



COMUNE DI CHIUSI DELLA VERNA

Provincia di Arezzo

Studi di Microzonazione Sismica Locale

(O.P.C.M. 3974/2012 - art. 2 comma 1 - lett.a)

(D.G.R. n. 261 del 18 aprile 2011)

ALLEGATO B -
Indagini sismiche
realizzate per
microzonazione sismica
di I livello

Consulente:

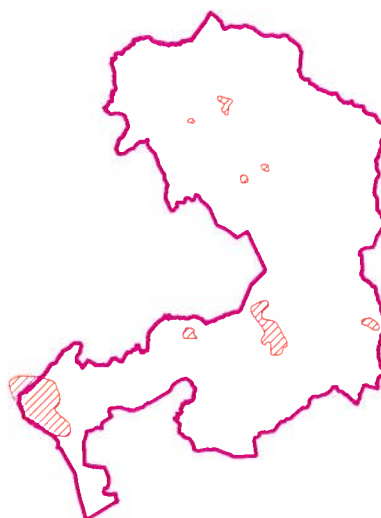
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Data: Settembre 2012

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PREMESSA

Nel mese di Giugno 2012, su incarico della Tecna s.n.c. e Geo Eco Engineering s.r.l., per conto Amministrazione Comunale di Chiusi della Verna, è stata svolta una campagna di indagine sismica, estesa al territorio comunale di Chiusi della Verna (AR), nell'ambito di un progetto di studio di microzonazione sismica di primo livello. La campagna, ha previsto la realizzazione di 32 misure di sismica passiva con tecnica a "stazione singola", 2 misure di sismica attiva acquisita con array monodimensionale e tecnica a rifrazione per la definizione della velocità.

Le misure sono state distribuite nei principali centri abitati del Comune: Frassineta, Corezzo, Rimbocchi, Biforco, Compito, Chiusi della Verna, Dama, Corsalone ed ubicate secondo lo schema successivamente riportato.

Di seguito vengono esposte le basi teoriche della metodologia adottata, le specifiche tecniche dello strumento utilizzato ed infine i risultati ottenuti.

INTRODUZIONE

L'andamento delle velocità di propagazione delle onde di taglio nel primo sottosuolo (profilo delle Vs) rappresenta in generale un'informazione importante ai fini della caratterizzazione meccanica (in campo dinamico) dei terreni. In particolare essa risulta fondamentale negli studi della risposta sismica locale. A seguito di un terremoto, si ha spesso modo di osservare come la distribuzione dei danni sul territorio sia assai eterogenea a parità di vulnerabilità dell'edificio. Le condizioni geologico-tecniche degli strati più superficiali, nonché le caratteristiche geomorfologiche possono concorrere, infatti, ad accrescere localmente lo scuotimento indotto da un terremoto. Per un'efficace azione di prevenzione, in materia di rischio sismico, è necessario tener conto non solo, quindi, della zonazione sismica nazionale, ma anche di eventuali sfavorevoli condizioni locali, a scala intra-comunale.

Particolarmente rilevanti sono i cosiddetti effetti di amplificazione di sito, ossia l'insieme delle variazioni in ampiezza, durata e contenuto in frequenza che un moto sismico, rispetto ad una formazione rocciosa di base, subisce attraversando gli strati sovrastanti, fino alla superficie. Tali effetti sono causati, essenzialmente, da un processo di intrappolamento e risonanza dell'energia del terremoto all'interno di un volume di sottosuolo costituito da materiali sedimentari a bassa impedenza sismica (IS : prodotto della velocità di propagazione dell'onda per la densità del mezzo attraversato) e posto sopra ad un dominio con più alta IS , per esempio un substrato roccioso o un suolo particolarmente rigido. Durante la propagazione dalla sorgente al sito, il raggio sismico, per via del fenomeno della rifrazione, subisce un processo di verticalizzazione e tende ad emergere

lungo una direzione sub-verticale. Le onde compressionali (P), dunque, sollecitano all'incirca verticalmente l'edificio, tuttavia è la sollecitazione orizzontale, dovuta alle onde trasversali (S), la causa principale del danneggiamento per le costruzioni. Gli edifici e le opere architettoniche in genere sono collaudate per resistere a forti carichi statici ma quasi mai viene valutata la risposta della costruzione a carichi dinamici orizzontali. Da quanto detto si deduce che studiare le modalità di propagazione ed amplificazione delle onde trasversali o di taglio (S) nel sottosuolo vuol dire prevedere, a basso costo, le sollecitazioni che una struttura dovrà sopportare durante il verificarsi di un probabile evento sismico. Tra le metodologie che consentono di ricavare il profilo Vs del sottosuolo stanno oltre alle tecniche attive più comuni, stanno suscitando particolare interesse quelle definite di tipo "passivo" ovvero basate sullo studio della continua vibrazione del suolo dovuta a cause sia antropiche che naturali (Vibrazioni Ambientali). Tali tecniche consentono di misurare le velocità di propagazione delle onde sismiche già presenti nel terreno per effetto di sorgenti naturali (p.es. il vento e le mareggiate) o antropiche (p.es. il traffico cittadino e l'attività industriale). A parità di caratteristiche degli stendimenti e dei sensori, le metodologie di tipo "passivo" raggiungono profondità di esplorazione di gran lunga superiori a qualsiasi altra tecnica sismica.

Di seguito vengono esposti i principi teorici delle due principali tecniche di acquisizione dati di Vibrazioni Ambientali (HVSr) e di sismica a rifrazione.

PRINCIPI TEORICI DELLE TECNICHE ADOTTATE

Metodologia a "Stazione Singola"(HVSr)

Nella tecnica a stazione singola, vengono misurate le vibrazioni ambientali nelle tre direzioni dello spazio attraverso un unico sensore tridirezionale posto sulla superficie del terreno. In particolare viene valutato il rapporto di ampiezza fra le componenti orizzontali e verticali del moto (metodo HVSr ovvero "Horizontal to Vertical Spectral Ratios") [**Bard., 1998**] . Analizzando misure di questo tipo è possibile identificare le modalità di vibrazione del terreno. In particolare è possibile individuare la frequenza f di questa vibrazione definita di "Risonanza". Sapendo che in generale esiste una relazione semplice fra f , lo spessore della parte più soffice del terreno e la velocità media delle onde sismiche nel sottosuolo (ricavata per esempio dai metodi con antenna sismica o rifrazione), attraverso le misure HVSr è possibile risalire allo spessore di questo strato.

In figura 2 viene mostrato un esempio di misura a stazione singola e la curva HVSr corrispondente. Il massimo della curva HVSr indica la frequenza fondamentale di risonanza del sito.

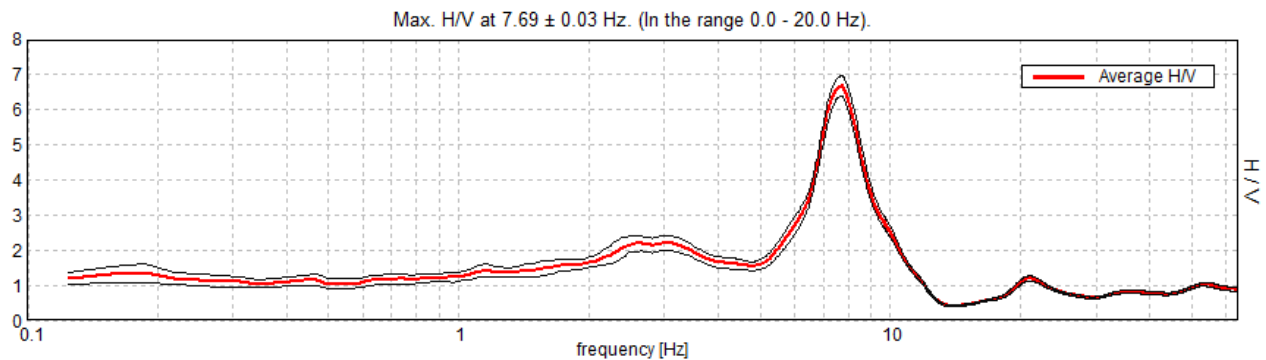


Figura 2: Esempio di misura realizzata con la tecnica a stazione singola. Nella foto, si può osservare il sensore tridirezionale ; e la curva dei rapporti spettrali.

CAMPAGNA DI RACCOLTA DATI

Durante il mese di Giugno e parte del mese di Luglio 2012 sono state realizzate 32 registrazioni di Vibrazioni Ambientali con tecnica a “stazione singola” (HVSR) nel comune di Chiusi della Verna, in particolare: 1 nell’abitato di Frassineta, 3 nell’abitato di Corezzo, 2 a Rimbocchi, 3 a Biforco, 1 a Compito, 12 a Chiusi della Verna, 2 a Dama, 8 a Corsalone.

Inoltre nella frazione di Biforco sono state acquisite due linee di Sismica a rifrazione.

La Tabella 1 sintetizza il numero di registrazioni effettuate in ognuna delle località in studio, in allegato è mostrata l’ubicazione delle misure.

Località	HVSR	ARRAY	Rifrazione
Frassineta	1		
Corezzo	3		
Rimbocchi	2		
Biforco	3		2
Compito	1		
Chiusi della Verna	12		
Dama	2		
Corsalone	8		
Totale	32		2

Tabella 1 : Sintesi delle misure realizzate nei siti in studio

Per le misure HVSR è stato impiegato un tromografo digitale modello Tromino (Micromed).

I dati di vibrazioni ambientali, acquisiti con questa tecnica d'indagine sono stati successivamente elaborati con il software "Grilla" in dotazione al tromografo e catalogati in base ai criteri proposti da Albarello e Mucciarelli pubblicati nel volume "Contributi per l'aggiornamento degli 'Indirizzi e criteri per la microzonazione sismica'" di supplemento alla rivista "Ingegneria Sismica", nel numero 2 del 2011.

Ogni misura è stata inserita in una delle seguenti 3 classi di appartenenza:

- Classe A: registrazione affidabile ed interpretabile che può essere utilizzata anche da sola
- Classe B: registrazione sospetta da utilizzare con cautela ed in presenza di altre misure ottenute nelle vicinanze
- Classe C: registrazione scadente e di difficile interpretazione

LOCALITA'	NOME MISURA	Fq1(Hz)	A1	Fq2(Hz)	A2	CLASSE
Frassineta	R1	flat	flat	flat	flat	A2
Corezzo	R2	6	2.2	2	1.8	B1
Corezzo	R3	9.4	3	2	2.1	B1
Corezzo	R4	10	3.1	?	?	B1
Corezzo ripetuta	R4_2	10.81	3.5	2.3	2.1	B1
Rimbocchi	R5	6.8	4.3	1.4	2	A1
Rimbocchi	R6	8.8	2	flat	flat	B1
Biforco	R7	9.8	2.7	flat	flat	A1
Biforco	R8	?	?	?	?	C non classificabile
Biforco ripetuta	R8_2	5.97	2.5	flat	flat	B1
Biforco	R9	flat	flat	flat	flat	B2
Biforco ripetuta	R9_2	7.81	2.5	flat	flat	B1
Compito	R10	6.5	3.3	flat	flat	B1
Compito ripetuta	R10_2	7.28	2.8	flat	flat	B1
Capoluogo	R11	?	?	?	?	C non classificabile
Capoluogo	R12	18	2.8	3.8	1.8	A1
Capoluogo	R13	1.9	3.5	flat	flat	B1
Capoluogo	R14	11	3.8	flat	flat	B1
Capoluogo	R15	2.9	3.2	flat	flat	A1
Capoluogo	R16	flat	flat	flat	flat	B2
Capoluogo ripetuta	R16_2	4.38	2.2	flat	flat	B1
Capoluogo	R17	?	?	?	?	C non classificabile
Capoluogo	R18	1.9	2.8	flat	flat	A1
Capoluogo	R19	1.5	2.5	flat	flat	B1
Capoluogo	R20	2	3.1	flat	flat	A1
Capoluogo	R21	flat	flat	flat	flat	B2
Capoluogo	R22	?	?	?	?	C non classificabile
Dama	R23	flat	flat	flat	flat	A2
Dama	R24	7.1	3.5	flat	flat	B1
Corsalone	R25	7.7	6.5	2.4	2.2	A1
Corsalone	R26	8.1	7.1	flat	flat	A1
Corsalone	R27	15.5	5	flat	flat	B1
Corsalone	R28	flat	flat	flat	flat	B2
Corsalone	R29	10	5	flat	flat	B1
Corsalone	R30	13.3	6.5	flat	flat	A1
Corsalone	R31	10.8	6	flat	flat	B1
Corsalone	R32	?	?	?	?	C non classificabile
Corsalone ripetuta	R32_2	10.47	3	flat	flat	B1

Metodologia sismica a “Rifrazione”

L'indagine sismica consiste nel produrre sulla superficie del terreno, in prossimità del sito da investigare, sollecitazioni dinamiche verticali per la generazione di onde di volume (P) e sollecitazioni dinamiche orizzontali per la generazione di onde di taglio (SH) e nel registrare le vibrazioni prodotte, sempre in corrispondenza della superficie, a distanze note e prefissate mediante sensori a componente verticale ed orizzontale.

L'interpretazione dei segnali rilevati e la conseguente stima del profilo di velocità delle onde sismiche, può scomporsi nelle seguenti fasi fondamentali:

individuazione del primo arrivo per ogni traccia, sui sismogrammi registrati;

ricostruzione delle relative dromocrone;

interpretazione delle dromocrone con conseguente ricostruzione delle geometrie del sottosuolo.

Apparecchiatura usata e schema della prova.

L'apparecchiatura utilizzata si compone delle seguenti parti:

- sistema sorgente;
- sistema di ricezione;
- sistema di acquisizione dati;
- trigger.

Sorgente onde P:

La sorgente deve essere in grado di generare onde elastiche ad alta frequenza ricche di energia, con forme d'onda ripetibili, con la possibilità di ottenere prevalentemente onde di compressione, es. grave in caduta libera (massa da 110 kg), in alternativa è possibile utilizzare un cannoncino a cartucce industriali o una mazza di 8 kg adoperata per colpire una piastra di alluminio appoggiata sul terreno.

Sorgente onde SH:

La sorgente deve essere in grado di generare onde elastiche ad alta frequenza ricche di energia, con forme d'onda ripetibili e direzionali, cioè con la possibilità di ottenere prevalentemente onde di taglio polarizzate sul piano orizzontale.

Tale sorgente è costituita da un parallelepipedo di forma tale da poter essere colpita lateralmente ad entrambe le estremità con una massa pesante. E' importante che il parallelepipedo venga gravato di un carico statico addizionale in modo che possa rimanere aderente al terreno sia nel momento in cui viene colpito sia successivamente, affinché l'energia prodotta non venga in parte dispersa. Con questo dispositivo è possibile generare essenzialmente delle onde elastiche di taglio polarizzate

orizzontalmente, con uniformità sia nella direzione di propagazione che nella polarizzazione e con una generazione di onde P trascurabile.

L'accoppiamento parallelepipedo-terreno è fatto per "contatto" e non per "infissione".

I profili sismici a rifrazione sono realizzati energizzando ad intervalli regolari lungo stendimenti di sensori detti geofoni: ciascuno stendimento multicanale viene denominato base sismica.

Sistema di ricezione:

Il sistema di ricezione è costituito da 24 geofoni a componente verticale per le onde P, con frequenza propria di circa 14 Hz e 24 geofoni a componente orizzontale per le onde SH, con frequenza propria di circa 10 Hz. Per l'acquisizione i geofoni sono accoppiati al terreno e posizionati verticalmente tramite il puntale di cui sono dotati.

Sistema di acquisizione dati:

Le registrazioni sono state acquisite mediante un sismografo digitale con 24 canali a 16 bit, si tratta di un sistema multicanale in grado di registrare su ciascun canale in modo digitale i segnali provenienti da ogni trasduttore di velocità (geofoni) a cui è collegato e conservarli su memoria di massa dinamica. Le forme d'onda acquisite sono visualizzabili come tracce a partire dall'impulso inviato dal trigger nel computer portatile ad esso collegato e salvabili in forma numerica in modo definitivo.

Trigger:

Il trigger consiste in un circuito elettrico che viene chiuso nell'istante in cui il grave o la mazza colpisce la base di battuta, consentendo la produzione di un impulso che viene inviato a un sensore collegato al sistema di acquisizione dati; in questo modo è possibile individuare e visualizzare l'esatto istante in cui la sorgente viene attivata e parte la sollecitazione dinamica.

Interpretazione dei profili sismici:

I tempi di arrivo delle onde letti in corrispondenza di ciascun geofono hanno permesso di ricostruire i diagrammi spazio-tempo, detti dromocrone. L'interpretazione delle dromocrone fatta attraverso il software Rayfract, ha permesso di definire un modello della stratigrafia del terreno basato sulle variazioni della velocità delle onde di volume e di taglio.

Risultati:

Dall'elaborazione dei dati acquisiti si sono ottenuti elaborati tomografici dell'andamento delle velocità delle onde di taglio v_s e delle onde di volume v_p , oltre alle relative sezioni sismostratigrafiche che schematizzano gli spessori individuati di seguito allegati.

CONCLUSIONI

Nell'ambito del lavoro svolto, è stato indagato parte del territorio comunale di Chiusi della Verna. Geologicamente l'area è rappresentata da Formazioni delle Unità Liguri e dell'Unità Tettonica Toscana "Cervarola-Falterona". Le misure sismiche realizzate rispecchiano spesso l'assetto geologico del sito. La maggior parte delle misure effettuate sulle formazioni affioranti ha dato risposte piatte, mentre le misure effettuate su corpi di frana o accumuli di versante hanno dato luogo a risonanze con frequenze medio alte, compatibili con gli spessori dei corpi coinvolti, evidenziando in alcuni casi la risalita del substrato geologico.

Le frequenze più elevate riscontrate nelle zone di fondovalle, rappresentano i depositi alluvionali dell'Arno.

R1 Frassineta

La misura eseguita nella località Frassineta è risultata piatta perché eseguita sulla formazione in affioramento delle Arenarie del Monte Falterona – Membro di Montalto.

R2, R3, R4 Corezzo

Le misure effettuate nella località di Corezzo, hanno evidenziato:

picchi in alta frequenza dai 6 ai 10 hz indicativi della coltre detritica rimaneggiata superficiale, con spessore compreso tra 5 e 10 metri;

un picco a circa 2 hz di ampiezza inferiore più evidente nella R3, che potrebbe indicare il passaggio per sovrascorrimento tra le Marne Varicolori di Villore e il Membro di Montalto posto ad una profondità indicativa di 30-50 m.

R5, R6 Rimbocchi:

Le misure eseguite in loc. Rimbocchi, con il loro picco in alta frequenza, hanno evidenziato la coltre di depositi alluvionali terrazzati e detriti di versante, con spessore che si assottiglia avvicinandosi al versante dove affiora il membro di Montalto. Infatti la misura R5 più vicina al torrente Corsalone con picco a 6.8 hz. è indicativa di spessori tra i 10 e i 20 m., la R6 con frequenza più alta di 8.8 hz evidenzia la risalita del substrato entro i 5-10 m.

R7, R8, R9 Biforco

Le misure effettuate in loc. Biforco hanno evidenziato frequenze di risonanza medio alte indicative di spessori compresi tra 5 e 10 m. per la R7 e la R9, leggermente maggiori per la R8. Questi spessori rappresentano la coltre detritica di pietrame lapideo di piccole dimensioni in matrice limoso argillosa, con un basso contrasto di impedenza rispetto al substrato costituito dal Membro di Montalto.

R10 Compito:

La misura effettuata nella località di Compito, ha evidenziato un picco in alta frequenza di 7.28 hz generato dalla presenza di una coltre di frana per colamento stabilizzata, con spessore di 5-10 m sul substrato rappresentato dalla Formazione di Monte Morello.

R11-R22 Chiusi della Verna:

Le misure eseguite presso l'abitato di Chiusi della Verna sono distribuite su un'ampia coltre di depositi per frana di colamento e detriti di versante che ricoprono la Formazione di Sillano sottostante. Le misure abbastanza coerenti tra loro, non hanno risentito di questa copertura superficiale per mancanza di un evidente contrasto di impedenza con la formazione di Sillano sottostante, infatti le misure R13, R15, R18, R19, R20 distribuite su tali depositi, hanno evidenziato picchi di frequenze medio basse comprese tra 1.5 e 3 hz indicativi di profondità dell'ordine dei 30-50 m, non compatibili con gli spessori modesti delle coltri superficiali. Probabilmente questi contrasti evidenziati sono dovuti a livelli calcarei più competenti all'interno della formazione di Sillano stessa. Le misure R14 e R16 con frequenze sensibilmente più alte evidenziano il contrasto tra depositi di versante e la formazione di Monte Morello sottostante, che si trova a profondità comprese tra 5 e 10 m in corrispondenza della R14 e 10 e 20 m per la R16.

La misura R12 presenta entrambe le frequenze che evidenziano un contrasto tra 5 e 10 m e tra 10 e 20 m.


La R21 è risultata piatta e le misure R11, R17, R22 sono risultate non interpretabili.

R23-24 Dama:

Le misure svolte in località Dama, sono ubicate su una coltre di depositi di versante che ricoprono le Arenarie del Monte Falterona. La misura R23 è risultata piatta probabilmente per lo spessore esiguo di tali depositi, mentre la misura R24 con un picco a 7.1 hz indica spessori compresi tra 10 e 20 m.

R25-32 Corsalone:

La località di Corsalone sorge su una serie di coperture alluvionali, di versante e riempimenti antropici che poggiano su un substrato rigido poco profondo (rappresentato dalla formazione di Monte Morello) con elevato contrasto di impedenza,. Infatti le misure effettuate hanno evidenziato tutte picchi in alta frequenza con elevate ampiezze, indicativi di spessori compresi tra 5 e 10 m ed elevati contrasti di velocità, compatibili con l'assetto geologico locale. La misura R28 è risultata piatta probabilmente per un basso contrasto di impedenza tra i materiali di discarica delle miniere ed il substrato.


GeoEcho s.n.c.

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ALLEGATI

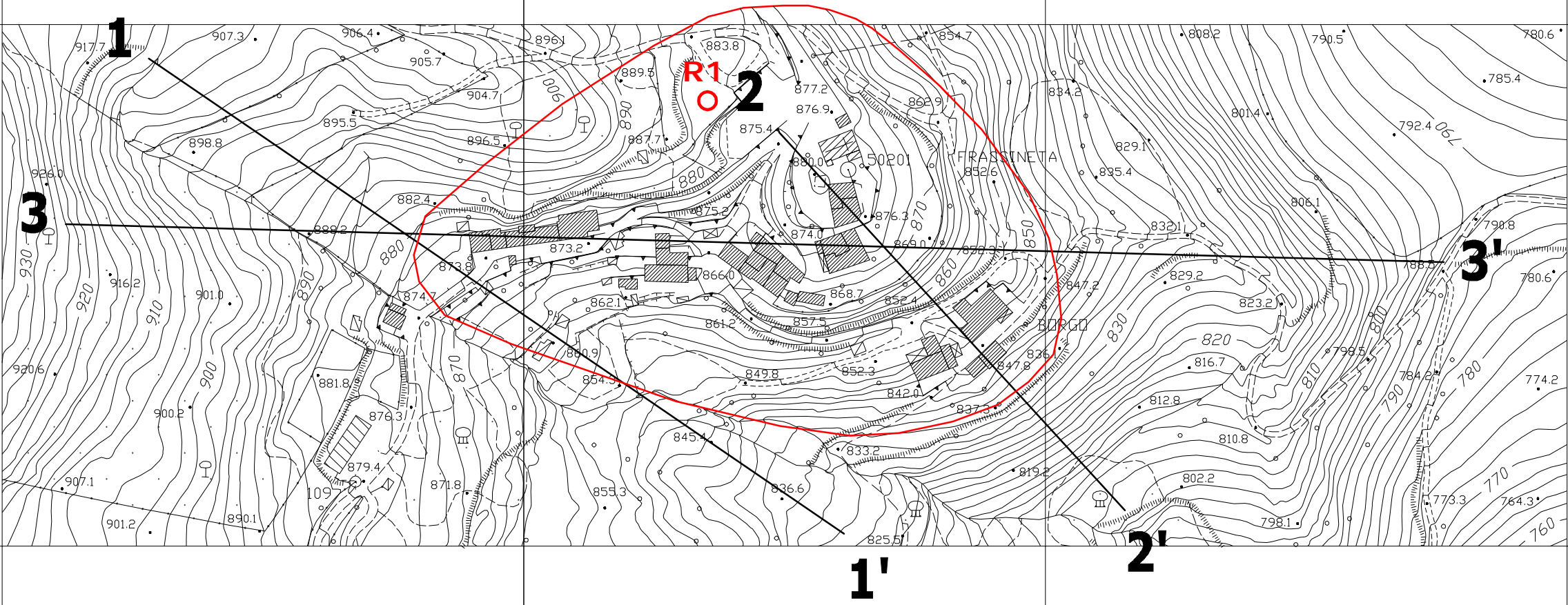
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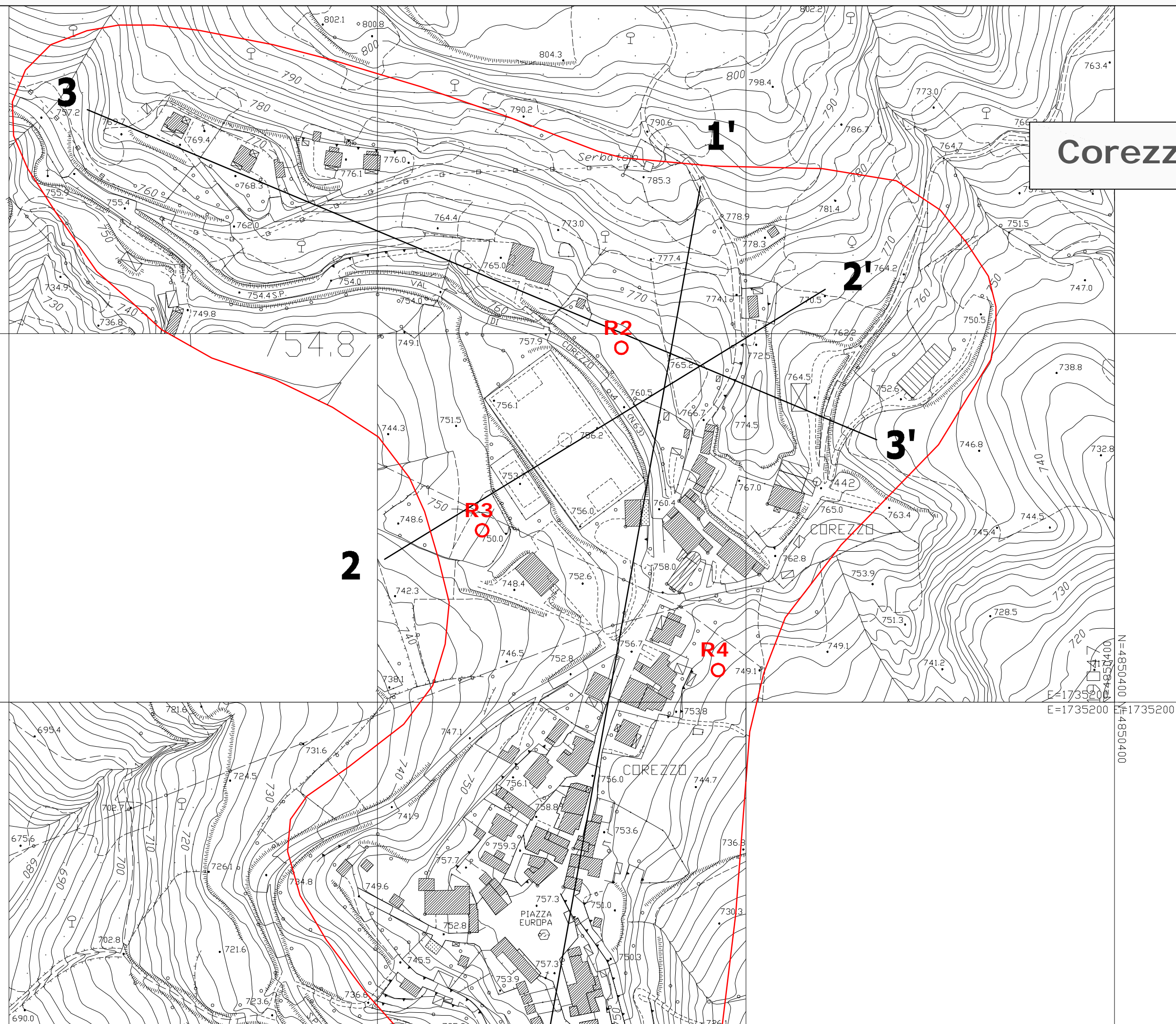
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- Corezzo
- Rimbocchi
- Biforco
- Compito
- Chiusi della Verna 1
- Chiusi della Verna 2
- Chiusi della Verna 3
- Dama
- Corsalone 1
- Corsalone 2
- Corsalone 3

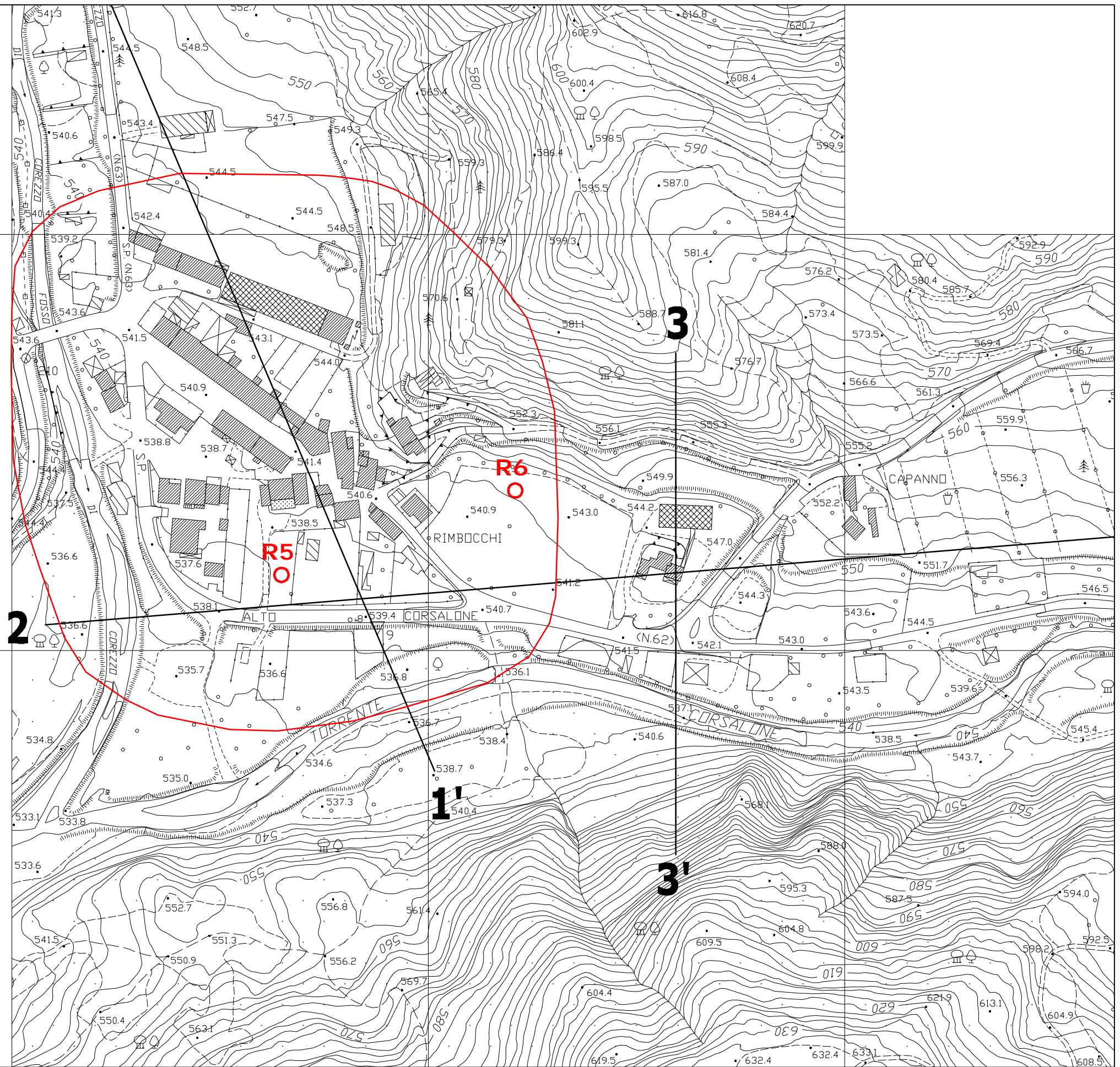
Elaborati sismica a rifrazione

Elaborati misure HVSr

Frassineta

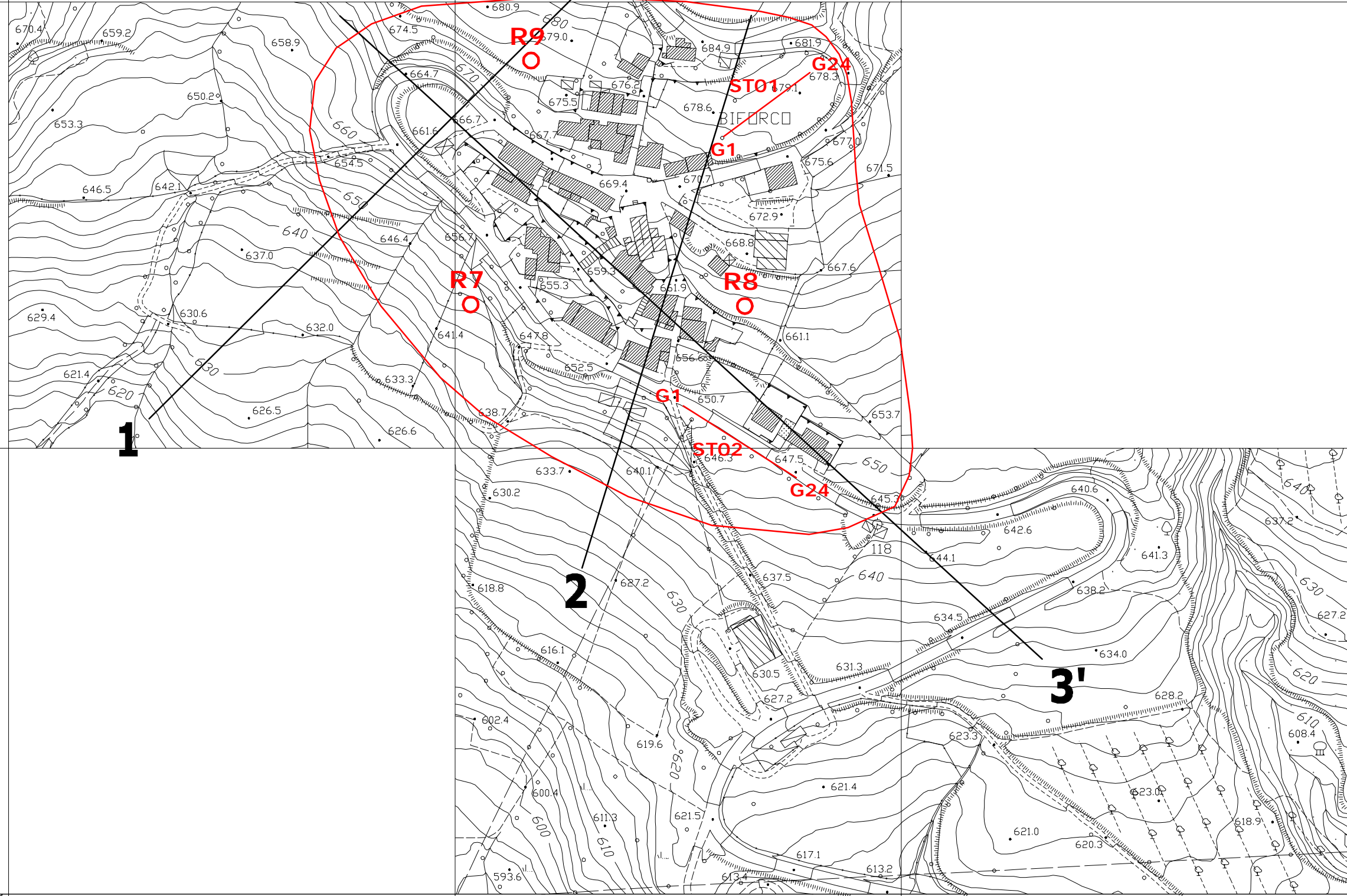




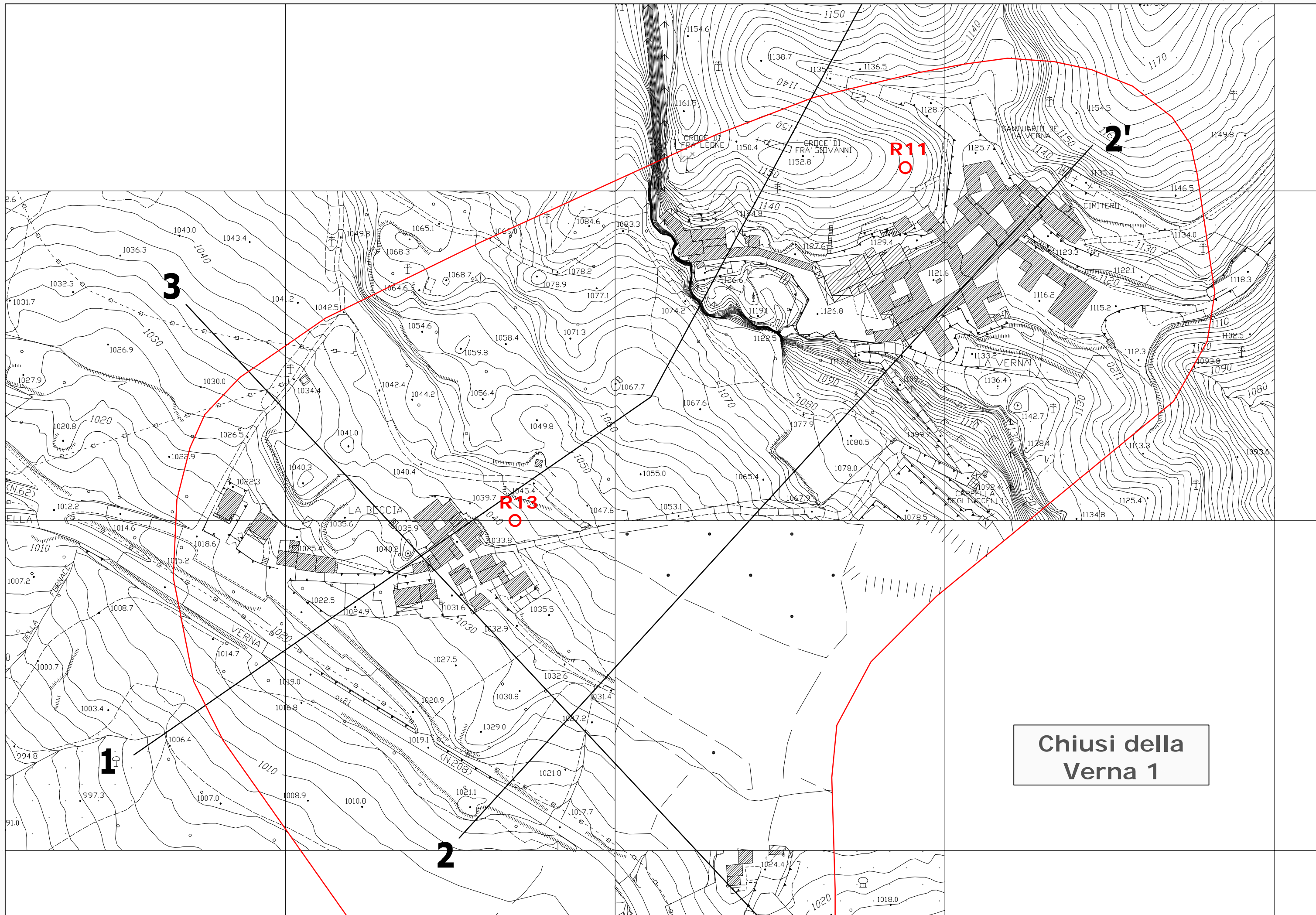


Rimbocchi

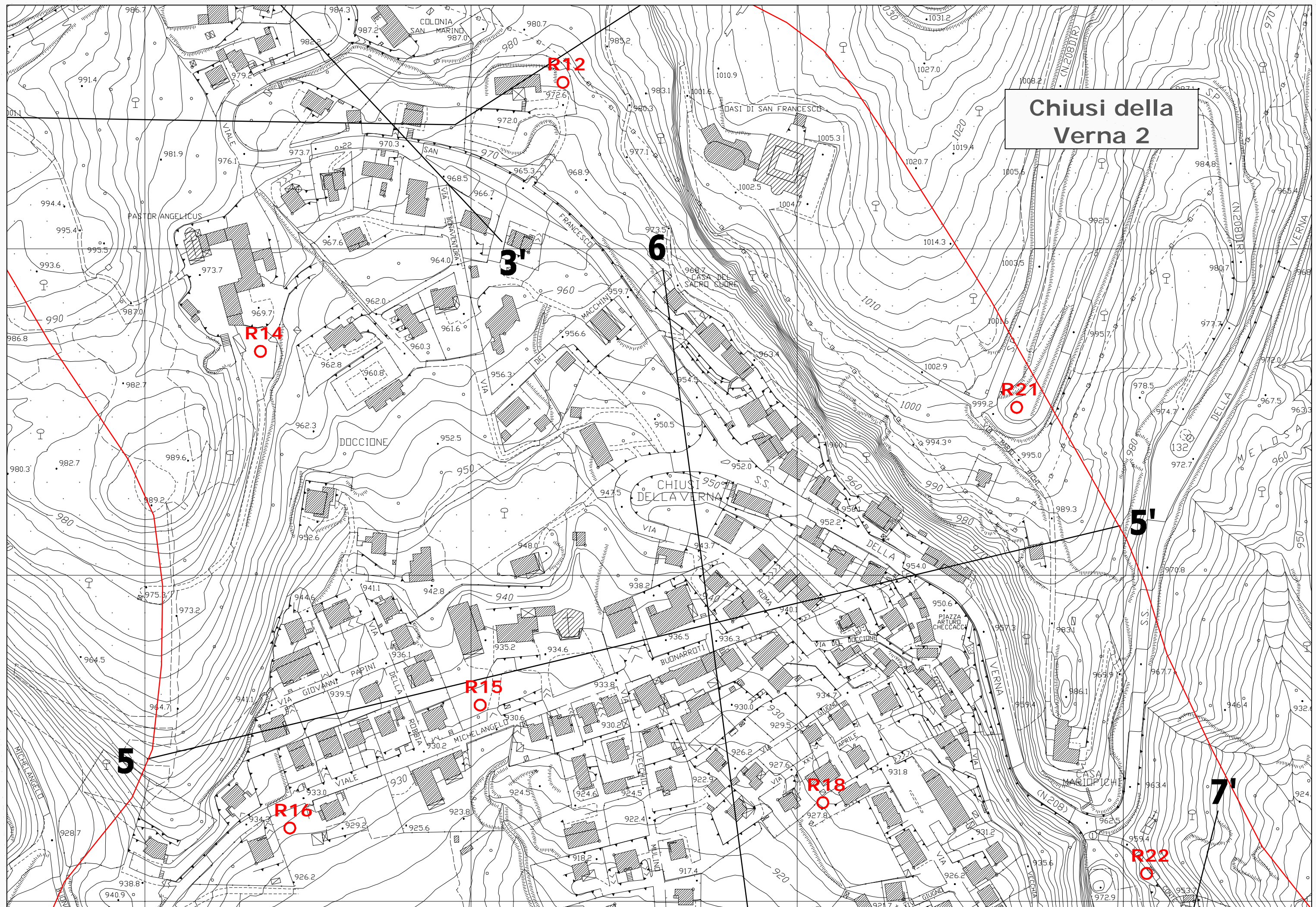
Biforco

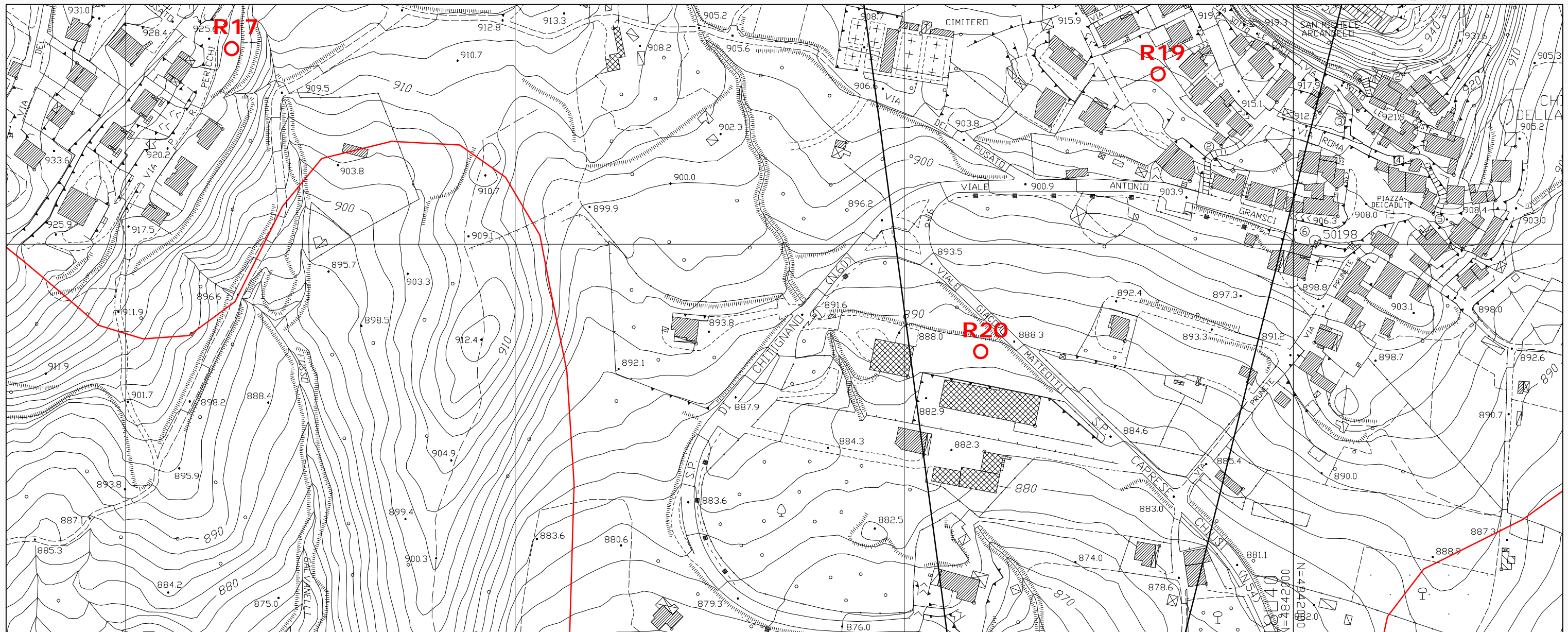




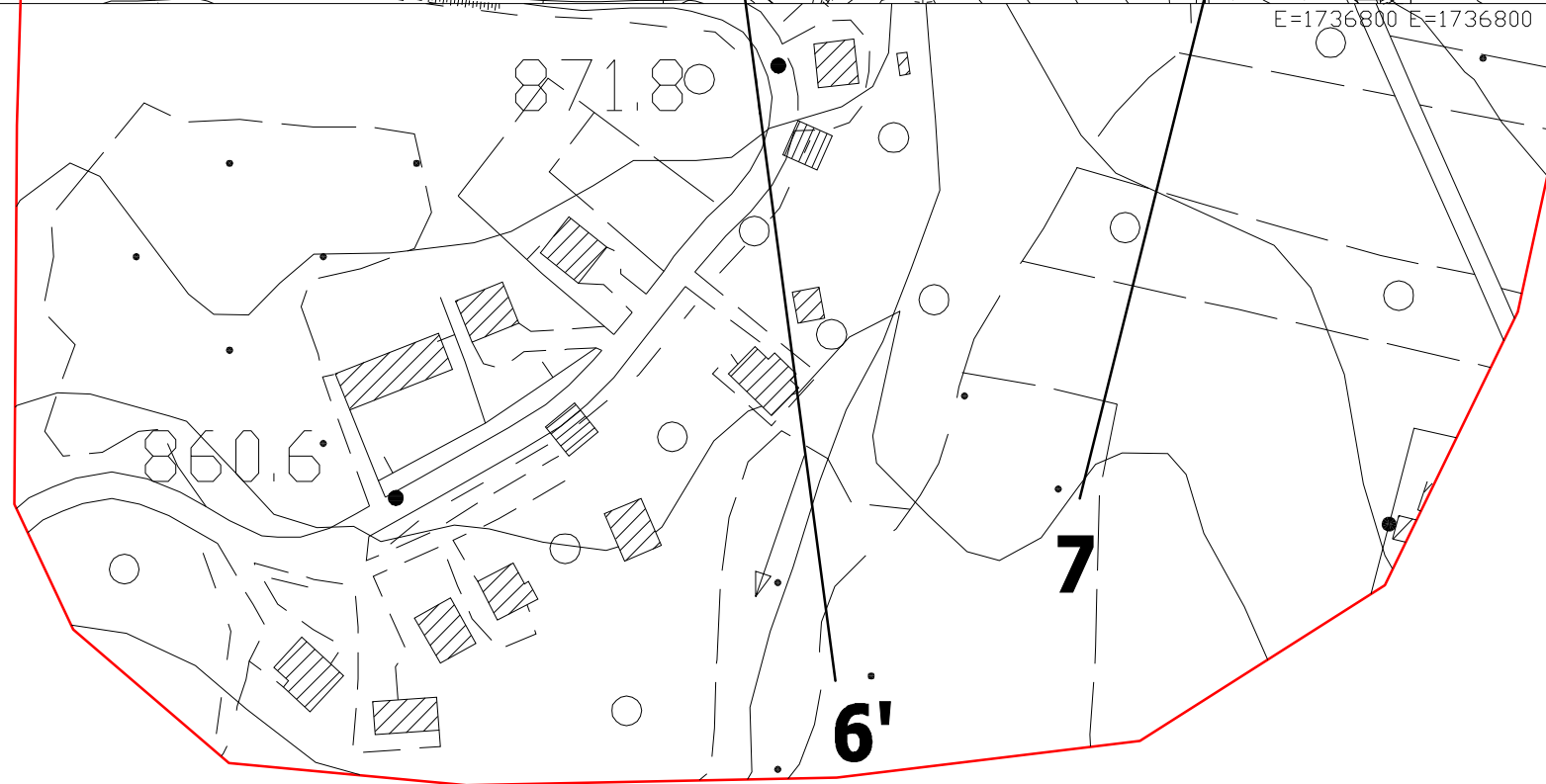


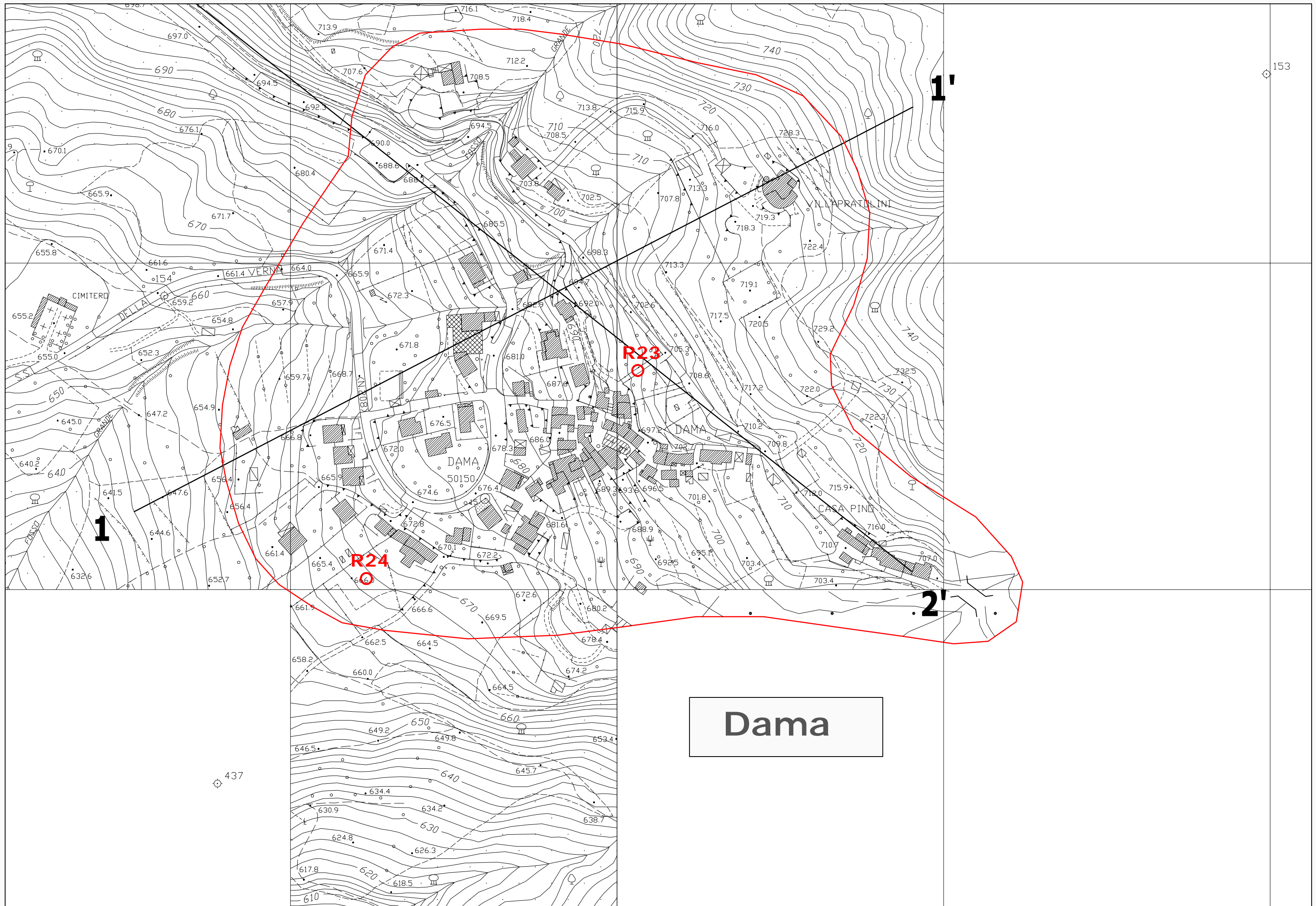
Chiusi della
Verna 1

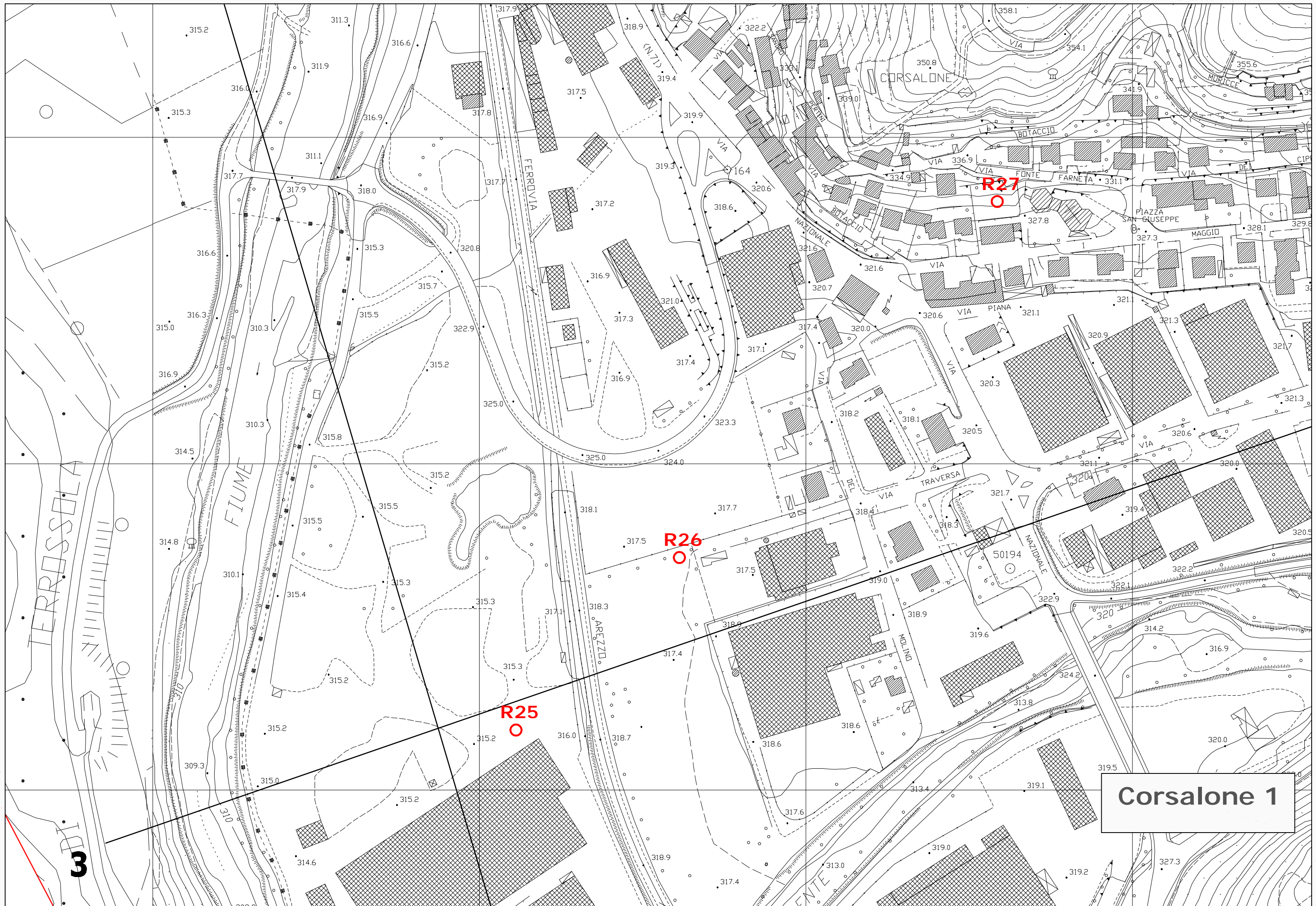




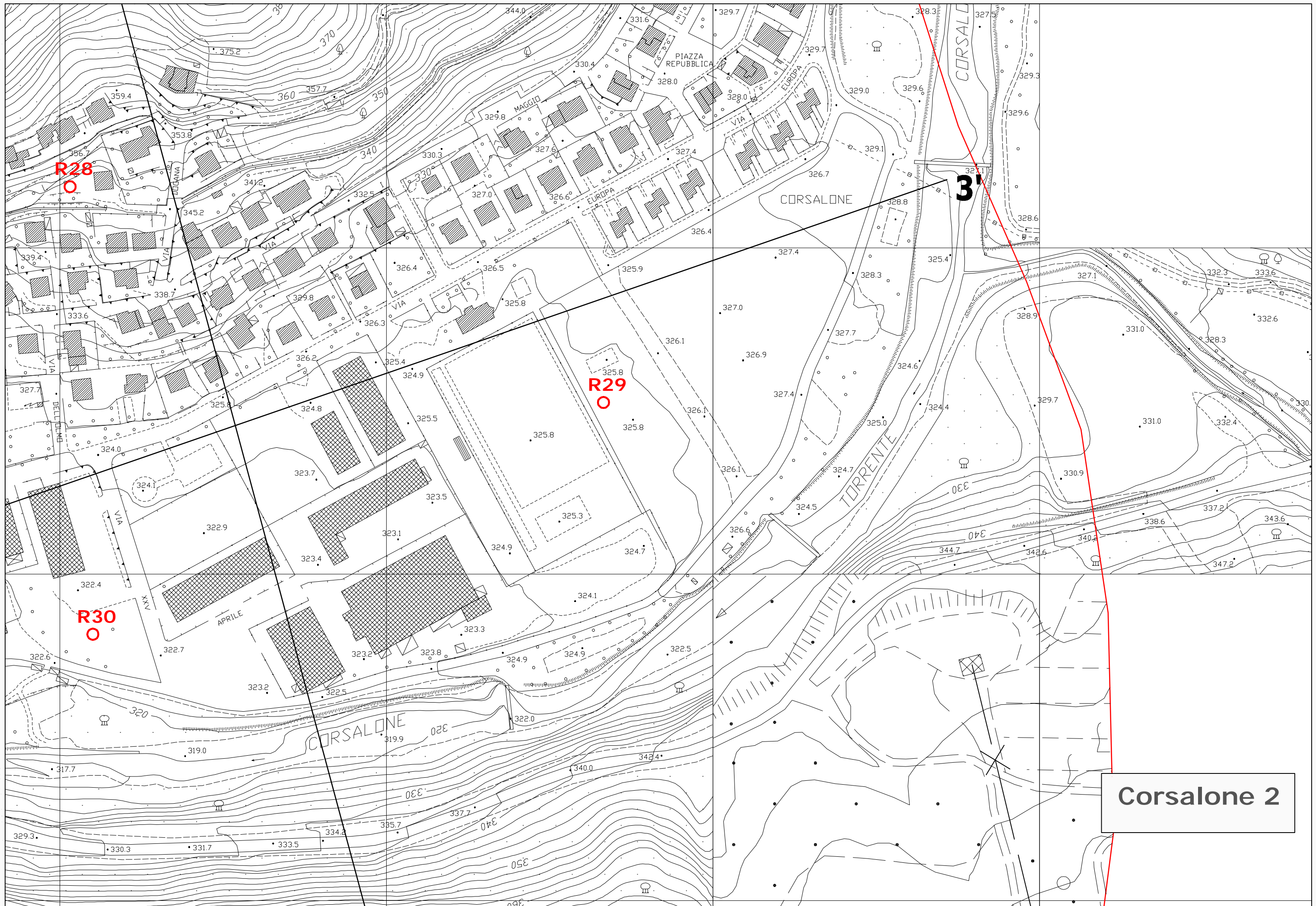
Chiusi della
Verna 3







Corsalone 1



R28



R29



R30



Corsalone 2



Corsalone 3

LINEA ST01

INDAGINE DI SISMICA A RIFRAZIONE IN ONDE P e SH SCHEMA DETTAGLIATO DELLA LINEA DI ACQUISIZIONE

GEOFON. N.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DISTANZA PROGRESSIVA (m)	0	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46
DISTANZA PARZIALE (m)	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
QUOTA (metri s.l.m.)	679.00	679.00	679.00	679.00	679.00	679.00	679.00	679.00	679.00	679.00	679.00	679.00	679.00	679.00	679.00	679.00	679.00	679.00	679.00	679.00	679.00	679.00	679.00	679.00

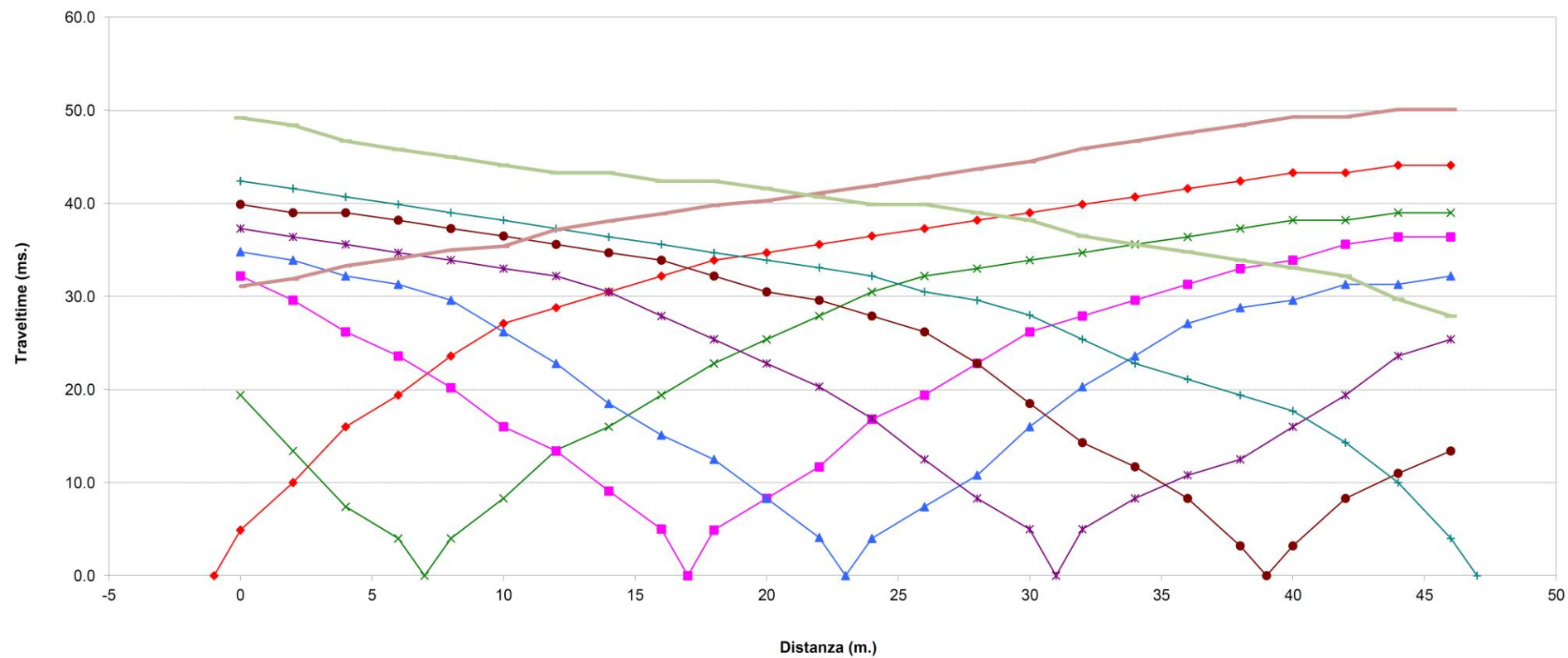
PUNTI DI ENERGIZZAZIONE ONDE P e SH

	SCOPPIO 1	SCOPPIO 2	SCOPPIO 3	SCOPPIO 4	SCOPPIO 5	SCOPPIO 6	SCOPPIO 7
POSIZ. DAL GEOF. N 1 (m)	-1.0	7.0	17.0	23.0	31.0	39.0	47.0
QUOTA (metri s.l.m.)	679.0	679.0	679.0	679.0	679.0	679.0	679.0

ST01 – DROMOCRONE - ONDE P

G1

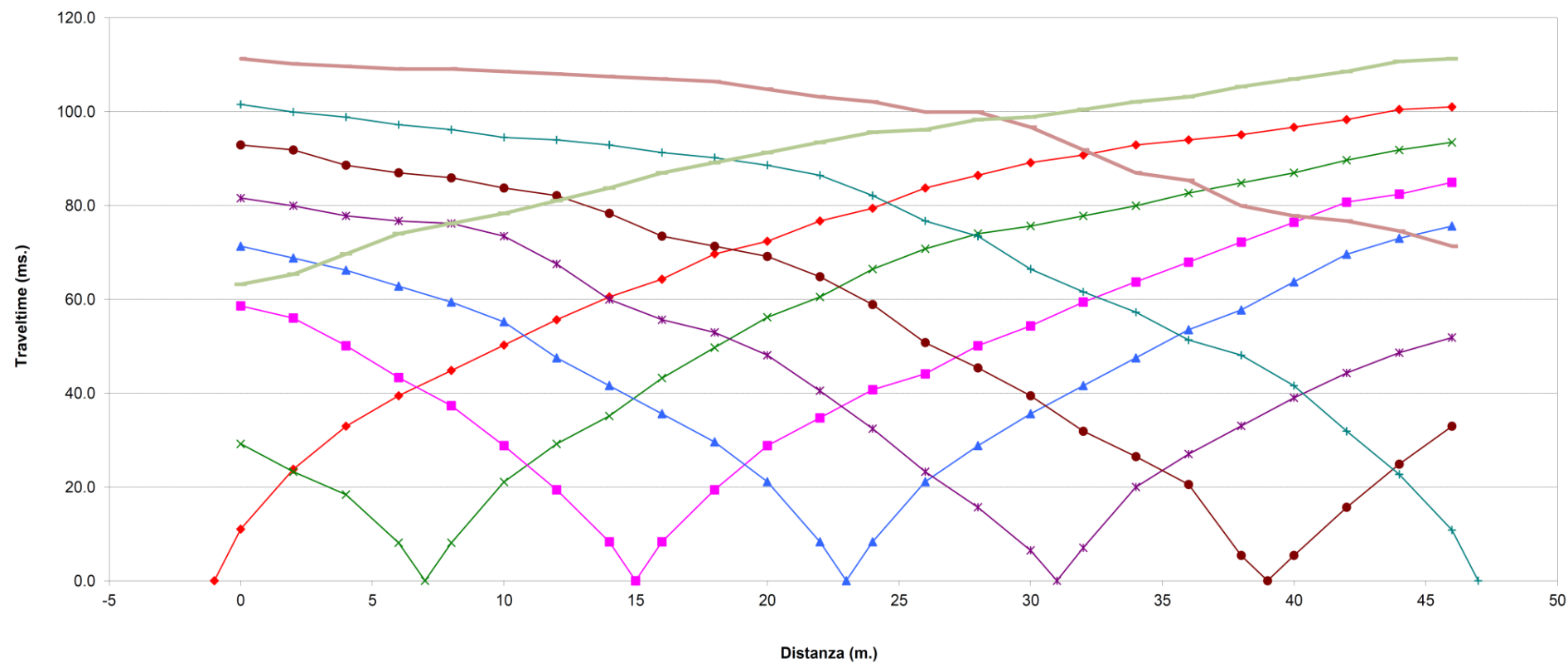
G24



ST01 – DROMOCRONE - ONDE SH

G1

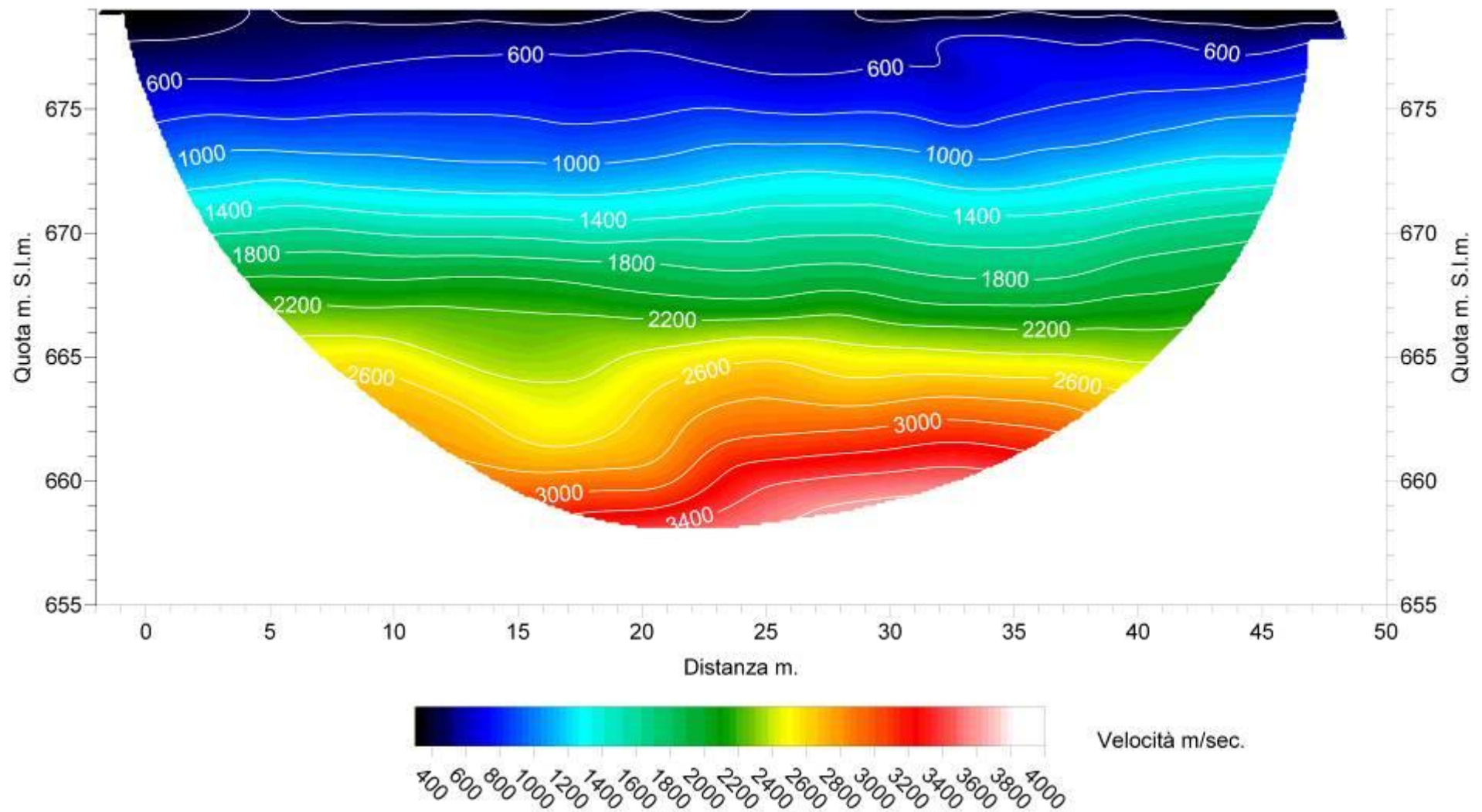
G24



G1

G24

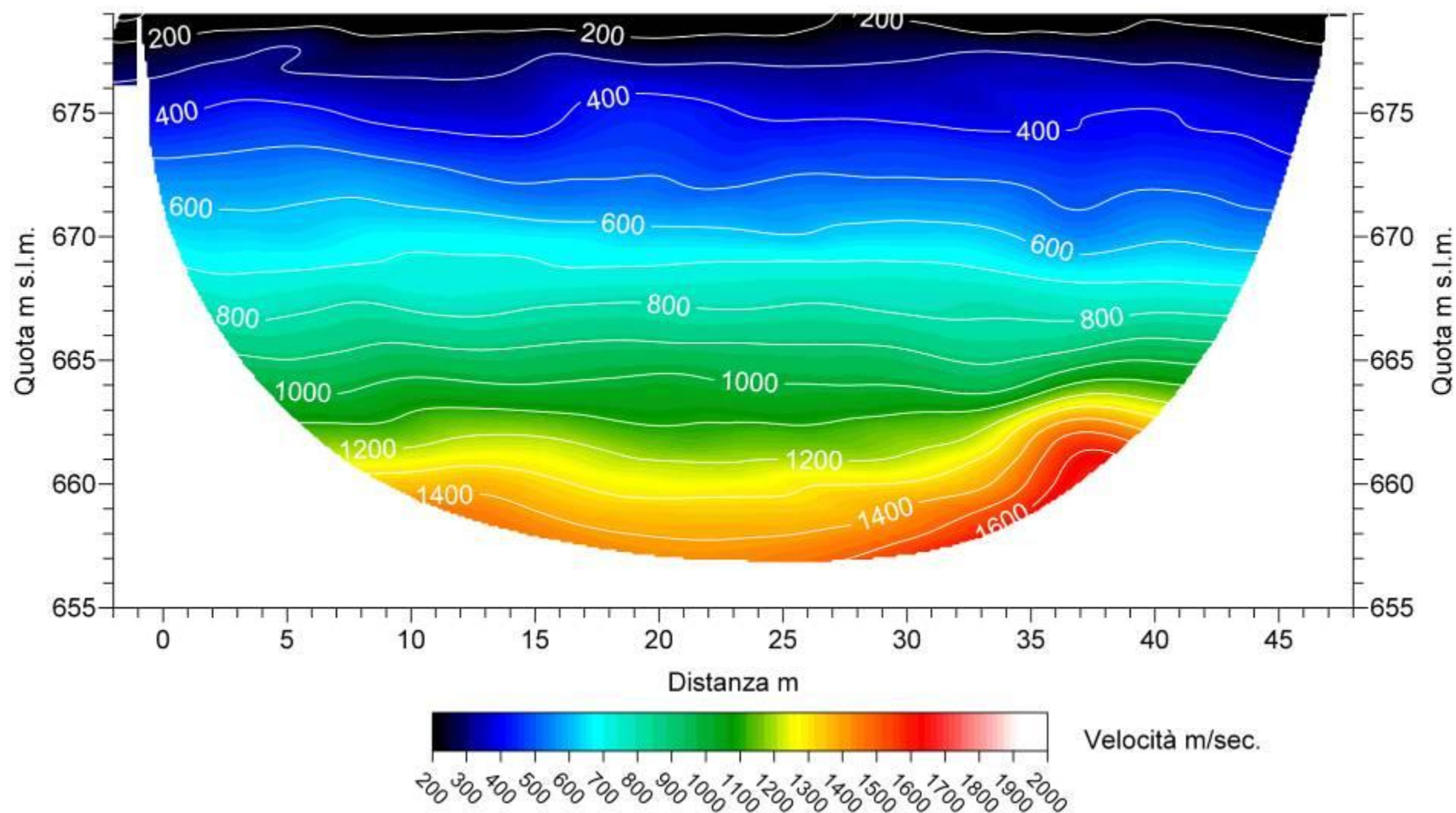
Tomografia sismica ST01 onde P



G1

G24

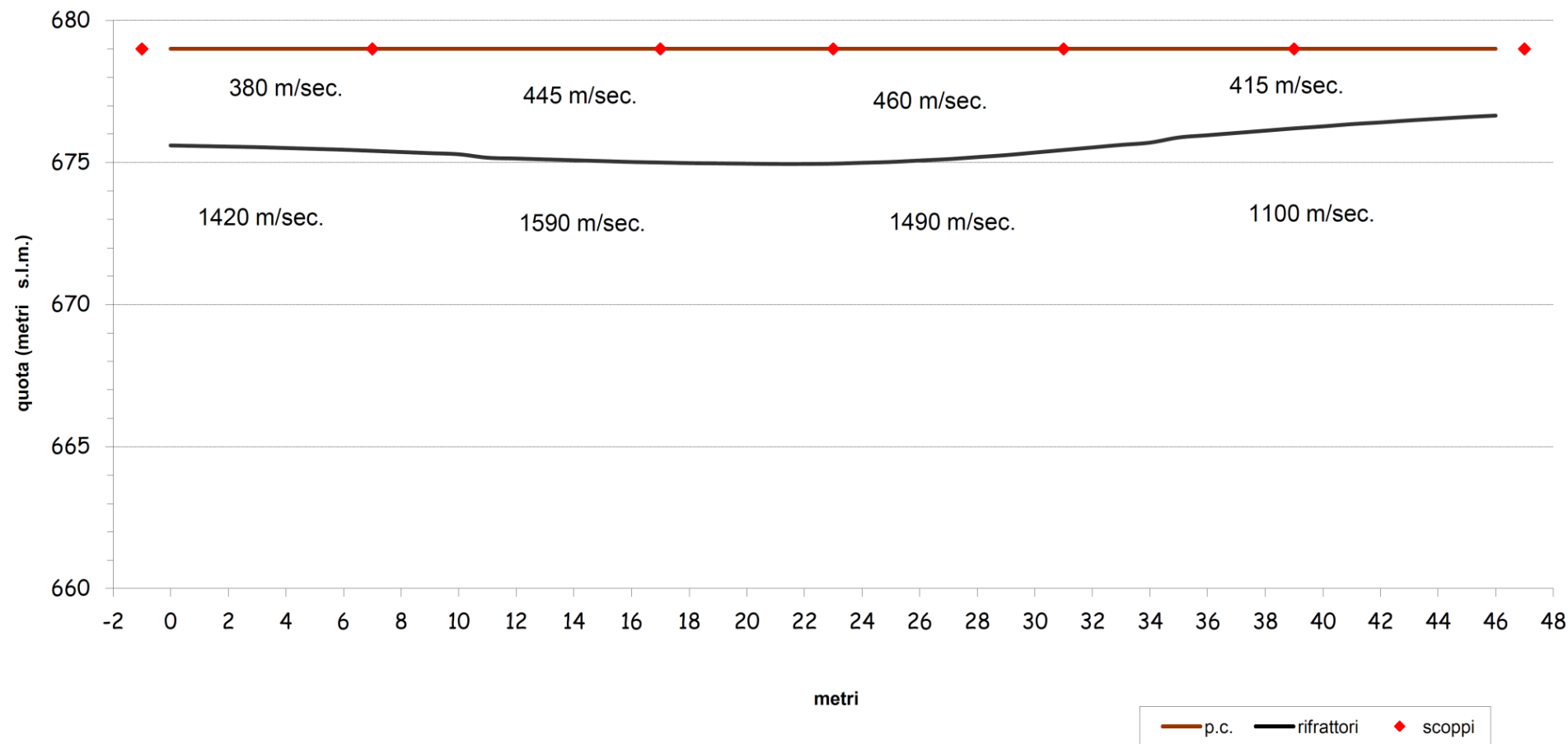
Tomografia sismica ST01 onde SH



ST01 – SEZIONE SISMOSTRATIGRAFICA - ONDE P

G1

G24



ST01 – SEZIONE SISMOSTRATIGRAFICA - ONDE SH

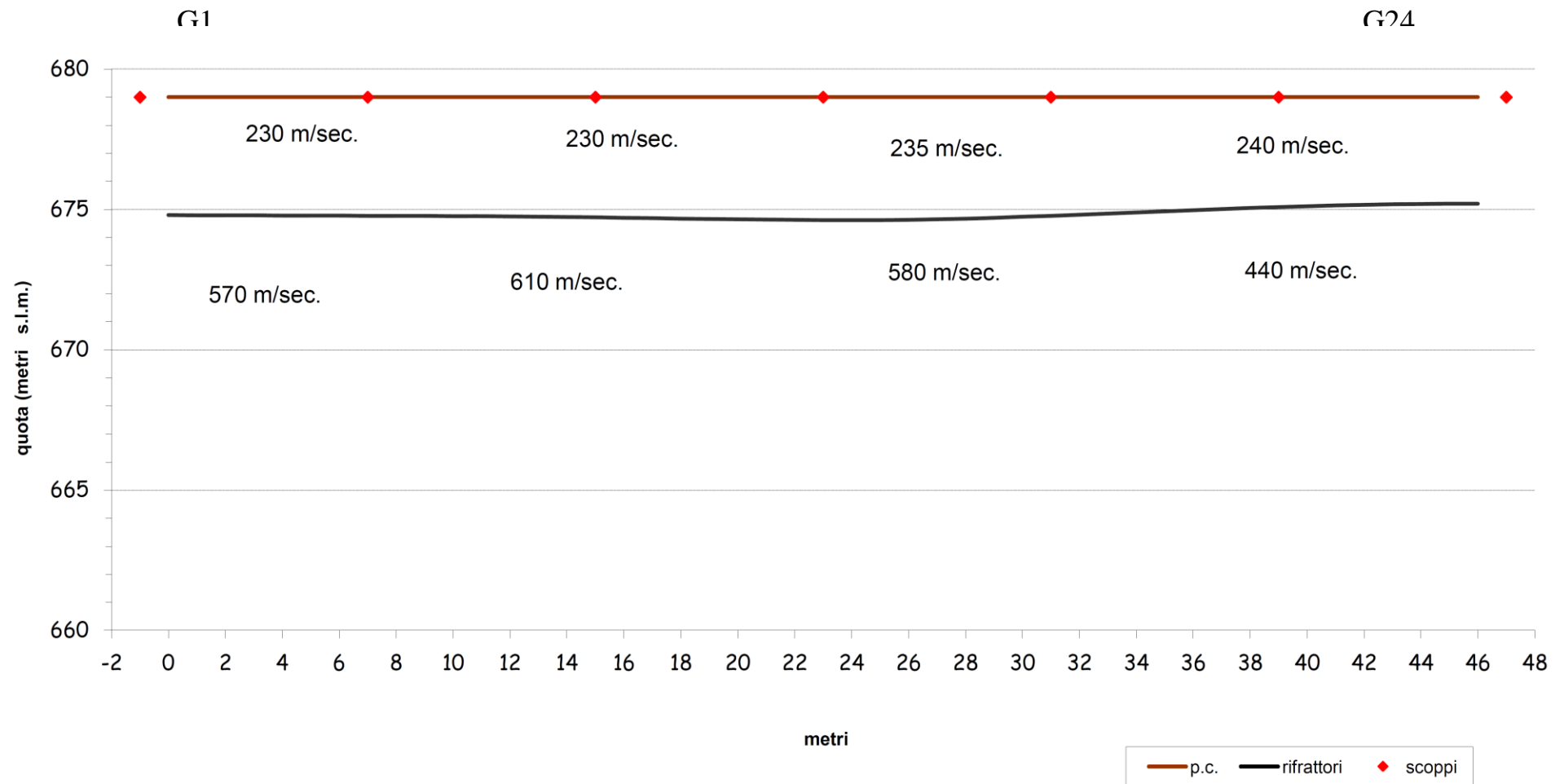


Tabella velocità e spessori Onde				P	Linea	ST01
Distanza dal geof.1	Quota	V1 m/sec	Profondità 1 m.	V2 m/sec	Profondità 2 m.	V3 m/sec
-	679.00	363.8	3.40	1 468.21		
1.00	679.00	365.0	3.42	1 458.13		
2.00	679.00	366.3	3.44	1 449.00		
3.00	679.00	367.9	3.46	1 436.58		
4.00	679.00	369.5	3.49	1 419.72		
5.00	679.00	373.4	3.52	1 412.14		
6.00	679.00	377.3	3.55	1 403.29		
7.00	679.00	381.6	3.59	1 389.90		
8.00	679.00	385.9	3.63	1 383.79		
9.00	679.00	393.3	3.67	1 380.73		
10.00	679.00	400.7	3.71	1 384.46		
11.00	679.00	407.9	3.83	1 418.64		
12.00	679.00	415.0	3.86	1 442.81		
13.00	679.00	423.0	3.89	1 475.67		
14.00	679.00	431.0	3.92	1 500.19		
15.00	679.00	437.1	3.95	1 538.33		
16.00	679.00	443.1	3.98	1 580.65		
17.00	679.00	446.9	4.00	1 622.11		
18.00	679.00	450.7	4.02	1 656.51		
19.00	679.00	452.2	4.03	1 676.91		
20.00	679.00	453.8	4.04	1 668.21		
21.00	679.00	455.6	4.05	1 648.91		
22.00	679.00	457.4	4.05	1 641.12		
23.00	679.00	459.1	4.04	1 632.88		
24.00	679.00	460.8	4.01	1 619.29		
25.00	679.00	462.6	3.98	1 598.91		
26.00	679.00	464.5	3.93	1 578.15		
27.00	679.00	463.3	3.88	1 563.63		
28.00	679.00	462.0	3.81	1 538.52		
29.00	679.00	464.4	3.74	1 510.00		
30.00	679.00	466.8	3.65	1 488.49		
31.00	679.00	465.5	3.56	1 462.32		
32.00	679.00	464.3	3.47	1 433.92		
33.00	679.00	460.0	3.38	1 396.45		
34.00	679.00	455.8	3.30	1 362.47		
35.00	679.00	449.2	3.12	1 293.23		
36.00	679.00	442.6	3.04	1 261.25		
37.00	679.00	438.4	2.96	1 228.49		
38.00	679.00	434.3	2.88	1 189.43		
39.00	679.00	427.2	2.80	1 148.32		
40.00	679.00	420.1	2.73	1 106.42		
41.00	679.00	413.0	2.65	1 070.00		
42.00	679.00	405.9	2.59	1 040.26		
43.00	679.00	399.6	2.52	1 028.35		
44.00	679.00	393.3	2.46	1 028.54		
45.00	679.00	391.4	2.40	1 027.46		
46.00	679.00	389.6	2.35	1 029.47		

Tabella velocità e spessori Onde				SH	Linea	ST01
Distanza dal geof.1	Quota	V1 m/sec	Profondità 1 m.	V2 m/sec	Profondità 2 m.	V3 m/sec
-	679.00	235.5	4.20	557.15		
1.00	679.00	235.1	4.21	558.13		
2.00	679.00	234.8	4.21	557.74		
3.00	679.00	234.6	4.21	558.22		
4.00	679.00	234.4	4.22	559.63		
5.00	679.00	233.9	4.22	563.99		
6.00	679.00	233.4	4.22	568.54		
7.00	679.00	232.6	4.23	570.90		
8.00	679.00	231.8	4.23	572.67		
9.00	679.00	231.4	4.23	578.41		
10.00	679.00	230.9	4.24	585.66		
11.00	679.00	230.5	4.24	592.82		
12.00	679.00	230.1	4.25	596.73		
13.00	679.00	229.8	4.26	599.51		
14.00	679.00	229.5	4.27	601.48		
15.00	679.00	229.5	4.28	603.12		
16.00	679.00	229.5	4.30	604.88		
17.00	679.00	230.3	4.31	608.76		
18.00	679.00	231.1	4.33	612.70		
19.00	679.00	231.4	4.34	620.28		
20.00	679.00	231.8	4.35	624.31		
21.00	679.00	231.9	4.36	623.54		
22.00	679.00	232.1	4.37	621.97		
23.00	679.00	232.8	4.38	622.67		
24.00	679.00	233.5	4.38	622.19		
25.00	679.00	233.8	4.38	621.85		
26.00	679.00	234.1	4.37	618.54		
27.00	679.00	234.9	4.35	616.45		
28.00	679.00	235.6	4.33	606.92		
29.00	679.00	236.6	4.30	594.97		
30.00	679.00	237.5	4.26	582.48		
31.00	679.00	238.5	4.23	570.80		
32.00	679.00	239.4	4.19	559.15		
33.00	679.00	240.1	4.15	546.55		
34.00	679.00	240.8	4.11	531.66		
35.00	679.00	240.9	4.07	516.25		
36.00	679.00	241.0	4.03	499.26		
37.00	679.00	241.3	3.99	485.89		
38.00	679.00	241.7	3.95	474.14		
39.00	679.00	241.7	3.92	459.80		
40.00	679.00	241.8	3.89	446.49		
41.00	679.00	241.7	3.86	435.43		
42.00	679.00	241.7	3.84	421.76		
43.00	679.00	242.2	3.82	407.46		
44.00	679.00	242.7	3.81	394.89		
45.00	679.00	243.0	3.80	392.29		
46.00	679.00	243.2	3.80	392.29		

LINEA ST02

INDAGINE DI SISMICA A RIFRAZIONE IN ONDE P e SH SCHEMA DETTAGLIATO DELLA LINEA DI ACQUISIZIONE

GEOFON. N.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
DISTANZA PROGRESSIVA (m)	0	2.5	5	7.5	10	12.5	15	17.5	20	22.5	25	27.5	30	32.5	35	40	42.5	45	47.5	50	52.5	55	57.5	60
DISTANZA PARZIALE (m)	0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
QUOTA (metri s.l.m.)	650.00	649.88	649.75	649.63	649.50	649.38	649.25	649.13	649.00	648.88	648.75	648.63	648.50	648.38	648.25	648.13	648.00	647.88	647.75	647.63	647.50	647.38	647.25	647.00

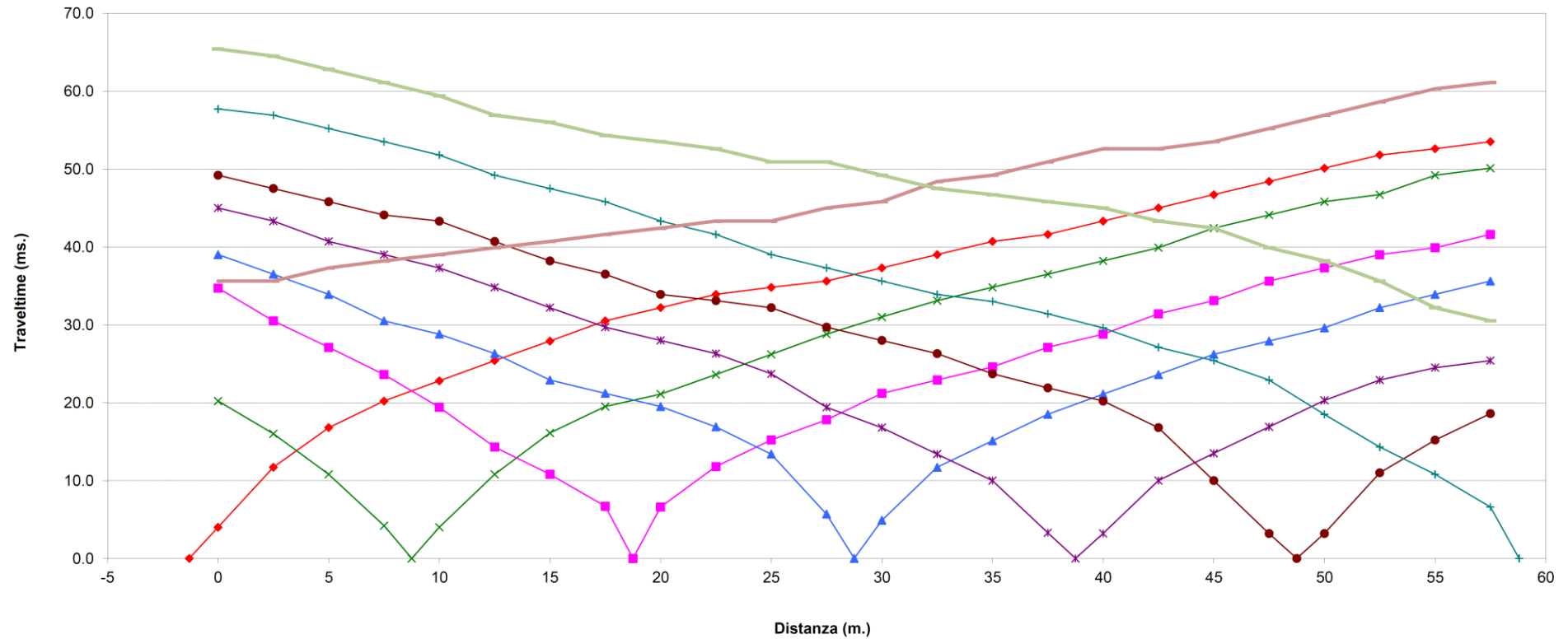
PUNTI DI ENERGIZZAZIONE ONDE P e SH

	SCOPPIO 1	SCOPPIO 2	SCOPPIO 3	SCOPPIO 4	SCOPPIO 5	SCOPPIO 6	SCOPPIO 7
POSIZ. DAL GEOF. N 1 (m)	-1.25	8.75	18.75	28.75	38.75	48.75	58.75
QUOTA (metri s.l.m.)	650.0	649.6	649.1	648.6	648.1	647.6	647.0

G1

ST02 – DROMOCRONE - ONDE P

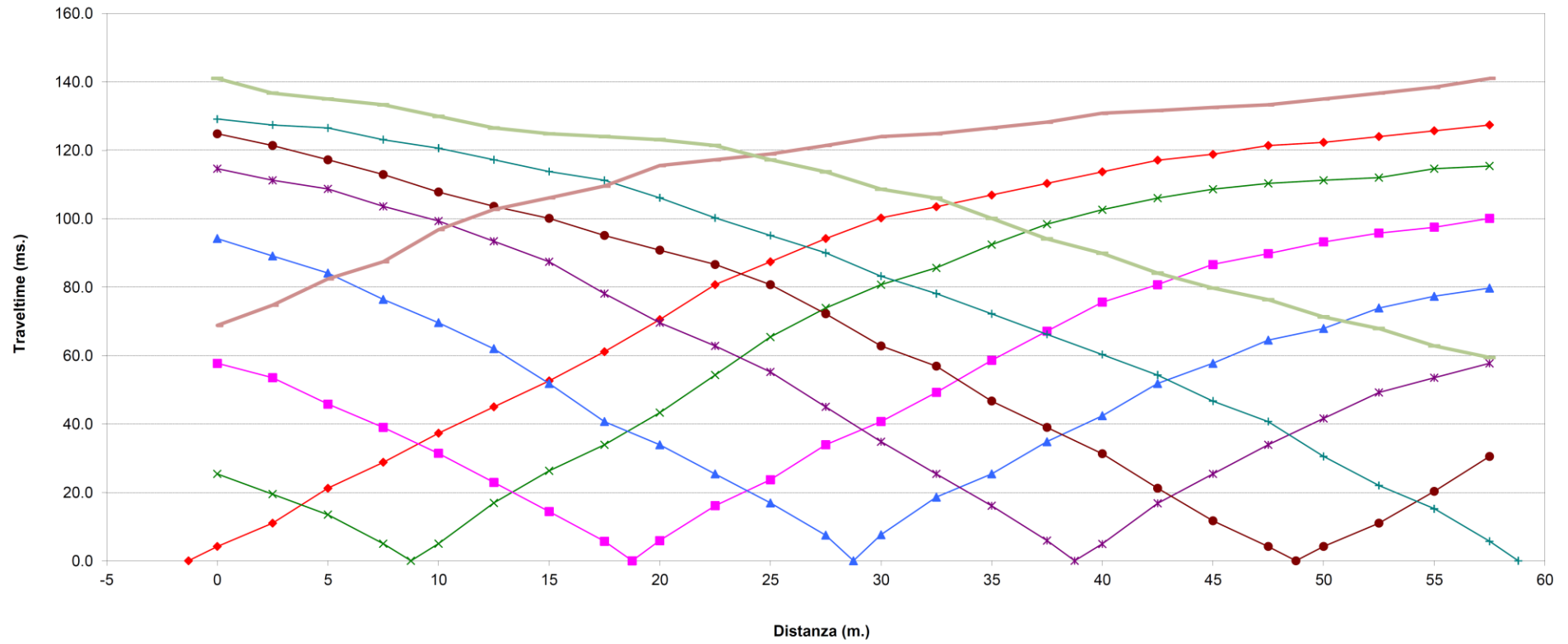
G24



ST02 – DROMOCRONE - ONDE SH

G1

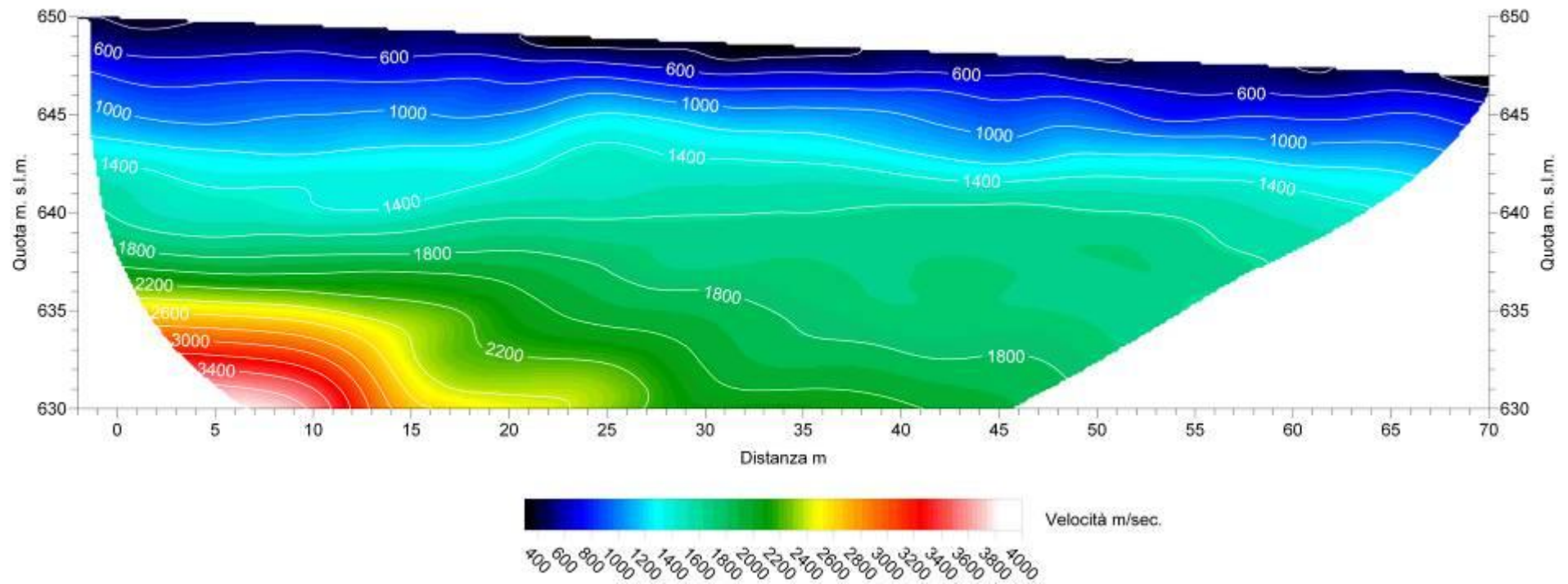
G24



G1

G24

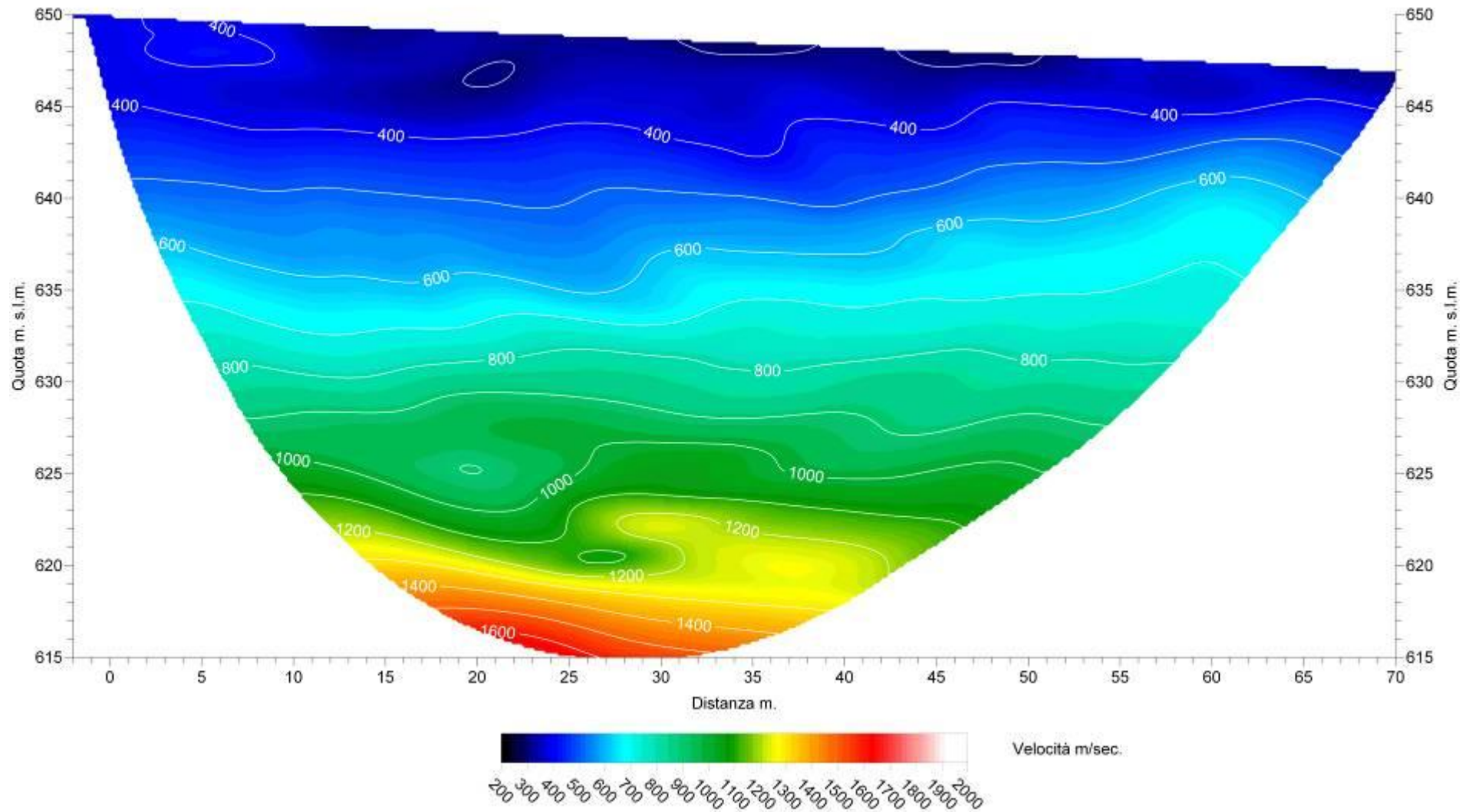
Tomografia sismica ST02 onde P



G1

G24

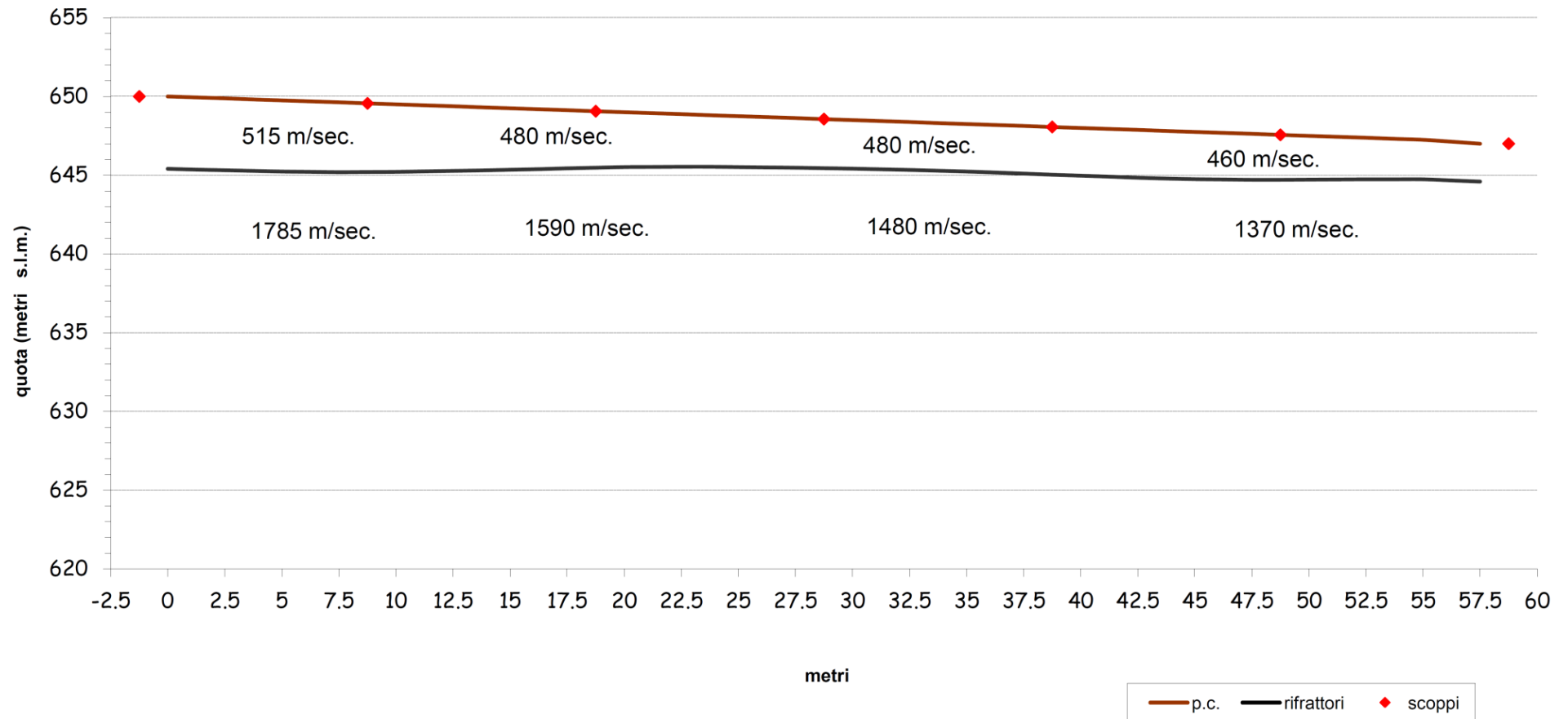
Tomografia sismica ST02 onde SH



ST02 – SEZIONE SISMOSTRATIGRAFICA - ONDE P

G1

G24



ST02 – SEZIONE SISMOSTRATIGRAFICA - ONDE SH

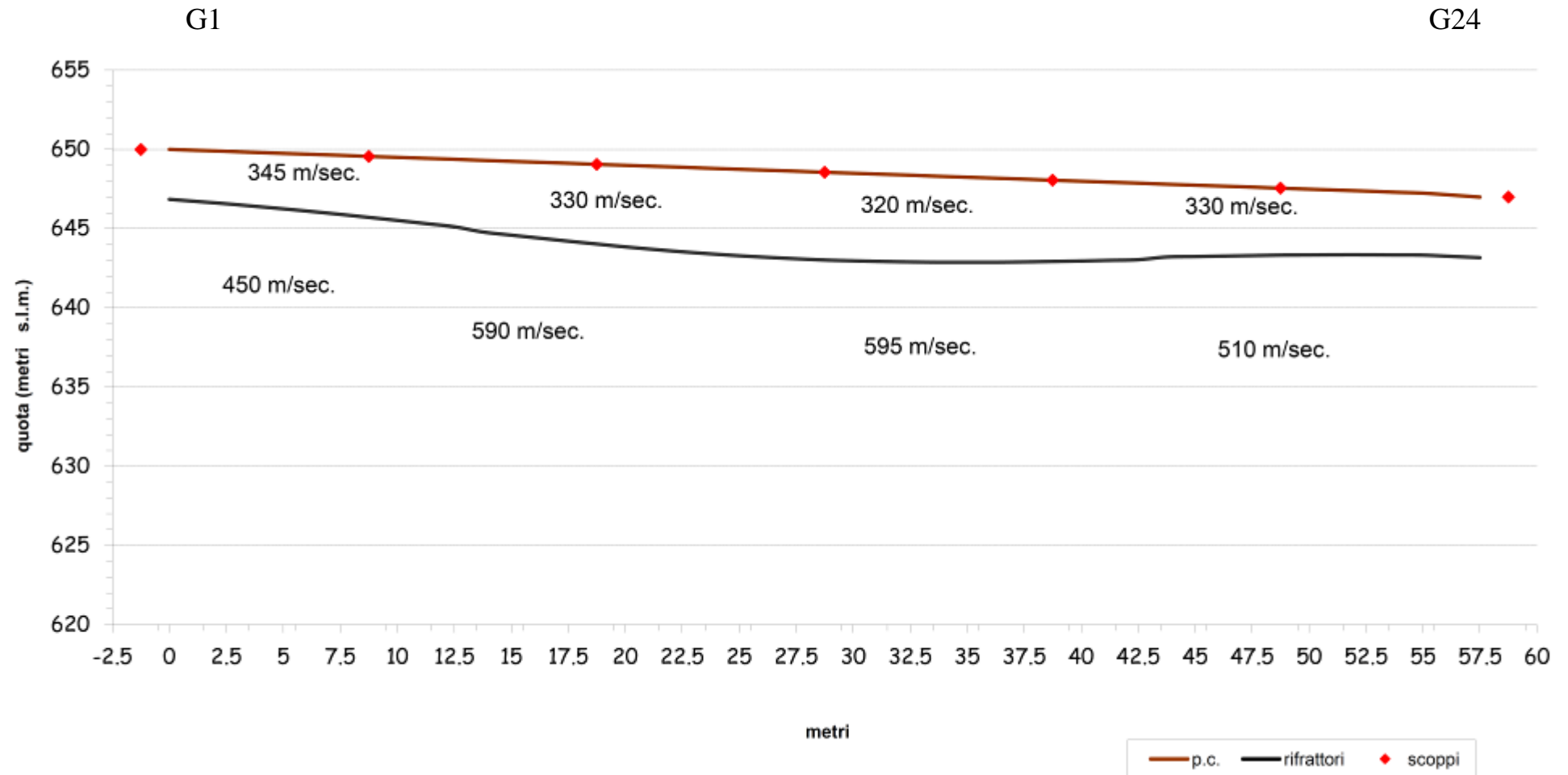


Tabella velocità e spessori Onde				P	Linea	ST02
Distanza dal geof.1	Quota	V1 m/sec	Profondità 1 m.	V2 m/sec	Profondità 2 m.	V3 m/sec
-	650.00	522.9	4.60	1 846.26		
1.25	649.94	523.0	4.59	1 843.65		
2.50	649.88	523.1	4.57	1 836.75		
3.75	649.81	522.6	4.54	1 815.04		
5.00	649.75	522.0	4.52	1 786.79		
6.25	649.69	518.5	4.48	1 768.54		
7.50	649.63	515.0	4.44	1 766.32		
8.75	649.56	514.5	4.36	1 773.12		
10.00	649.50	513.9	4.29	1 773.86		
11.25	649.44	509.5	4.20	1 770.19		
12.50	649.38	505.0	4.11	1 743.08		
13.75	649.31	499.4	4.01	1 695.68		
15.00	649.25	493.8	3.91	1 661.55		
16.25	649.19	488.7	3.81	1 635.14		
17.50	649.13	483.7	3.70	1 619.03		
18.75	649.06	481.1	3.59	1 603.01		
20.00	649.00	478.6	3.49	1 592.16		
21.25	648.94	476.3	3.42	1 585.20		
22.50	648.88	474.1	3.35	1 571.93		
23.75	648.81	471.3	3.28	1 563.89		
25.00	648.75	468.5	3.24	1 554.35		
26.25	648.69	469.4	3.20	1 557.22		
27.50	648.63	470.4	3.16	1 557.18		
28.75	648.56	471.3	3.12	1 541.77		
30.00	648.50	472.2	3.09	1 528.90		
31.25	648.44	473.2	3.07	1 518.00		
32.50	648.38	474.1	3.05	1 507.09		
33.75	648.31	475.0	3.03	1 490.73		
35.00	648.25	476.0	3.02	1 477.24		
36.25	648.19	481.9	3.02	1 460.76		
37.50	648.13	487.9	3.03	1 457.56		
38.75	648.06	489.8	3.03	1 458.70		
40.00	648.00	491.7	3.03	1 459.10		
41.25	647.94	489.3	3.03	1 462.77		
42.50	647.88	486.9	3.04	1 468.94		
43.75	647.81	484.3	3.02	1 474.89		
45.00	647.75	481.7	3.00	1 463.32		
46.25	647.69	478.9	2.96	1 445.75		
47.50	647.63	476.2	2.92	1 431.59		
48.75	647.56	470.2	2.85	1 418.51		
50.00	647.50	464.2	2.78	1 403.98		
51.25	647.44	457.3	2.71	1 379.30		
52.50	647.38	450.4	2.64	1 356.13		
53.75	647.31	450.4	2.57	1 331.78		
55.00	647.25	450.4	2.51	1 308.22		
56.25	647.13	450.4	2.46	1 288.10		
57.50	647.00	450.4	2.40	1 273.66		

Tabella velocità e spessori Onde				SH	Linea	ST02
Distanza dal geof.1	Quota	V1 m/sec	Profondità 1 m.	V2 m/sec	Profondità 2 m.	V3 m/sec
-	650.00	361.2	3.15	389.45		
1.25	649.94	359.6	3.23	396.32		
2.50	649.88	358.0	3.31	403.04		
3.75	649.81	355.0	3.40	410.33		
5.00	649.75	352.1	3.50	421.73		
6.25	649.69	347.7	3.61	434.06		
7.50	649.63	343.3	3.73	448.50		
8.75	649.56	339.3	3.85	461.13		
10.00	649.50	335.3	3.98	475.49		
11.25	649.44	331.8	4.12	488.32		
12.50	649.38	328.2	4.26	503.30		
13.75	649.31	327.0	4.52	528.47		
15.00	649.25	325.7	4.66	538.81		
16.25	649.19	325.6	4.79	549.59		
17.50	649.13	325.4	4.92	561.42		
18.75	649.06	326.1	5.03	571.73		
20.00	649.00	326.8	5.15	581.57		
21.25	648.94	328.2	5.25	589.62		
22.50	648.88	329.6	5.34	598.65		
23.75	648.81	330.1	5.40	607.39		
25.00	648.75	330.6	5.46	613.54		
26.25	648.69	328.6	5.50	618.86		
27.50	648.63	326.6	5.53	622.77		
28.75	648.56	325.2	5.54	625.72		
30.00	648.50	323.8	5.53	625.57		
31.25	648.44	323.0	5.51	624.75		
32.50	648.38	322.2	5.48	623.50		
33.75	648.31	321.6	5.43	618.79		
35.00	648.25	321.0	5.37	612.17		
36.25	648.19	320.2	5.31	602.61		
37.50	648.13	319.5	5.23	594.96		
38.75	648.06	320.5	5.13	585.62		
40.00	648.00	321.6	5.04	577.98		
41.25	647.94	323.4	4.94	567.92		
42.50	647.88	325.1	4.84	560.06		
43.75	647.81	326.5	4.60	540.45		
45.00	647.75	327.9	4.51	535.07		
46.25	647.69	329.2	4.42	528.14		
47.50	647.63	330.5	4.33	522.25		
48.75	647.56	332.4	4.23	516.76		
50.00	647.50	334.4	4.16	513.00		
51.25	647.44	335.3	4.09	509.20		
52.50	647.38	336.2	4.03	505.27		
53.75	647.31	336.7	3.97	502.24		
55.00	647.25	337.3	3.92	498.75		
56.25	647.13	337.5	3.88	495.82		
57.50	647.00	337.7	3.83	493.45		

Misure HVSR Frassineta

FRASSINETA, R 1

Instrument: TRS-0009/00-06

Start recording: 06/06/12 09:45:41 End recording: 06/06/12 10:05:42

Channel labels: NORTH SOUTH; EAST WEST; UP DOWN

GPS data not available

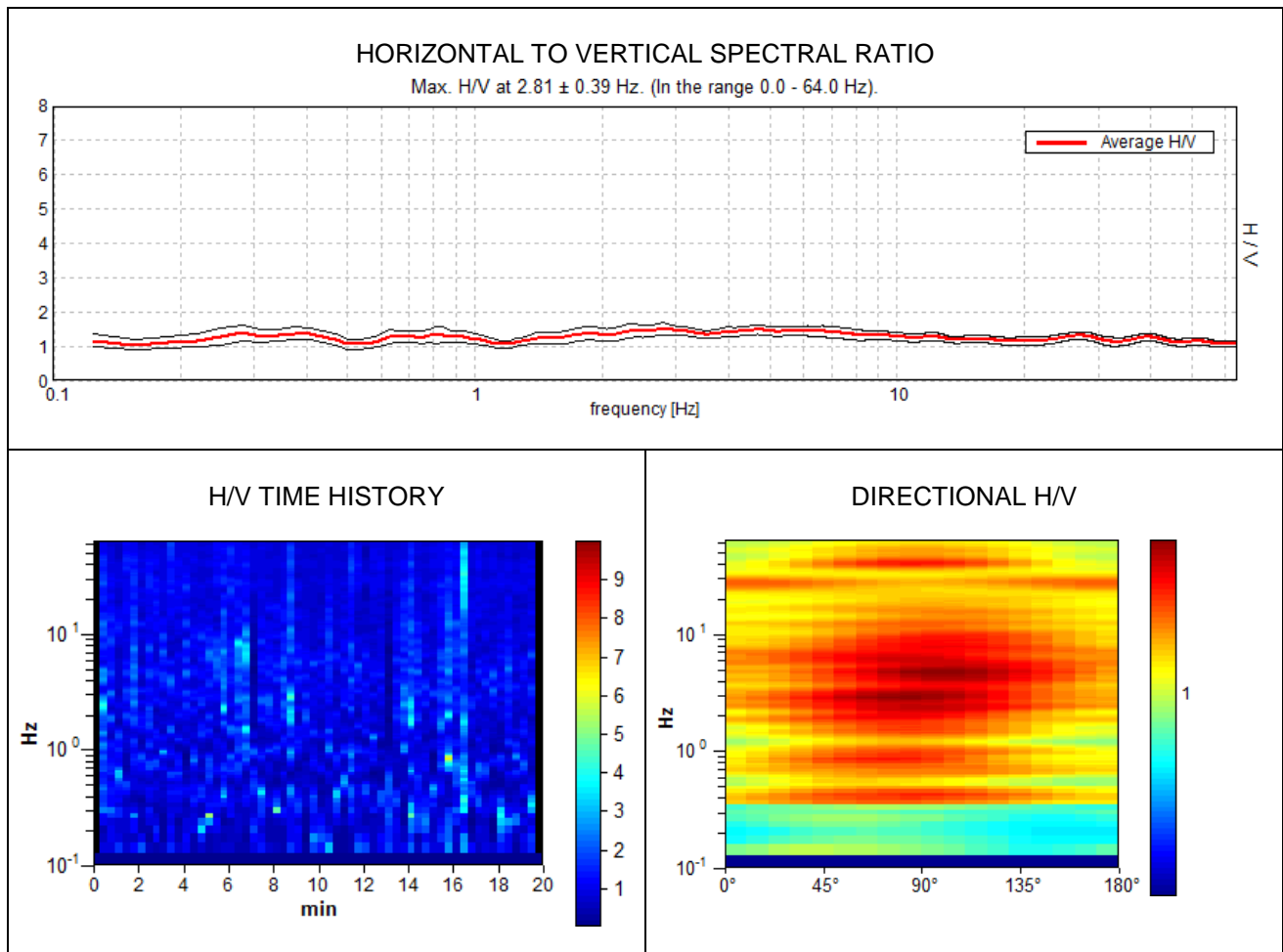
Trace length: 0h20'00". Analyzed 97% trace (manual window selection)

Sampling frequency: 128 Hz

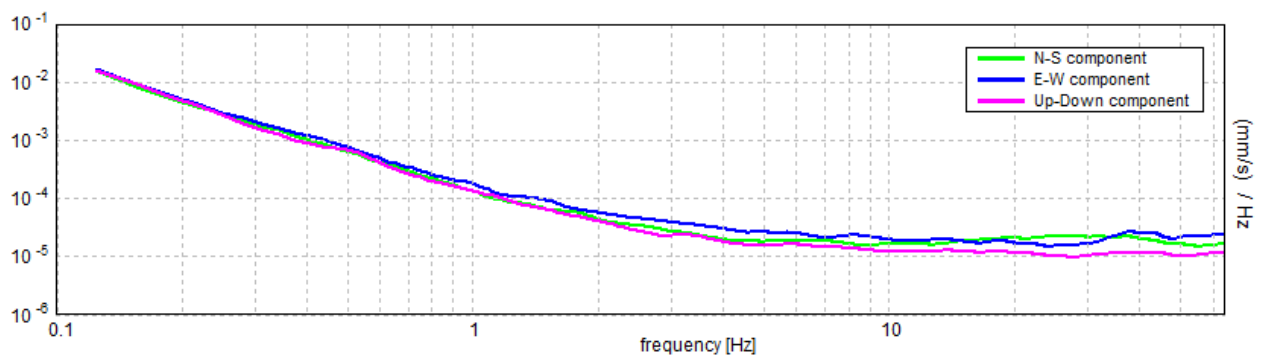
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 2.81 ± 0.39 Hz (in the range 0.0 - 64.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$2.81 > 0.50$	OK	
$n_c(f_0) > 200$	$3262.5 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 136 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$			NO
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$1.50 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.06939 < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.19517 < 0.14063$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.0866 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

Misure HVSR Corezzo

COREZZO, R 2

Instrument: TRS-0009/00-06

Start recording: 06/06/12 10:40:31 End recording: 06/06/12 11:00:32

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

GPS data not available

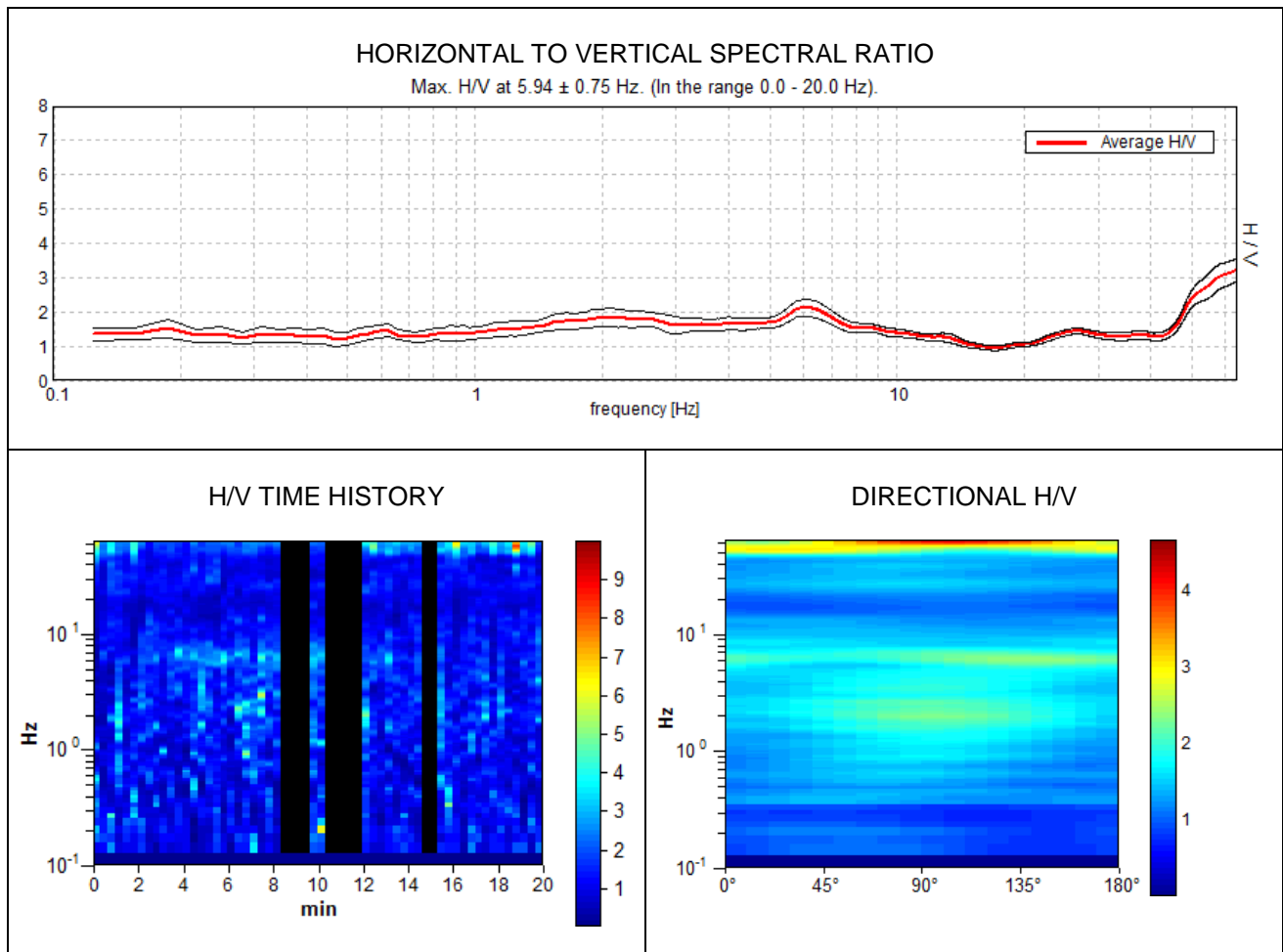
Trace length: 0h20'00". Analyzed 82% trace (manual window selection)

Sampling frequency: 128 Hz

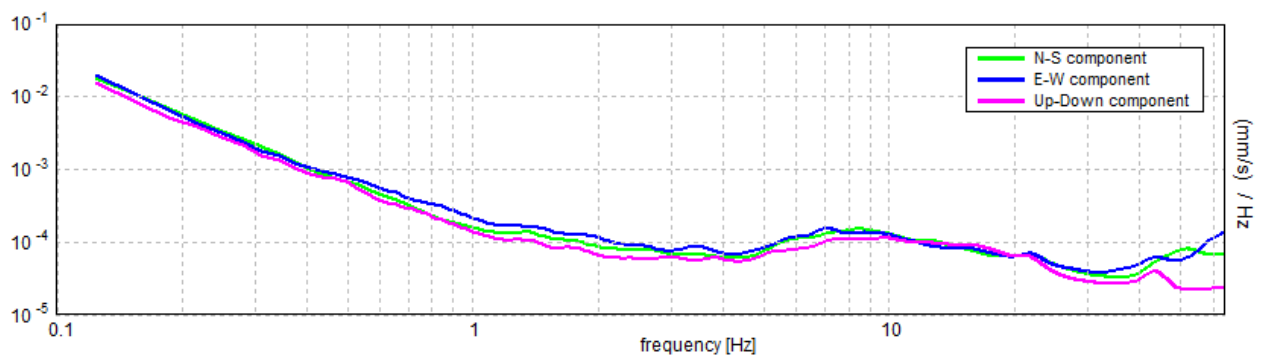
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 5.94 ± 0.75 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	5.94 > 0.50	OK	
$n_c(f_0) > 200$	5818.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 286 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 $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	14.656 Hz	OK	
$A_0 > 2$	2.12 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.06177 < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.36677 < 0.29688$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.1168 < 1.58$	OK	

L_w	window length
n_w	number of windows used in the analysis
$n_c = L_w n_w f_0$	number of significant cycles
f	current frequency
f_0	H/V peak frequency
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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COREZZO, R 3

Instrument: TRS-0009/00-06

Start recording: 06/06/12 11:16:52 End recording: 06/06/12 11:36:53

Channel labels: NORTH SOUTH; EAST WEST; UP DOWN

GPS data not available

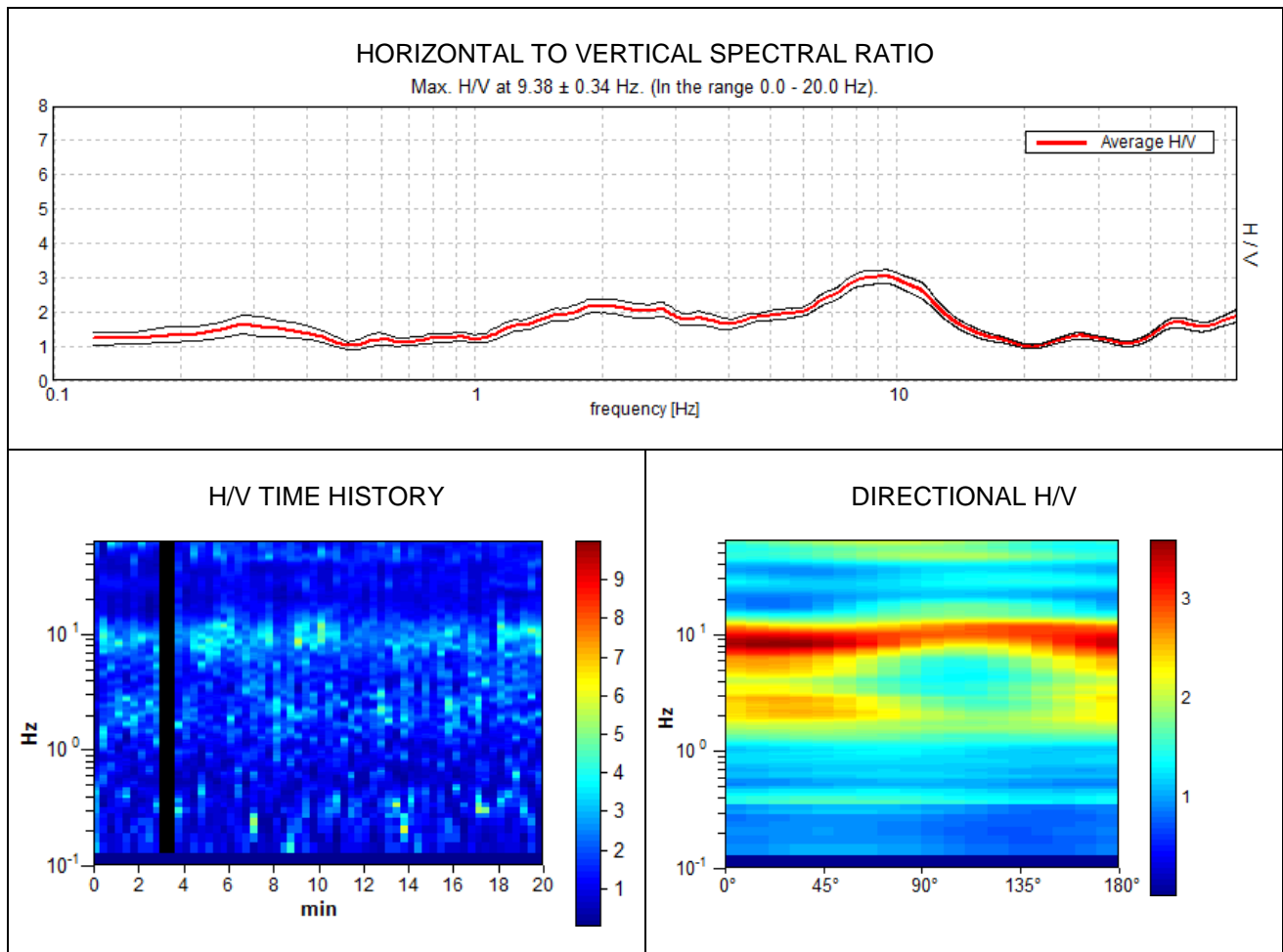
Trace length: 0h20'00". Analyzed 97% trace (manual window selection)

Sampling frequency: 128 Hz

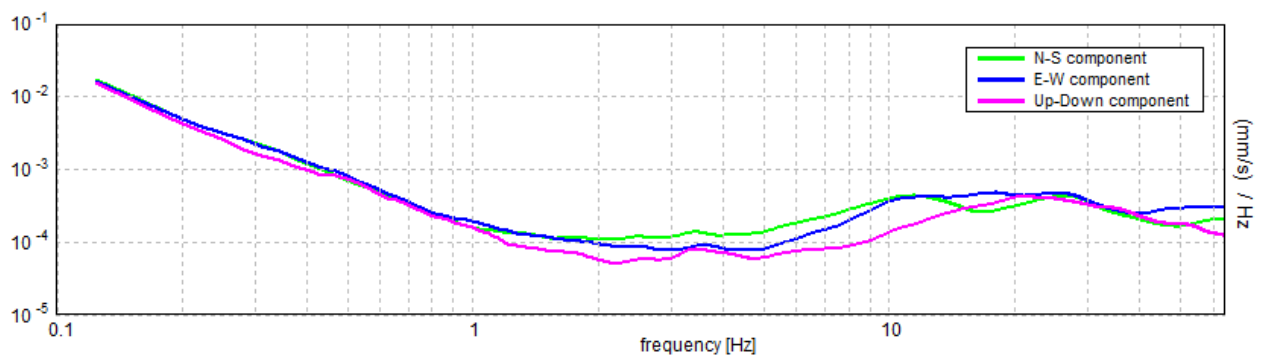
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 9.38 ± 0.34 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$9.38 > 0.50$	OK	
$n_c(f_0) > 200$	$10875.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 451 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 $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	14.656 Hz	OK	
$A_0 > 2$	$3.03 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01779 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.16677 < 0.46875$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.0983 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

COREZZO, R 4

Strumento: TRS-0009/00-06

Start recording: 06/06/12 11:49:48 End recording: 06/06/12 12:09:49

Channel labels: NORTH SOUTH; EAST WEST; UP DOWN

GPS data not available

Trace length: 0h20'00". Analizzato 87% tracciato (selezione manuale)

Sampling rate: 128 Hz

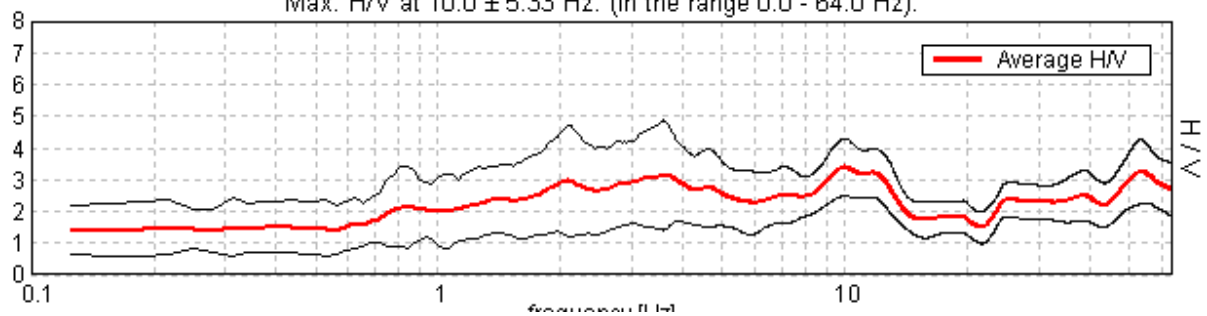
Lunghezza finestre: 20 s

Tipo di lisciamento: Triangular window

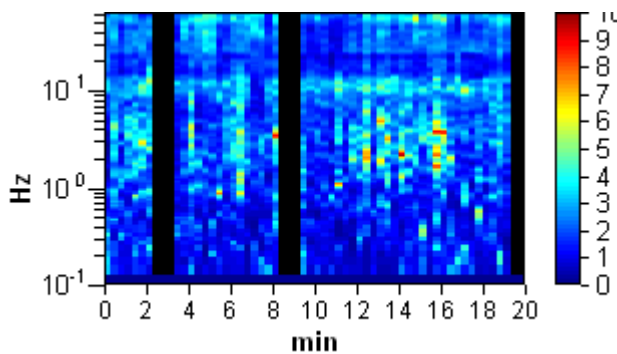
Lisciamento: 10%

RAPPORTO SPETTRALE ORIZZONTALE SU VERTICALE

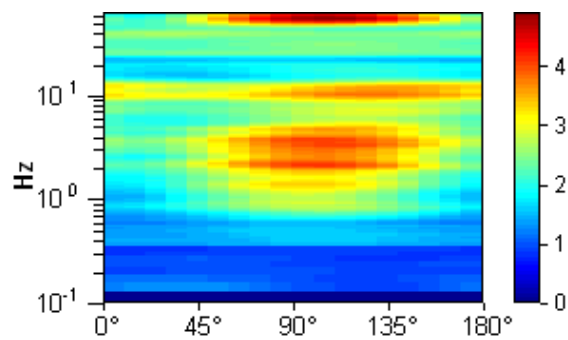
Max. H/V at 10.0 ± 5.33 Hz. (In the range 0.0 - 64.0 Hz).



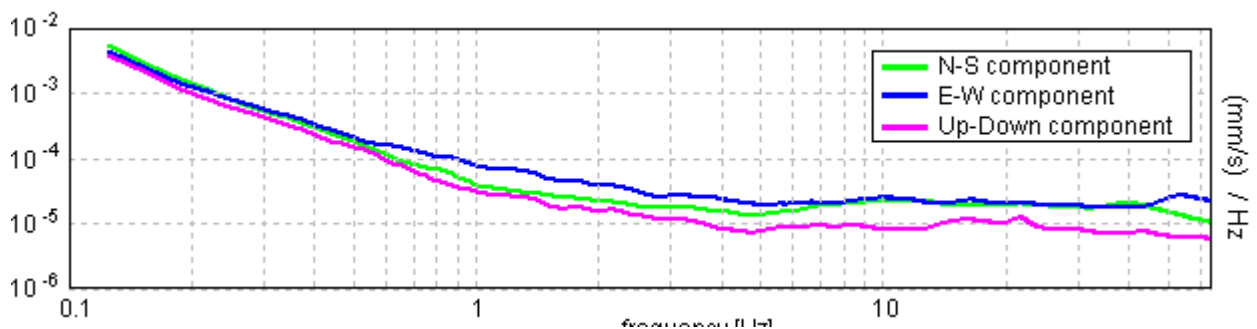
SERIE TEMPORALE H/V



DIREZIONALITA' H/V



SPETTRI DELLE SINGOLE COMPONENTI



[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 10.0 ± 5.33 Hz (nell'intervallo 0.0 - 64.0 Hz).

Criteri per una curva H/V affidabile

[Tutti 3 dovrebbero risultare soddisfatti]

$f_0 > 10 / L_w$	$10.00 > 0.50$	OK	
$n_c(f_0) > 200$	$10400.0 > 200$	OK	
$\sigma_A(f) < 2$ per $0.5f_0 < f < 2f_0$ se $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ per $0.5f_0 < f < 2f_0$ se $f_0 < 0.5\text{Hz}$	Superato 0 volte su 481	OK	

Criteri per un picco H/V chiaro

[Almeno 5 su 6 dovrebbero essere soddisfatti]

Esiste f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$			NO
Esiste f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	20.219 Hz	OK	
$A_0 > 2$	$3.39 > 2$	OK	
$f_{\text{picco}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.26299 < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$2.62994 < 0.5$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.4478 < 1.58$	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
$\sigma_{\log H/V}(f)$	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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

R 4 RIPETUTA

Strumento: TRS-0004/00-06

Inizio registrazione: 01/08/12 11:00:02 Fine registrazione: 01/08/12 11:20:03

Nomi canali: NORTH SOUTH; EAST WEST; UP DOWN

Dato GPS non disponibile

Durata registrazione: 0h20'00".

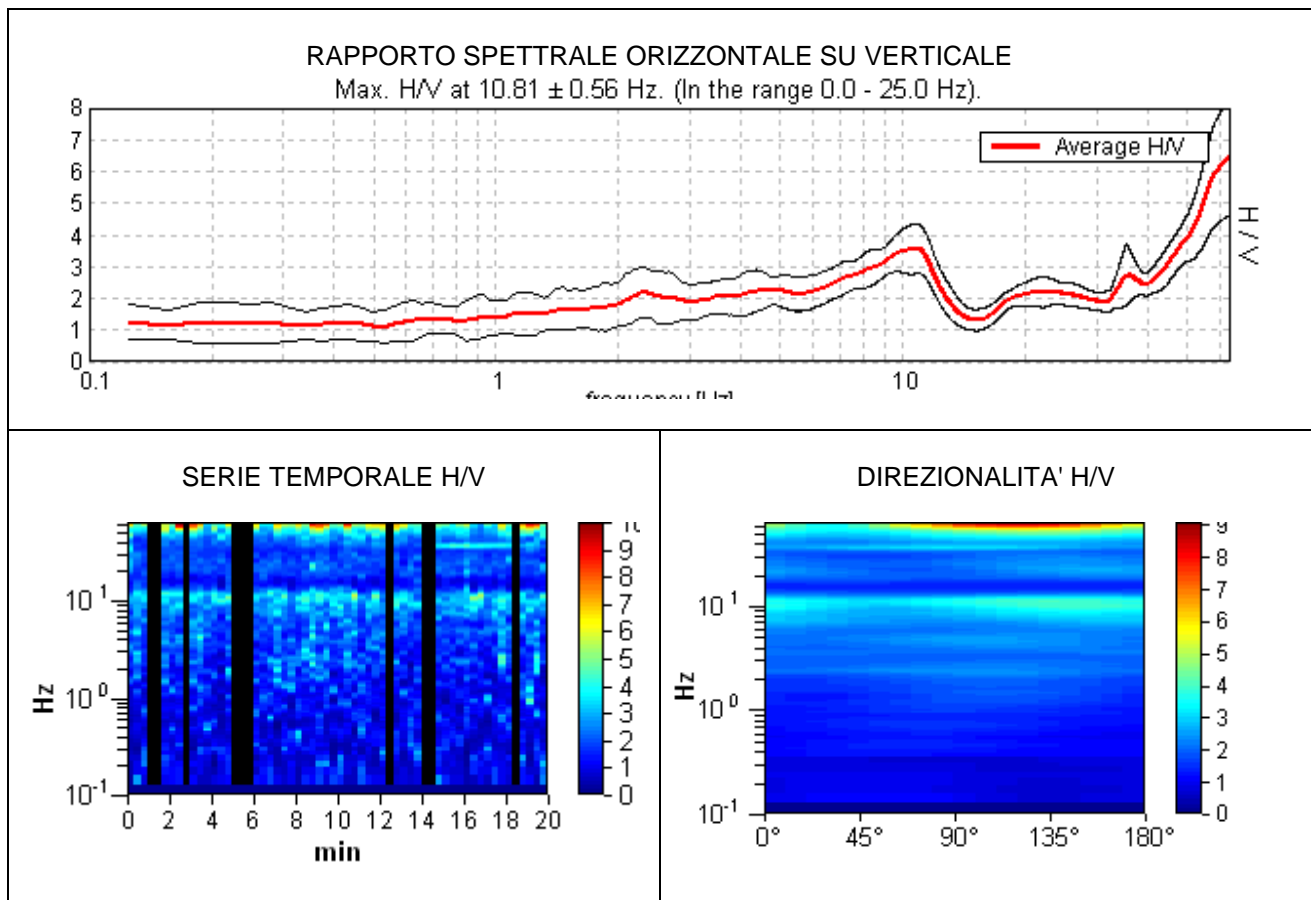
Analizzato 83% tracciato (selezione manuale)

Freq. campionamento: 128 Hz

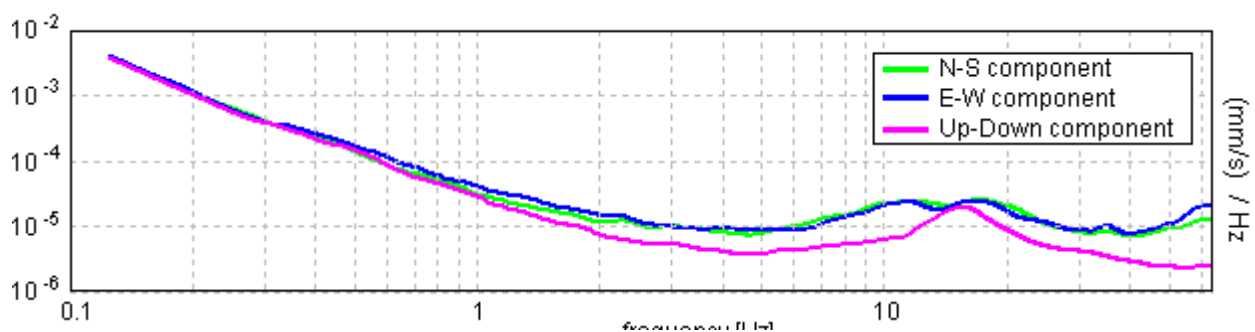
Lunghezza finestre: 20 s

Tipo di lisciamento: Triangular window

Lisciamento: 10%



SPETTRI DELLE SINGOLE COMPONENTI



[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 10.81 ± 0.56 Hz (nell'intervallo 0.0 - 25.0 Hz).

Criteri per una curva H/V affidabile

[Tutti 3 dovrebbero risultare soddisfatti]

$f_0 > 10 / L_w$	$10.81 > 0.50$	OK	
$n_c(f_0) > 200$	$10812.5 > 200$	OK	
$\sigma_A(f) < 2$ per $0.5f_0 < f < 2f_0$ se $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ per $0.5f_0 < f < 2f_0$ se $f_0 < 0.5\text{Hz}$	Superato 0 volte su 520	OK	

Criteri per un picco H/V chiaro

[Almeno 5 su 6 dovrebbero essere soddisfatti]

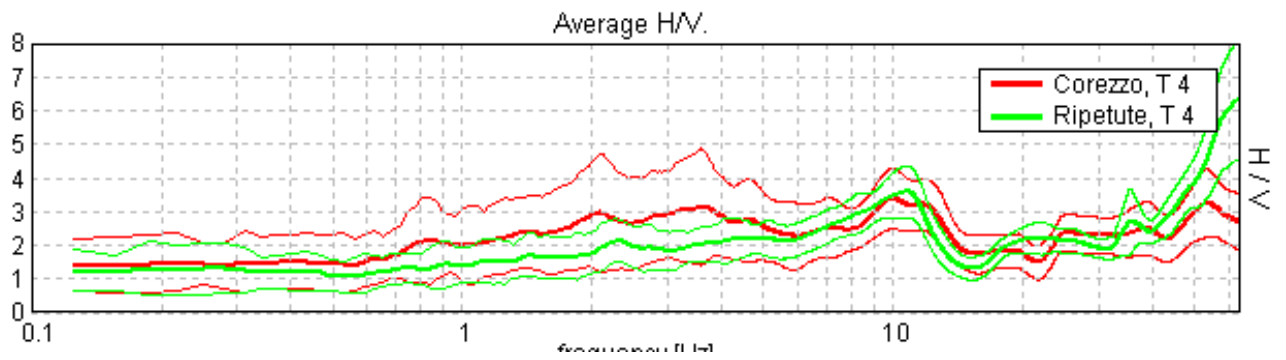
Esiste f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$			NO
Esiste f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	13.25 Hz	OK	
$A_0 > 2$	$3.57 > 2$	OK	
$f_{\text{picco}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02563 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.27708 < 0.54063$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.3881 < 1.58$	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
$\sigma_{\log H/V}(f)$	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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

Sovrapposizione misura precedente e misura ripetuta



Misure HVSr Rimbocchi

RIMBOCCHI, R 5

Instrument: TRS-0009/00-06

Start recording: 07/06/12 09:49:15 End recording: 07/06/12 10:09:16

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

GPS data not available

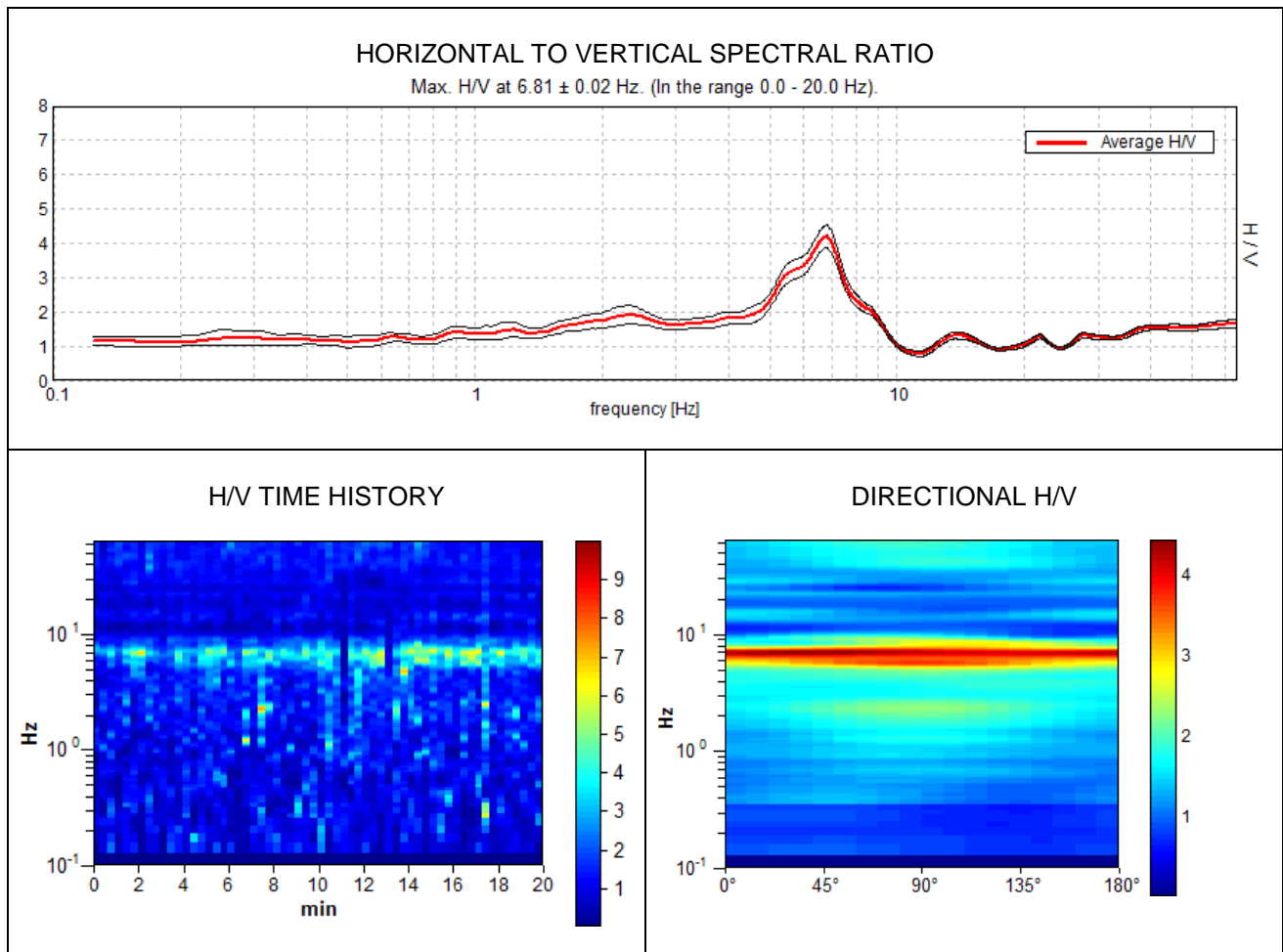
Trace length: 0h20'00". Analysis performed on the entire trace.

Sampling frequency: 128 Hz

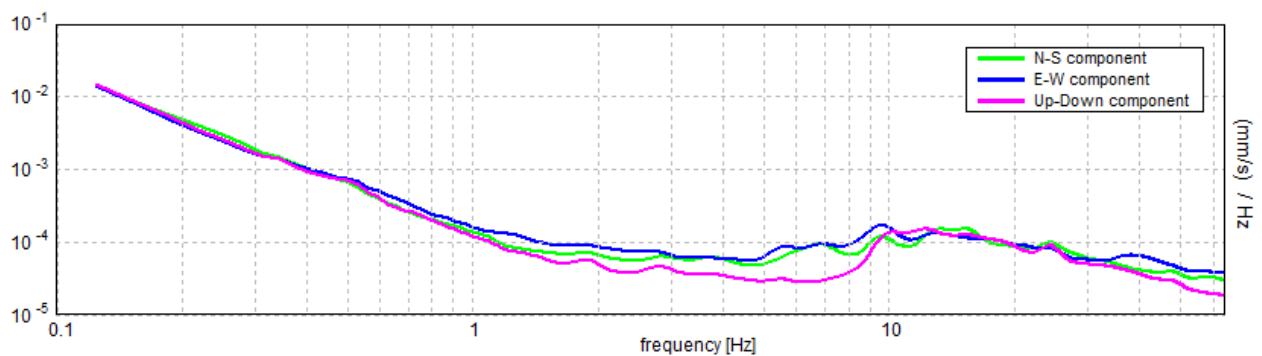
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 6.81 ± 0.02 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$6.81 > 0.50$	OK	
$n_c(f_0) > 200$	$8175.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 328 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0 / 2$	4.813 Hz	OK	
Exists f^+ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0 / 2$	8.469 Hz	OK	
$A_0 > 2$	$4.20 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00138 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.00939 < 0.34063$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1656 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

RIMBOCCHI, R 6

Instrument: TRS-0009/00-06

Start recording: 07/06/12 10:15:51 End recording: 07/06/12 10:35:52

Channel labels: NORTH SOUTH; EAST WEST; UP DOWN

GPS data not available

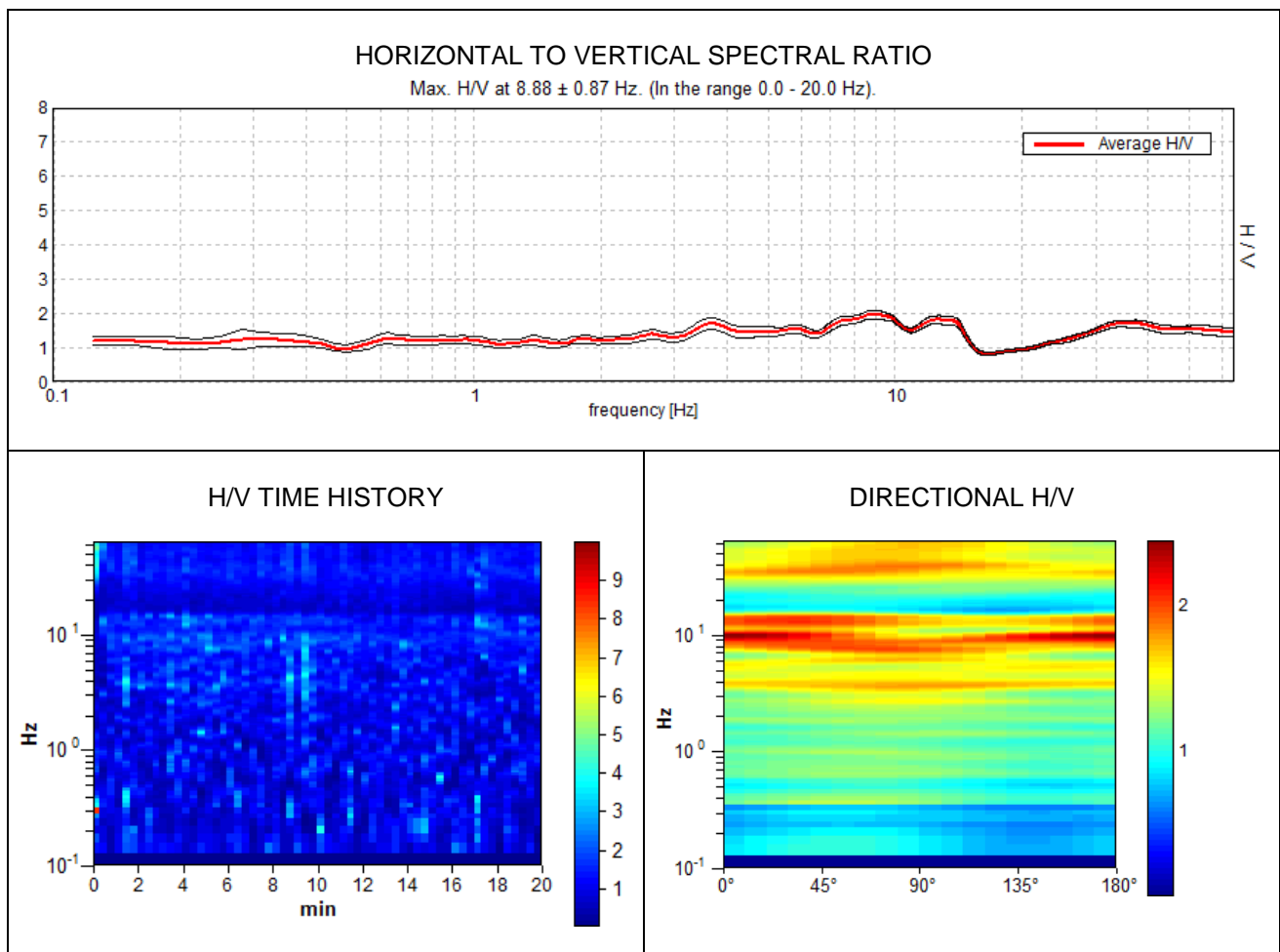
Trace length: 0h20'00". Analysis performed on the entire trace.

Sampling frequency: 128 Hz

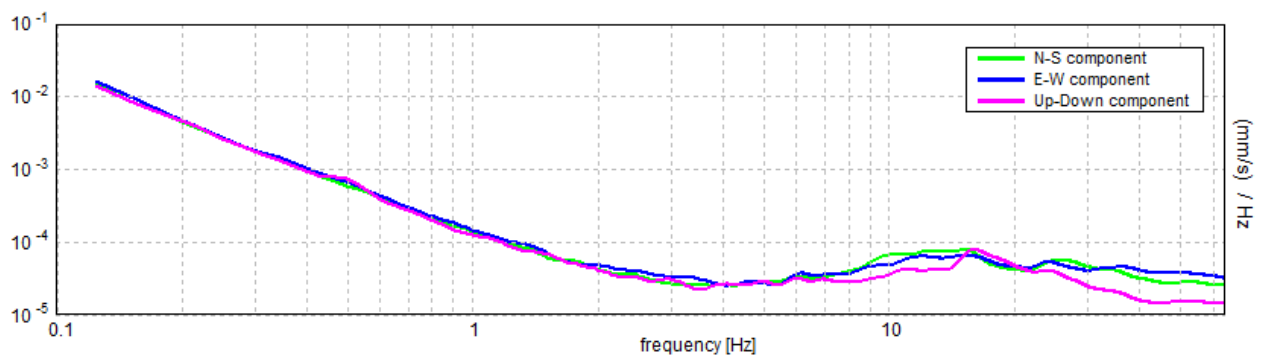
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 8.88 ± 0.87 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$8.88 > 0.50$	OK	
$n_c(f_0) > 200$	$10650.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 427 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 $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	15.469 Hz	OK	
$A_0 > 2$	$1.96 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.04848 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.43026 < 0.44375$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.061 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

Misure HVSR Biforco

BIFORCO, R 7

Instrument: TRS-0009/00-06

Start recording: 06/06/12 16:59:09 End recording: 06/06/12 17:19:10

Channel labels: NORTH SOUTH; EAST WEST; UP DOWN

GPS data not available

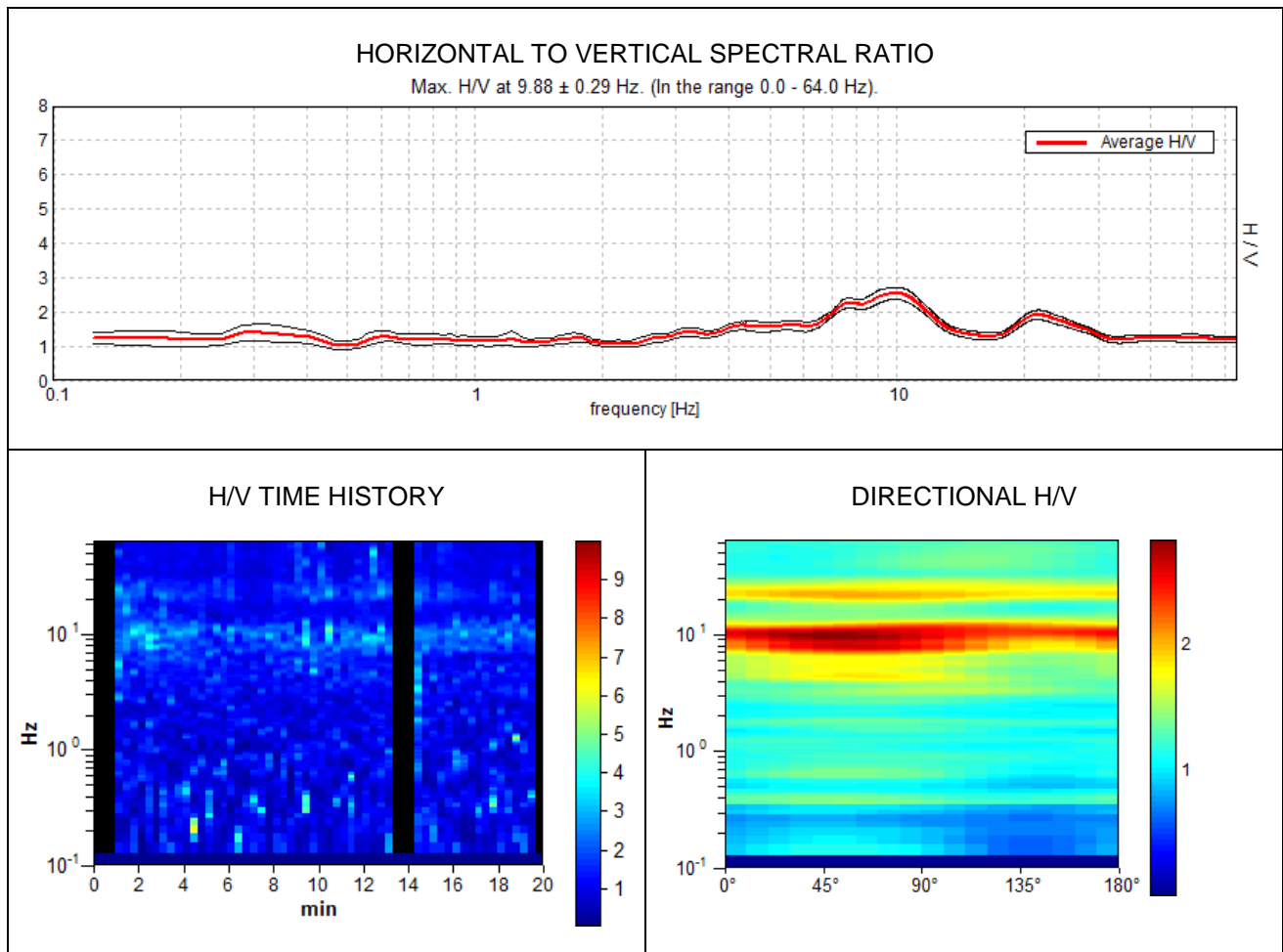
Trace length: 0h20'00". Analyzed 88% trace (manual window selection)

Sampling frequency: 128 Hz

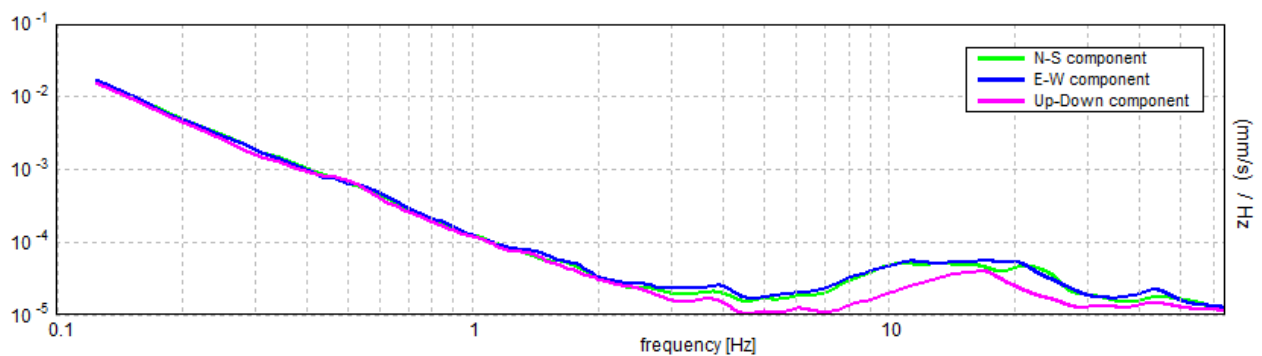
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 9.88 ± 0.29 Hz (in the range 0.0 - 64.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$9.88 > 0.50$	OK	
$n_c(f_0) > 200$	$10467.5 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 475 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$	2.844 Hz	OK	
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	30.813 Hz	OK	
$A_0 > 2$	$2.53 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01446 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.14277 < 0.49375$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.0794 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

BIFORCO, R 8

Instrument: TRS-0009/00-06

Start recording: 06/06/12 16:16:04 End recording: 06/06/12 16:36:05

Channel labels: NORTH SOUTH; EAST WEST; UP DOWN

GPS data not available

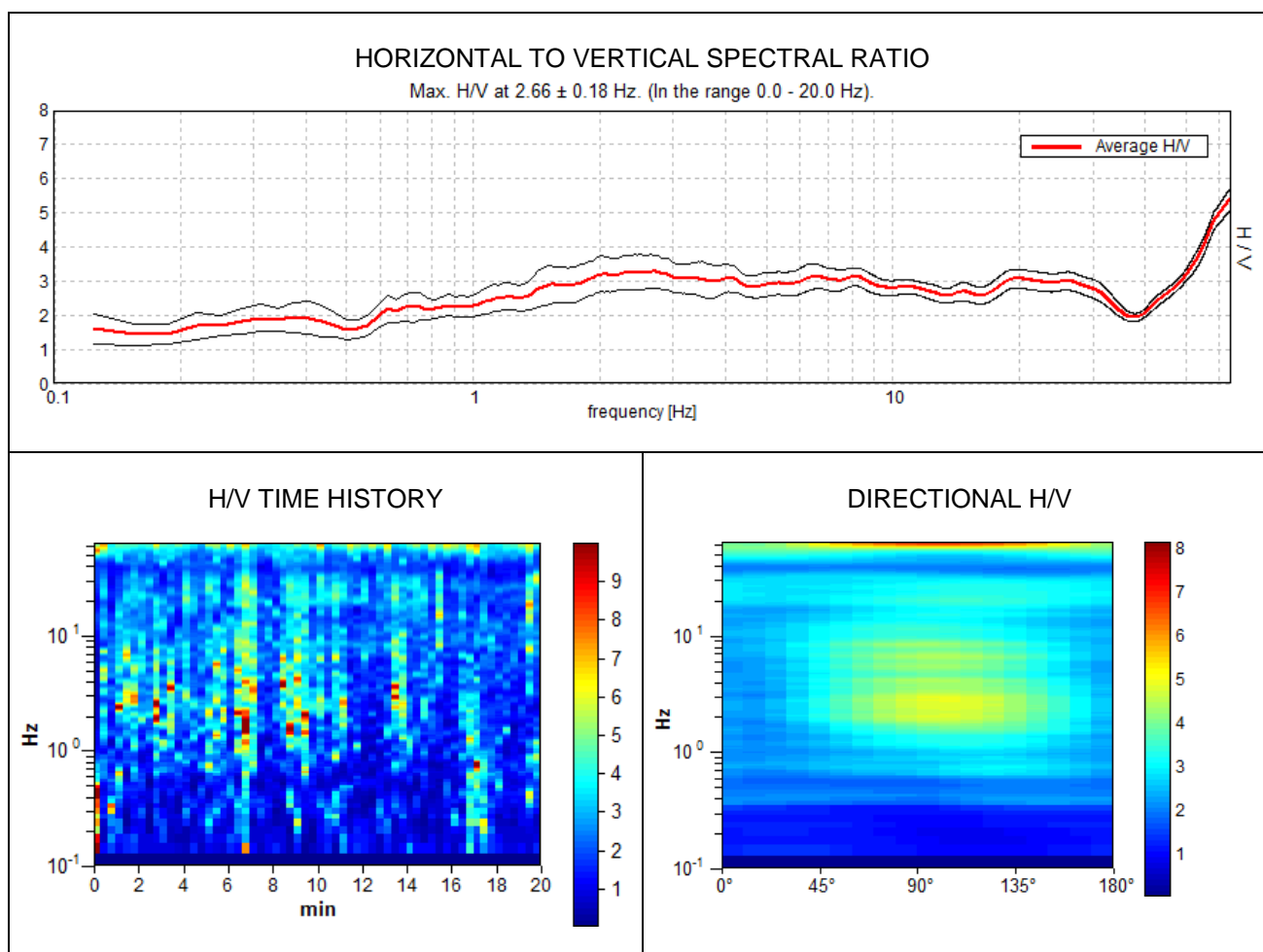
Trace length: 0h20'00". Analysis performed on the entire trace.

Sampling frequency: 128 Hz

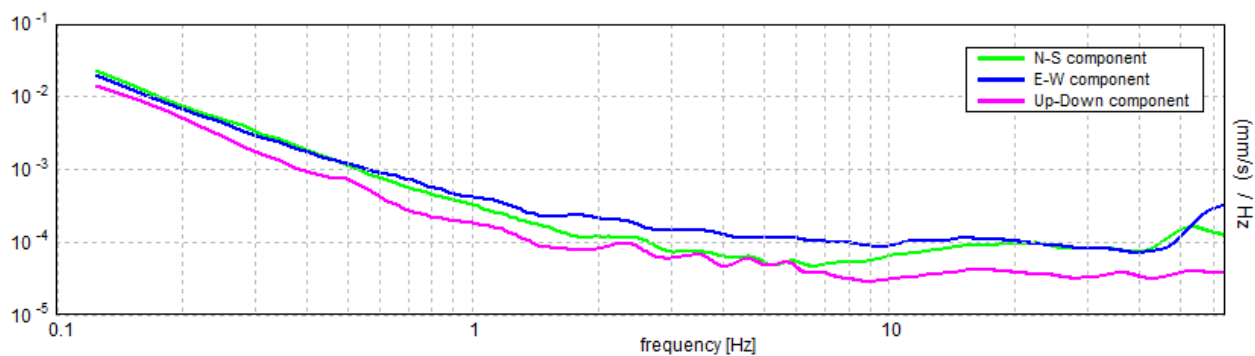
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 2.66 ± 0.18 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$2.66 > 0.50$	OK	
$n_c(f_0) > 200$	$3187.5 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 128 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
$A_0 > 2$	$3.29 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03449 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.0916 < 0.13281$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2433 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

R 8 RIPETUTA

Strumento: TRS-0004/00-06

Inizio registrazione: 01/08/12 12:23:34 Fine registrazione: 01/08/12 12:43:35

Nomi canali: NORTH SOUTH; EAST WEST; UP DOWN

Dato GPS non disponibile

Durata registrazione: 0h20'00".

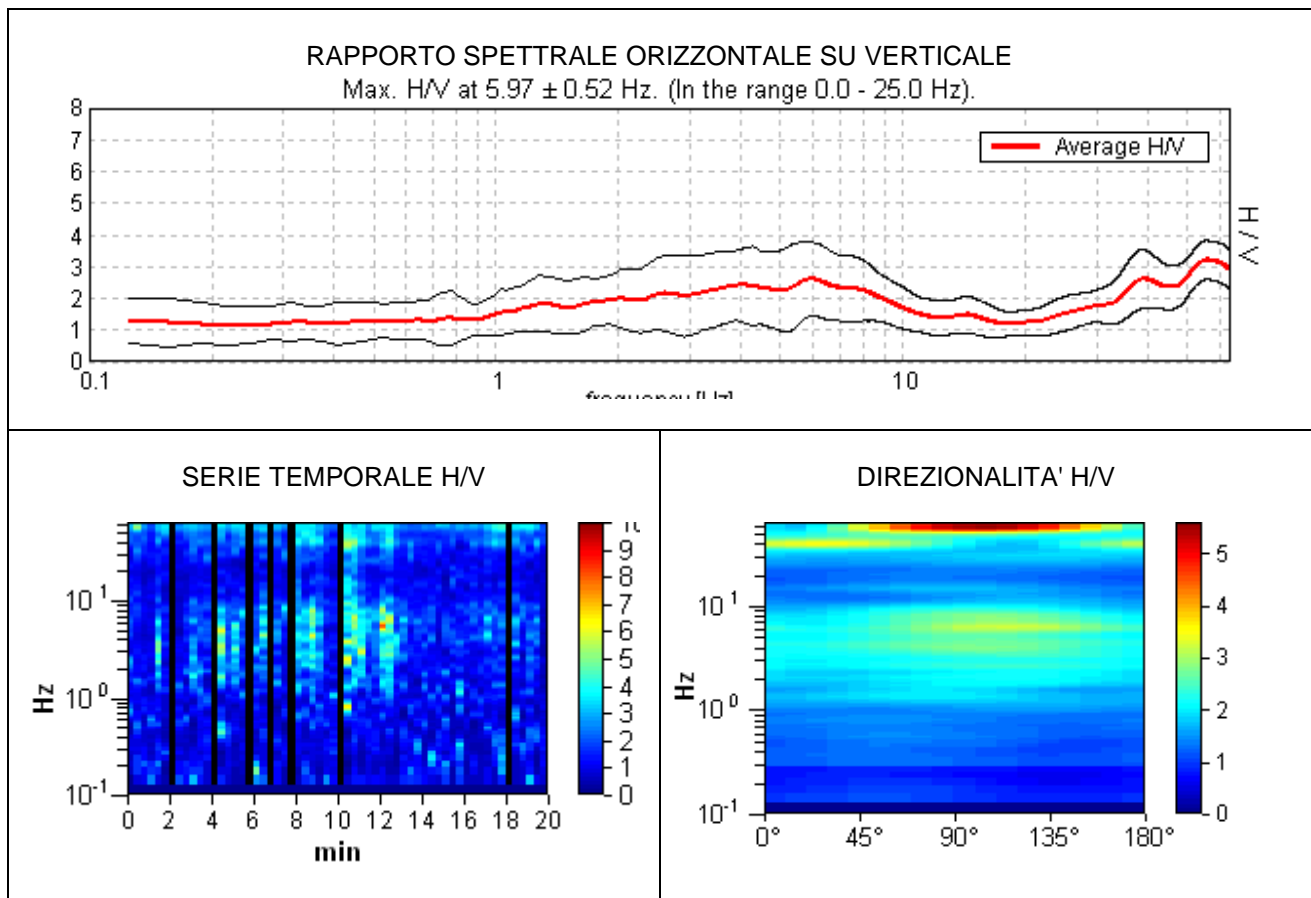
Analizzato 88% tracciato (selezione manuale)

Freq. campionamento: 128 Hz

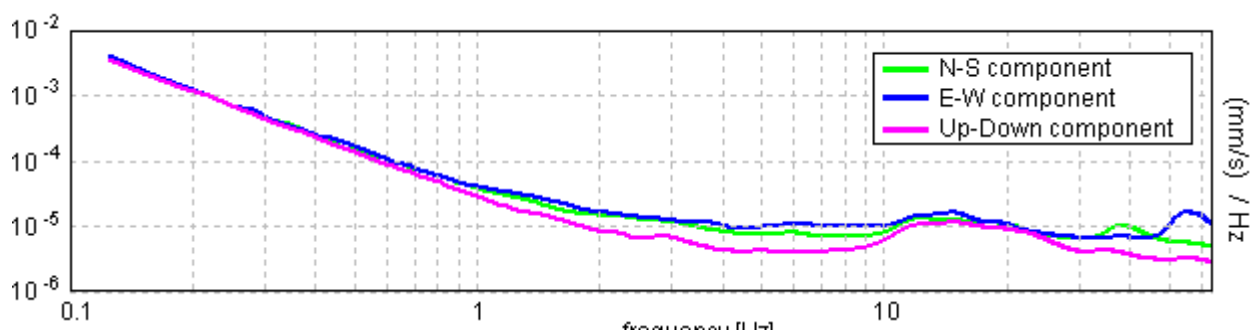
Lunghezza finestre: 20 s

Tipo di lisciamento: Triangular window

Lisciamento: 12%



SPETTRI DELLE SINGOLE COMPONENTI



[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 5.97 ± 0.52 Hz (nell'intervallo 0.0 - 25.0 Hz).

Criteri per una curva H/V affidabile

[Tutti 3 dovrebbero risultare soddisfatti]

$f_0 > 10 / L_w$	$5.97 > 0.50$	OK	
$n_c(f_0) > 200$	$6326.9 > 200$	OK	
$\sigma_A(f) < 2$ per $0.5f_0 < f < 2f_0$ se $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ per $0.5f_0 < f < 2f_0$ se $f_0 < 0.5\text{Hz}$	Superato 0 volte su 288	OK	

Criteri per un picco H/V chiaro

[Almeno 5 su 6 dovrebbero essere soddisfatti]

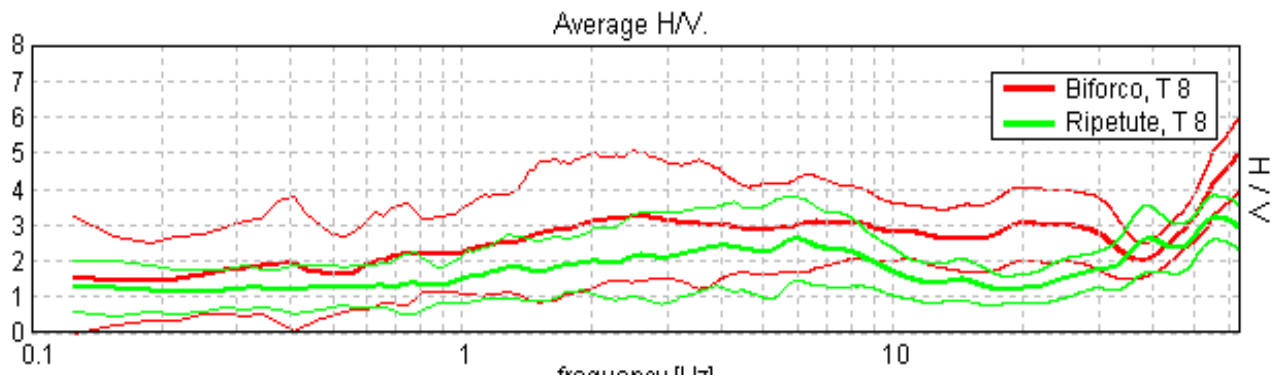
Esiste f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$			NO
Esiste f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	16.156 Hz	OK	
$A_0 > 2$	$2.61 > 2$	OK	
$f_{\text{picco}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.04311 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.25729 < 0.29844$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.5773 < 1.58$	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
$\sigma_{\log H/V}(f)$	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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

Sovrapposizione misura precedente e misura ripetuta



BIFORCO, R 9

Instrument: TRS-0009/00-06

Start recording: 06/06/12 13:04:07 End recording: 06/06/12 13:24:08

Channel labels: NORTH SOUTH; EAST WEST; UP DOWN

GPS data not available

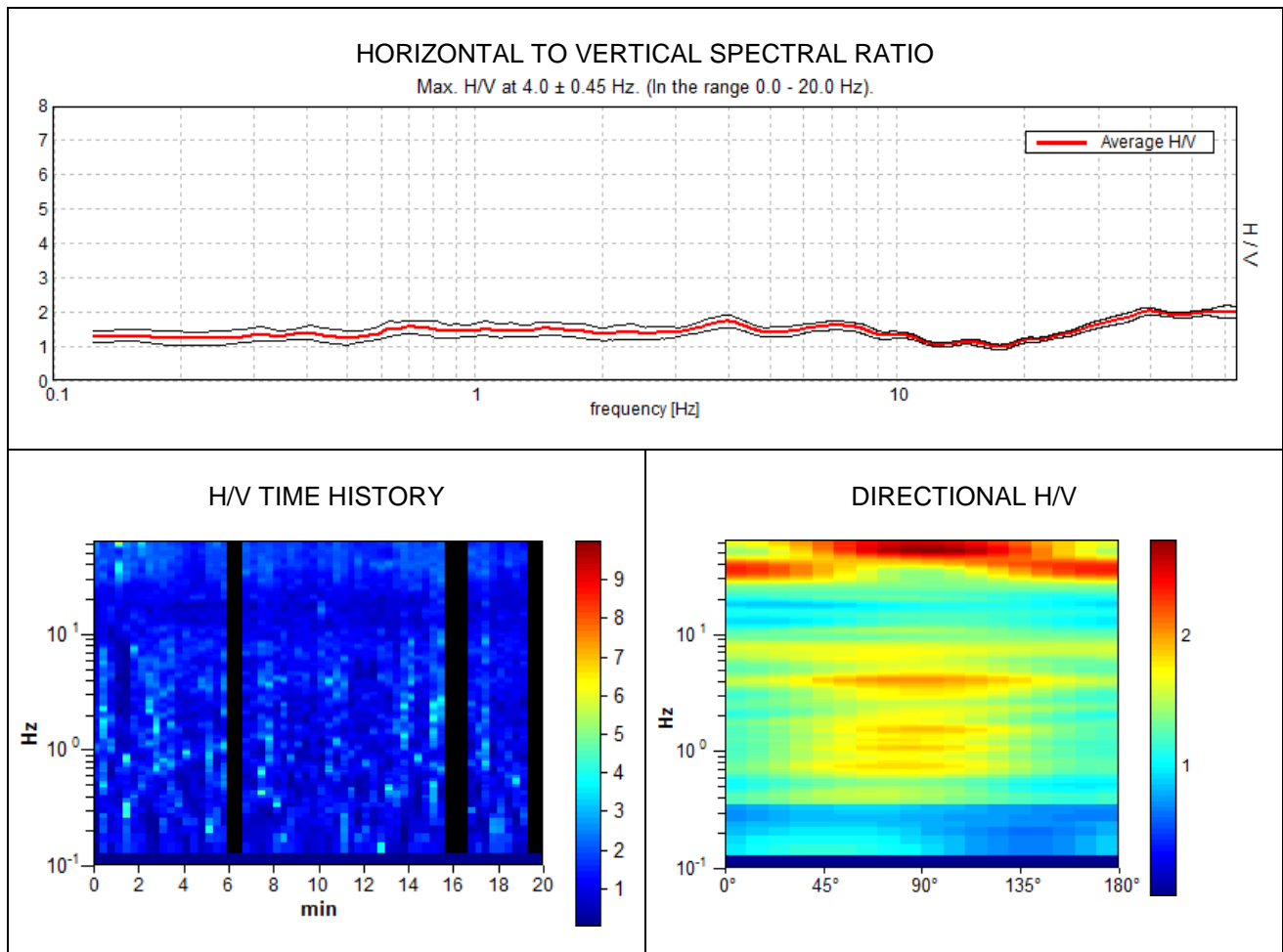
Trace length: 0h20'00". Analyzed 88% trace (manual window selection)

Sampling frequency: 128 Hz

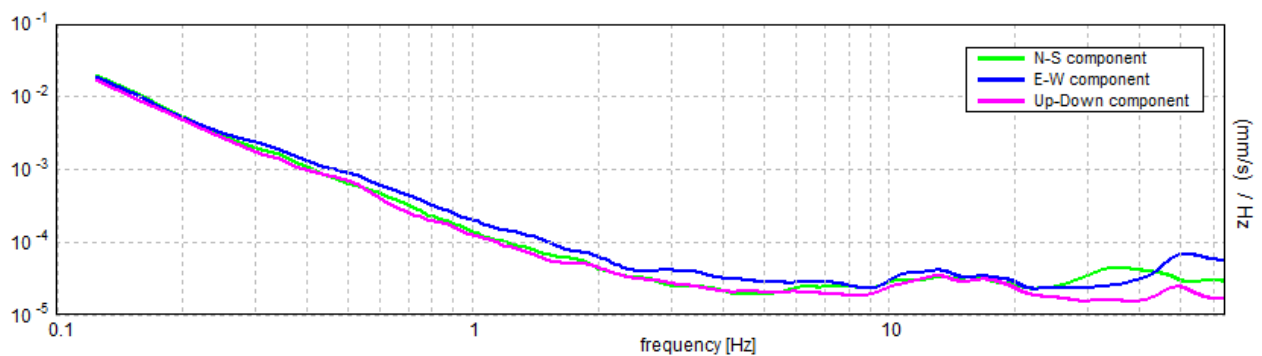
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 4.0 ± 0.45 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$4.00 > 0.50$	OK	
$n_c(f_0) > 200$	$4240.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 193 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$			NO
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$1.72 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.05529 < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.22115 < 0.2$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.0895 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

R 9 RIPETUTA

Strumento: TRS-0004/00-06

Inizio registrazione: 01/08/12 11:55:02 Fine registrazione: 01/08/12 12:15:03

Nomi canali: NORTH SOUTH; EAST WEST; UP DOWN

Dato GPS non disponibile

Durata registrazione: 0h20'00".

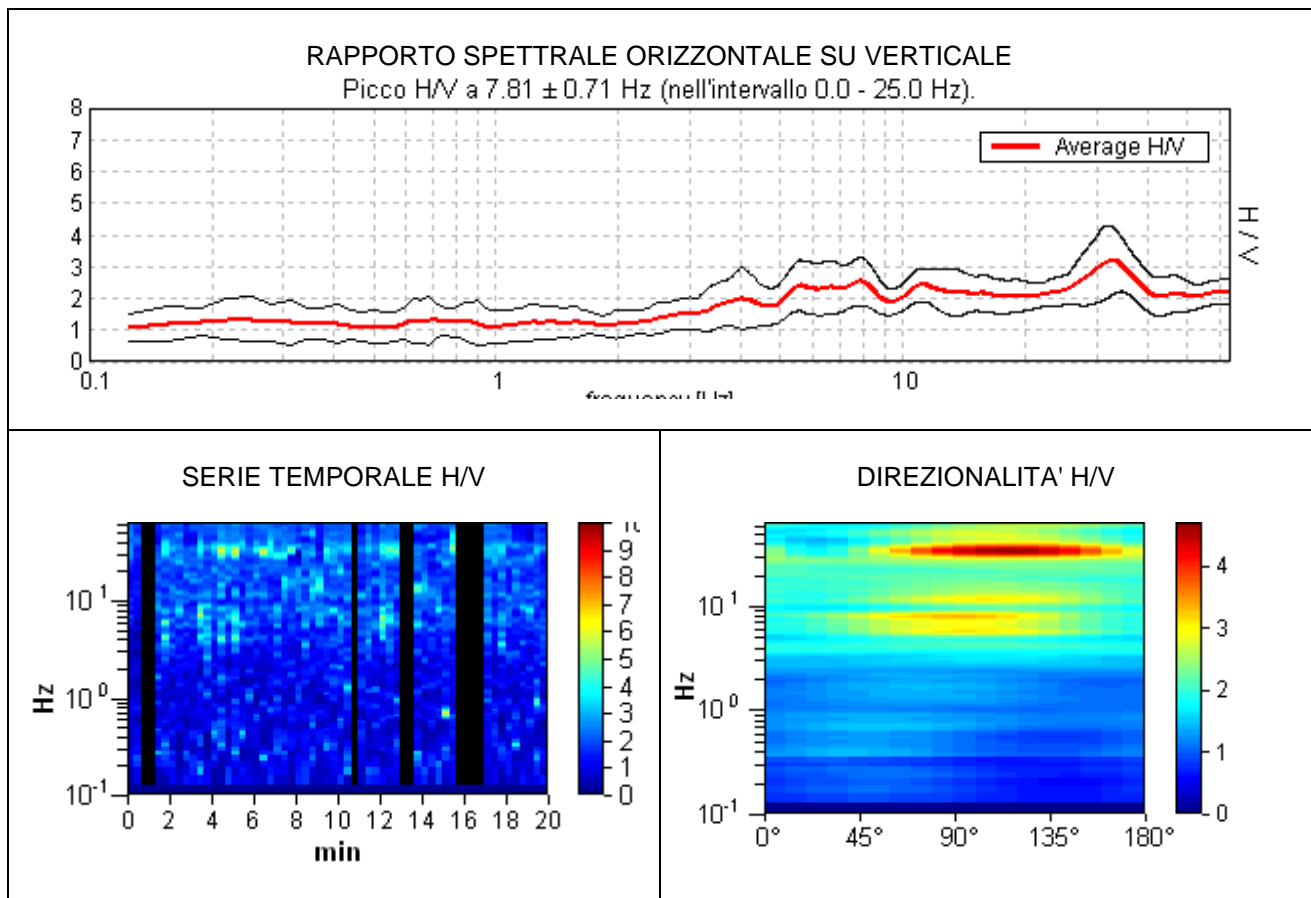
Analizzato 85% tracciato (selezione manuale)

Freq. campionamento: 128 Hz

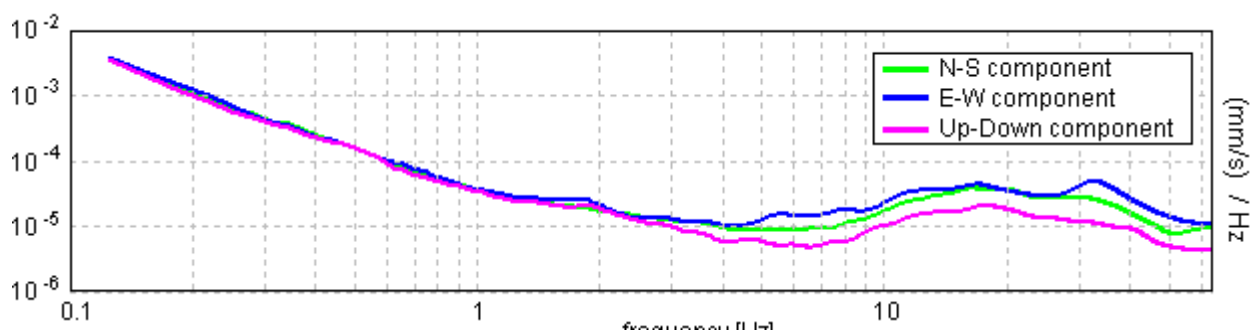
Lunghezza finestre: 20 s

Tipo di lisciamento: Triangular window

Lisciamento: 10%



SPETTRI DELLE SINGOLE COMPONENTI



[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 7.81 ± 0.71 Hz (nell'intervallo 0.0 - 25.0 Hz).

Criteri per una curva H/V affidabile

[Tutti 3 dovrebbero risultare soddisfatti]

$f_0 > 10 / L_w$	$7.81 > 0.50$	OK	
$n_c(f_0) > 200$	$7968.8 > 200$	OK	
$\sigma_A(f) < 2$ per $0.5f_0 < f < 2f_0$ se $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ per $0.5f_0 < f < 2f_0$ se $f_0 < 0.5\text{Hz}$	Superato 0 volte su 376	OK	

Criteri per un picco H/V chiaro

[Almeno 5 su 6 dovrebbero essere soddisfatti]

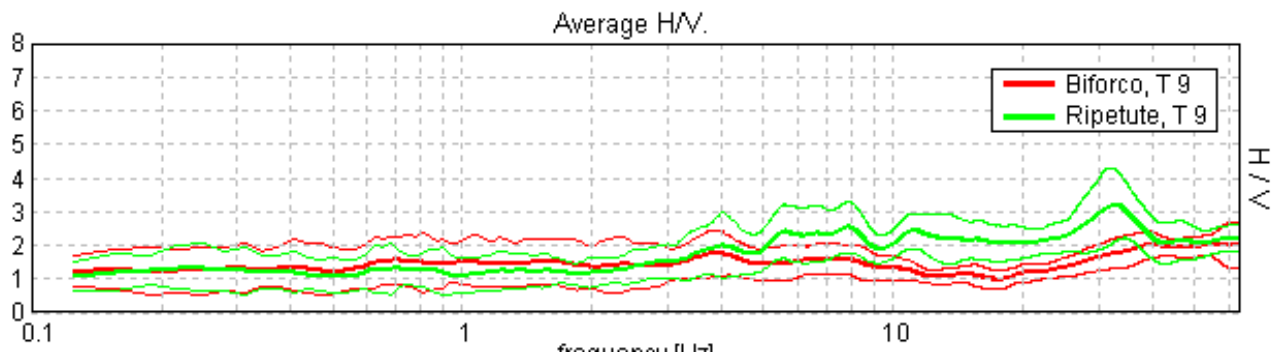
Esiste f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$	2.313 Hz	OK	
Esiste f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$2.53 > 2$	OK	
$f_{\text{picco}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.04493 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.35102 < 0.39063$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.3724 < 1.58$	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
$\sigma_{\log H/V}(f)$	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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

Sovrapposizione misura precedente e misura ripetuta



Misure HVSR Compito

COMPITO, R 10

Instrument: TRS-0009/00-06

Start recording: 07/06/12 11:18:33 End recording: 07/06/12 11:38:34

Channel labels: NORTH SOUTH; EAST WEST; UP DOWN

GPS data not available

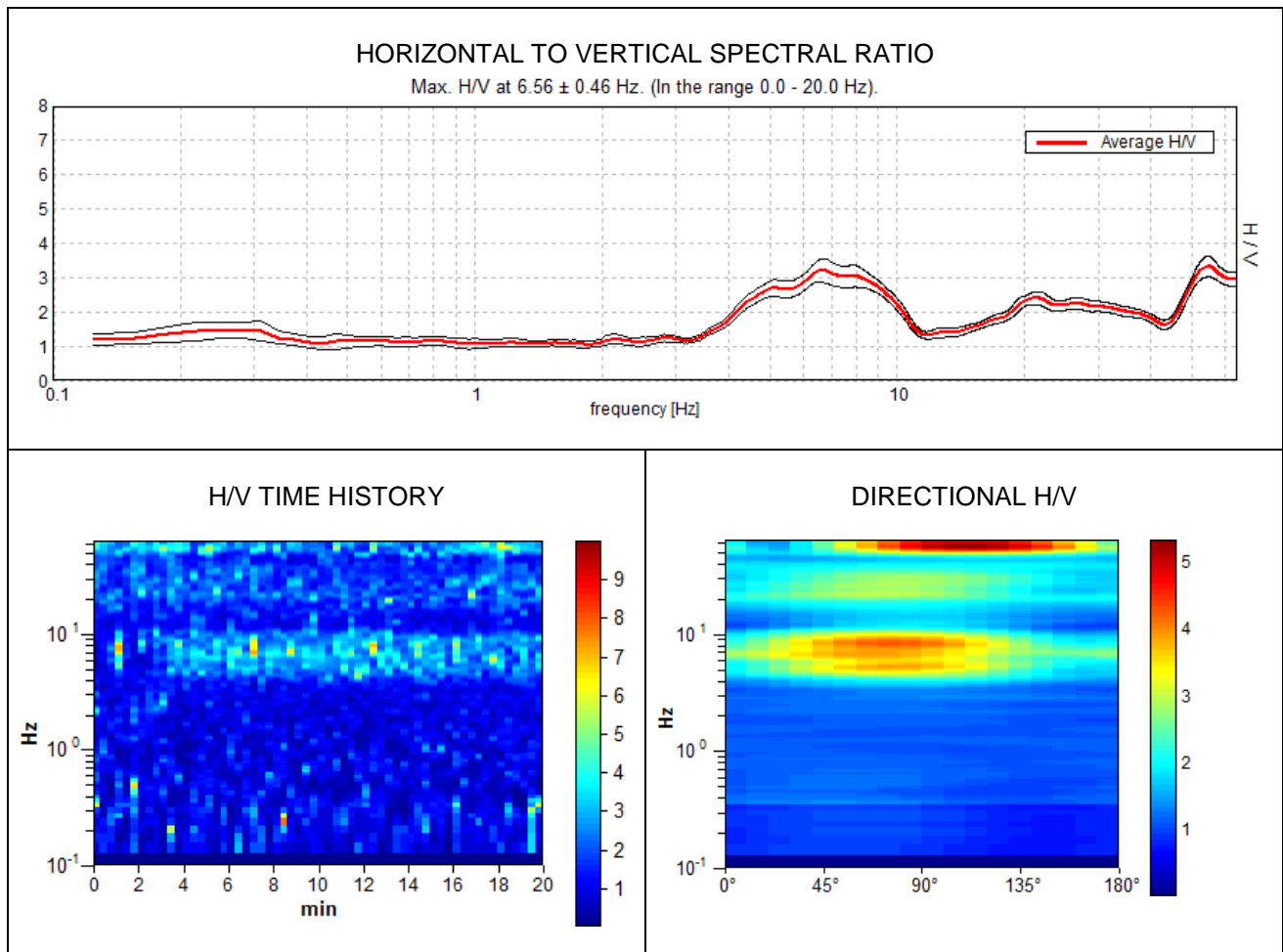
Trace length: 0h20'00". Analysis performed on the entire trace.

Sampling frequency: 128 Hz

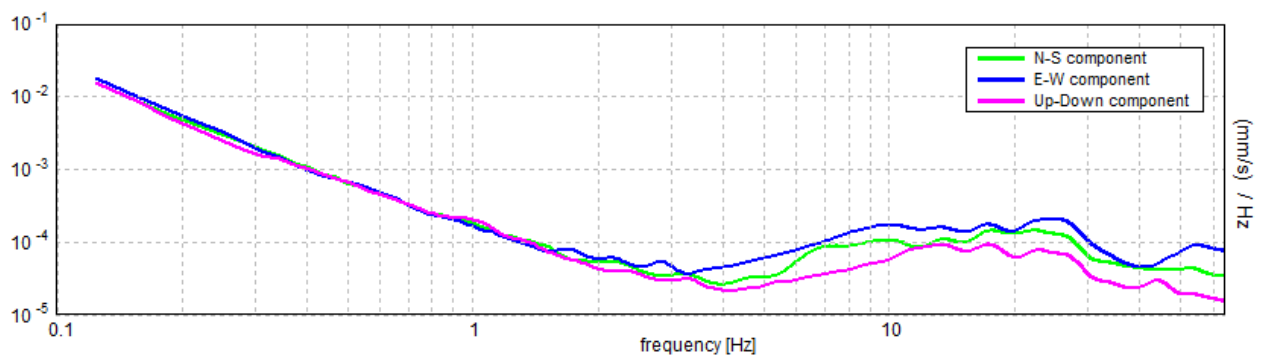
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 6.56 ± 0.46 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$6.56 > 0.50$	OK	
$n_c(f_0) > 200$	$7875.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 316 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$	3.813 Hz	OK	
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	10.906 Hz	OK	
$A_0 > 2$	$3.20 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03456 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.22682 < 0.32813$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1612 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

R 10 RIPETUTA

Strumento: TRS-0004/00-06

Inizio registrazione: 01/08/12 15:54:44 Fine registrazione: 01/08/12 16:24:45

Nomi canali: NORTH SOUTH; EAST WEST; UP DOWN

Dato GPS non disponibile

Durata registrazione: 0h30'00".

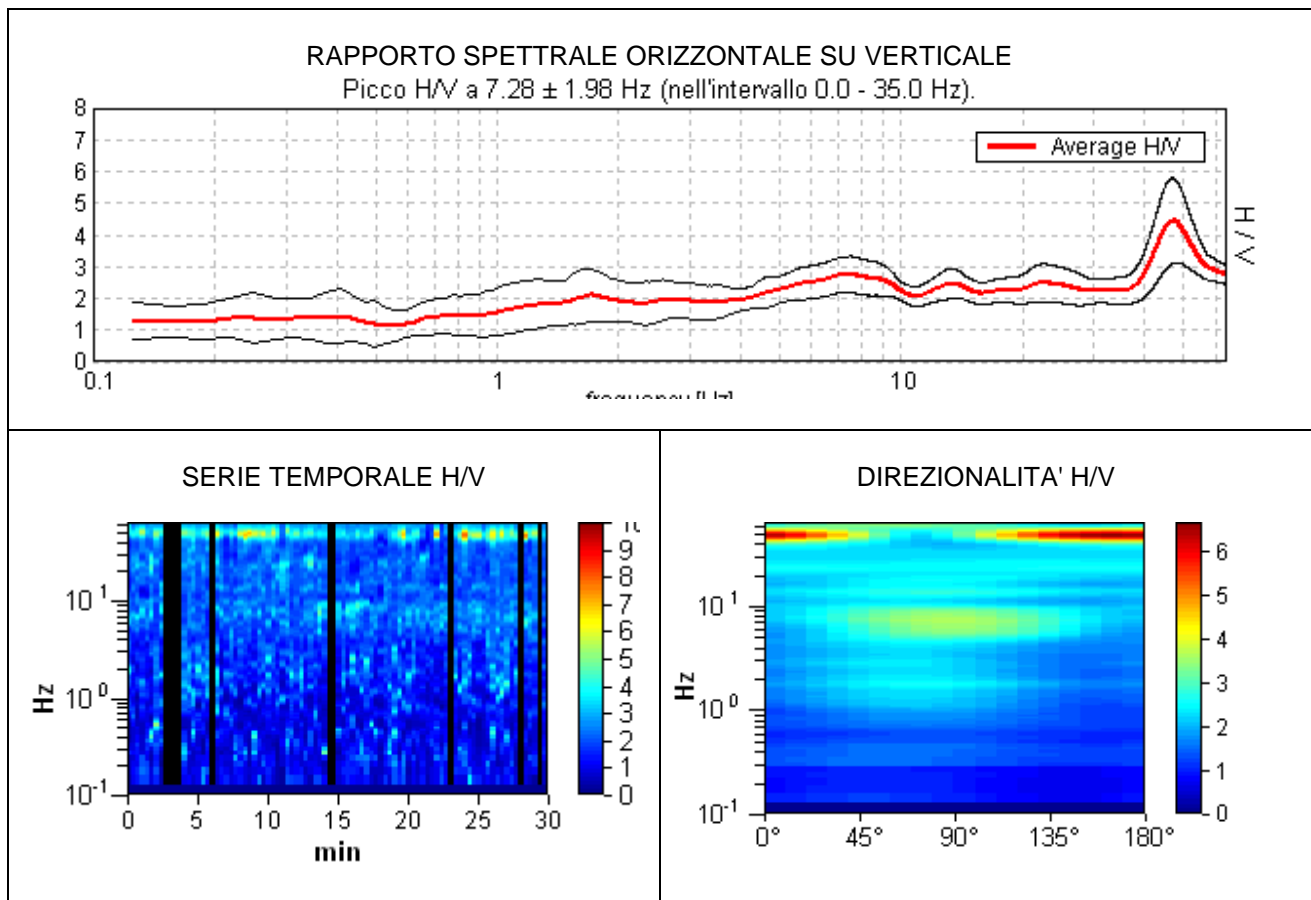
Analizzato 89% tracciato (selezione manuale)

Freq. campionamento: 128 Hz

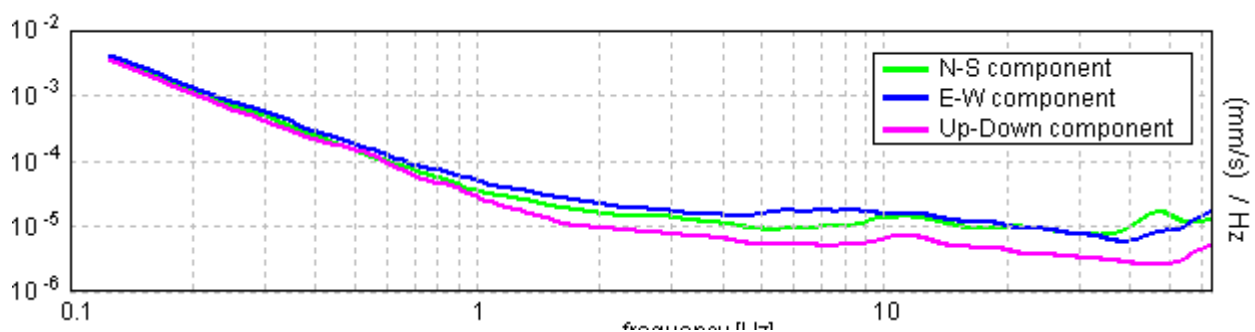
Lunghezza finestre: 20 s

Tipo di lisciamento: Triangular window

Lisciamento: 12%



SPETTRI DELLE SINGOLE COMPONENTI



[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 7.28 ± 1.98 Hz (nell'intervallo 0.0 - 35.0 Hz).

Criteri per una curva H/V affidabile

[Tutti 3 dovrebbero risultare soddisfatti]

$f_0 > 10 / L_w$	$7.28 > 0.50$	OK	
$n_c(f_0) > 200$	$11650.0 > 200$	OK	
$\sigma_A(f) < 2$ per $0.5f_0 < f < 2f_0$ se $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ per $0.5f_0 < f < 2f_0$ se $f_0 < 0.5\text{Hz}$	Superato 0 volte su 350	OK	

Criteri per un picco H/V chiaro

[Almeno 5 su 6 dovrebbero essere soddisfatti]

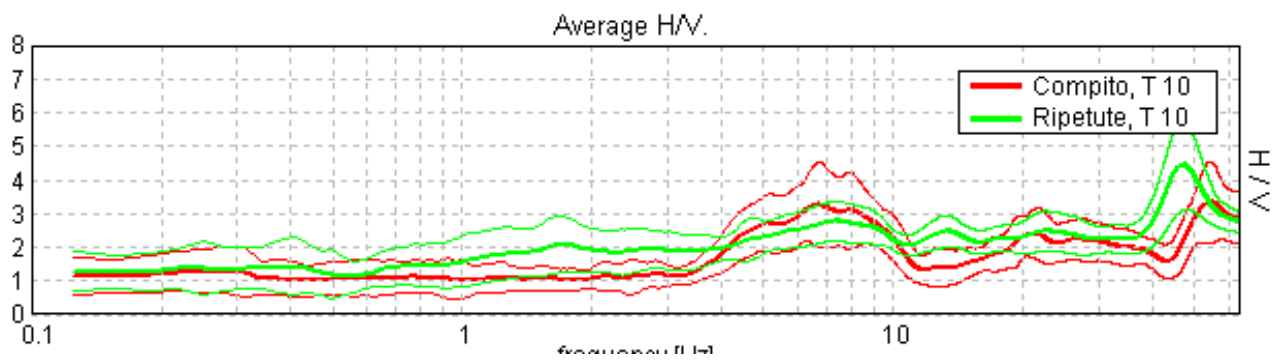
Esiste f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$			NO
Esiste f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$2.76 > 2$	OK	
$f_{\text{picco}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.13595 < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.98992 < 0.36406$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.2807 < 1.58$	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
$\sigma_{\log H/V}(f)$	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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

Sovrapposizione misura precedente e misura ripetuta



Misure HVSR Chiusi della Verna

CAPOLUOGO, R 11

Instrument: TRS-0009/00-06

Start recording: 07/06/12 12:16:22 End recording: 07/06/12 12:36:23

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

GPS data not available

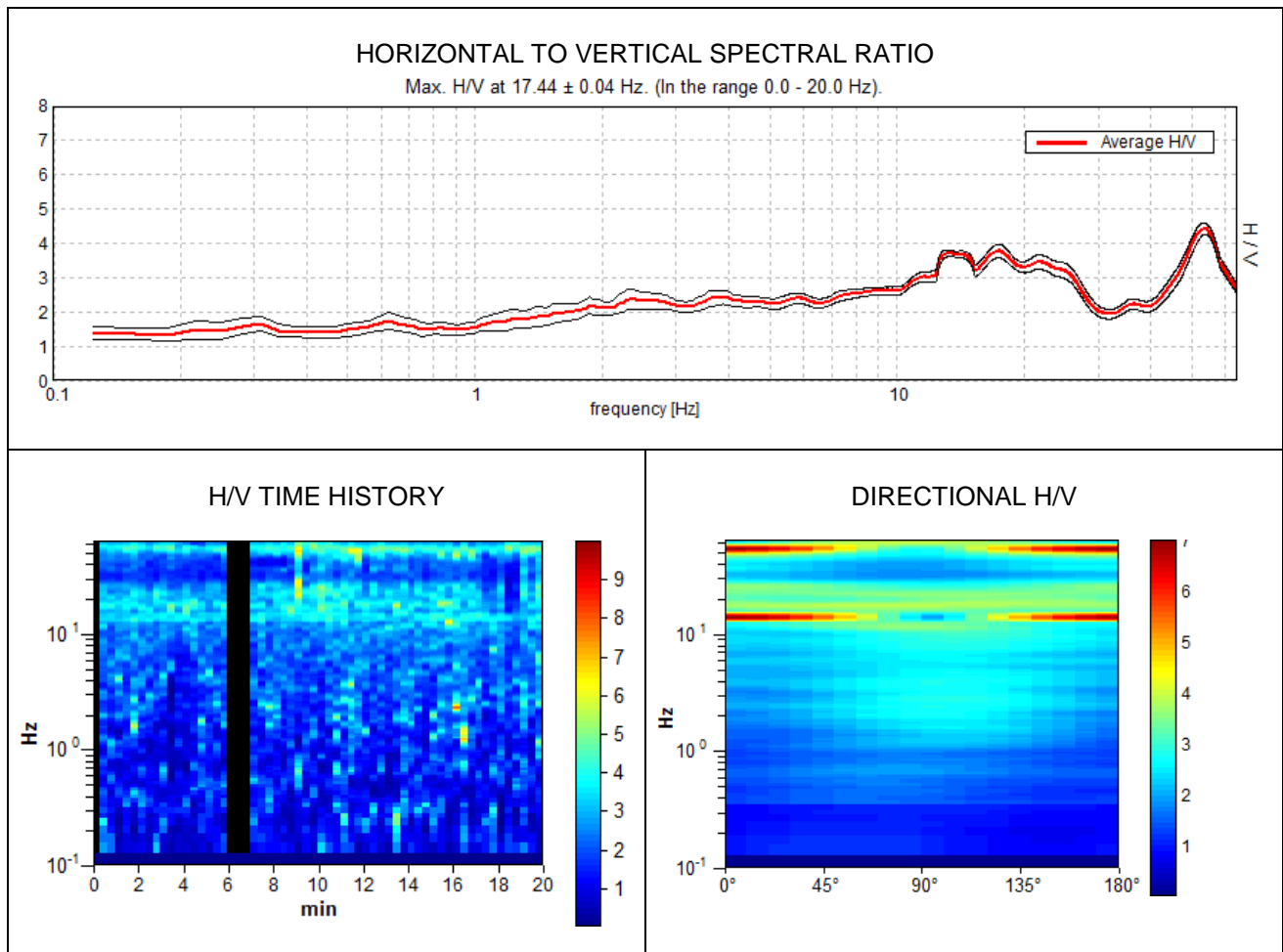
Trace length: 0h20'00". Analyzed 93% trace (manual window selection)

Sampling frequency: 128 Hz

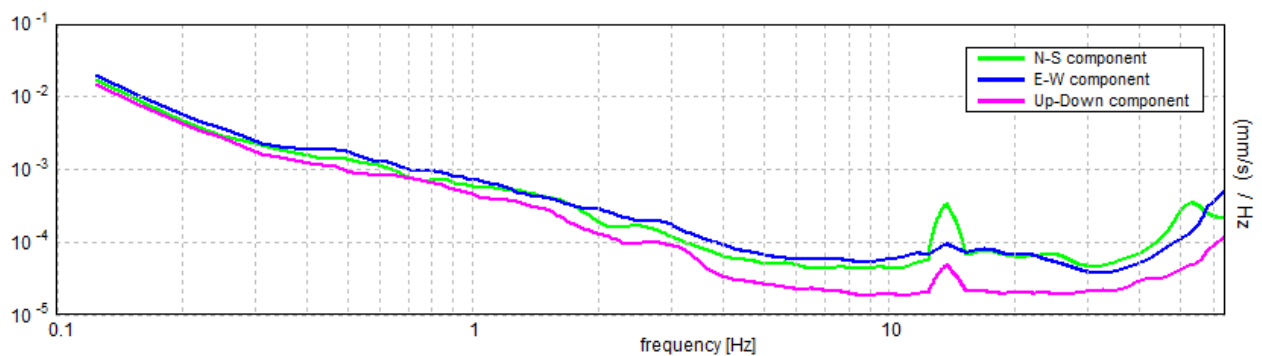
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 17.44 ± 0.04 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$17.44 > 0.50$	OK	
$n_c(f_0) > 200$	$19530.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 838 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
$A_0 > 2$	$3.78 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00106 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01846 < 0.87188$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.0986 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

CAPOLUOGO, R 12

Instrument: TRS-0009/00-06

Start recording: 07/06/12 15:43:30 End recording: 07/06/12 16:03:31

Channel labels: NORTH SOUTH; EAST WEST; UP DOWN

GPS data not available

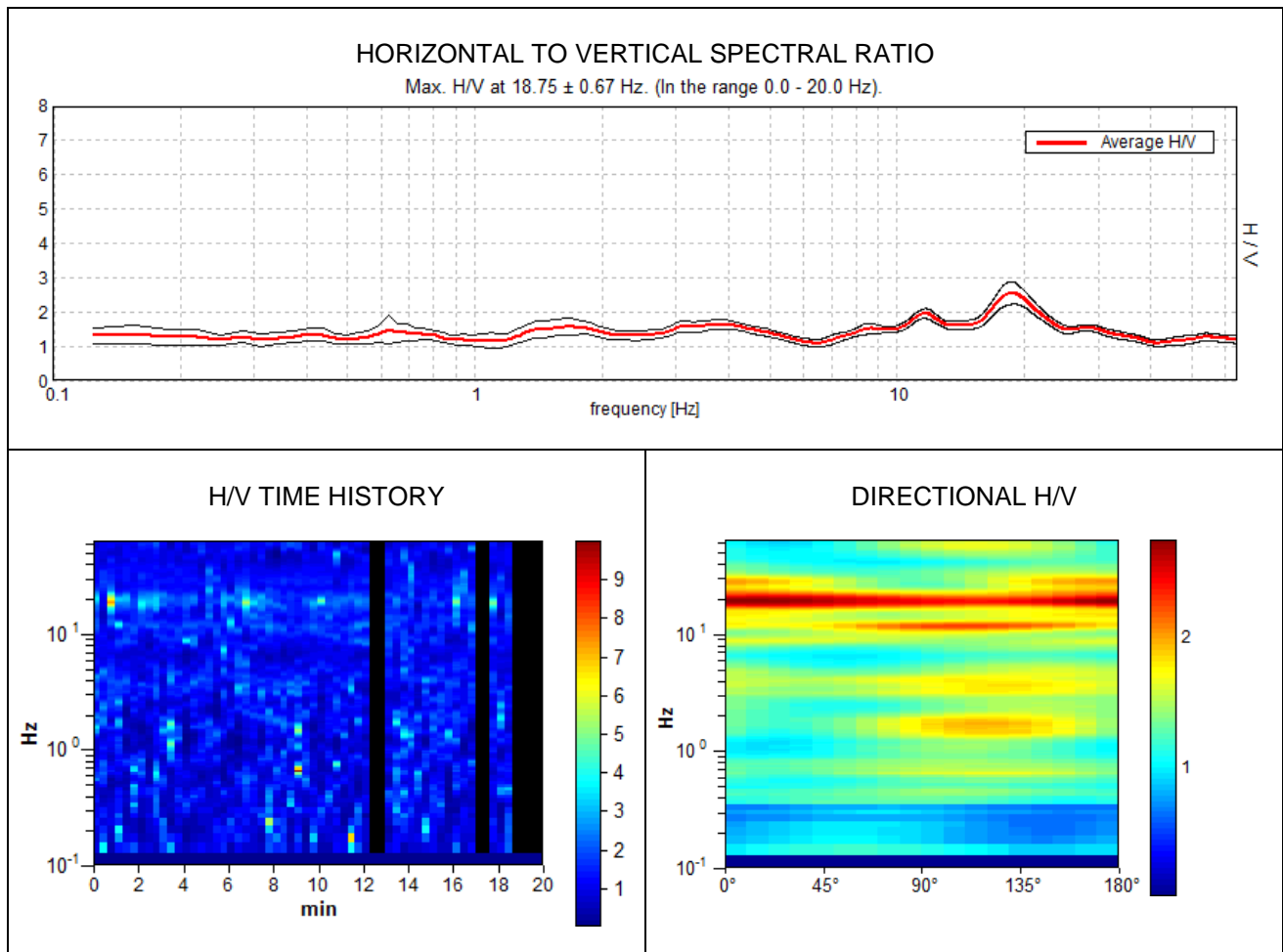
Trace length: 0h20'00". Analyzed 87% trace (manual window selection)

Sampling frequency: 128 Hz

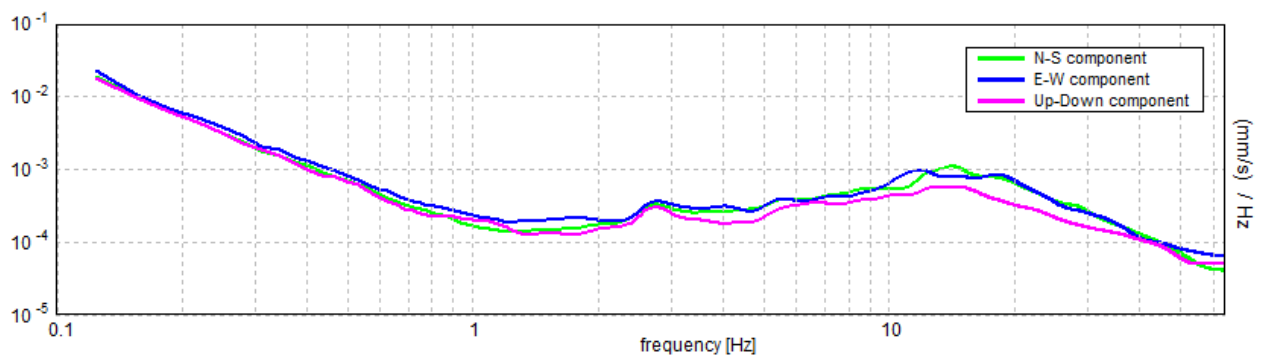
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 18.75 ± 0.67 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	18.75 > 0.50	OK	
$n_c(f_0) > 200$	19500.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 901 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$	7.406 Hz	OK	
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	35.094 Hz	OK	
$A_0 > 2$	2.56 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01768 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.33152 < 0.9375$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1631 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

CAPOLUOGO, R 13

Instrument: TRS-0009/00-06

Start recording: 07/06/12 14:41:26 End recording: 07/06/12 15:01:27

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

GPS data not available

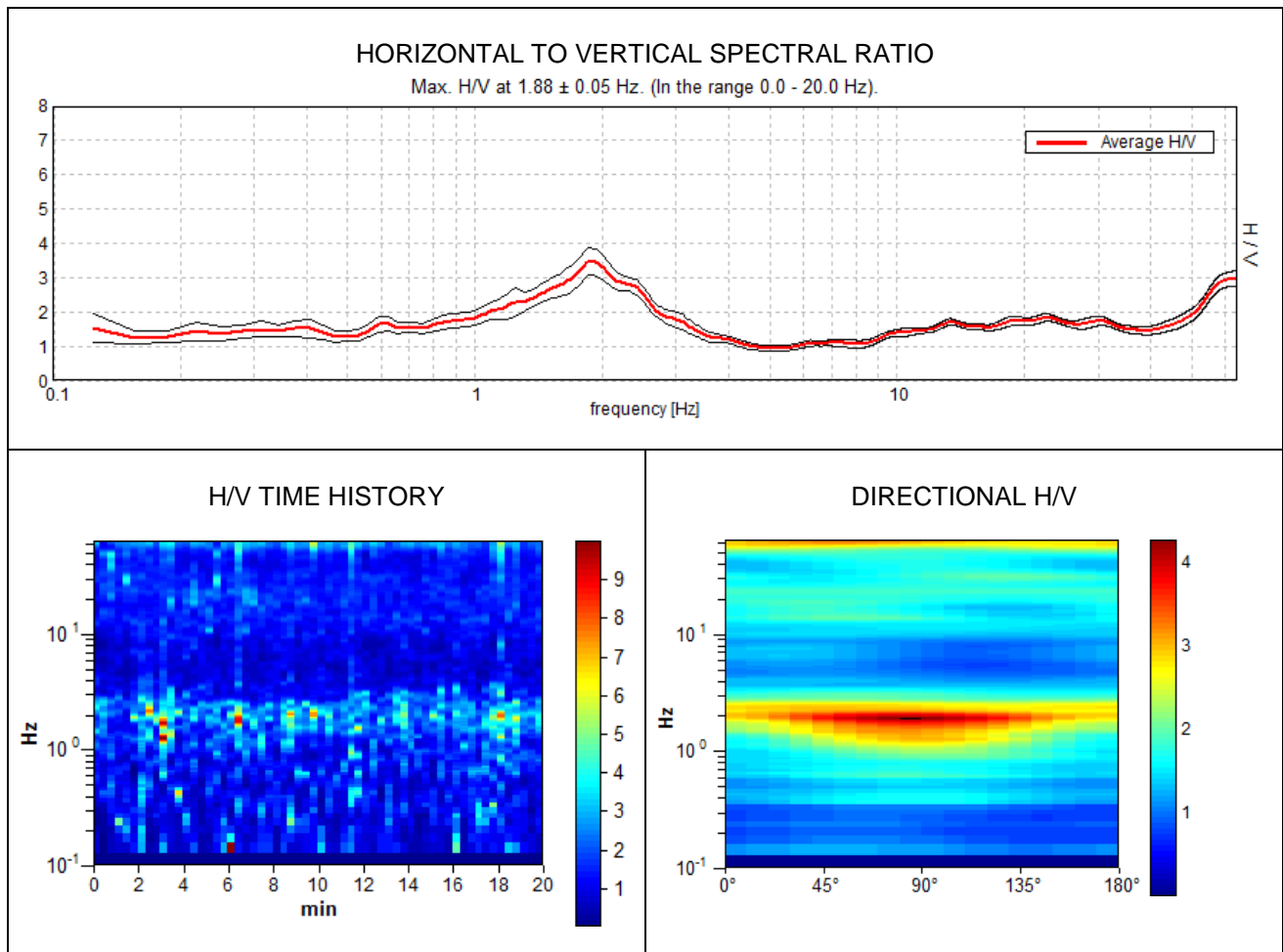
Trace length: 0h20'00". Analysis performed on the entire trace.

Sampling frequency: 128 Hz

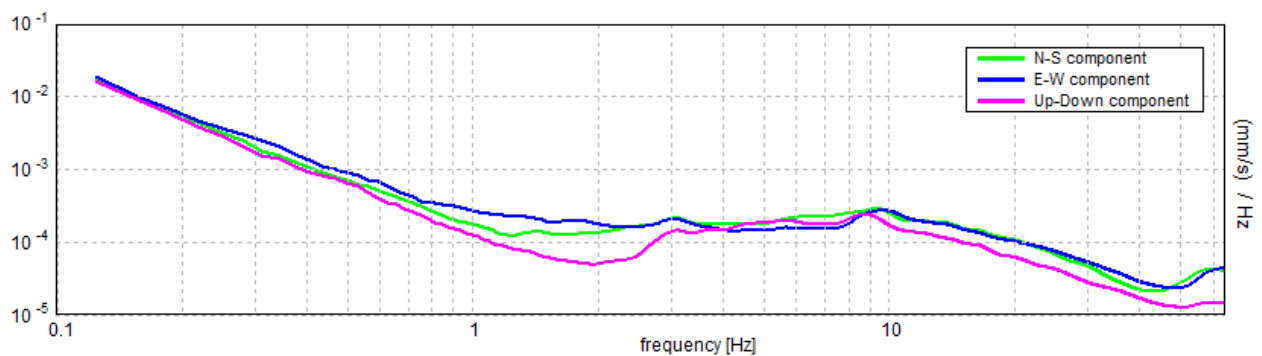
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 1.88 ± 0.05 Hz (in the range 0.0 - 20.0 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 $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 91 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$	0.875 Hz	OK	
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	3.063 Hz	OK	
$A_0 > 2$	$3.47 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01364 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02557 < 0.1875$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2014 < 1.78$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

CAPOLUOGO, R 14

Instrument: TRS-0009/00-06

Start recording: 07/06/12 15:15:54 End recording: 07/06/12 15:35:55

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

GPS data not available

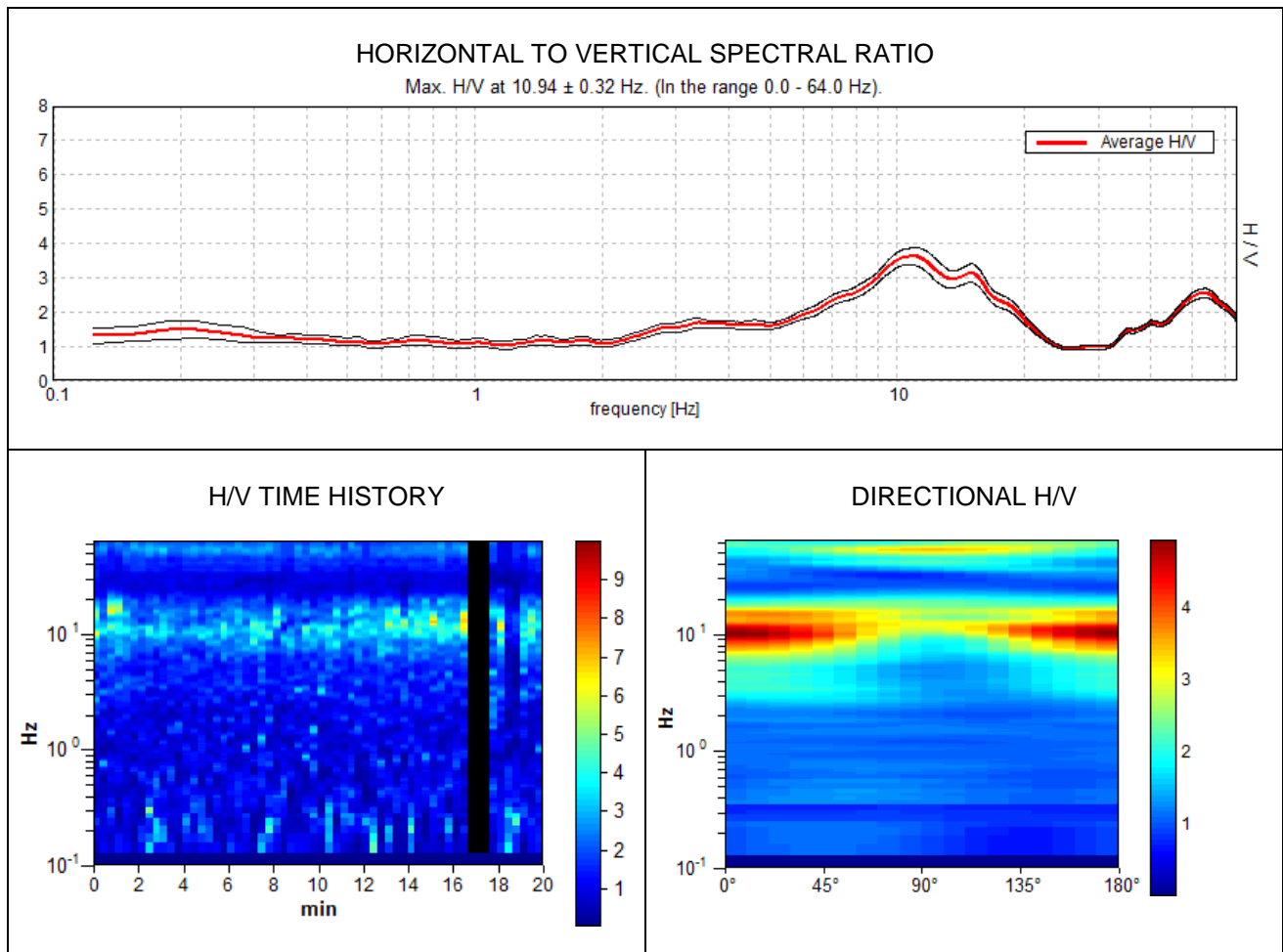
Trace length: 0h20'00". Analyzed 95% trace (manual window selection)

Sampling frequency: 128 Hz

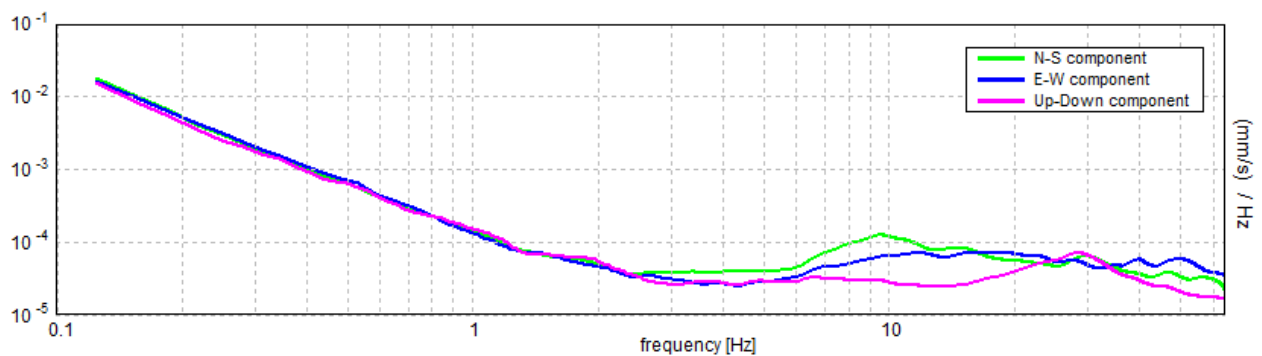
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 10.94 ± 0.32 Hz (in the range 0.0 - 64.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	10.94 > 0.50	OK	
$n_c(f_0) > 200$	12468.8 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 526 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$	5.688 Hz	OK	
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	19.938 Hz	OK	
$A_0 > 2$	3.62 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01433 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.1567 < 0.54688$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1288 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

CAPOLUOGO, R 15

Instrument: TRS-0009/00-06

Start recording: 07/06/12 16:16:02 End recording: 07/06/12 16:36:03

Channel labels: NORTH SOUTH; EAST WEST; UP DOWN

GPS data not available

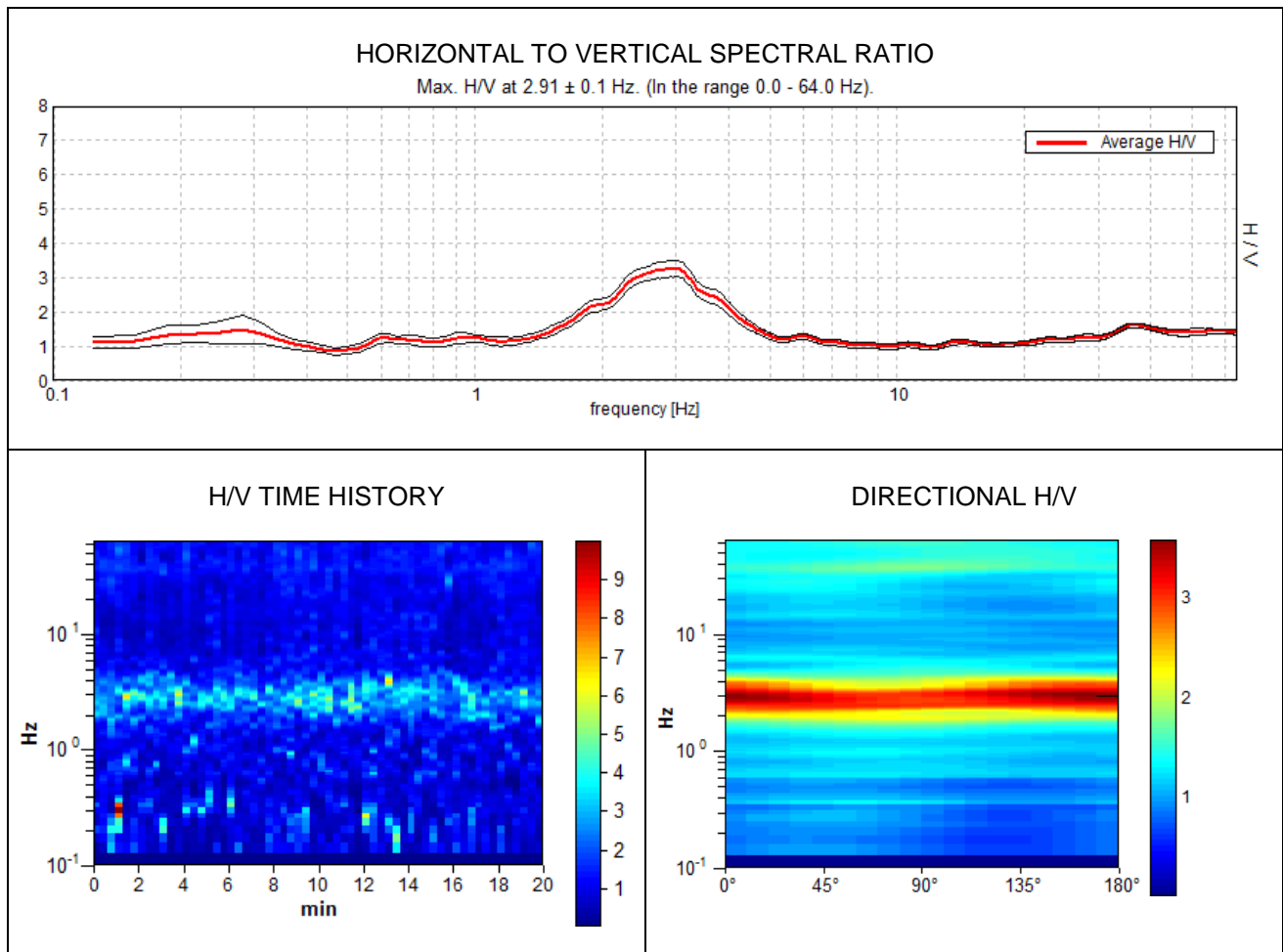
Trace length: 0h20'00". Analysis performed on the entire trace.

Sampling frequency: 128 Hz

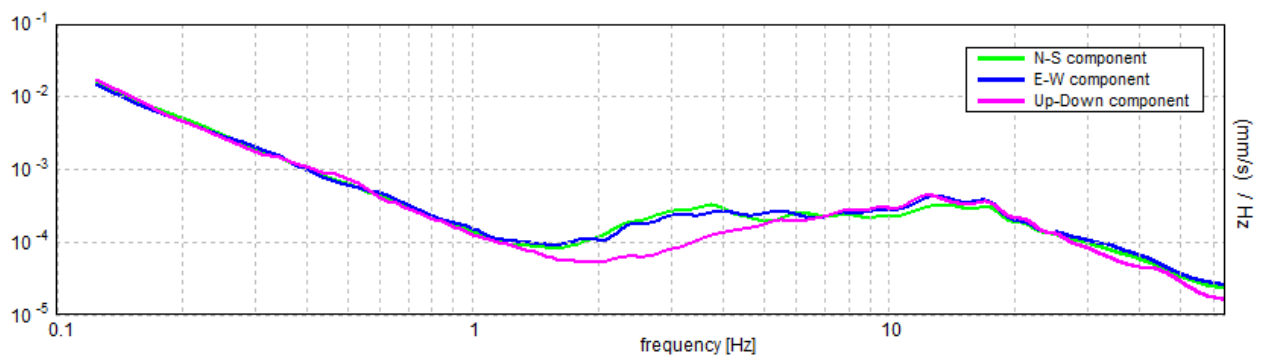
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 2.91 ± 0.1 Hz (in the range 0.0 - 64.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	2.91 > 0.50	OK	
$n_c(f_0) > 200$	3487.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 140 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$	1.625 Hz	OK	
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	4.469 Hz	OK	
$A_0 > 2$	3.26 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01777 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.05165 < 0.14531$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1207 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

CAPOLUOGO, R 16

Instrument: TRS-0009/00-06

Start recording: 07/06/12 16:42:09 End recording: 07/06/12 17:02:10

Channel labels: NORTH SOUTH; EAST WEST; UP DOWN

GPS data not available

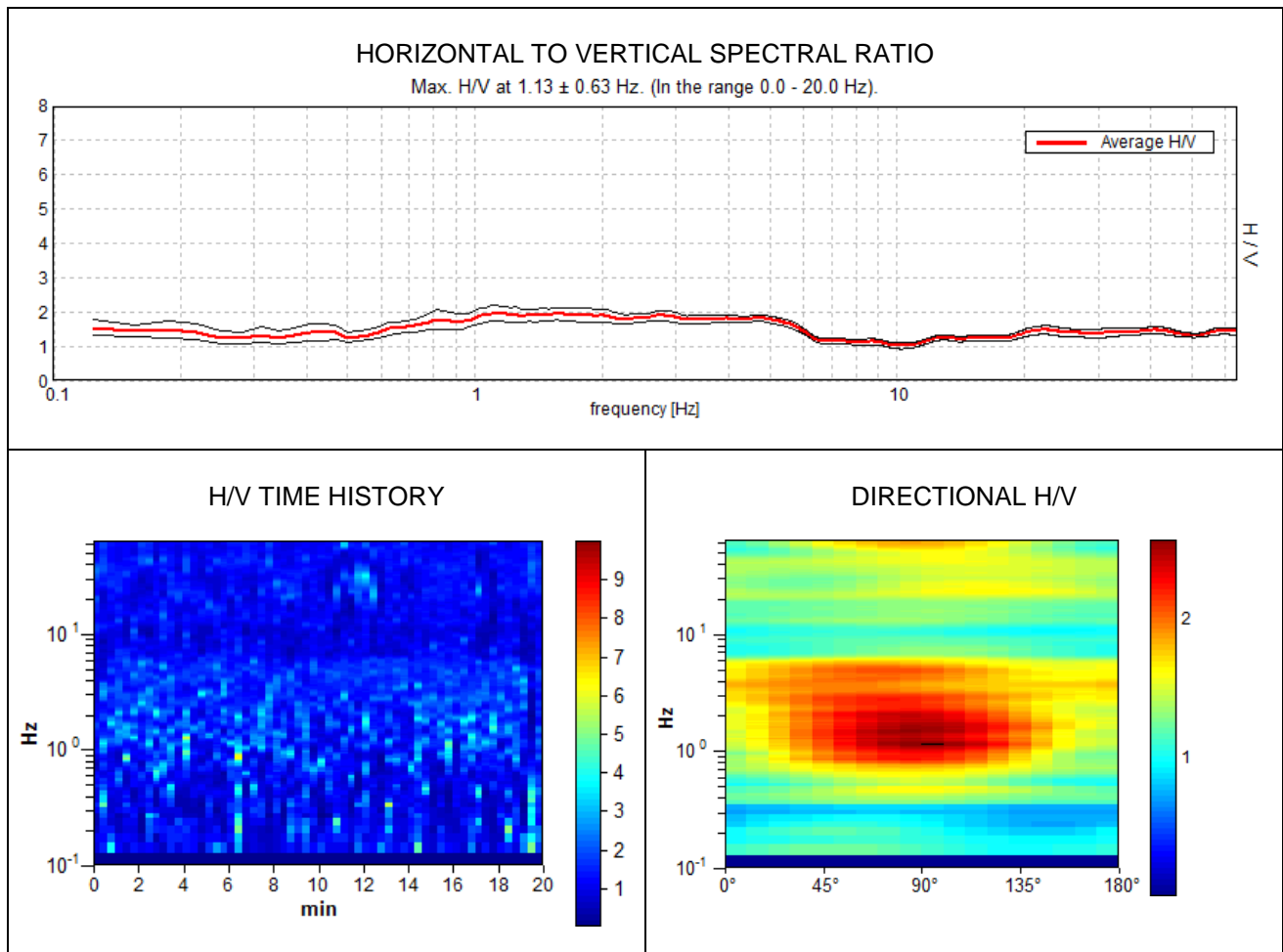
Trace length: 0h20'00". Analysis performed on the entire trace.

Sampling frequency: 128 Hz

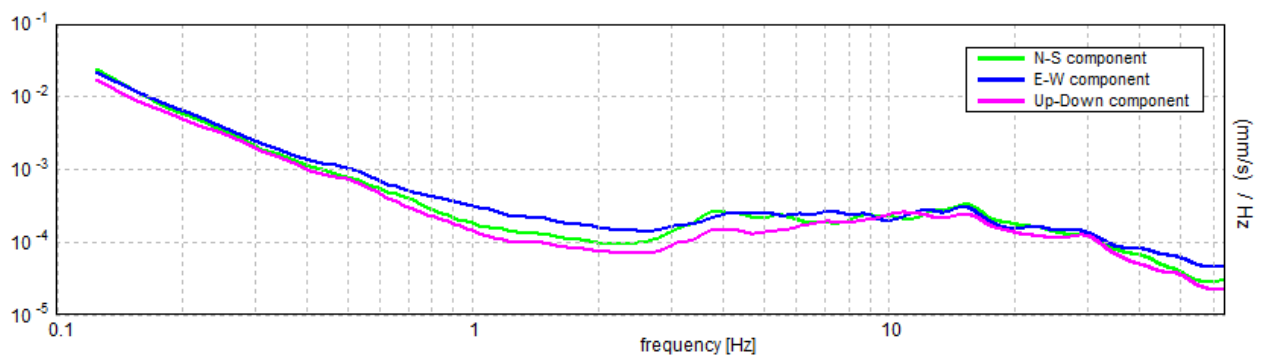
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 1.13 ± 0.63 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.13 > 0.50$	OK	
$n_c(f_0) > 200$	$1350.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 55 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$			NO
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$1.96 > 2$		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.27844 < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.31324 < 0.1125$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.1121 < 1.78$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

R 16 RIPETUTA

Strumento: TRS-0004/00-06

Inizio registrazione: 01/08/12 15:14:13 Fine registrazione: 01/08/12 15:34:13

Nomi canali: NORTH SOUTH; EAST WEST ; UP DOWN

Dato GPS non disponibile

Durata registrazione: 0h20'00".

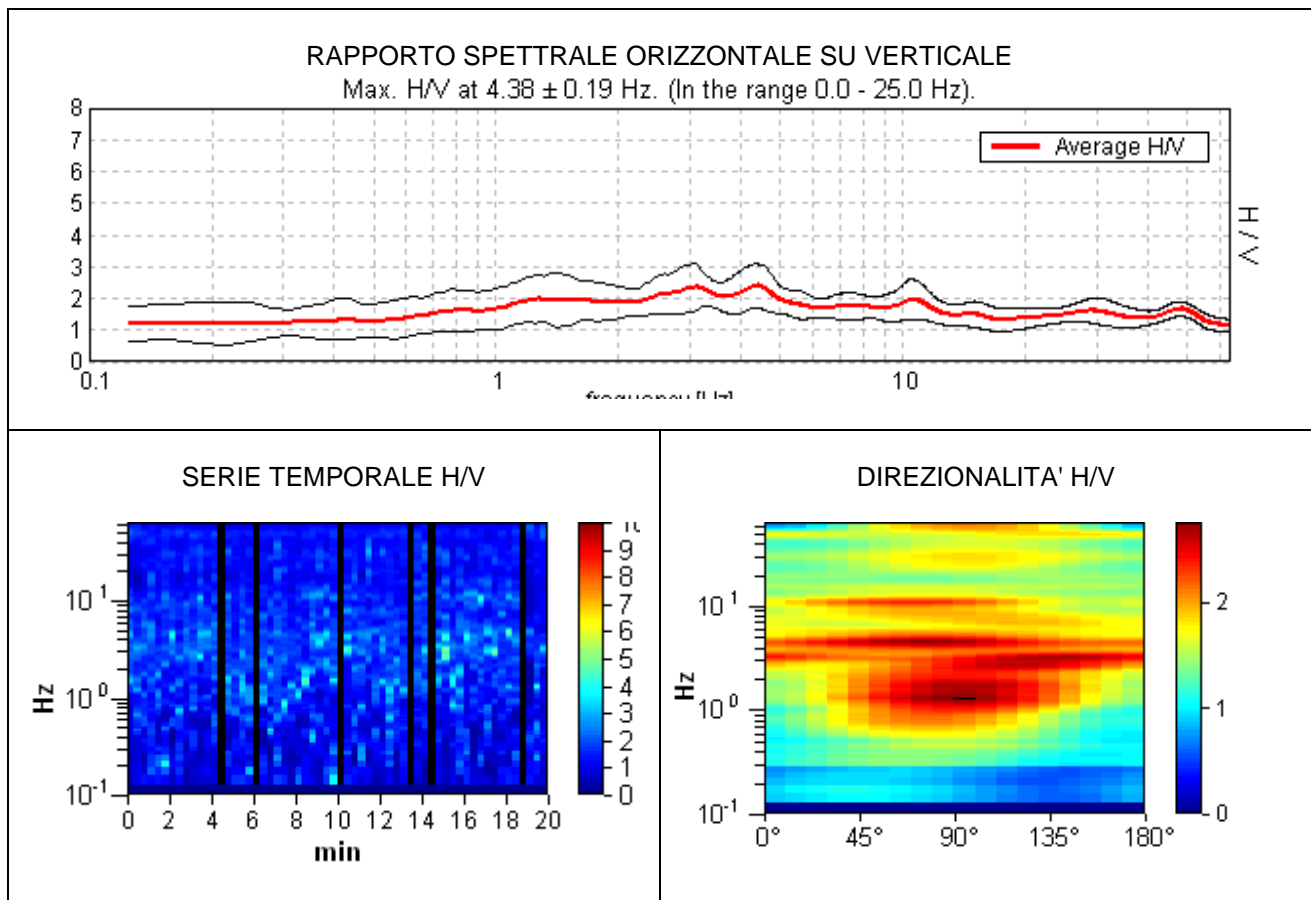
Analizzato 90% tracciato (selezione manuale)

Freq. campionamento: 128 Hz

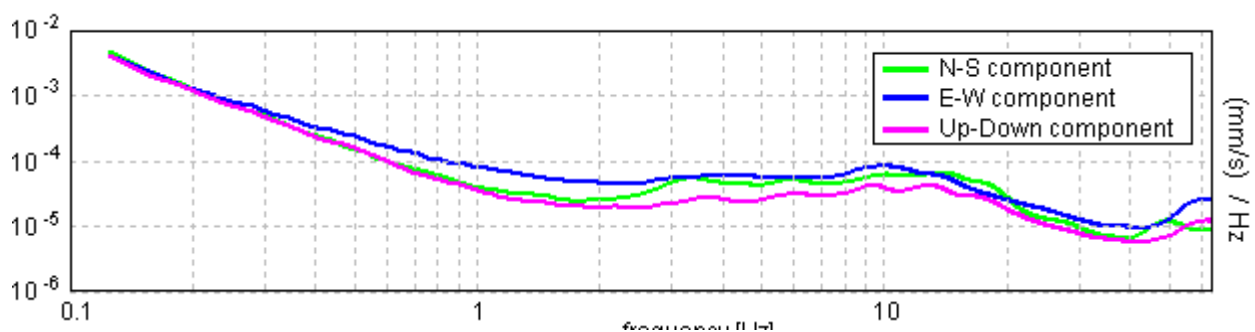
Lunghezza finestre: 20 s

Tipo di lisciamento: Triangular window

Lisciamento: 12%



SPETTRI DELLE SINGOLE COMPONENTI



[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 4.38 ± 0.19 Hz (nell'intervallo 0.0 - 25.0 Hz).

Criteri per una curva H/V affidabile

[Tutti 3 dovrebbero risultare soddisfatti]

$f_0 > 10 / L_w$	$4.38 > 0.50$	OK	
$n_c(f_0) > 200$	$4725.0 > 200$	OK	
$\sigma_A(f) < 2$ per $0.5f_0 < f < 2f_0$ se $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ per $0.5f_0 < f < 2f_0$ se $f_0 < 0.5\text{Hz}$	Superato 0 volte su 211	OK	

Criteri per un picco H/V chiaro

[Almeno 5 su 6 dovrebbero essere soddisfatti]

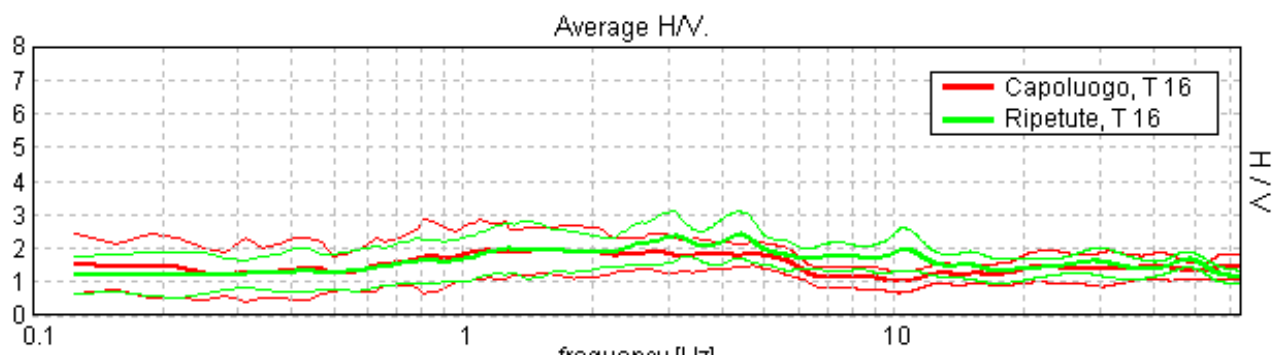
Esiste f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$			NO
Esiste f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	$2.41 > 2$	OK	
$f_{\text{picco}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.0214 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.09361 < 0.21875$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.3425 < 1.58$	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
$\sigma_{\log H/V}(f)$	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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

Sovrapposizione misura precedente e misura ripetuta



CAPOLUOGO, R 17

Instrument: TRS-0009/00-06

Start recording: 07/06/12 17:07:05 End recording: 07/06/12 17:27:06

Channel labels: NORTH SOUTH; EAST WEST; UP DOWN

GPS data not available

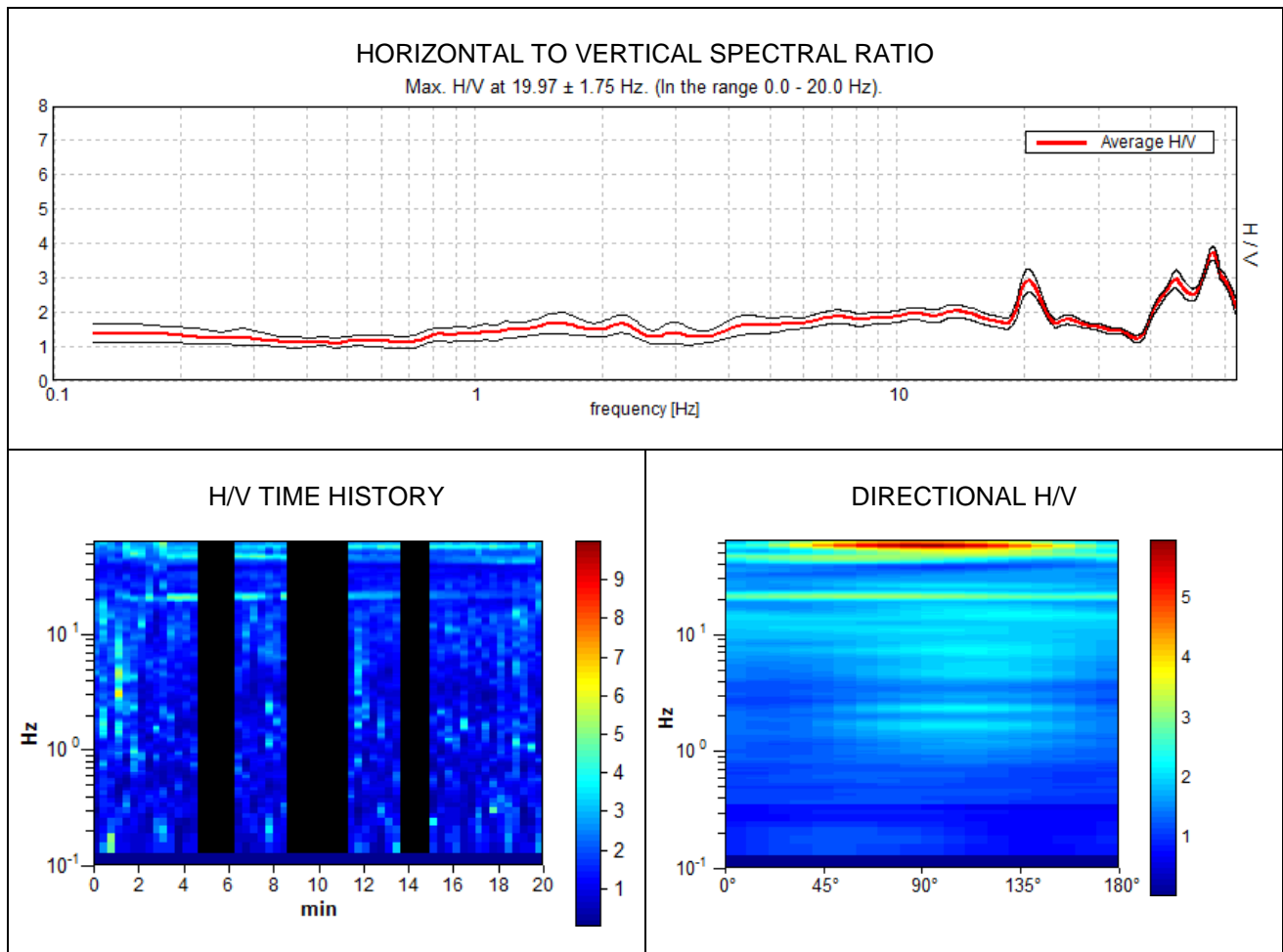
Trace length: 0h20'00". Analyzed 72% trace (manual window selection)

Sampling frequency: 128 Hz

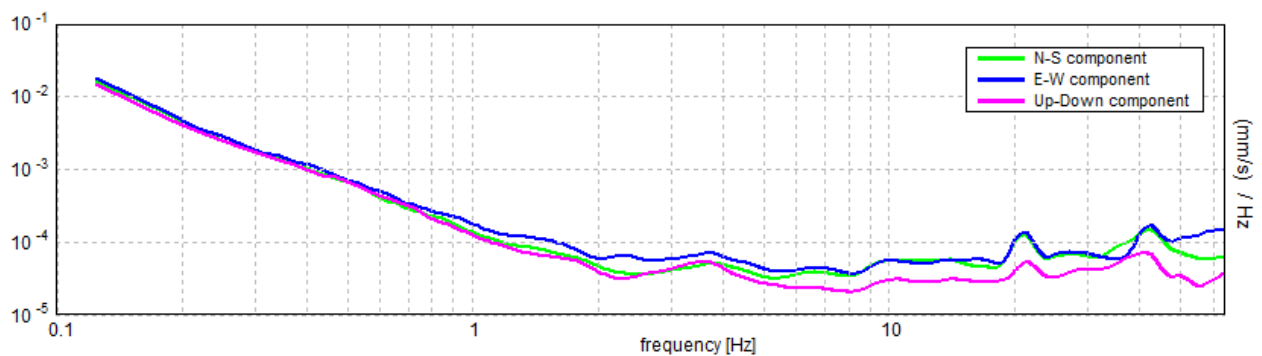
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 19.97 ± 1.75 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	19.97 > 0.50	OK	
$n_c(f_0) > 200$	17173.1 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 960 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 $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	34.781 Hz	OK	
$A_0 > 2$	2.77 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.04281 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.85488 < 0.99844$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1585 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

CAPOLUOGO, R 18

Instrument: TRS-0009/00-06

Start recording: 08/06/12 10:46:56 End recording: 08/06/12 11:06:57

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

GPS data not available

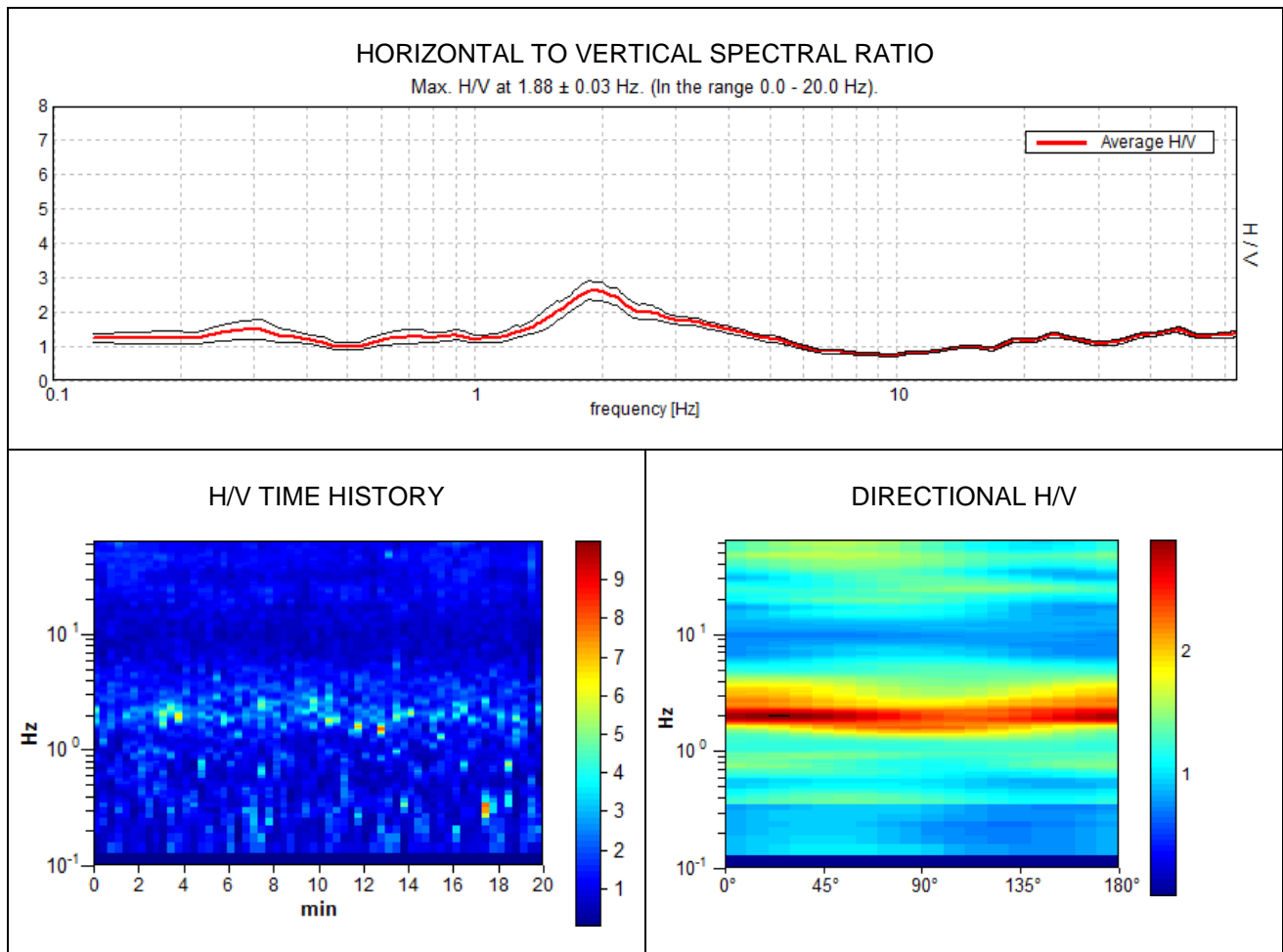
Trace length: 0h20'00". Analysis performed on the entire trace.

Sampling frequency: 128 Hz

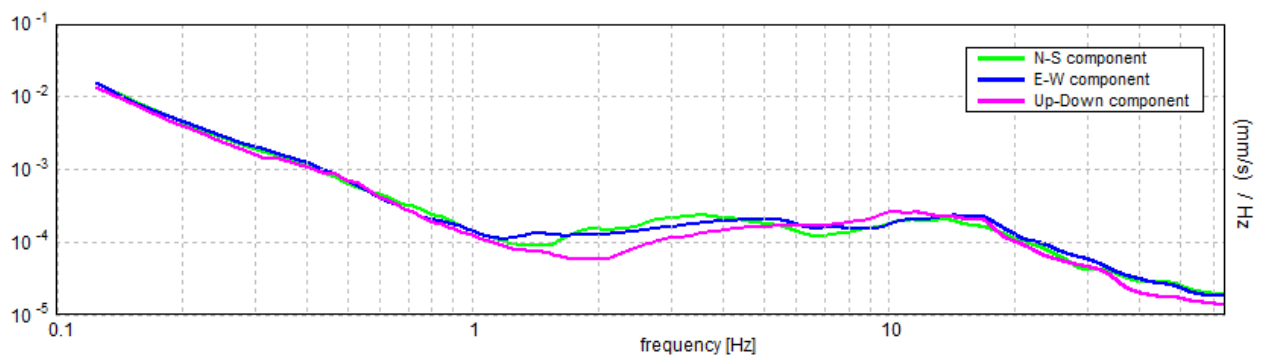
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 1.88 ± 0.03 Hz (in the range 0.0 - 20.0 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 $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 91 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$	1.188 Hz	OK	
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	4.531 Hz	OK	
$A_0 > 2$	$2.62 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00813 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01524 < 0.1875$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1378 < 1.78$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

CAPOLUOGO, R 19

Instrument: TRS-0009/00-06

Start recording: 08/06/12 11:20:05 End recording: 08/06/12 11:40:06

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

GPS data not available

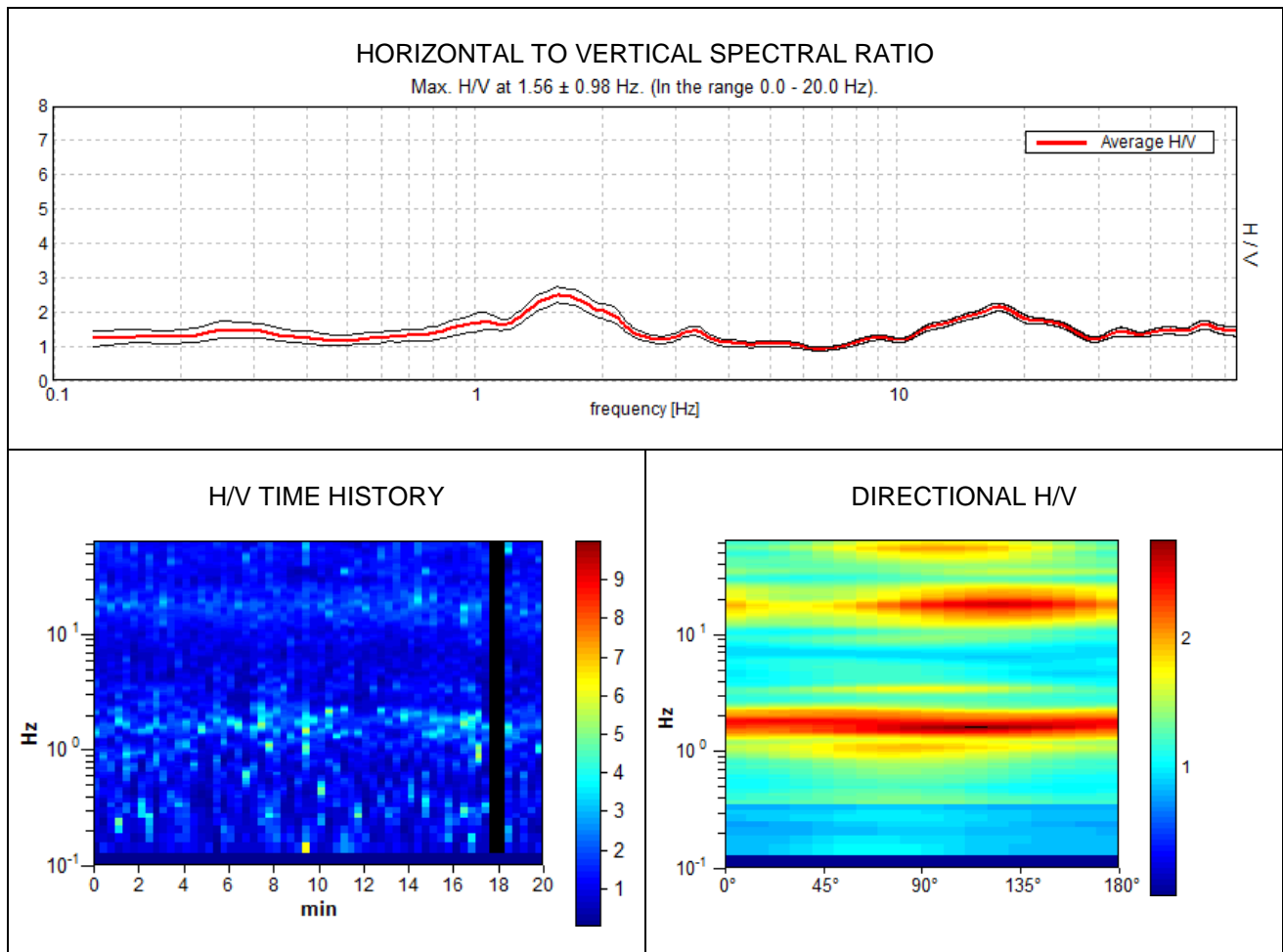
Trace length: 0h20'00". Analyzed 97% trace (manual window selection)

Sampling frequency: 128 Hz

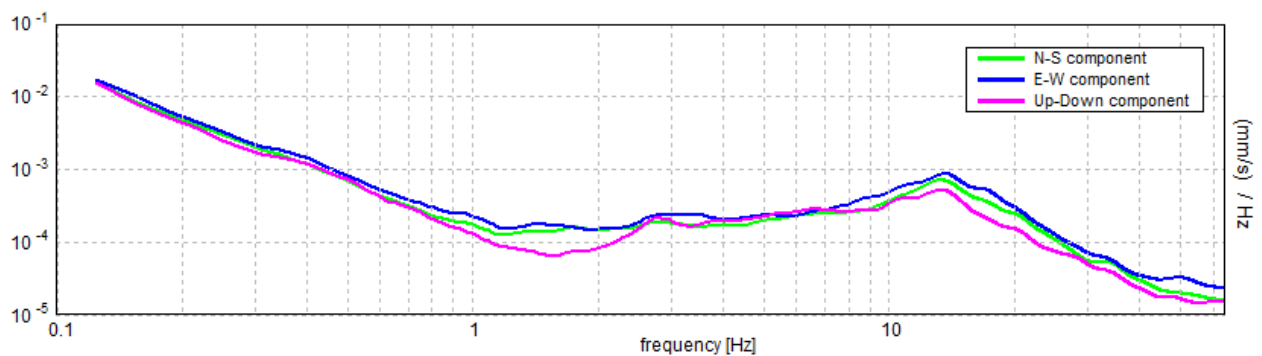
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 1.56 ± 0.98 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$1.56 > 0.50$	OK	
$n_c(f_0) > 200$	$1812.5 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 76 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$	0.594 Hz	OK	
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	2.563 Hz	OK	
$A_0 > 2$	$2.51 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.31123 < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.48629 < 0.15625$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.1226 < 1.78$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

CAPOLUOGO, R 20

Instrument: TRS-0009/00-06

Start recording: 08/06/12 10:11:56 End recording: 08/06/12 10:31:57

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

GPS data not available

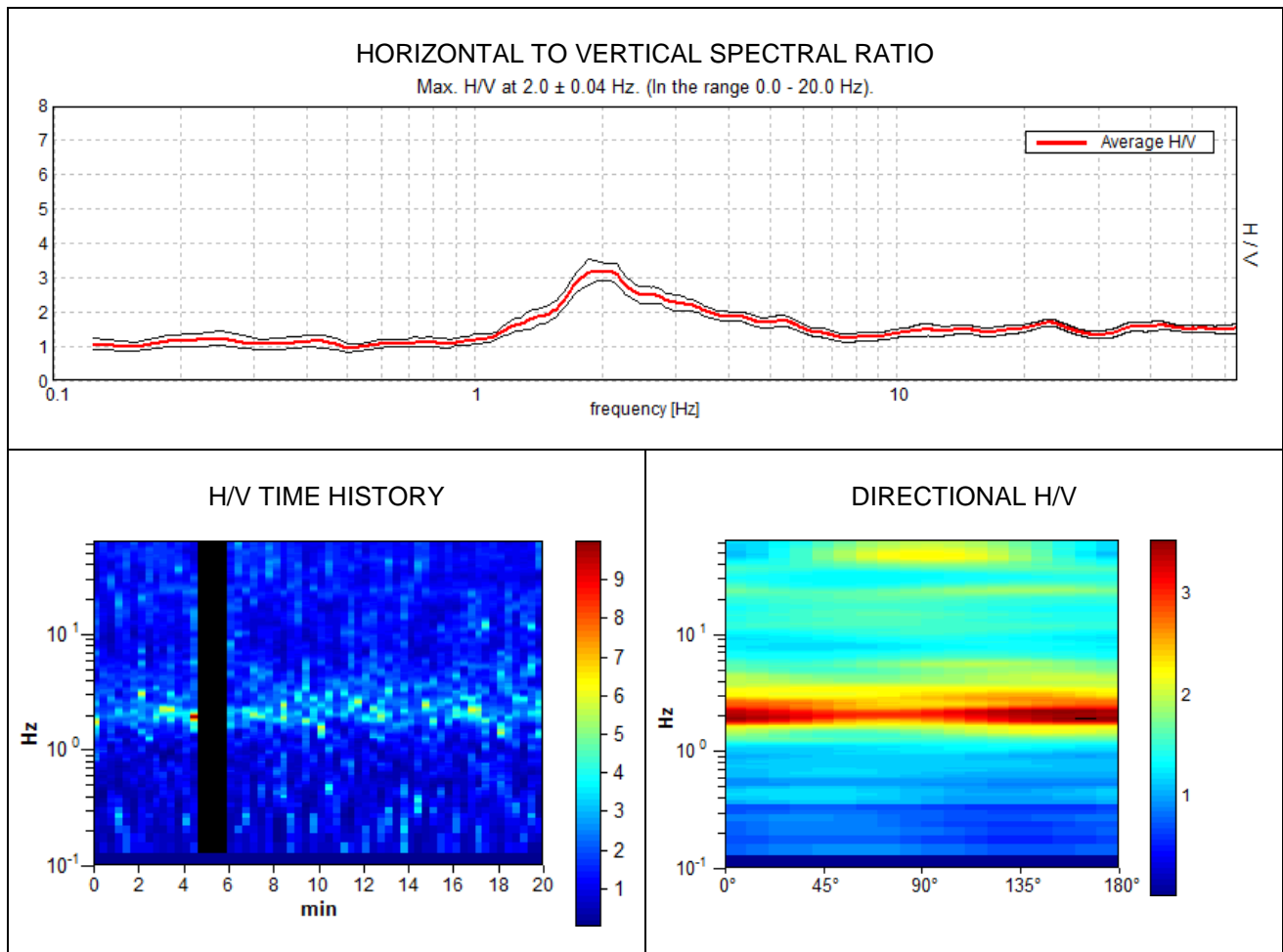
Trace length: 0h20'00". Analyzed 93% trace (manual window selection)

Sampling frequency: 128 Hz

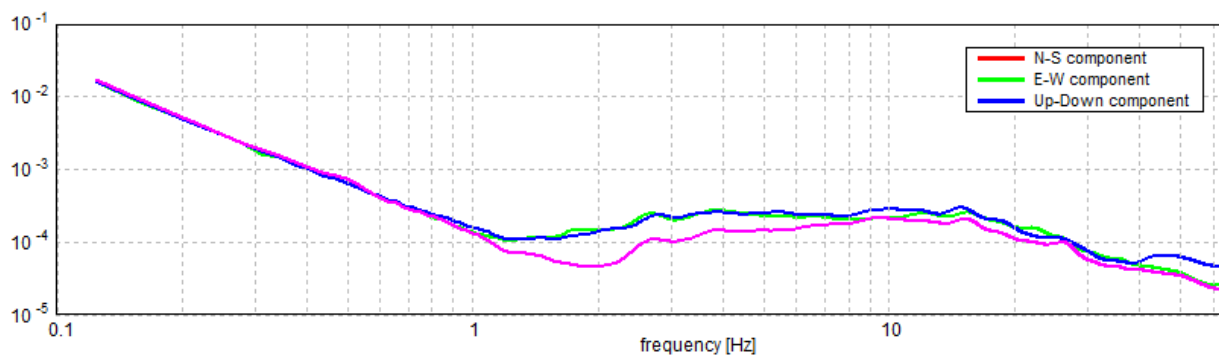
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 2.0 ± 0.04 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$2.00 > 0.50$	OK	
$n_c(f_0) > 200$	$2240.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 97 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$	1.219 Hz	OK	
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	5.844 Hz	OK	
$A_0 > 2$	$3.18 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01046 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02092 < 0.1$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1276 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

CAPOLUOGO, R 21

Instrument: TRS-0009/00-06

Start recording: 07/06/12 12:54:41 End recording: 07/06/12 13:14:42

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

GPS data not available

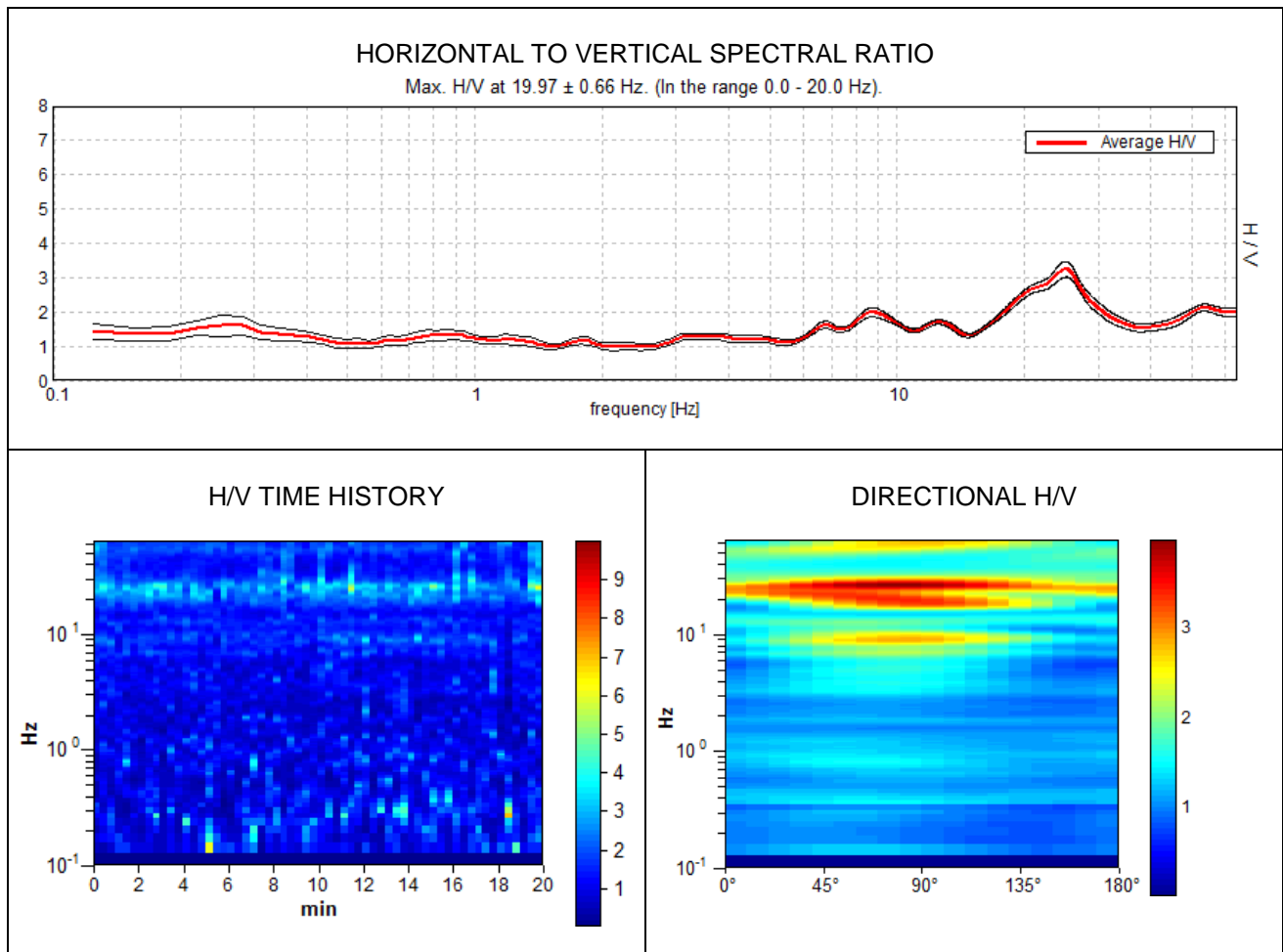
Trace length: 0h20'00". Analysis performed on the entire trace.

Sampling frequency: 128 Hz

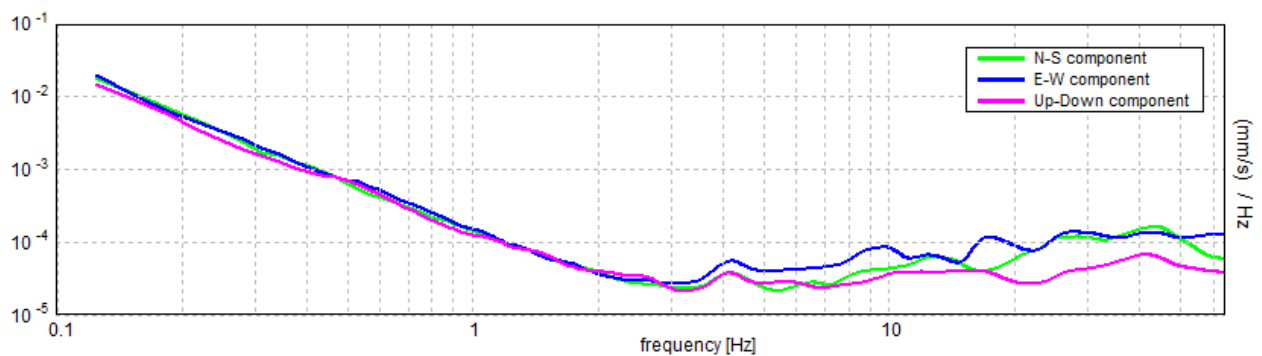
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 19.97 ± 0.66 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	19.97 > 0.50	OK	
$n_c(f_0) > 200$	23962.5 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 960 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0 / 2$	6.0 Hz	OK	
Exists f^+ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	2.50 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01645 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.32841 < 0.99844	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.0571 < 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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

CAPOLUOGO, R 22

Instrument: TRS-0009/00-06

Start recording: 07/06/12 13:24:46 End recording: 07/06/12 13:44:47

Channel labels: NORTH SOUTH; EAST WEST; UP DOWN

GPS data not available

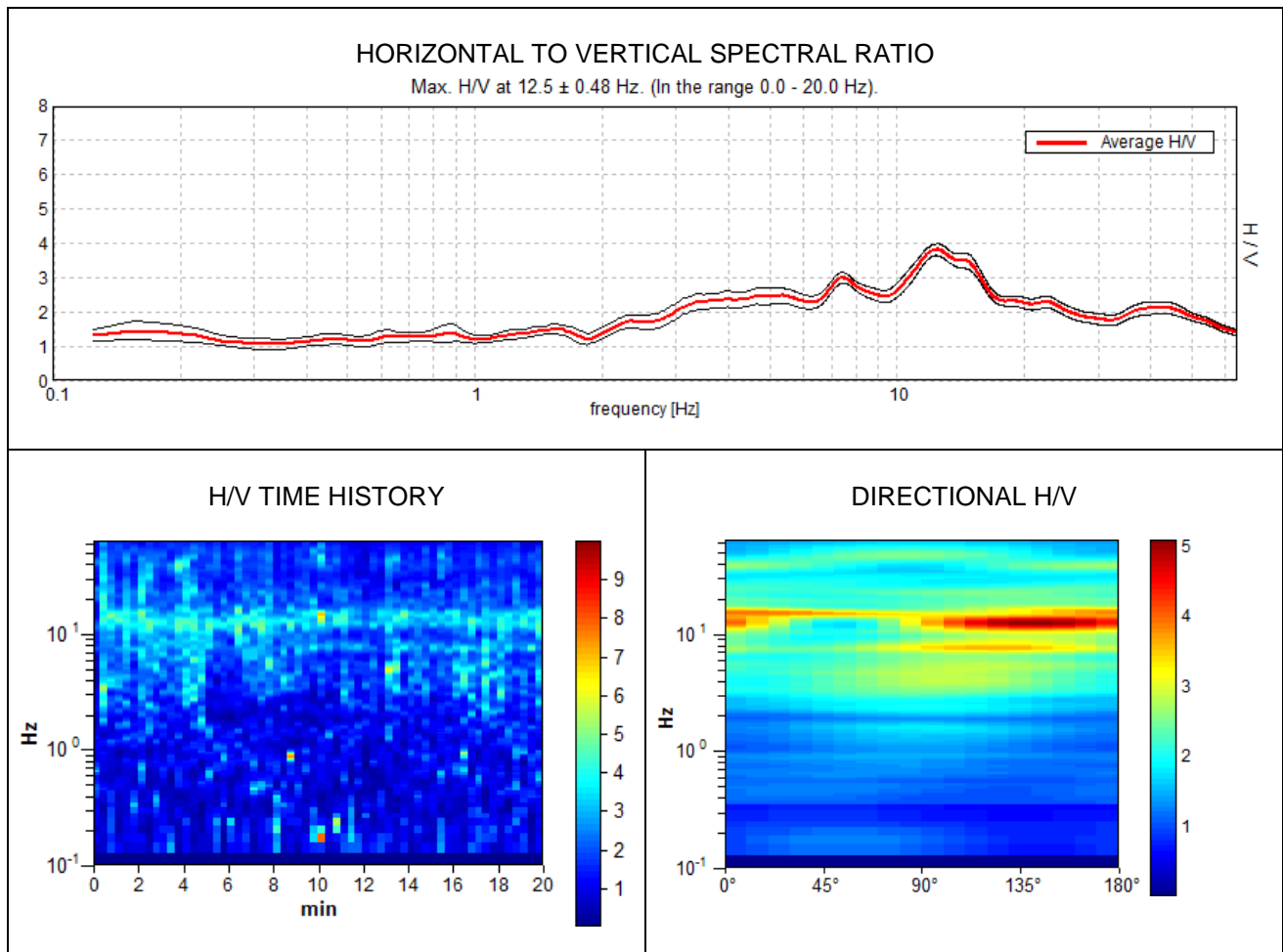
Trace length: 0h20'00". Analysis performed on the entire trace.

Sampling frequency: 128 Hz

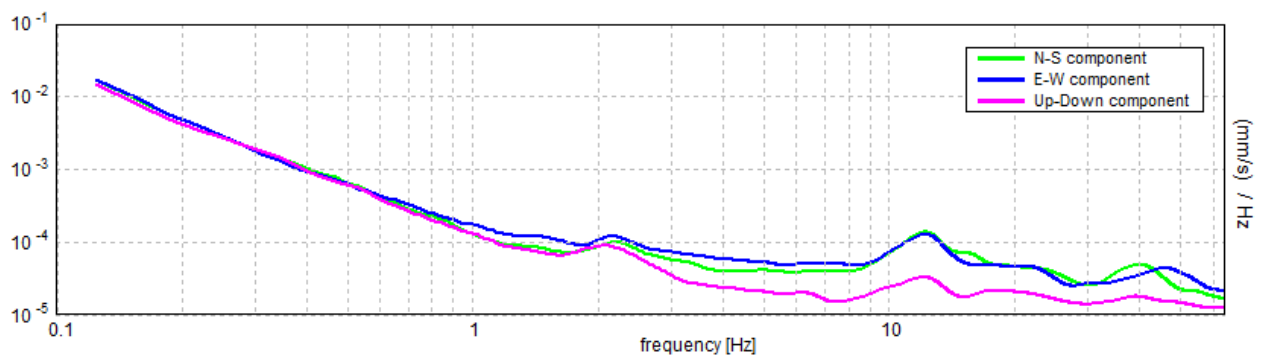
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 12.5 ± 0.48 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$12.50 > 0.50$	OK	
$n_c(f_0) > 200$	$15000.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 601 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 $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	26.75 Hz	OK	
$A_0 > 2$	$3.81 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.01904 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.238 < 0.625$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.0856 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

Misure HVSR Dama

DAMA, R 23

Instrument: TRS-0009/00-06

Start recording: 08/06/12 08:49:40 End recording: 08/06/12 09:09:41

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

GPS data not available

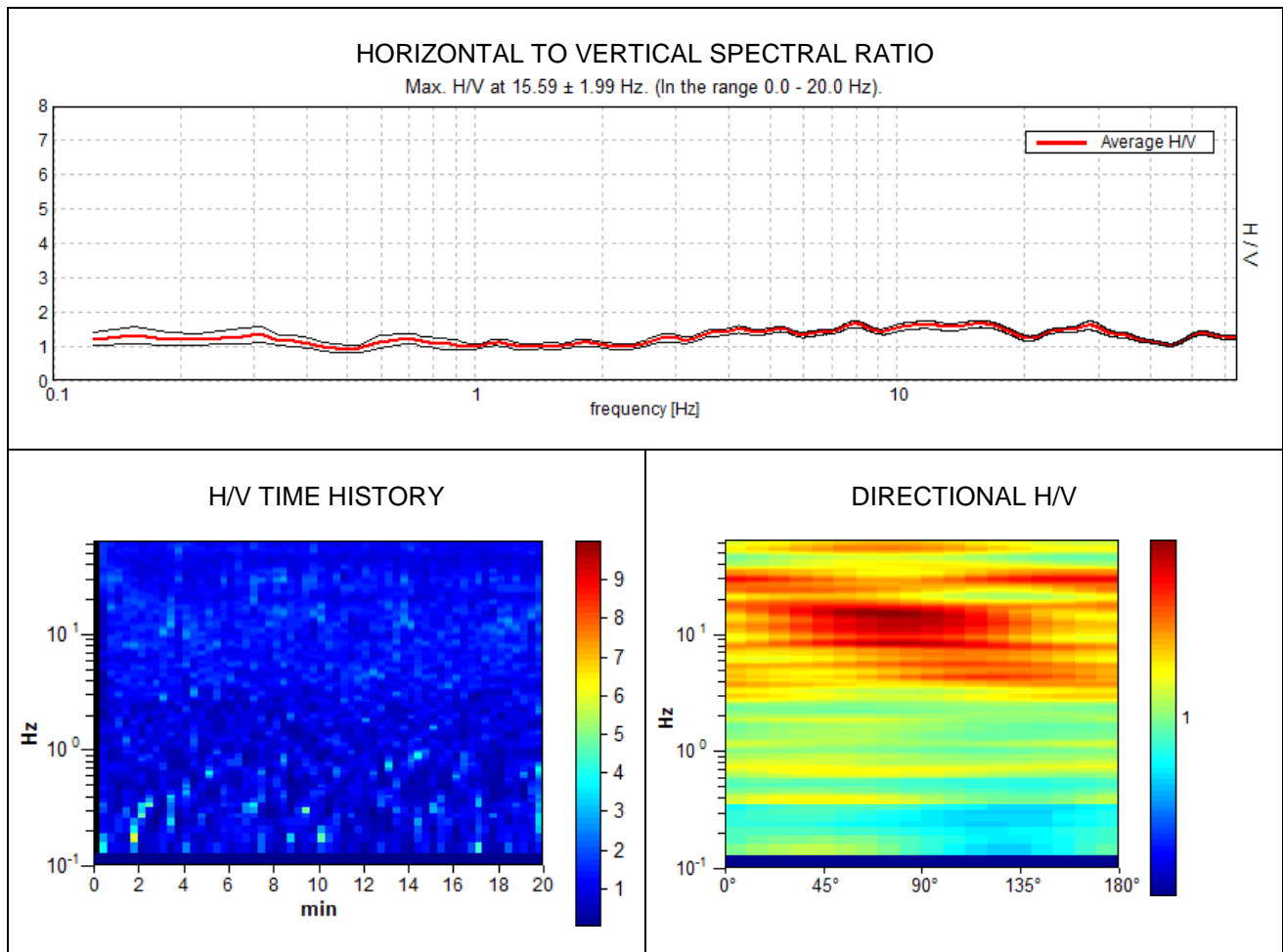
Trace length: 0h20'00". Analyzed 98% trace (manual window selection)

Sampling frequency: 128 Hz

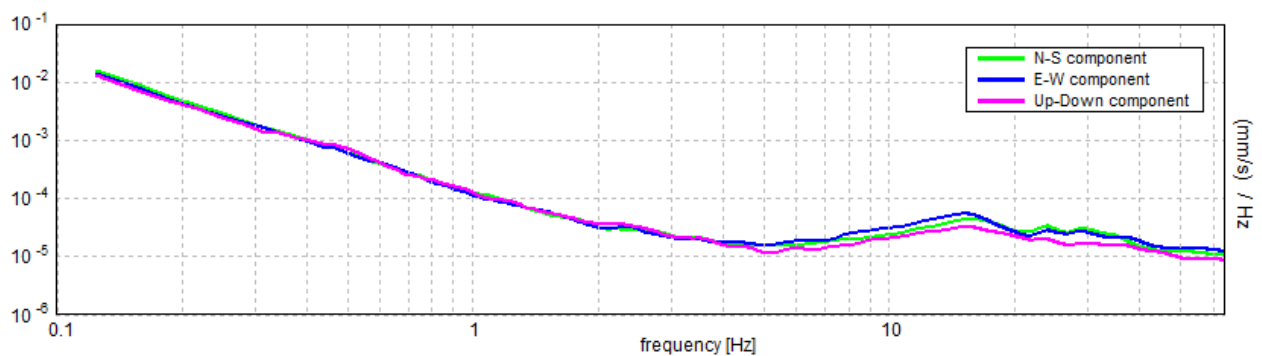
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 15.59 ± 1.99 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	15.59 > 0.50	OK	
$n_c(f_0) > 200$	18400.6 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 750 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$			NO
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	1.64 > 2		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.06326 < 0.05$		NO
$\sigma_f < \varepsilon(f_0)$	$0.98645 < 0.77969$		NO
$\sigma_A(f_0) < \theta(f_0)$	$0.0465 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

DAMA, R 24

Instrument: TRS-0009/00-06

Start recording: 08/06/12 09:19:57 End recording: 08/06/12 09:39:58

Channel labels: NORTH SOUTH; EAST WEST; UP DOWN

GPS data not available

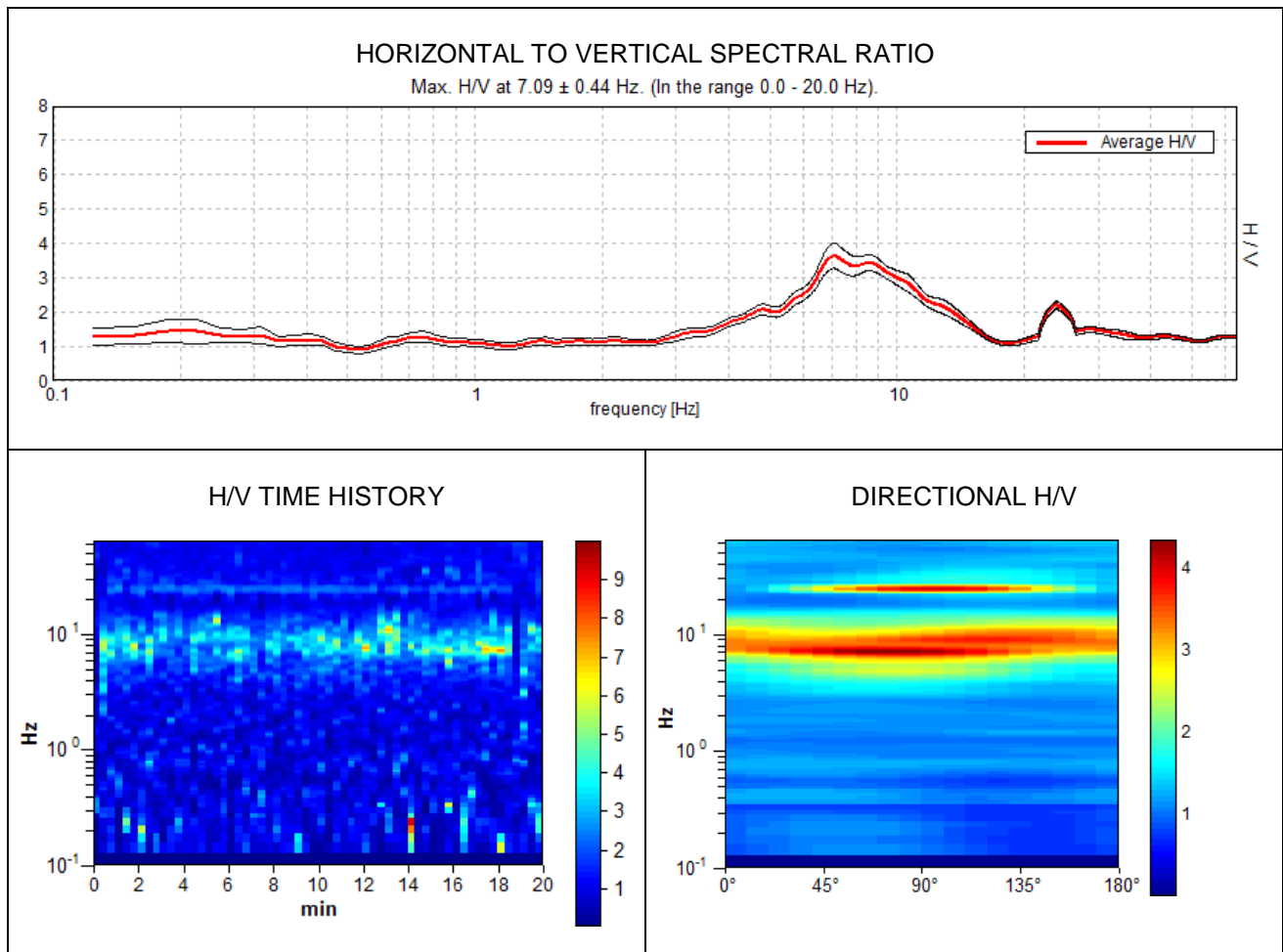
Trace length: 0h20'00". Analysis performed on the entire trace.

Sampling frequency: 128 Hz

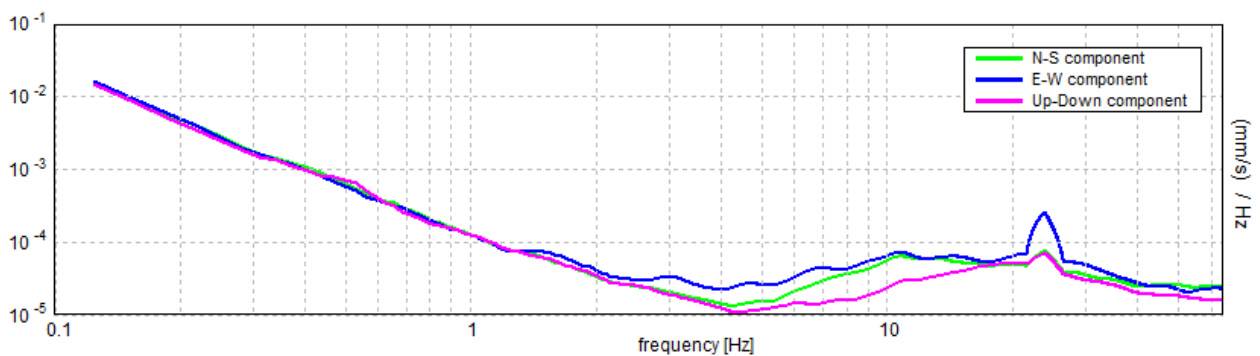
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 7.09 ± 0.44 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$7.09 > 0.50$	OK	
$n_c(f_0) > 200$	$8512.5 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 342 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$	4.313 Hz	OK	
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	14.188 Hz	OK	
$A_0 > 2$	$3.64 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03093 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.21942 < 0.35469$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1835 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

Misure HVSR Corsalone

CORSALONE, R 25

Instrument: TRS-0009/00-06

Start recording: 08/06/12 12:33:39 End recording: 08/06/12 12:53:40

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

GPS data not available

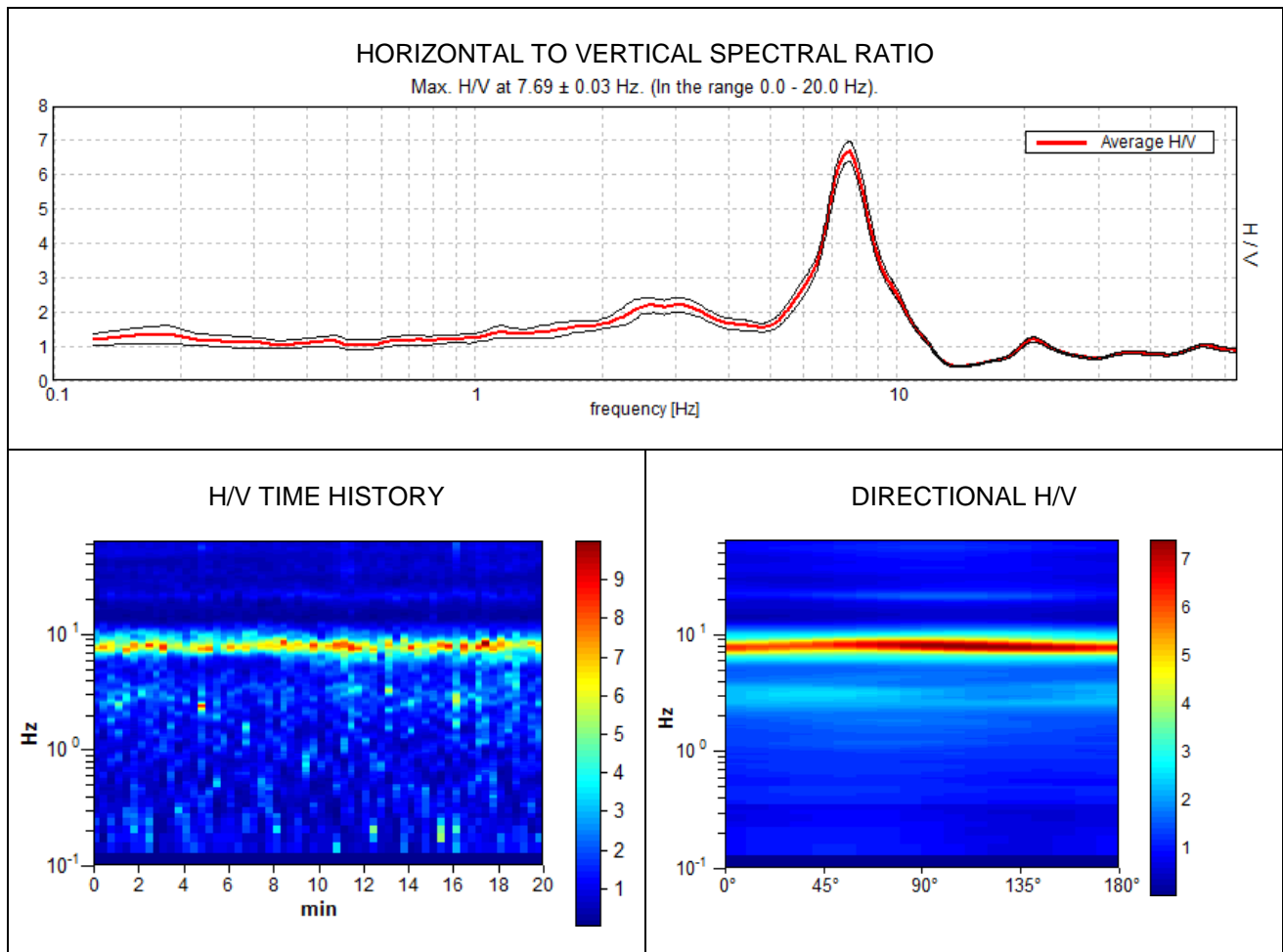
Trace length: 0h20'00". Analysis performed on the entire trace.

Sampling frequency: 128 Hz

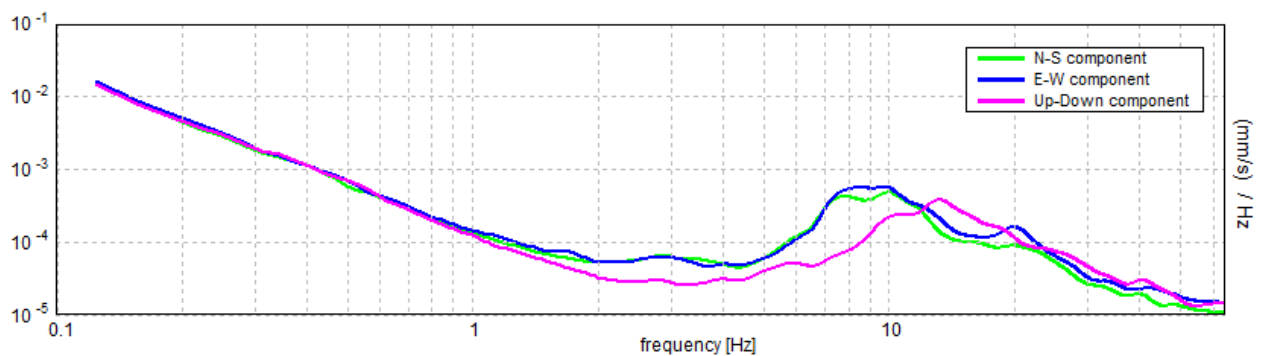
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 7.69 ± 0.03 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$7.69 > 0.50$	OK	
$n_c(f_0) > 200$	$9225.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 370 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$	6.406 Hz	OK	
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	9.219 Hz	OK	
$A_0 > 2$	$6.67 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00188 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01446 < 0.38438$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1436 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

CORSALONE, R 26

Instrument: TRS-0009/00-06

Start recording: 08/06/12 13:02:35 End recording: 08/06/12 13:22:36

Channel labels: NORTH SOUTH; EAST WEST; UP DOWN

GPS data not available

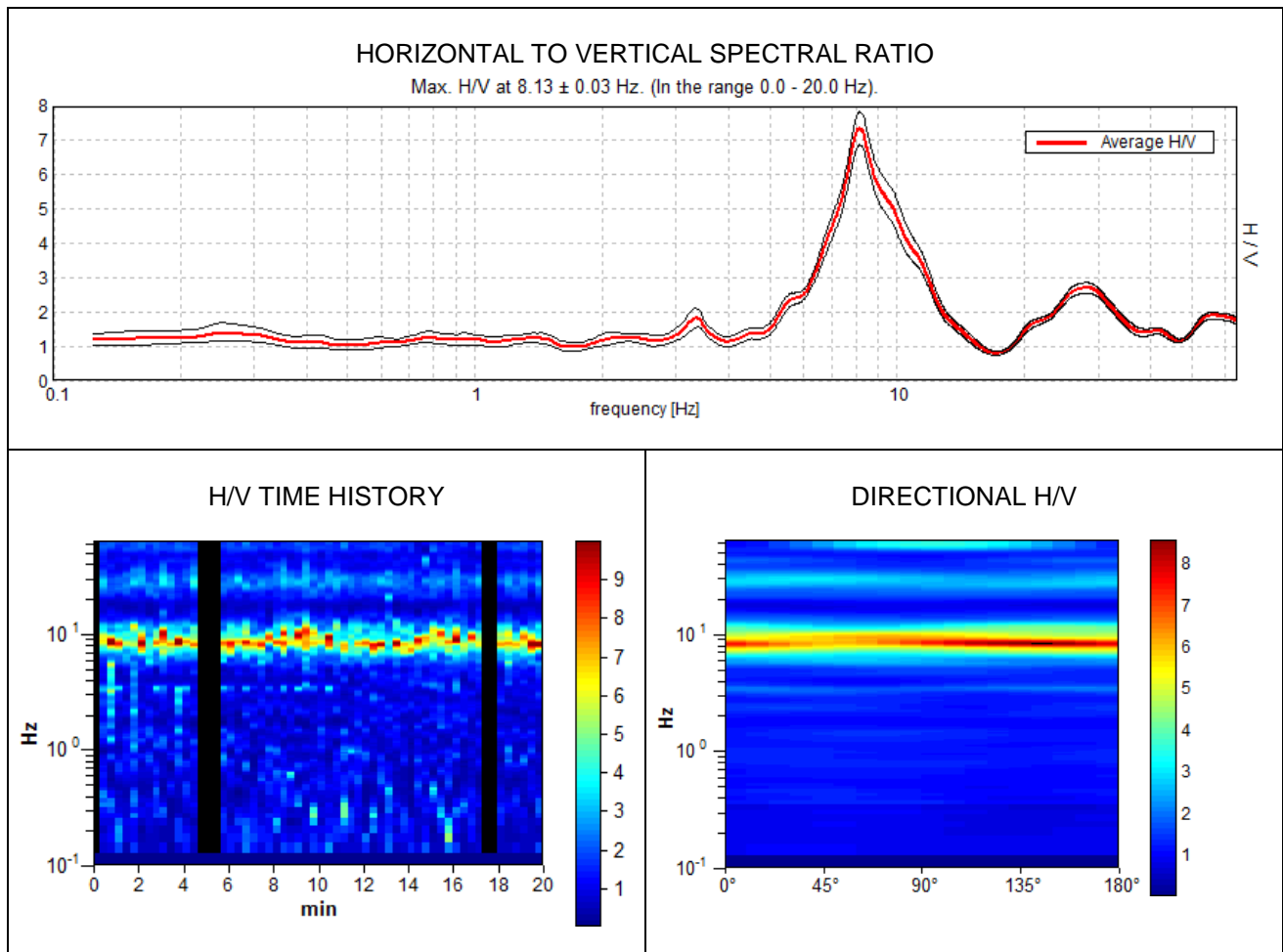
Trace length: 0h20'00". Analyzed 90% trace (manual window selection)

Sampling frequency: 128 Hz

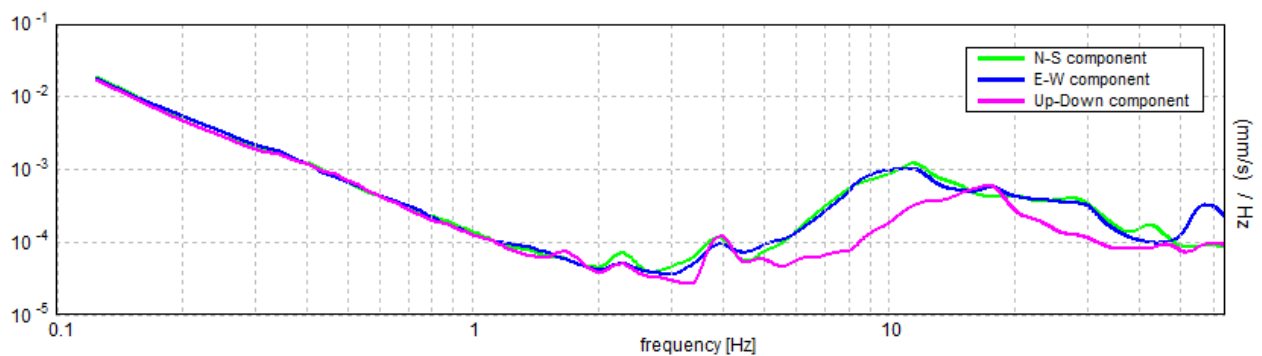
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 8.13 ± 0.03 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	$8.13 > 0.50$	OK	
$n_c(f_0) > 200$	$8775.0 > 200$	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 391 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$	6.625 Hz	OK	
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	11.156 Hz	OK	
$A_0 > 2$	$7.37 > 2$	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.0018 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01465 < 0.40625$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.2377 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

CORSALONE, R 27

Instrument: TRS-0009/00-06

Start recording: 08/06/12 13:33:06 End recording: 08/06/12 13:53:07

Channel labels: NORTH SOUTH; EAST WEST; UP DOWN

GPS data not available

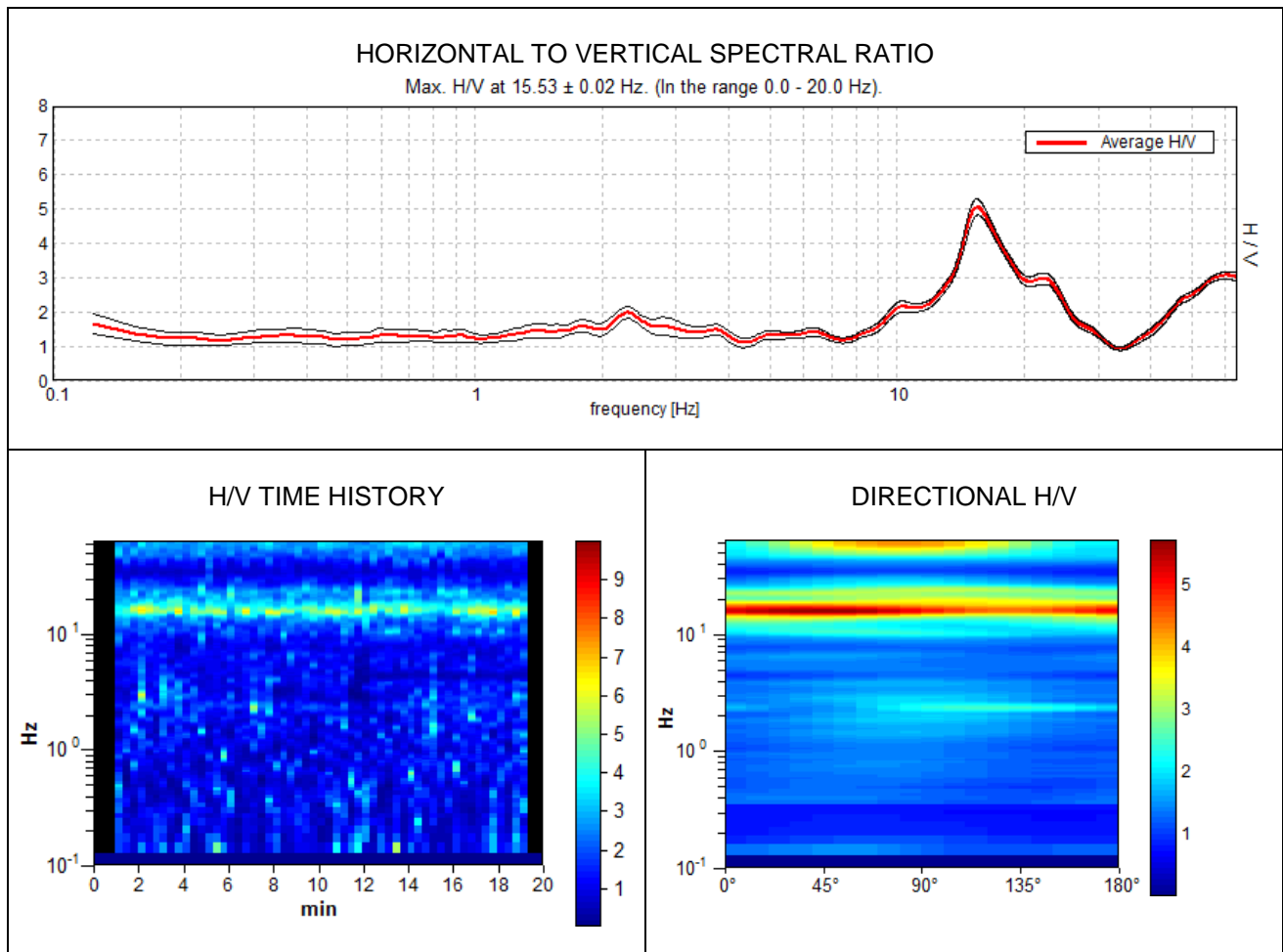
Trace length: 0h20'00". Analyzed 92% trace (manual window selection)

Sampling frequency: 128 Hz

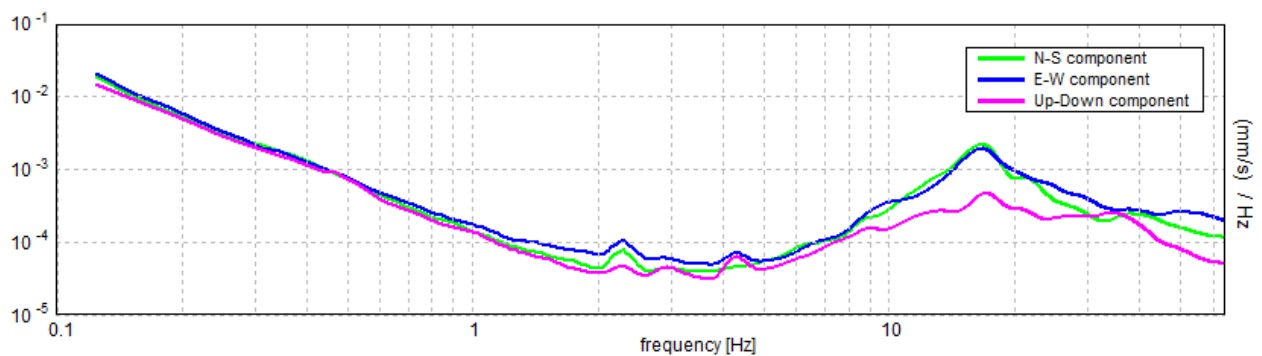
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 15.53 ± 0.02 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	15.53 > 0.50	OK	
$n_c(f_0) > 200$	17084.4 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 746 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$	12.625 Hz	OK	
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	24.281 Hz	OK	
$A_0 > 2$	5.06 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00078 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.01217 < 0.77656$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1164 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

CORSALONE, R 28

Instrument: TRS-0009/00-06

Start recording: 08/06/12 14:03:34 End recording: 08/06/12 14:23:35

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

GPS data not available

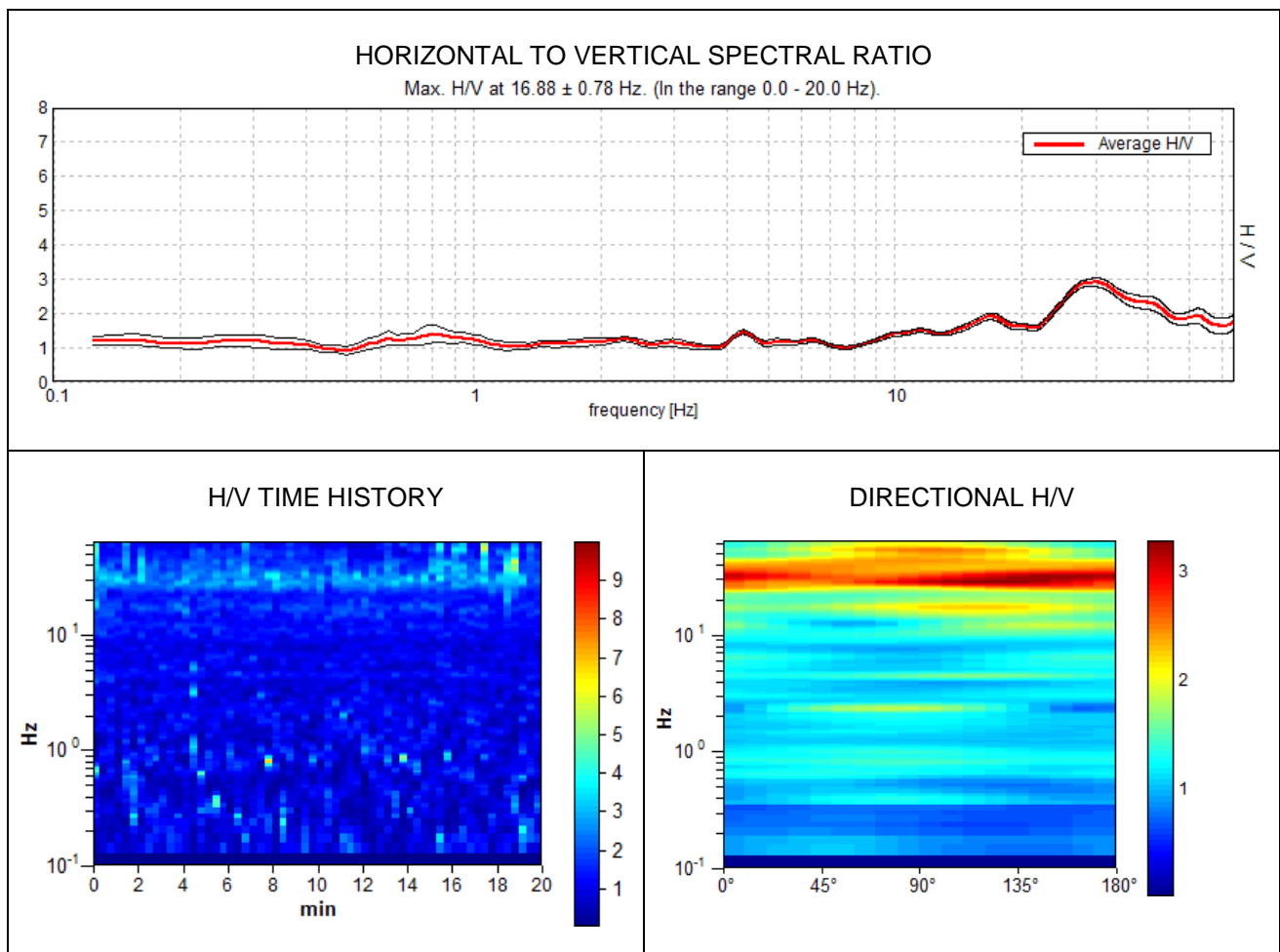
Trace length: 0h20'00". Analysis performed on the entire trace.

Sampling frequency: 128 Hz

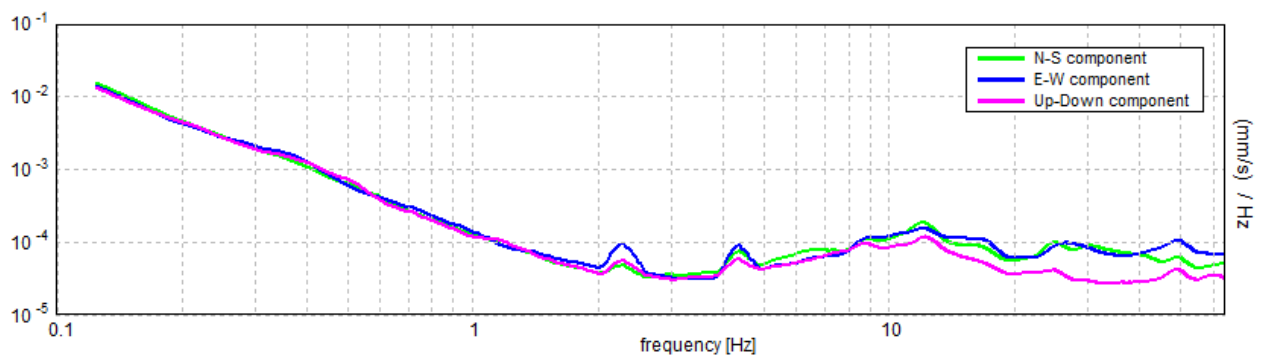
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 16.88 ± 0.78 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	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 $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	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 $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$			NO
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$			NO
$A_0 > 2$	1.90 > 2		NO
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.02282 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.38508 < 0.84375$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.0467 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

CORSALONE, R 29

Instrument: TRS-0009/00-06

Start recording: 08/06/12 15:07:02 End recording: 08/06/12 15:27:03

Channel labels: NORTH SOUTH; EAST WEST; UP DOWN

GPS data not available

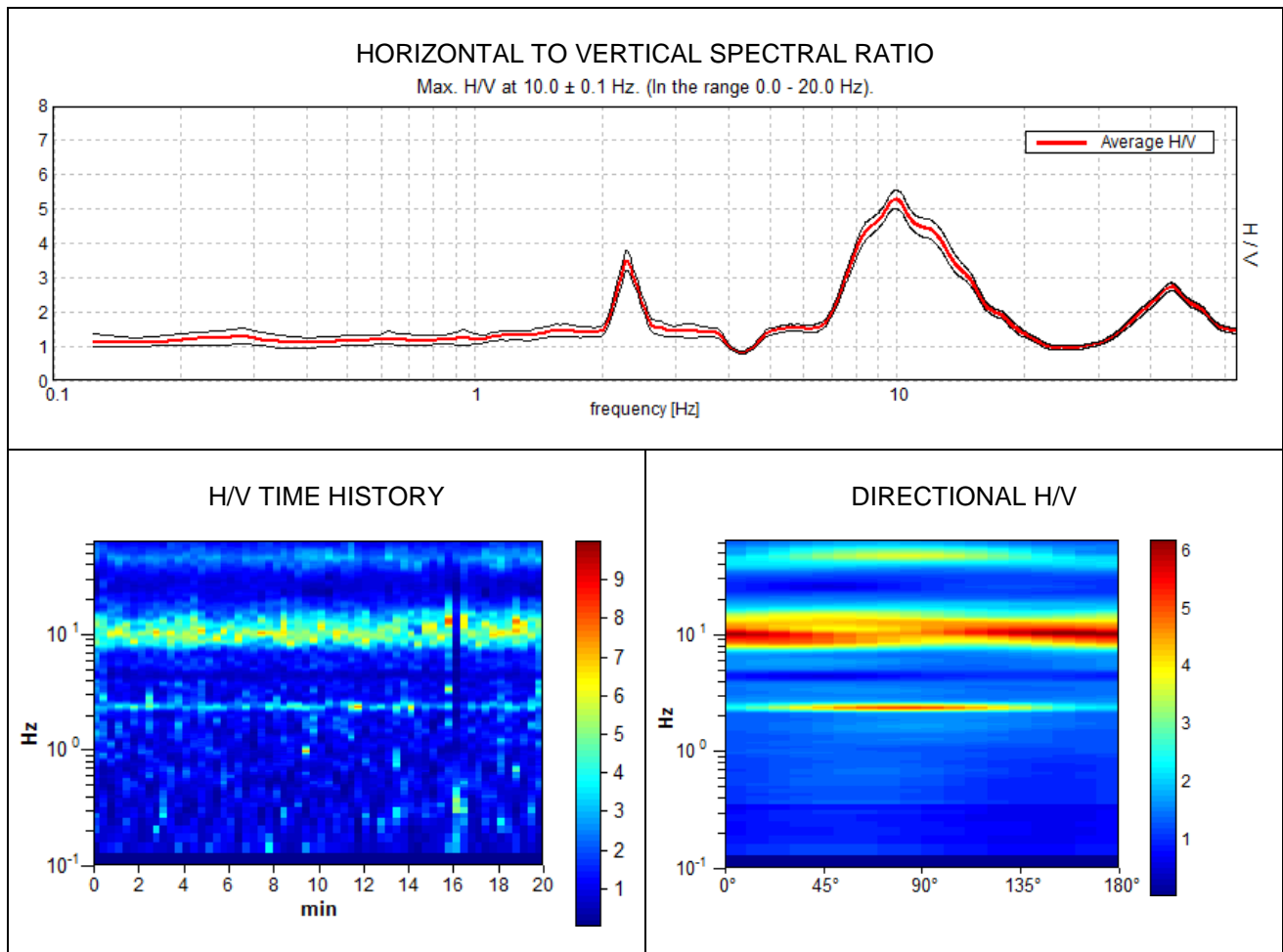
Trace length: 0h20'00". Analysis performed on the entire trace.

Sampling frequency: 128 Hz

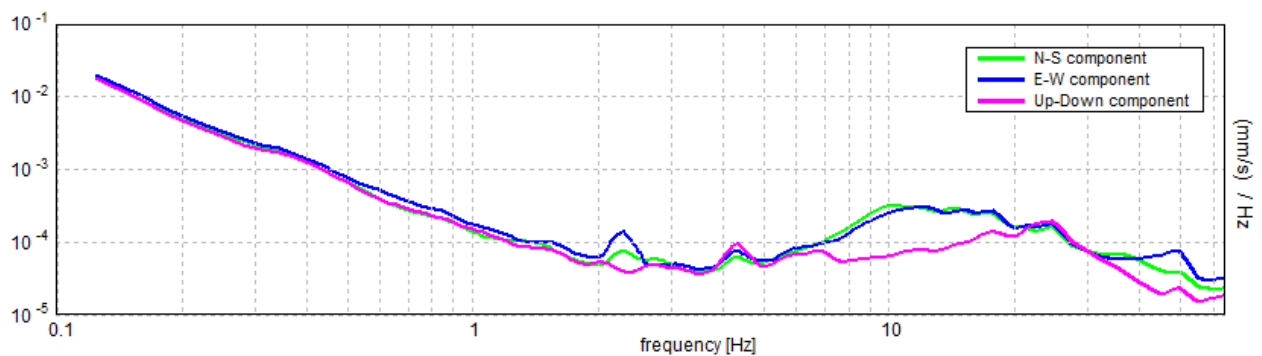
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 10.0 ± 0.1 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	10.00 > 0.50	OK	
$n_c(f_0) > 200$	12000.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 481 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0] \mid A_{H/V}(f^-) < A_0 / 2$	7.375 Hz	OK	
Exists f^+ in $[f_0, 4f_0] \mid A_{H/V}(f^+) < A_0 / 2$	15.469 Hz	OK	
$A_0 > 2$	5.29 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00489 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	0.04894 < 0.5	OK	
$\sigma_A(f_0) < \theta(f_0)$	0.1358 < 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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

CORSALONE, R 30

Instrument: TRS-0009/00-06

Start recording: 08/06/12 14:35:51 End recording: 08/06/12 14:55:52

Channel labels: NORTH SOUTH; EAST WEST; UP DOWN

GPS data not available

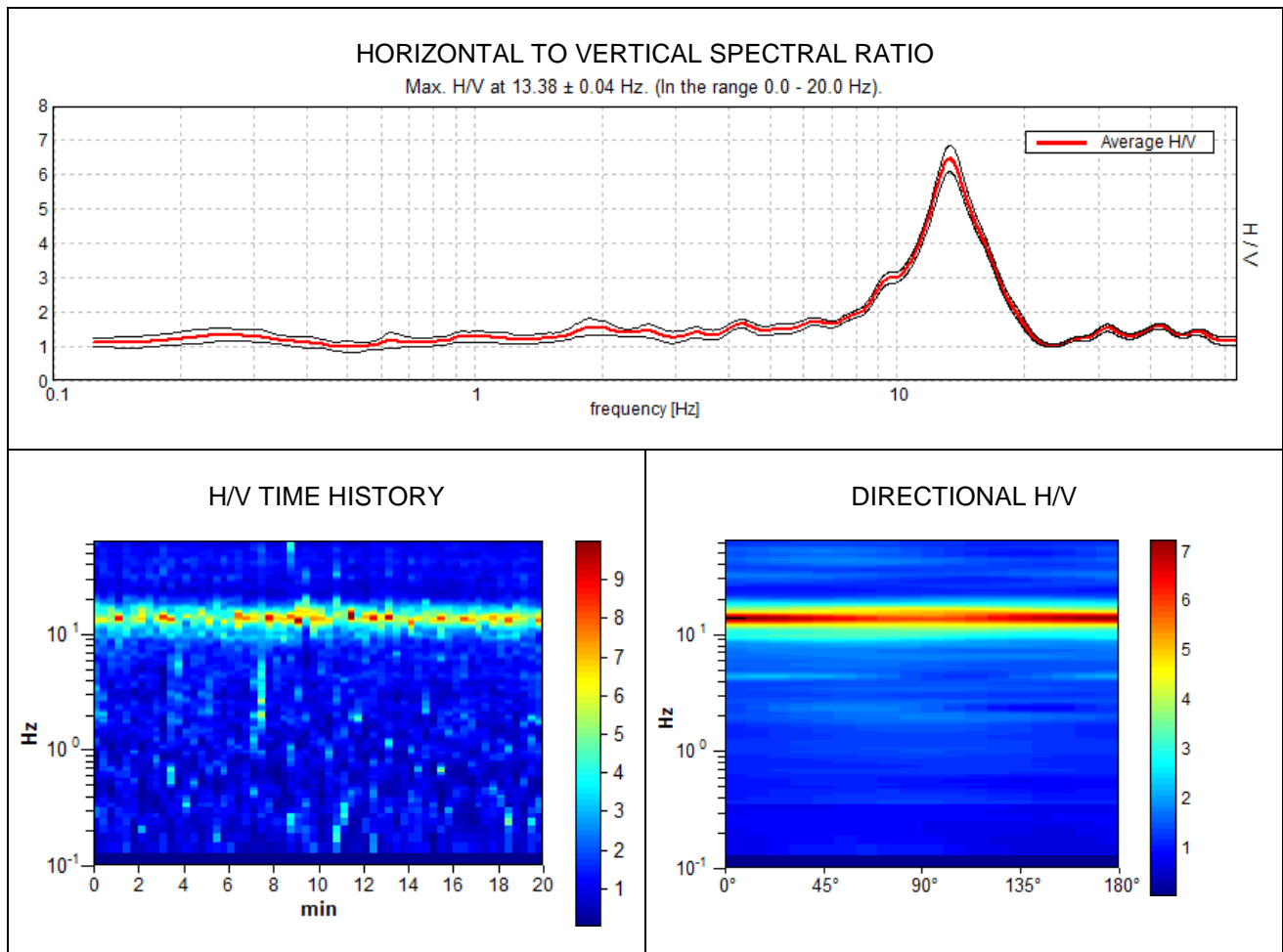
Trace length: 0h20'00". Analysis performed on the entire trace.

Sampling frequency: 128 Hz

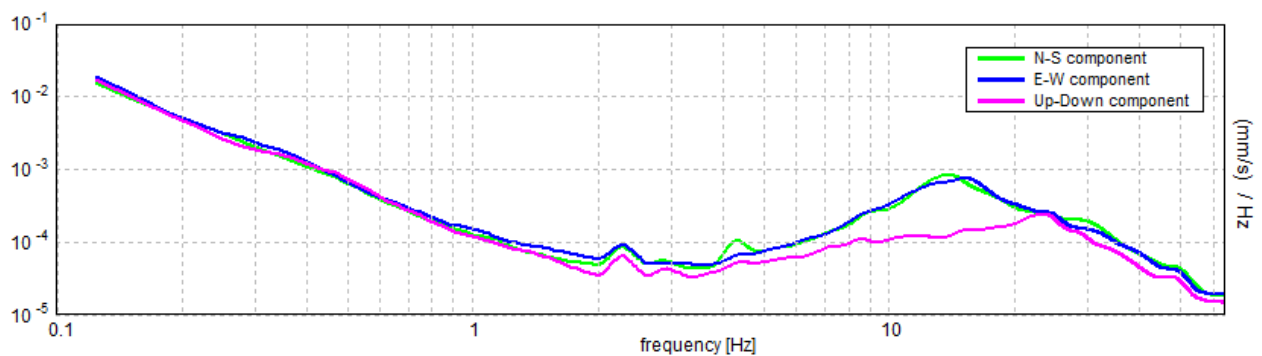
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 13.38 ± 0.04 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	13.38 > 0.50	OK	
$n_c(f_0) > 200$	16050.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 643 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$	10.469 Hz	OK	
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	17.125 Hz	OK	
$A_0 > 2$	6.47 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00164 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.02188 < 0.66875$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1918 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

CORSALONE, R 31

Instrument: TRS-0009/00-06

Start recording: 08/06/12 16:13:27 End recording: 08/06/12 16:33:28

Channel labels: NORTH SOUTH; EAST WEST; UP DOWN

GPS data not available

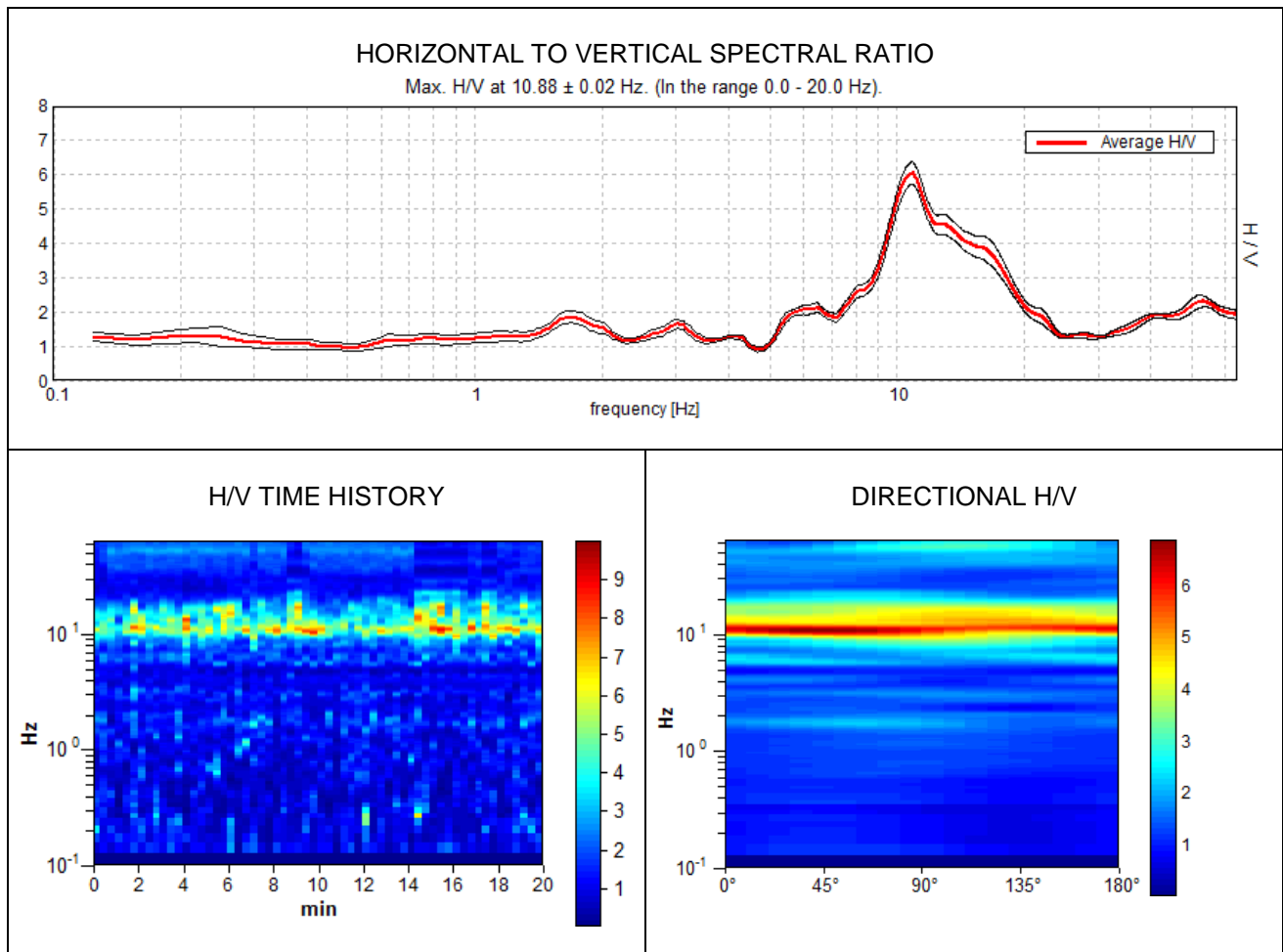
Trace length: 0h20'00". Analysis performed on the entire trace.

Sampling frequency: 128 Hz

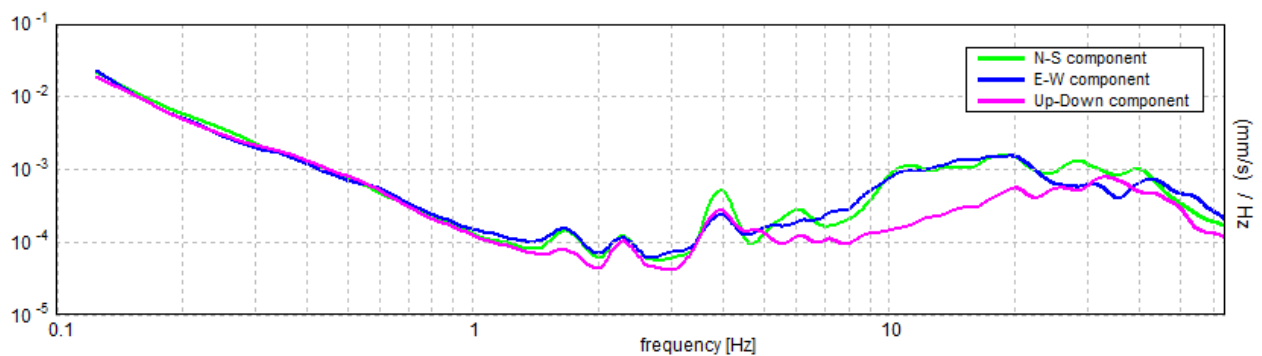
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 10.88 ± 0.02 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	10.88 > 0.50	OK	
$n_c(f_0) > 200$	13050.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 523 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$	8.875 Hz	OK	
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	18.219 Hz	OK	
$A_0 > 2$	6.05 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00078 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.00853 < 0.54375$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.1585 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

CORSALONE, R 32

Instrument: TRS-0009/00-06

Start recording: 08/06/12 16:47:24 End recording: 08/06/12 17:07:25

Channel labels: NORTH SOUTH; EAST WEST; UP DOWN

GPS data not available

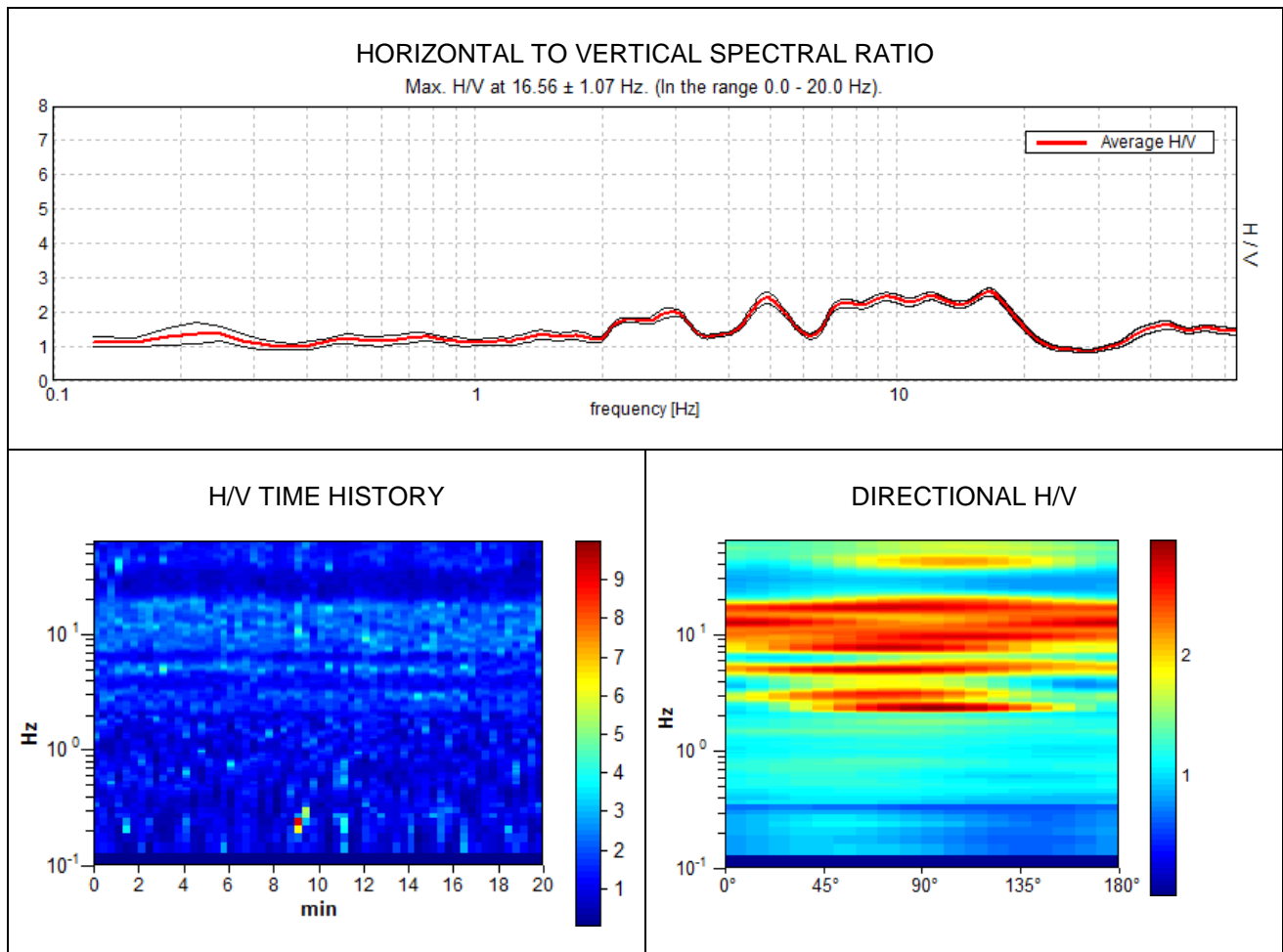
Trace length: 0h20'00". Analysis performed on the entire trace.

Sampling frequency: 128 Hz

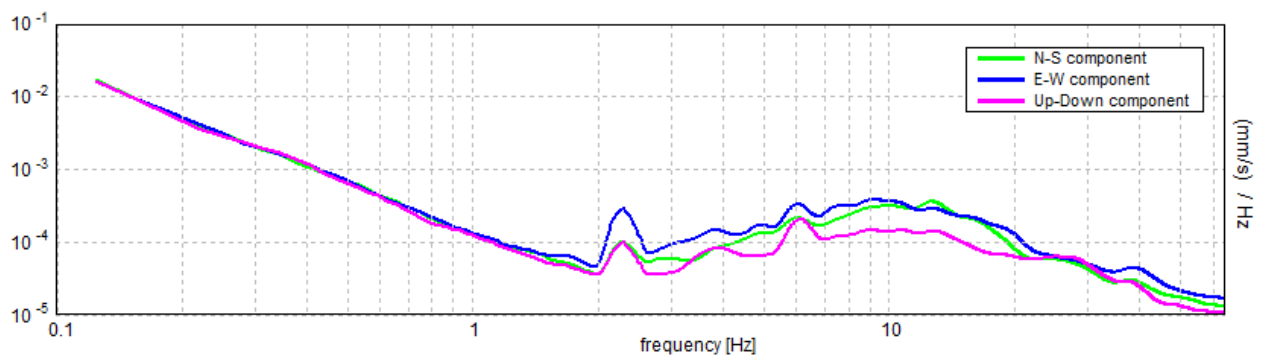
Window size: 20 s

Smoothing window: Triangular window

Smoothing: 10%



SINGLE COMPONENT SPECTRA



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

Max. H/V at 16.56 ± 1.07 Hz (in the range 0.0 - 20.0 Hz).

Criteria for a reliable HVSR curve

[All 3 should be fulfilled]

$f_0 > 10 / L_w$	16.56 > 0.50	OK	
$n_c(f_0) > 200$	19875.0 > 200	OK	
$\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5\text{Hz}$	Exceeded 0 out of 796 times	OK	

Criteria for a clear HVSR peak

[At least 5 out of 6 should be fulfilled]

Exists f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$	6.25 Hz	OK	
Exists f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	21.031 Hz	OK	
$A_0 > 2$	2.58 > 2	OK	
$f_{\text{peak}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.03215 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.53246 < 0.82813$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.0559 < 1.58$	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
$\sigma_{\log H/V}(f)$	standard deviation of $\log A_{H/V}(f)$ 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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

R 32 RIPETUTA

Strumento: TRS-0004/00-06

Inizio registrazione: 01/08/12 09:43:22 Fine registrazione: 01/08/12 10:13:23

Nomi canali: NORTH SOUTH; EAST WEST; UP DOWN

Dato GPS non disponibile

Durata registrazione: 0h30'00".

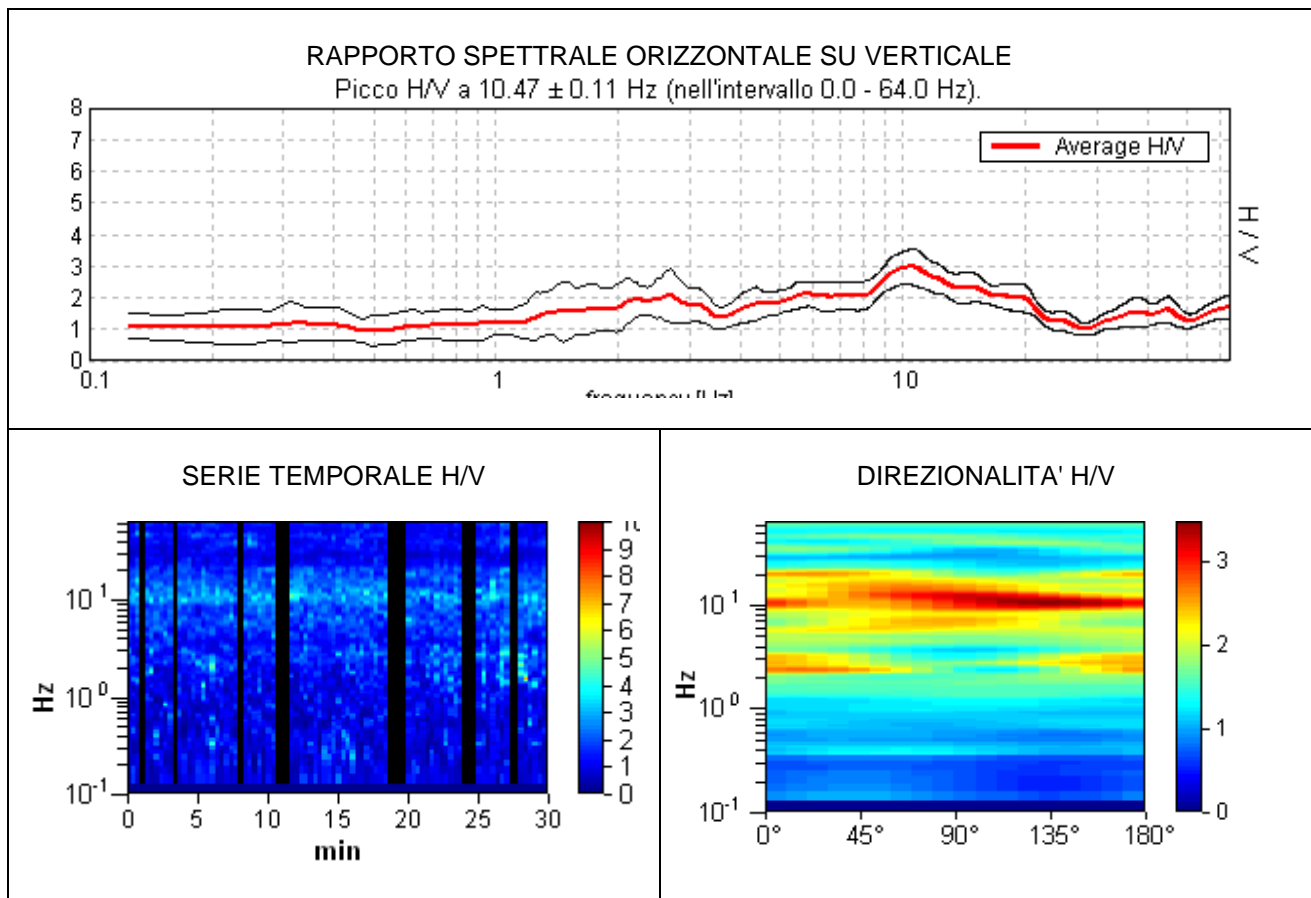
Analizzato 83% tracciato (selezione manuale)

Freq. campionamento: 128 Hz

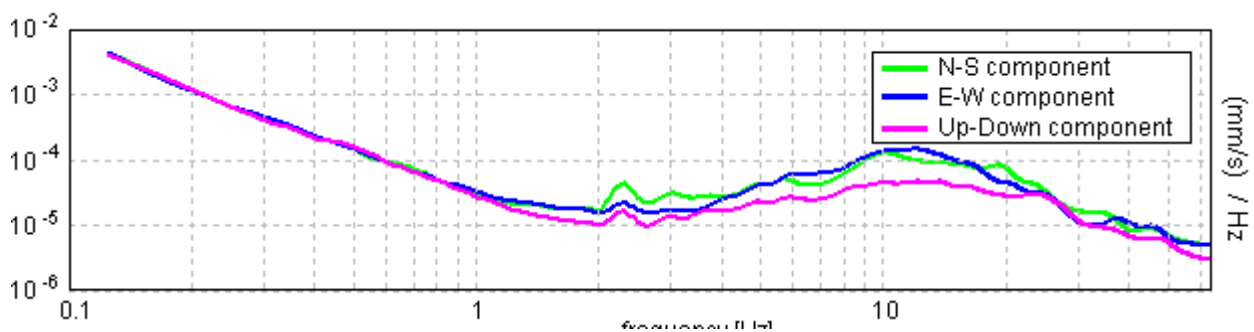
Lunghezza finestre: 20 s

Tipo di lisciamento: Triangular window

Lisciamento: 10%



SPETTRI DELLE SINGOLE COMPONENTI



[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 10.47 ± 0.11 Hz (nell'intervallo 0.0 - 64.0 Hz).

Criteri per una curva H/V affidabile

[Tutti 3 dovrebbero risultare soddisfatti]

$f_0 > 10 / L_w$	$10.47 > 0.50$	OK	
$n_c(f_0) > 200$	$15703.1 > 200$	OK	
$\sigma_A(f) < 2$ per $0.5f_0 < f < 2f_0$ se $f_0 > 0.5\text{Hz}$ $\sigma_A(f) < 3$ per $0.5f_0 < f < 2f_0$ se $f_0 < 0.5\text{Hz}$	Superato 0 volte su 504	OK	

Criteri per un picco H/V chiaro

[Almeno 5 su 6 dovrebbero essere soddisfatti]

Esiste f^- in $[f_0/4, f_0]$ $A_{H/V}(f^-) < A_0 / 2$	3.781 Hz	OK	
Esiste f^+ in $[f_0, 4f_0]$ $A_{H/V}(f^+) < A_0 / 2$	21.75 Hz	OK	
$A_0 > 2$	$2.97 > 2$	OK	
$f_{\text{picco}}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$	$ 0.00504 < 0.05$	OK	
$\sigma_f < \varepsilon(f_0)$	$0.05272 < 0.52344$	OK	
$\sigma_A(f_0) < \theta(f_0)$	$0.281 < 1.58$	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
$\sigma_{\log H/V}(f)$	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 $\sigma_{\log H/V}(f_0)$	0.48	0.40	0.30	0.25	0.20

Sovrapposizione misura precedente e misura ripetuta

