$	2,38 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,05113| < 0.05		**NO**
$\sigma_f < \varepsilon(f_0)$	0,06072 < 0,11875	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,1661 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M87* COLLESALVETTI_PIANO DEI PADULI

Instrument: TRS-0004/00-06
Start recording: 09/08/13 09:22:17   End recording: 09/08/13 09:42:18
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
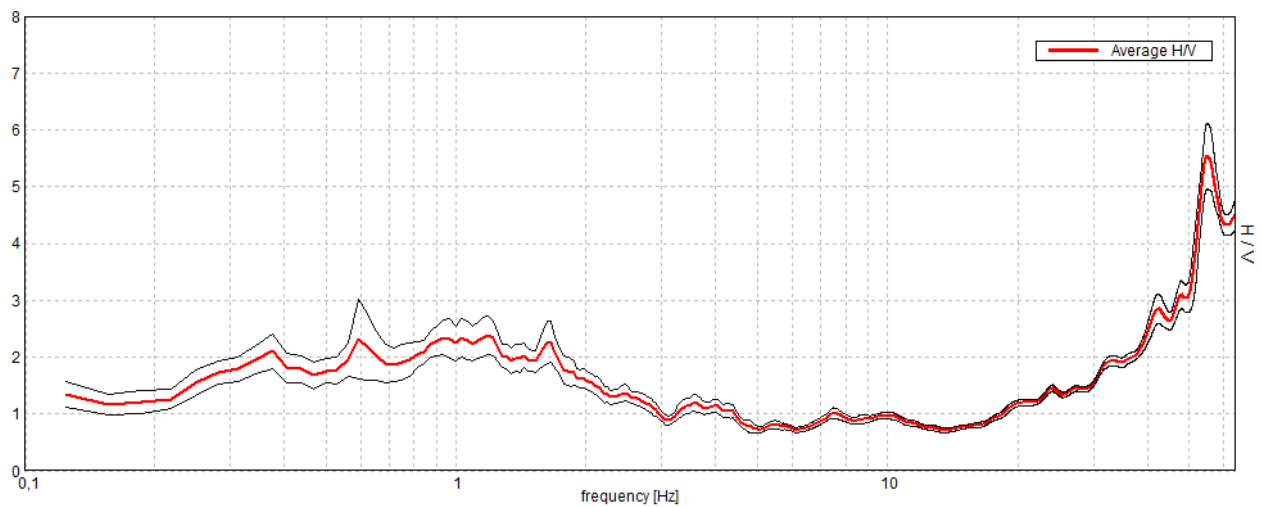Sampling frequency: 128 Hz
Window size: 20 s
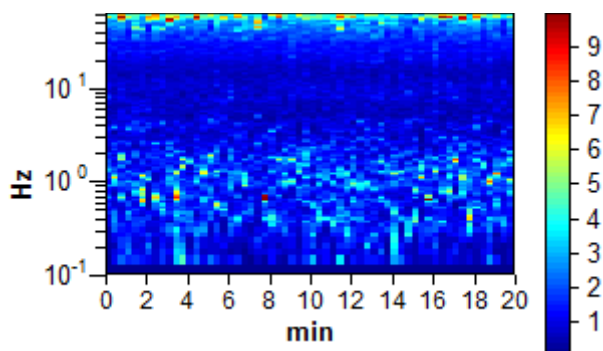Smoothing window: Triangular window
Smoothing: 5%
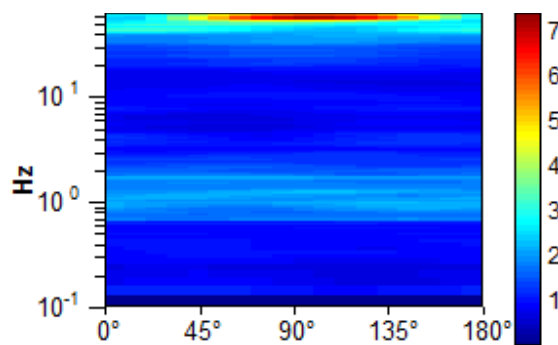
HORIZONTAL TO VERTICAL SPECTRAL RATIO

Max. H/V at 1,16 ± 0,03 Hz. (In the range 0,0 - 30,0 Hz).
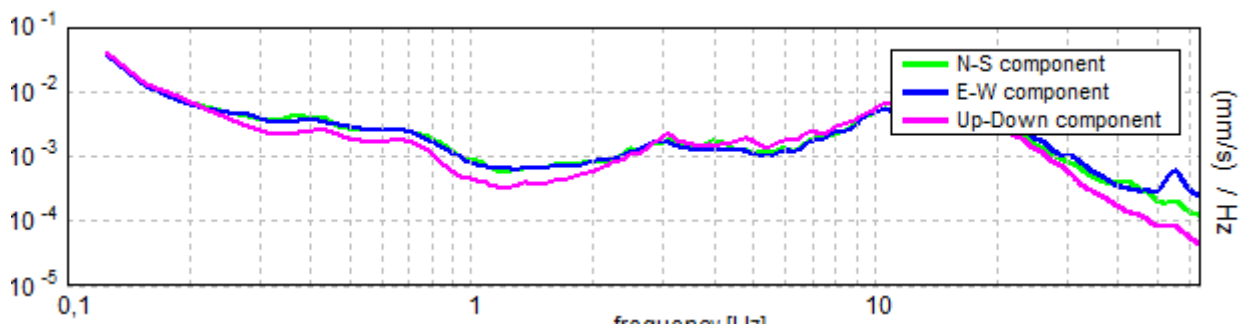

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M87

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

<table>
<tr><td colspan="4">Max. H/V at 1,16 ± 0,03 Hz (in the range 0,0 - 30,0 Hz).</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Criteria for a reliable HVSR curve
[All 3 should be fulfilled]</td></tr>
<tr><td>$f_0 > 10 / L_w$</td><td>1,16 > 0,50</td><td>OK</td><td></td></tr>
<tr><td>$n_c(f_0) > 200$</td><td>1387,5 > 200</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td><td>Exceeded 0 out of 56 times</td><td>OK</td><td></td></tr>
<tr><td colspan="4" align="center">Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td>Exists f⁻ in [f₀/4, f₀] | A_{H/V}(f⁻) < A₀ / 2</td><td>0,281 Hz</td><td>OK</td><td></td></tr>
<tr><td>Exists f⁺ in [f₀, 4f₀] | A_{H/V}(f⁺) < A₀ / 2</td><td>1,969 Hz</td><td>OK</td><td></td></tr>
<tr><td>$A_0 > 2$</td><td>3,58 > 2</td><td>OK</td><td></td></tr>
<tr><td>$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td>|0,01191| < 0.05</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_f < \varepsilon(f_0)$</td><td>0,01377 < 0,11563</td><td>OK</td><td></td></tr>
<tr><td>$\sigma_A(f_0) < \theta(f_0)$</td><td>0,211 < 1,78</td><td>OK</td><td></td></tr>
</table>

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

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

COLLESALVETTI_MS, M88* CASTELL'ANSELMO_TORRETTA NUOVA

Instrument: TRS-0004/00-06
Start recording: 09/08/13 09:58:53   End recording: 09/08/13 10:18:54
Channel labels: NORTH SOUTH; EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
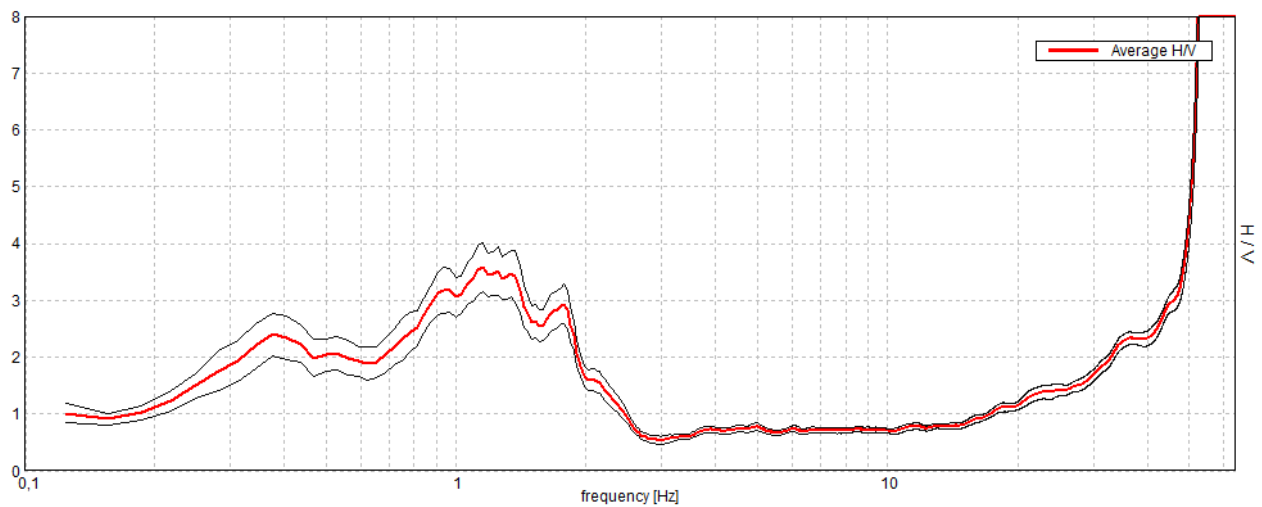Sampling frequency: 128 Hz
Window size: 20 s
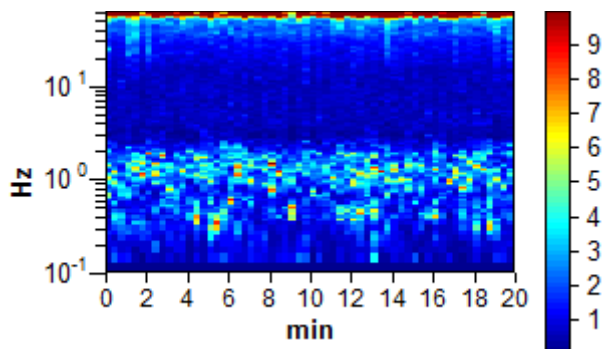Smoothing window: Triangular window
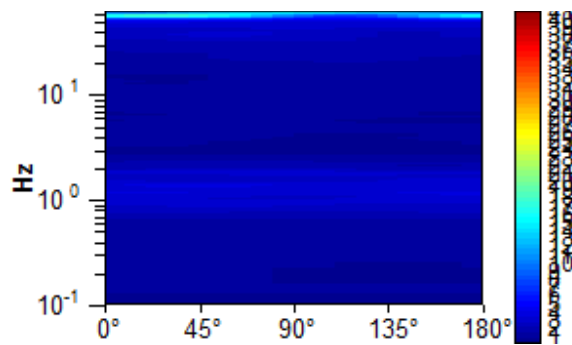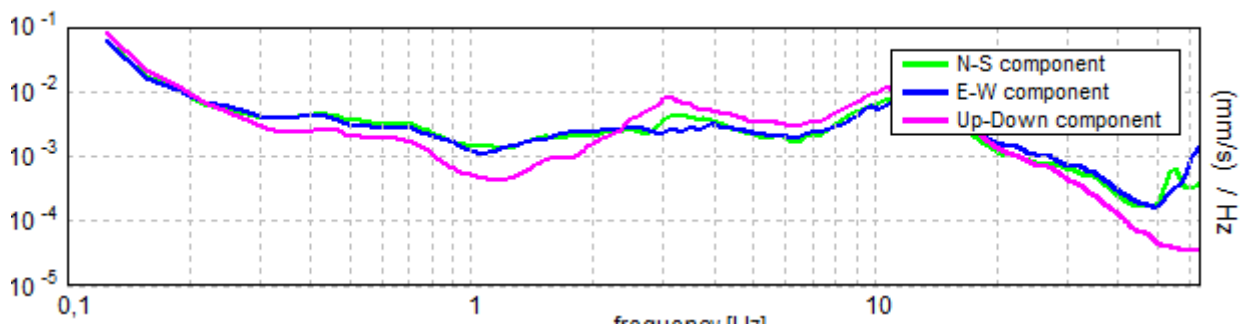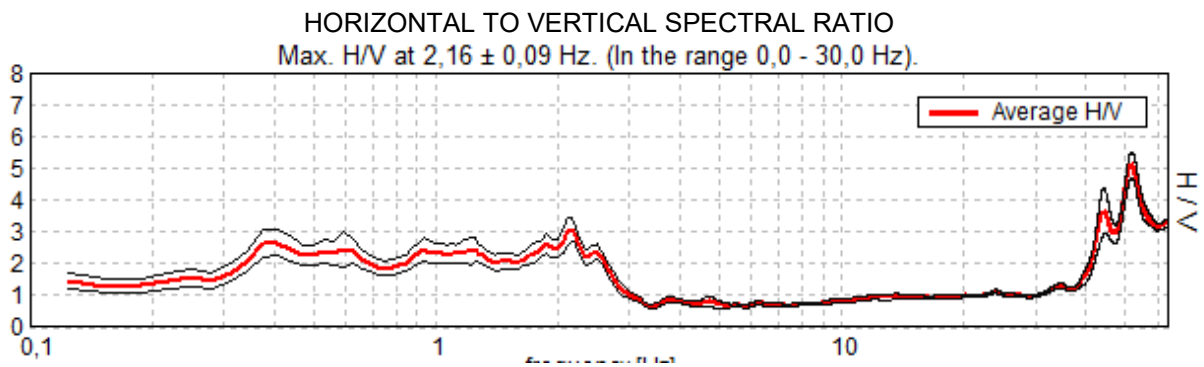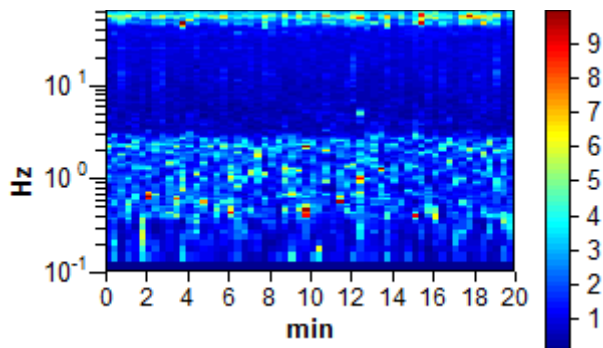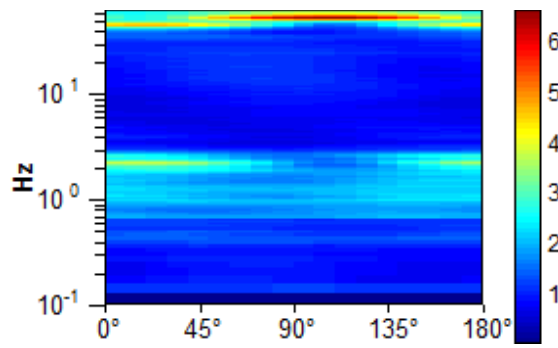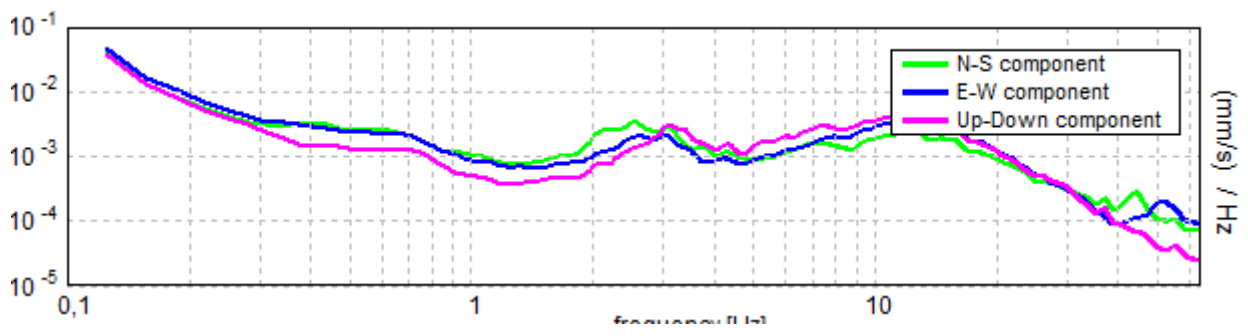Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
Max. H/V at 2,16 ± 0,09 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M88

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

<table>
<tr><td colspan="4" align="center">**Max. H/V at 2,16 ± 0,09 Hz (in the range 0,0 - 30,0 Hz).**</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">**Criteria for a reliable HVSR curve**
[All 3 should be fulfilled]</td></tr>
<tr><td align="center">$f_0 > 10 / L_w$</td><td align="center">2,16 > 0,50</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$n_c(f_0) > 200$</td><td align="center">2587,5 > 200</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$</td><td align="center">Exceeded 0 out of 104 times</td><td align="center">**OK**</td><td></td></tr>
<tr><td colspan="4" align="center">**Criteria for a clear HVSR peak**
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td align="center">Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td></td><td></td><td align="center">**NO**</td></tr>
<tr><td align="center">Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td align="center">2,781 Hz</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$A_0 > 2$</td><td align="center">3,05 > 2</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td align="center">|0,02095| < 0.05</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$\sigma_f < \varepsilon(f_0)$</td><td align="center">0,04517 < 0,10781</td><td align="center">**OK**</td><td></td></tr>
<tr><td align="center">$\sigma_A(f_0) < \theta(f_0)$</td><td align="center">0,1771 < 1,58</td><td align="center">**OK**</td><td></td></tr>
</table>

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

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

COLLESALVETTI_MS, M89* CROCINO_EMO MANNUCCI

Instrument: TRS-0004/00-06
Start recording: 09/08/13 10:30:55   End recording: 09/08/13 10:50:56
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00''.   Analyzed 88% trace (manual window selection)
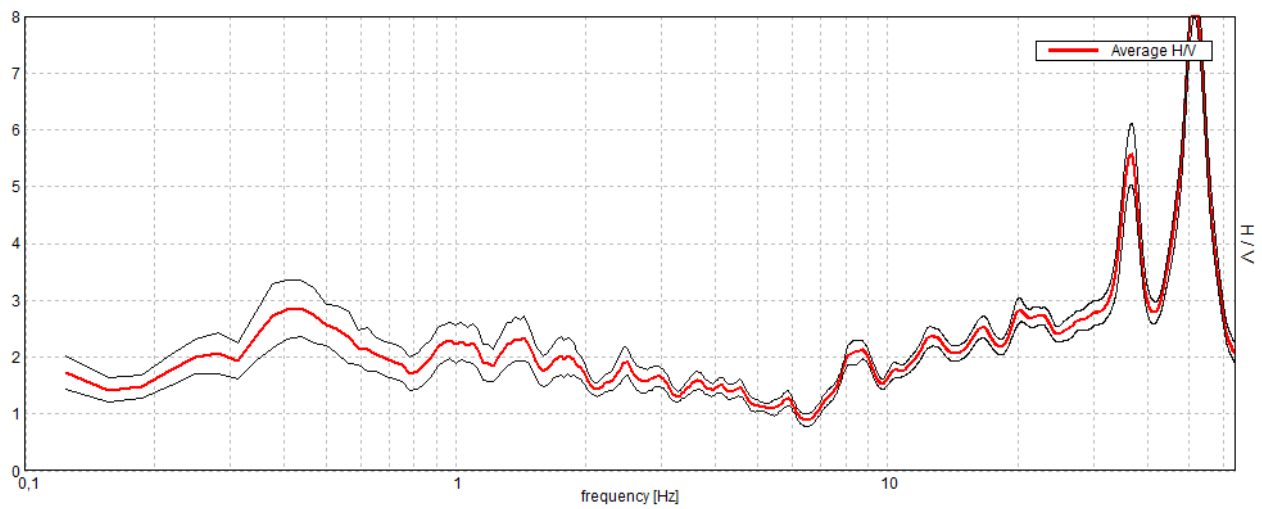Sampling frequency: 128 Hz
Window size: 20 s
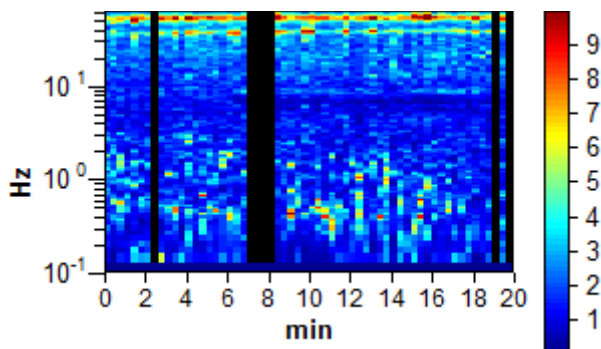Smoothing window: Triangular window
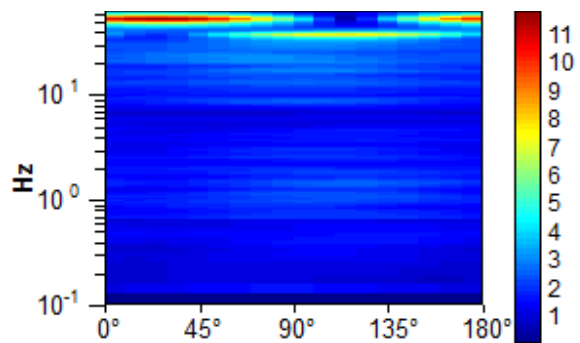Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
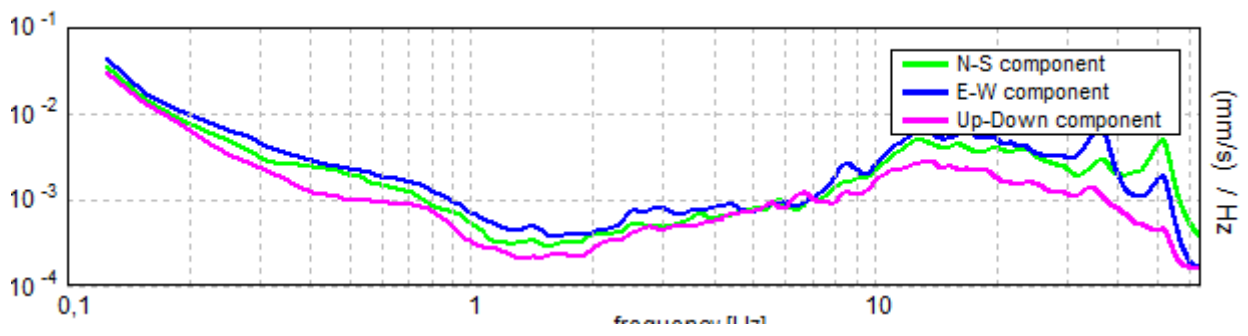
Max. H/V at 0,44 ± 0,1 Hz. (In the range 0,0 - 30,0 Hz).

H/V TIME HISTORY	DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M89

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

Max. H/V at 0,44 ± 0,1 Hz (in the range 0,0 - 30,0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0,44 > 0,50		**NO**
$n_c(f_0) > 200$	463,8 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5Hz$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5Hz$	Exceeded 0 out of 22 times	**OK**	

Criteria for a clear HVSR peak
[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0 / 2$	0,156 Hz	**OK**	
Exists f^+ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0 / 2$			**NO**
$A_0 > 2$	2,86 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,10998| < 0.05		**NO**
$\sigma_f < \varepsilon(f_0)$	0,04811 < 0,0875	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,2491 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M90* COLOGNOLE_INCROCIO

Instrument: TRS-0004/00-06
Start recording: 09/08/13 11:07:40   End recording: 09/08/13 11:27:41
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00''.   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 2,69 ± 0,13 Hz (in the range 0,0 - 64,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M90

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

<table>
<tr><td colspan="4">**Max. H/V at 2,69 ± 0,13 Hz (in the range 0,0 - 64,0 Hz).**</td></tr>
</table>

<table>
<tr><td colspan="4">**Criteria for a reliable HVSR curve**
[All 3 should be fulfilled]</td></tr>
<tr><td>$f_0 > 10 / L_w$</td><td>2,69 > 0,50</td><td>**OK**</td><td></td></tr>
<tr><td>$n_c(f_0) > 200$</td><td>3225,0 > 200</td><td>**OK**</td><td></td></tr>
<tr><td>$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td><td>Exceeded 0 out of 130 times</td><td>**OK**</td><td></td></tr>
<tr><td colspan="4">**Criteria for a clear HVSR peak**
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td>Exists f^- in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0 / 2$</td><td></td><td></td><td>**NO**</td></tr>
<tr><td>Exists f^+ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0 / 2$</td><td></td><td></td><td>**NO**</td></tr>
<tr><td>$A_0 > 2$</td><td>2,43 > 2</td><td>**OK**</td><td></td></tr>
<tr><td>$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td>|0,02383| < 0.05</td><td>**OK**</td><td></td></tr>
<tr><td>$\sigma_f < \varepsilon(f_0)$</td><td>0,06404 < 0,13438</td><td>**OK**</td><td></td></tr>
<tr><td>$\sigma_A(f_0) < \theta(f_0)$</td><td>0,113 < 1,58</td><td>**OK**</td><td></td></tr>
</table>

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

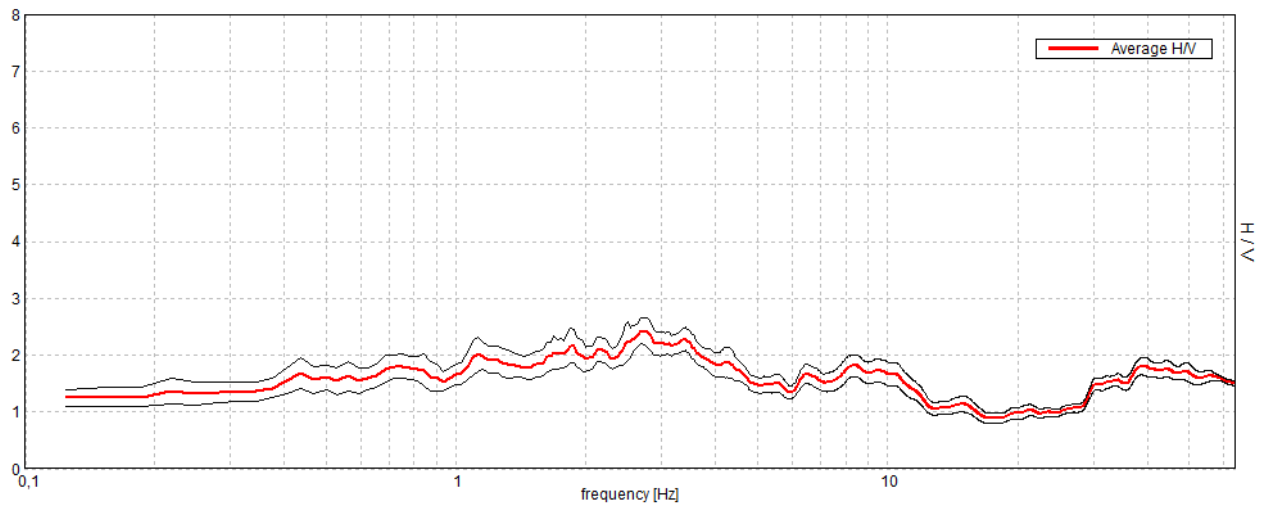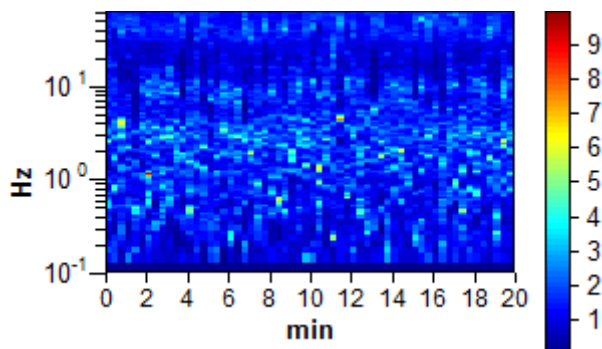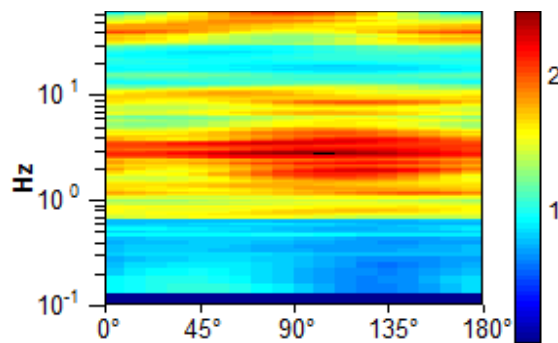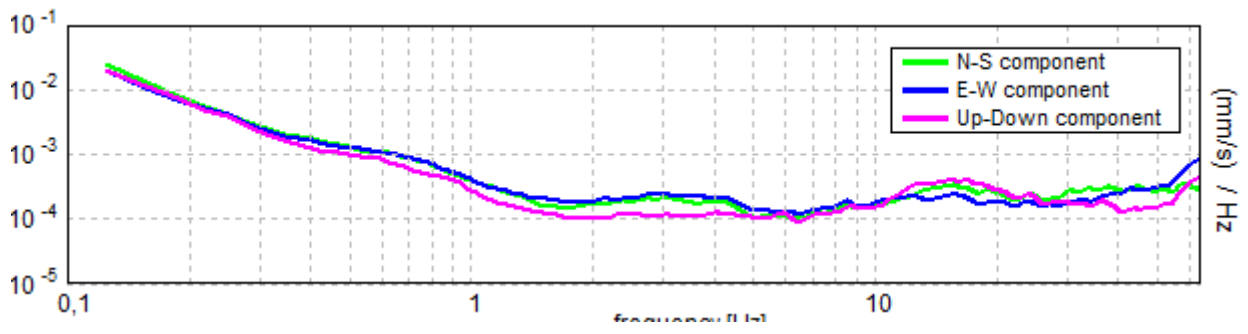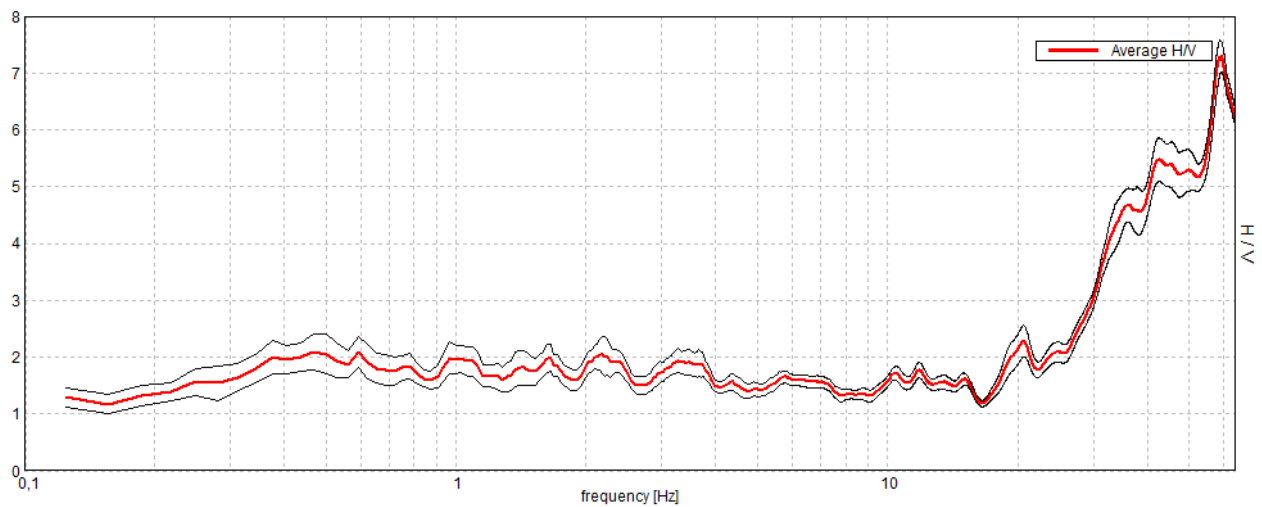| Threshold values for σ_f and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 f_0	0.2 f_0	0.15 f_0	0.10 f_0	0.05 f_0
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COLLESALVETTI_MS, M91* COLLE BEATO_CASINO

Instrument: TRS-0004/00-06
Start recording: 09/08/13 11:42:44   End recording: 09/08/13 12:02:45
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
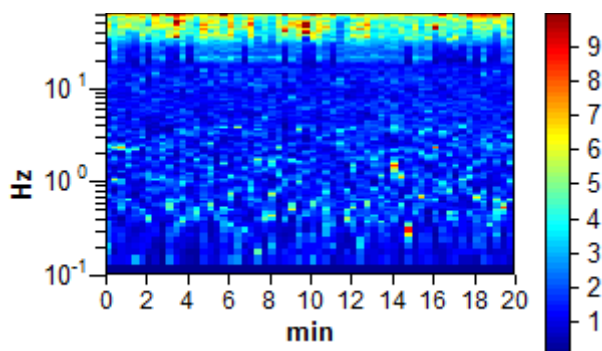GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
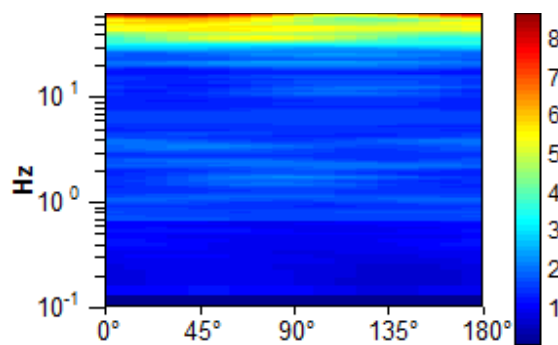Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

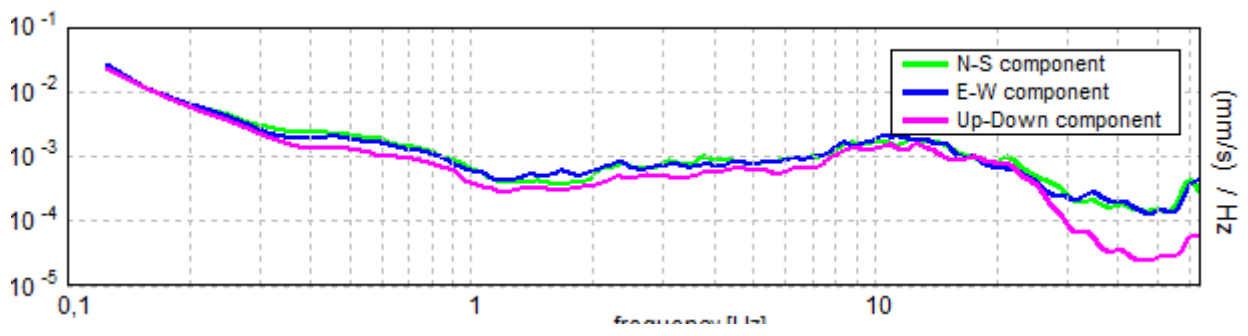Max. H/V at 0,59 ± 0,29 Hz. (In the range 0,0 - 15,0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M91

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

<div align="center">

Max. H/V at 0,59 ± 0,29 Hz (in the range 0,0 - 15,0 Hz).

</div>

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	0,59 > 0,50	**OK**	
$n_c(f_0) > 200$	712,5 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$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 $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$			**NO**
$A_0 > 2$	2,09 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,24613| < 0.05		**NO**
$\sigma_f < \varepsilon(f_0)$	0,14614 < 0,08906		**NO**
$\sigma_A(f_0) < \theta(f_0)$	0,1325 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M92* NUGOLA NUOVA SCUOLA

Instrument: TRS-0004/00-06
Start recording: 25/09/13 15:44:48   End recording: 25/09/13 16:04:49
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00''.   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 1.94 ± 0.33 Hz (in the range 0.0 - 10.0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M92

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

Max. H/V at 1.94 ± 0.33 Hz (in the range 0.0 - 10.0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1,94 > 0,50	**OK**	
$n_c(f_0) > 200$	2325,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz	Exceeded 0 out of 94 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**
$A_0 > 2$	2,53 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,08559| < 0.05		**NO**
$\sigma_f < \varepsilon(f_0)$	0,16583 < 0,19375	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,149 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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

COLLESALVETTI_MS, M93* NUGOLA NUOVA_SCUOLA

Instrument: TR-0007-01-05
Start recording: 25/09/13 16:50:13   End recording: 25/09/13 17:10:14
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
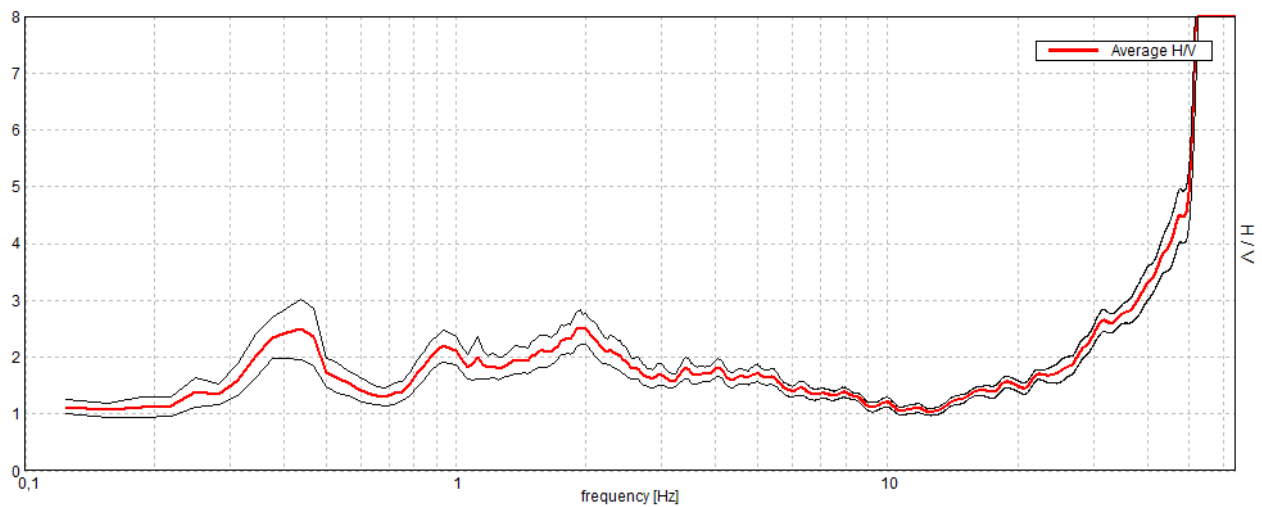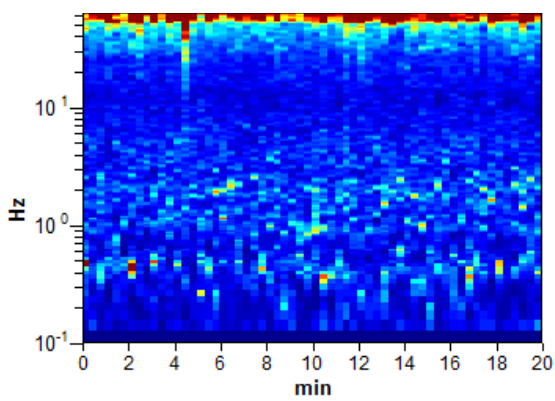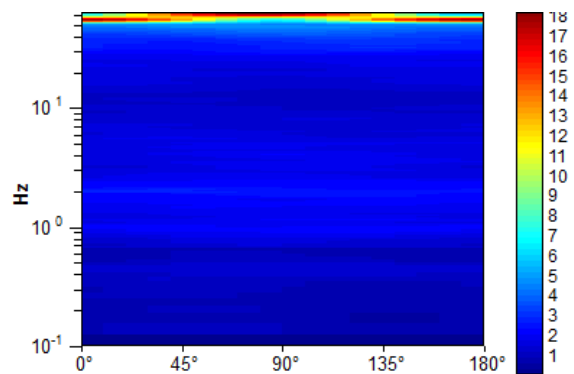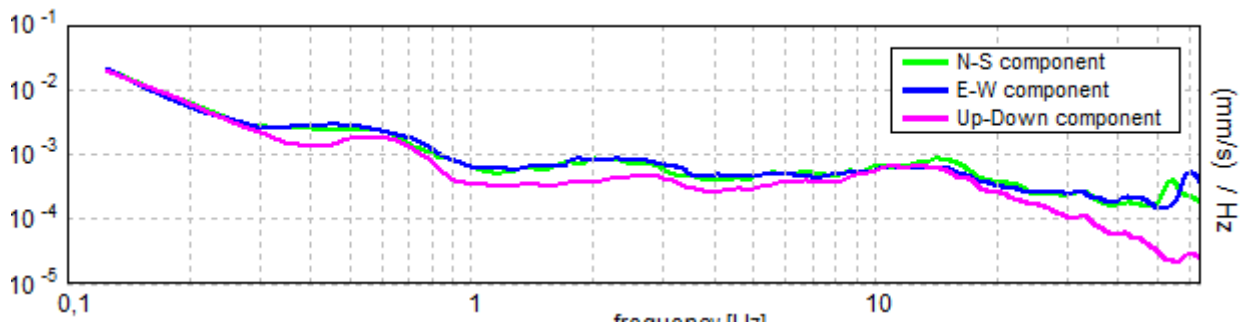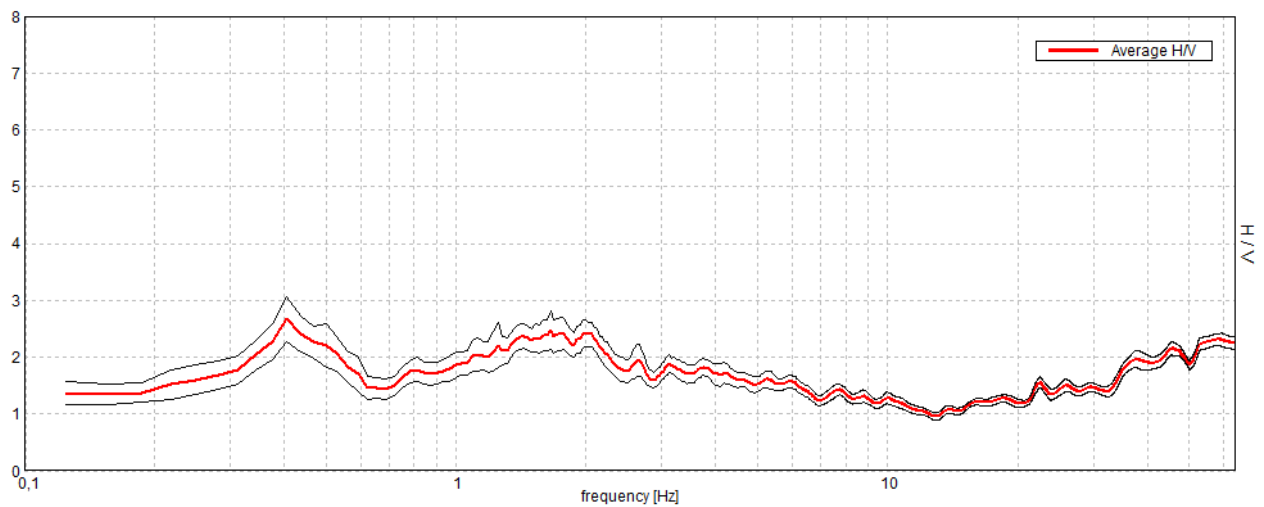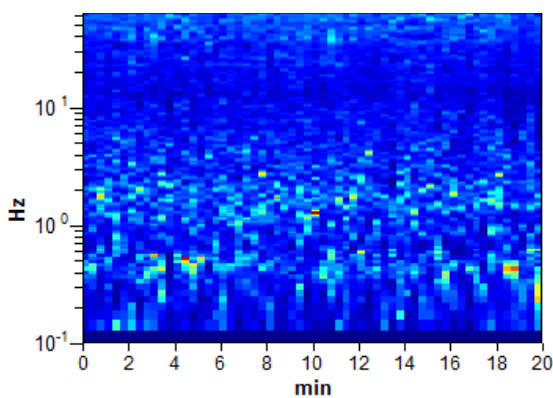Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
Smoothing: 5%

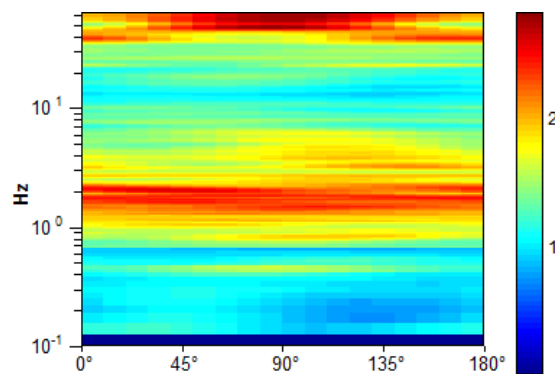### HORIZONTAL TO VERTICAL SPECTRAL RATIO

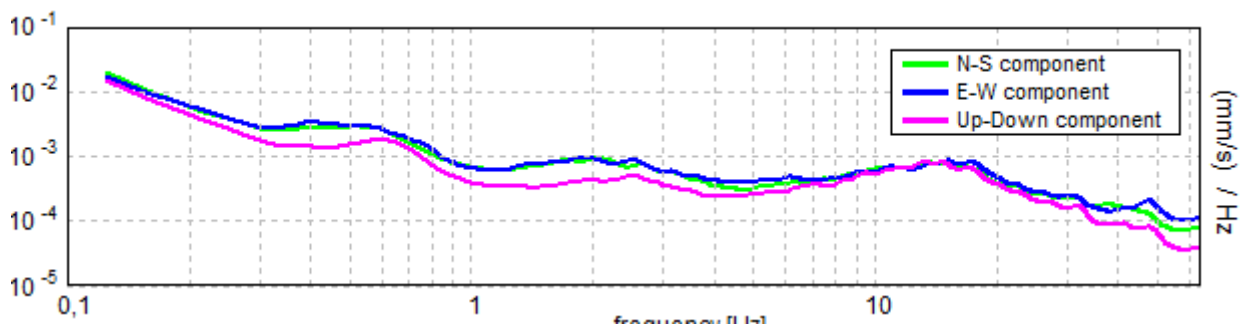Max. H/V at 0.41 ± 0.28 Hz (in the range 0.0 - 10.0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M93

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

<div style="border:1px solid">

Max. H/V at 0.41 ± 0.28 Hz (in the range 0.0 - 10.0 Hz).

</div>

Criteria for a reliable HVSR curve [All 3 should be fulfilled]			
$f_0 > 10 / L_w$	0,41 > 0,50		**NO**
$n_c(f_0) > 200$	487,5 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$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**
$A_0 > 2$	2,67 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,33978| < 0.05		**NO**
$\sigma_f < \varepsilon(f_0)$	0,13804 < 0,08125		**NO**
$\sigma_A(f_0) < \theta(f_0)$	0,1932 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

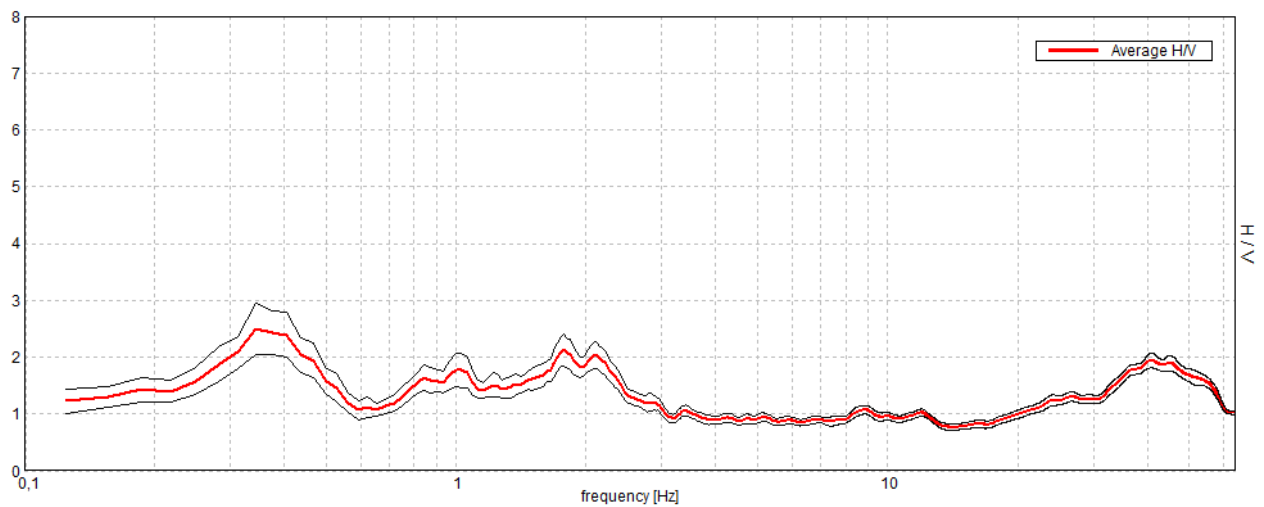| Threshold values for σ_f and $\sigma_A(f_0)$					
Freq.range [Hz]	< 0.2	0.2 – 0.5	0.5 – 1.0	1.0 – 2.0	> 2.0
$\varepsilon(f_0)$ [Hz]	0.25 f_0	0.2 f_0	0.15 f_0	0.10 f_0	0.05 f_0
$\theta(f_0)$ for $\sigma_A(f_0)$	3.0	2.5	2.0	1.78	1.58
Log $\theta(f_0)$ for $\sigma_{logH/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COLLESALVETTI_MS, M94* NUGOLA NUOVA_SCUOLA

Instrument: TE3-0006/01-13
Start recording: 25/09/13 15:46:16   End recording: 25/09/13 16:06:16
Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
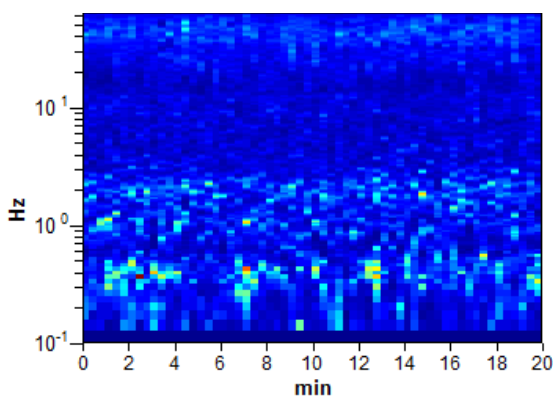GPS data not available

Trace length: 0h20'00".   Analysis performed on the entire trace.
Sampling frequency: 128 Hz
Window size: 20 s
Smoothing window: Triangular window
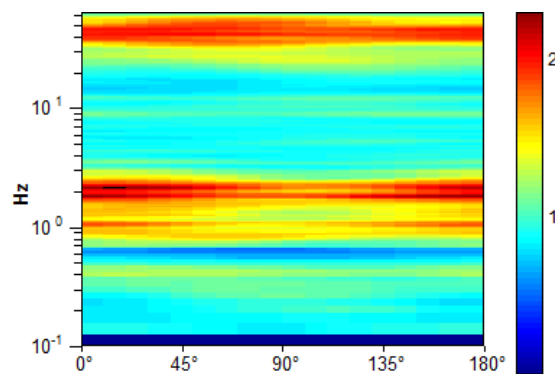Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO

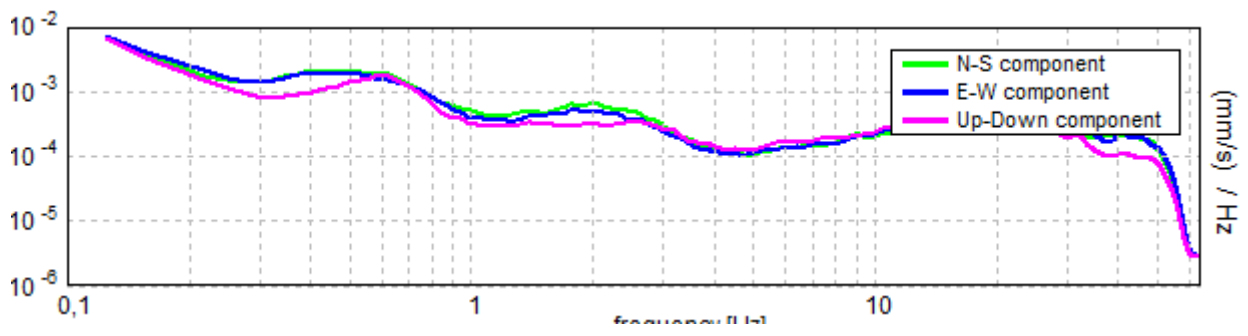Max. H/V at 0.34 ± 0.09 Hz (in the range 0.0 - 10.0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M94

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

<table>
<tr><td colspan="4">**Max. H/V at 0.34 ± 0.09 Hz (in the range 0.0 - 10.0 Hz).**</td></tr>
</table>

<table>
<tr><td colspan="4">**Criteria for a reliable HVSR curve**
[All 3 should be fulfilled]</td></tr>
<tr><td>$f_0 > 10 / L_w$</td><td>0,34 > 0,50</td><td></td><td>**NO**</td></tr>
<tr><td>$n_c(f_0) > 200$</td><td>412,5 > 200</td><td>**OK**</td><td></td></tr>
<tr><td>$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz
$\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz</td><td>Exceeded 0 out of 18 times</td><td>**OK**</td><td></td></tr>
<tr><td colspan="4">**Criteria for a clear HVSR peak**
[At least 5 out of 6 should be fulfilled]</td></tr>
<tr><td>Exists f^- in $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$</td><td>0,125 Hz</td><td>**OK**</td><td></td></tr>
<tr><td>Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$</td><td>0,563 Hz</td><td>**OK**</td><td></td></tr>
<tr><td>$A_0 > 2$</td><td>2,50 > 2</td><td>**OK**</td><td></td></tr>
<tr><td>$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$</td><td>|0,13487| < 0.05</td><td></td><td>**NO**</td></tr>
<tr><td>$\sigma_f < \varepsilon(f_0)$</td><td>0,04636 < 0,06875</td><td>**OK**</td><td></td></tr>
<tr><td>$\sigma_A(f_0) < \theta(f_0)$</td><td>0,2272 < 2,5</td><td>**OK**</td><td></td></tr>
</table>

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

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

COLLESALVETTI_MS, M95* MORTAIOLO_BIVIO

Instrument: TE3-0006/01-13
Start recording: 25/09/13 16:24:01   End recording: 25/09/13 16:44:01
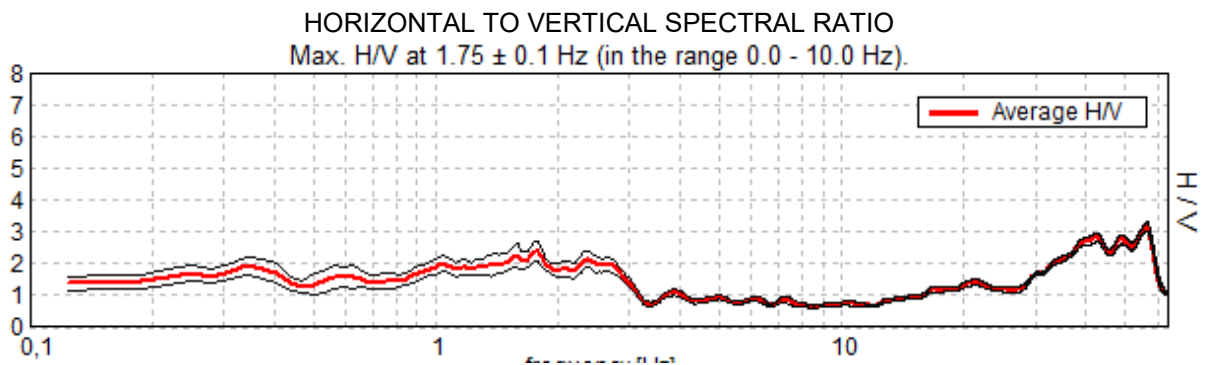Channel labels: NORTH SOUTH;   EAST WEST ;   UP   DOWN
GPS data not available

Trace length: 0h20'00''.   Analyzed 92% trace (manual window selection)
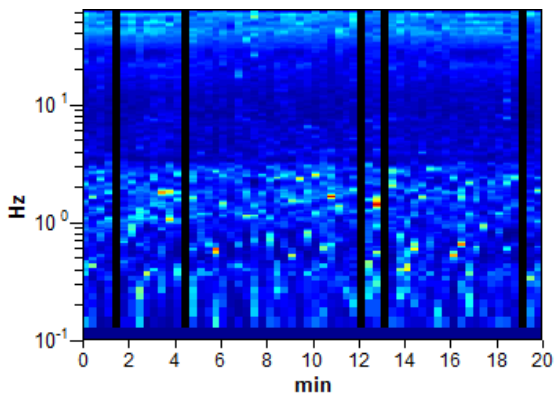Sampling frequency: 128 Hz
Window size: 20 s
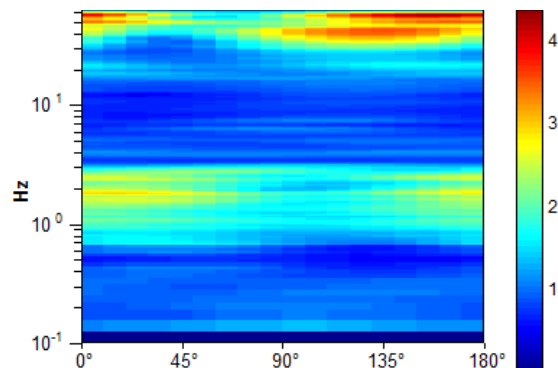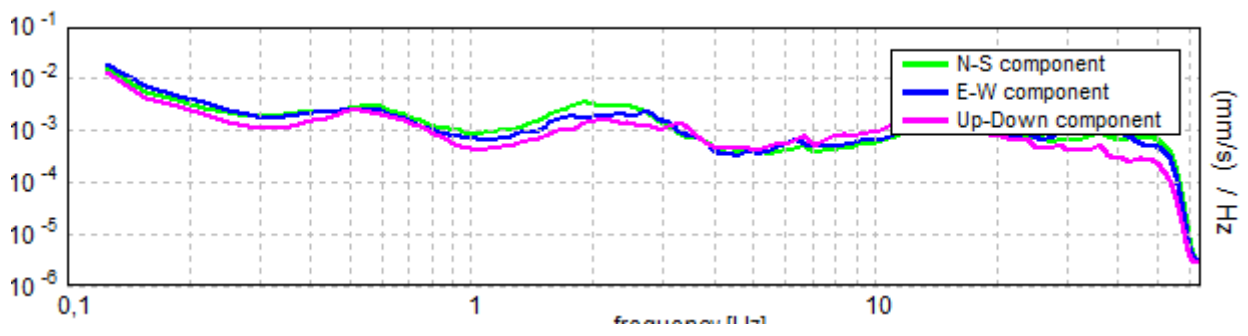Smoothing window: Triangular window
Smoothing: 5%

HORIZONTAL TO VERTICAL SPECTRAL RATIO
Max. H/V at 1.75 ± 0.1 Hz (in the range 0.0 - 10.0 Hz).

H/V TIME HISTORY

DIRECTIONAL H/V

SINGLE COMPONENT SPECTRA

Stazione di misura M95

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

Max. H/V at 1.75 ± 0.1 Hz (in the range 0.0 - 10.0 Hz).

Criteria for a reliable HVSR curve
[All 3 should be fulfilled]

$f_0 > 10 / L_w$	1,75 > 0,50	**OK**	
$n_c(f_0) > 200$	1925,0 > 200	**OK**	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$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 $[f_0/4, f_0]$ | $A_{H/V}(f^-) < A_0 / 2$			**NO**
Exists f^+ in $[f_0, 4f_0]$ | $A_{H/V}(f^+) < A_0 / 2$	3,125 Hz	**OK**	
$A_0 > 2$	2,38 > 2	**OK**	
$f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	|0,02846| < 0.05	**OK**	
$\sigma_f < \varepsilon(f_0)$	0,04981 < 0,175	**OK**	
$\sigma_A(f_0) < \theta(f_0)$	0,1622 < 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
σ_f	standard deviation of H/V peak frequency
$\varepsilon(f_0)$	threshold value for the stability condition $\sigma_f < \varepsilon(f_0)$
A_0	H/V peak amplitude at frequency f_0
$A_{H/V}(f)$	H/V curve amplitude at frequency f
f^-	frequency between $f_0/4$ and f_0 for which $A_{H/V}(f^-) < A_0/2$
f^+	frequency between f_0 and $4f_0$ for which $A_{H/V}(f^+) < A_0/2$
$\sigma_A(f)$	standard deviation of $A_{H/V}(f)$, $\sigma_A(f)$ is the factor by which the mean $A_{H/V}(f)$ curve should be multiplied or divided
$\sigma_{logH/V}(f)$	standard deviation of log $A_{H/V}(f)$ curve
$\theta(f_0)$	threshold value for the stability condition $\sigma_A(f) < \theta(f_0)$

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