



CONSORZIO DI BONIFICA PIANURA DI FERRARA

Sede legale e recapito postale:

44121 Ferrara - Via Borgo dei Leoni, 28 - C.F. 93076450381

web: www.bonificaferrara.it - e-mail: info@bonificaferrara.it - pec: posta.certificata@pec.bonificaferrara.it

aderente all'  Associazione Nazionale Bonifiche, Irrigazioni e Miglioramenti Fondiari

SISTEMA IRRIGUO VALLE PEGA

PROGETTO DEFINITIVO ED ESECUTIVO

Provincia di Ferrara

Comuni di Comacchio e Ostellato

**Recupero, adeguamento e miglioramento
funzionale del sistema irriguo di Valle Pega**

RELAZIONI TECNICHE E SPECIALISTICHE INQUADRAMENTO GENERALE - AUTORIZZAZIONI

Elaborato:

**INDAGINI GEOLOGICHE, IDROGEOLOGICHE
E DI CARATTERIZZAZIONE SISMICA**
Elaborazioni tomografiche

Codifica:

1.4.7

**Progetto generale e
integrazione delle prestazioni
specialistiche:**

Dott. Ing. Marco Volpin



Progetto rete di distribuzione:



Dott. Ing. Emiliano Corsi

**Progetto opere
elettromeccaniche:**



Per. Ind. Deris Ortali

Progetto impianti elettrici:



Per. Ind. Andrea Angelini

Data:

28.06.2021

**Il Responsabile
del Procedimento**

Geom. Marco Ardizzoni

Indagini geologiche:



Dott. Geol. Antonio Mucchi

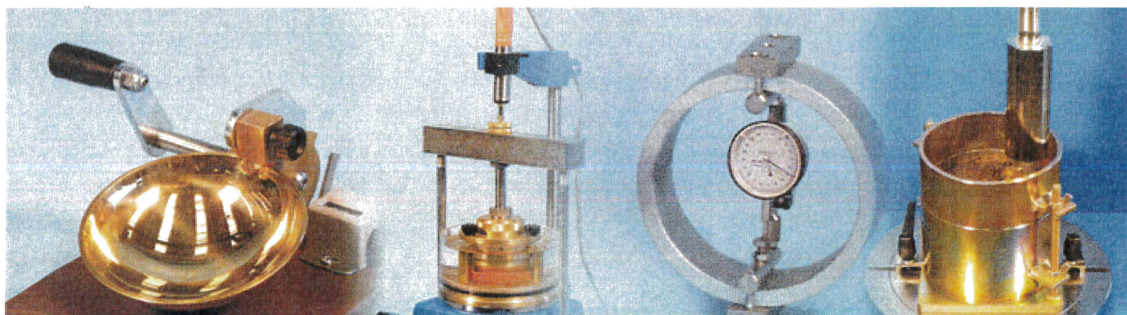
Coordinamento sicurezza:



Dott. Ing. Livia Burini

Rev.	Descrizione	Redatto	Verificato	Approvato	Data
A	Emissione	Mucchi A.	Mucchi A.	Mucchi A.	Aprile 2021
B					
C					



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 Autorizzazione del Ministero Infrastrutture e Trasporti
 Per prove di laboratorio sui terreni – ai sensi dell'art. 59 del DPR 380/01
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 Tel. 0532/ 815681



LABORATORIO PROVE MATERIALI
 Aut. Min. ai sensi dell'art. 59 del D.P.R. n° 380/01
Terre - Inerti - Riciclati - Asfalti
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COMMITTENTE : CONSORZIO DI BONIFICA PIANURA DI FERRARA
CANTIERE : Valle Pega – Comacchio (FE)
PROGETTO : Recupero, adeguamento e miglioramento funzionale del sistema irriguo di Valle Pega

ALLEGATO F – ELABORAZIONI TROMOGRAFICHE

Dott. Geol. Antonio Mucchi	Dott. Ing. Valentina Mucchi
	
	Ferrara, 21/07/2020 Prot 935 / 2020



TROMINO N.1



Instrument: TRZ-0009/01-09

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

Trace length: 0h30'00". Analyzed 82% trace (manual window selection)

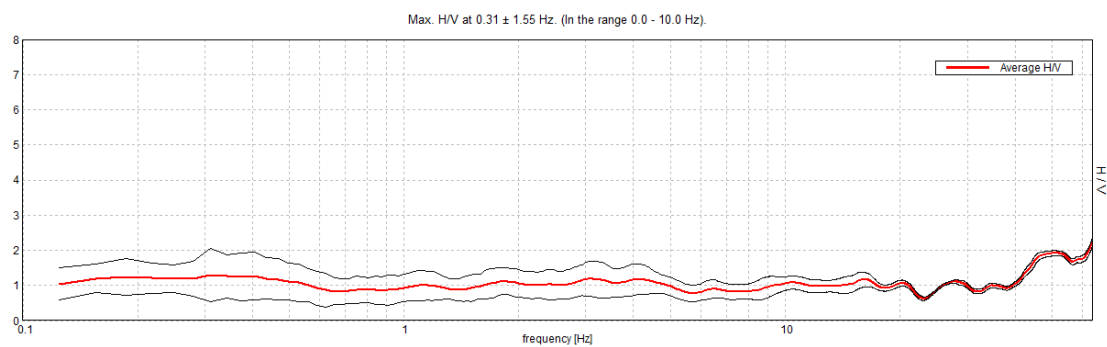
Sampling rate: 128 Hz

Window size: 20 s

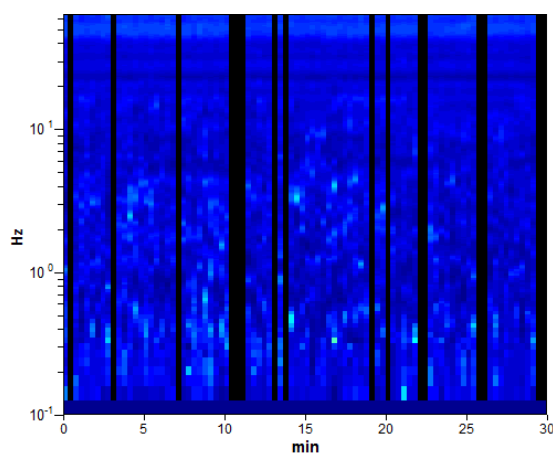
Smoothing type: Triangular window

Smoothing: 10%

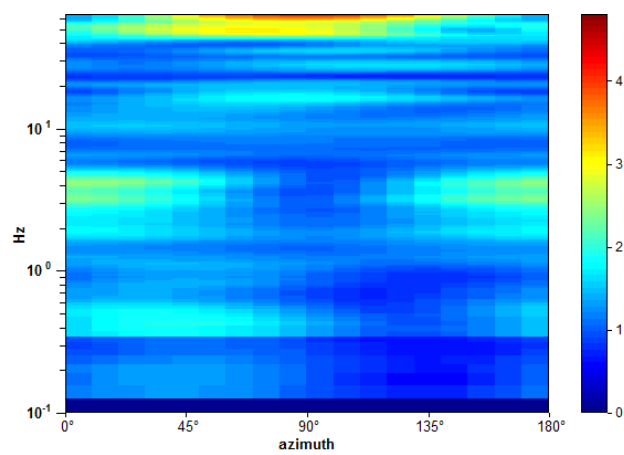
HORIZONTAL TO VERTICAL SPECTRAL RATIO



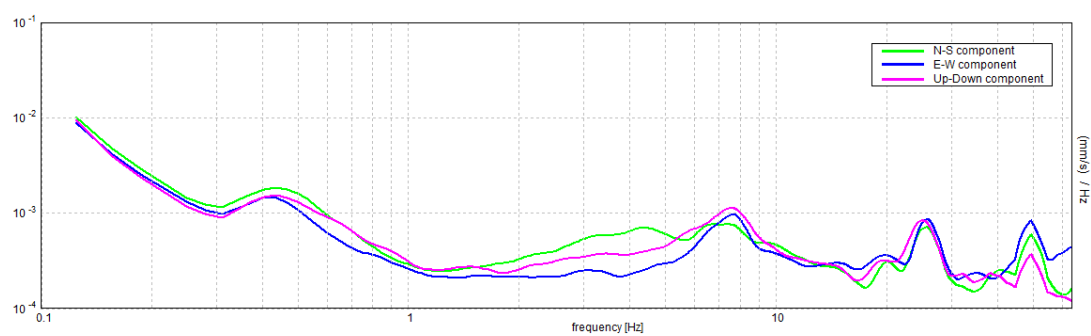
H/V TIME HISTORY



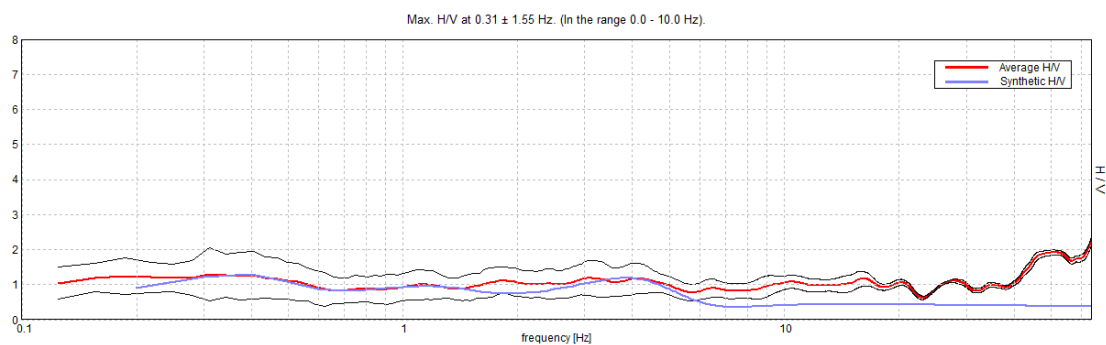
DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA

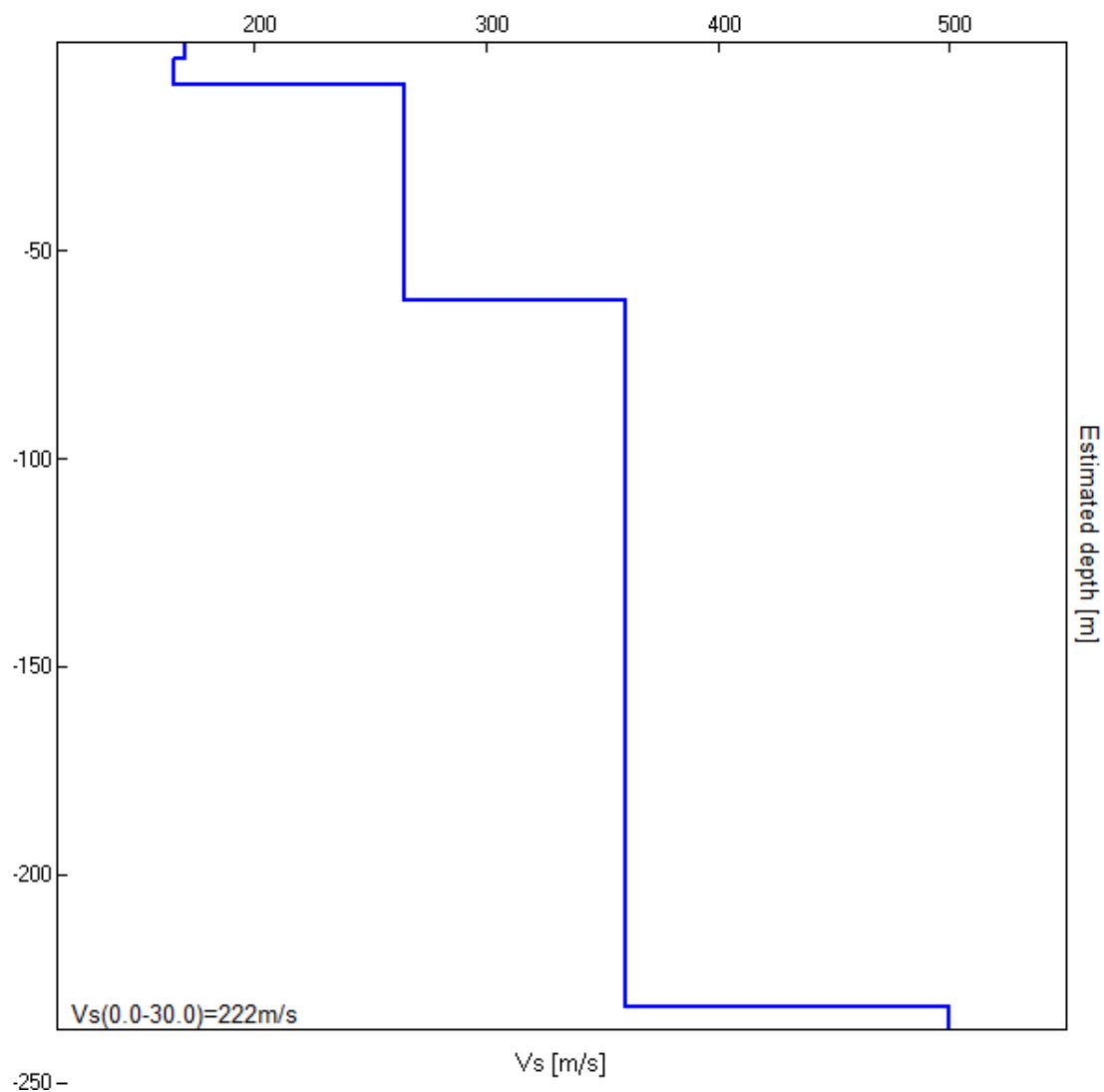


EXPERIMENTAL vs. SYNTHETIC H/V



Depth at the bottom of the layer [m]	Thickness [m]	Vs [m/s]	Poisson ratio
4.00	4.00	170	0.49
10.00	6.00	165	0.48
62.00	52.00	265	0.46
232.00	170.00	360	0.44
inf.	inf.	500	0.42

Vs(0.0-30.0)=222m/s



Max. H/V at 0.31 ± 1.55 Hz (in the range 0.0 - 10.0 Hz).

TROMINO N.2

Instrument: TRZ-0009/01-09

Start recording: 08/06/20 10:04:01 End recording: 08/06/20 10:34:01

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

Trace length: 0h30'00". Analyzed 76% trace (manual window selection)

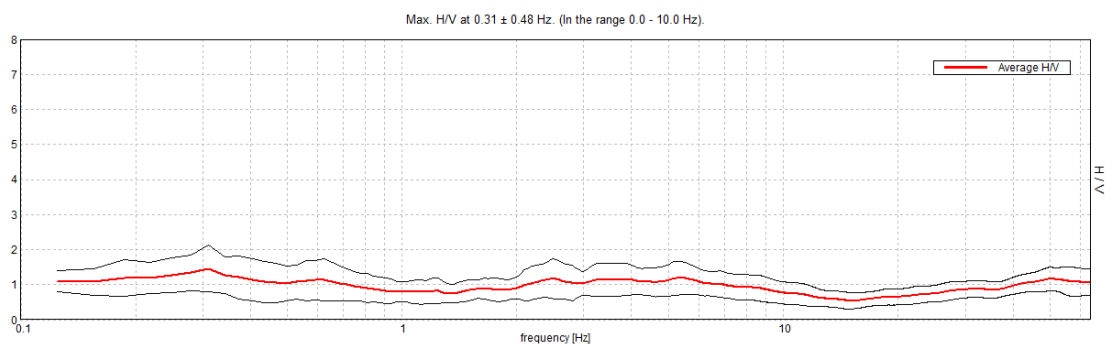
Sampling rate: 128 Hz

Window size: 20 s

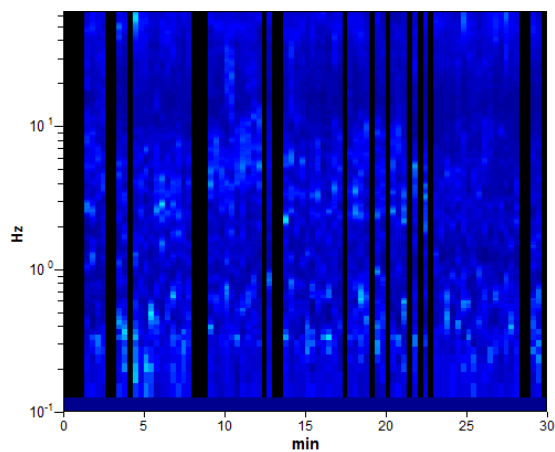
Smoothing type: Triangular window

Smoothing: 10%

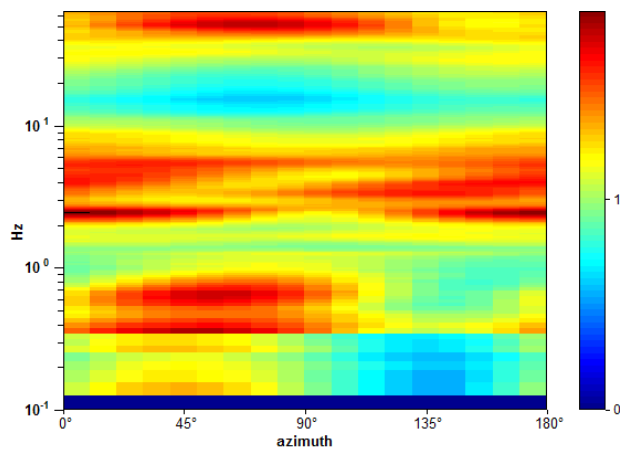
HORIZONTAL TO VERTICAL SPECTRAL RATIO



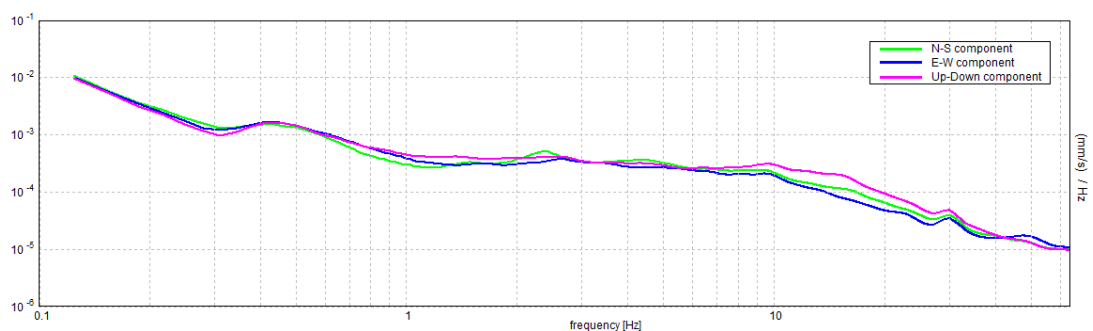
H/V TIME HISTORY



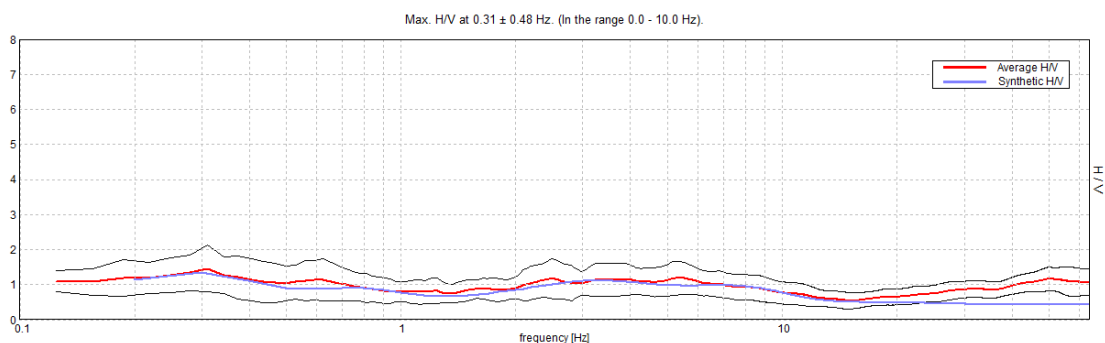
DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA

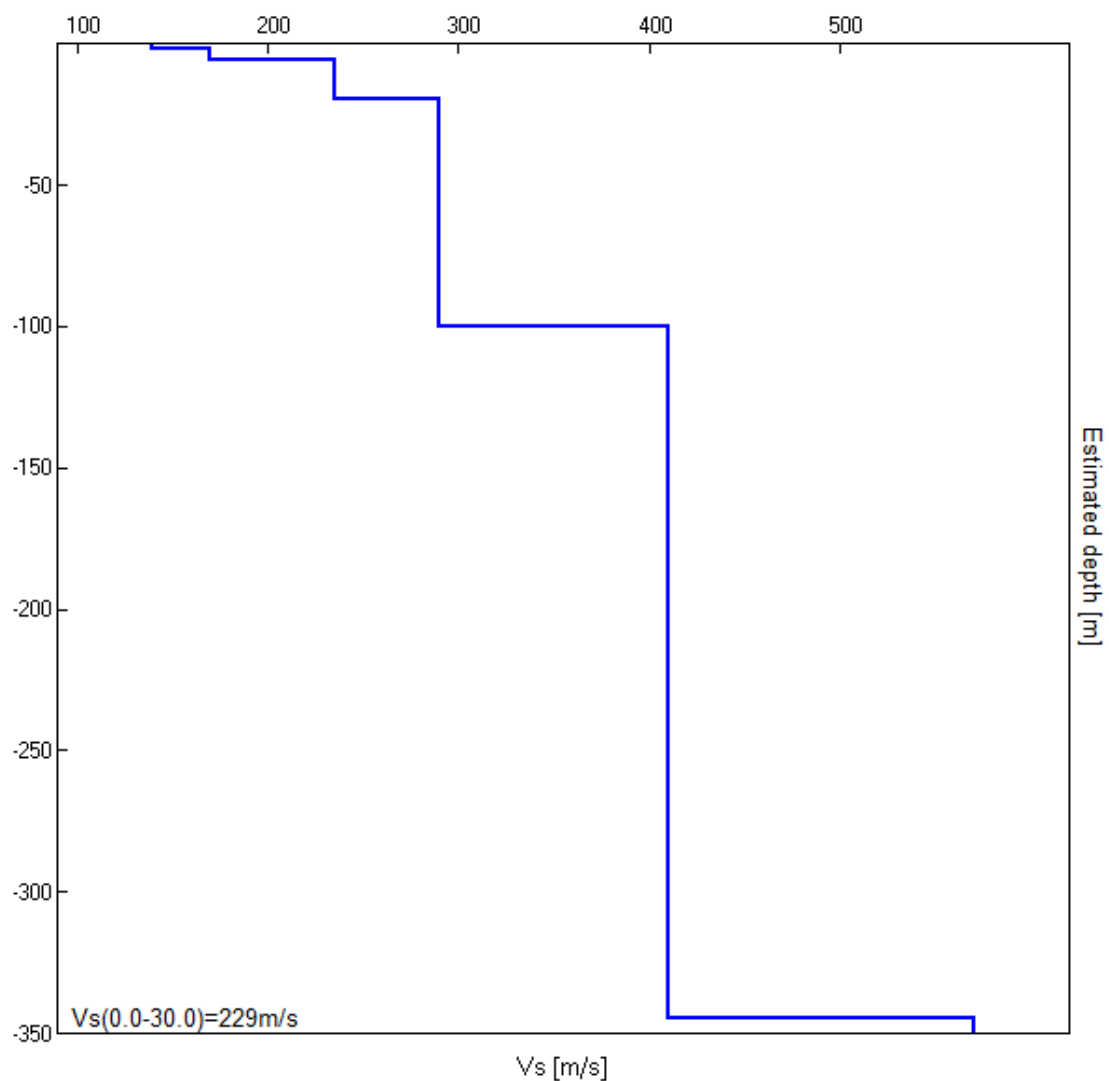


EXPERIMENTAL vs. SYNTHETIC H/V



Depth at the bottom of the layer [m]	Thickness [m]	Vs [m/s]	Poisson ratio
2.00	2.00	140	0.49
5.70	3.70	170	0.48
19.70	14.00	235	0.46
99.70	80.00	290	0.44
344.70	245.00	410	0.42
inf.	inf.	570	0.42

Vs(0.0-30.0)=229m/s



Max. H/V at 0.31 ± 0.48 Hz (in the range 0.0 - 10.0 Hz).

TROMINO N.3



Instrument: TRZ-0009/01-09

Start recording: 08/06/20 10:48:35 End recording: 08/06/20 11:18:35

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

Trace length: 0h30'00". Analyzed 76% trace (manual window selection)

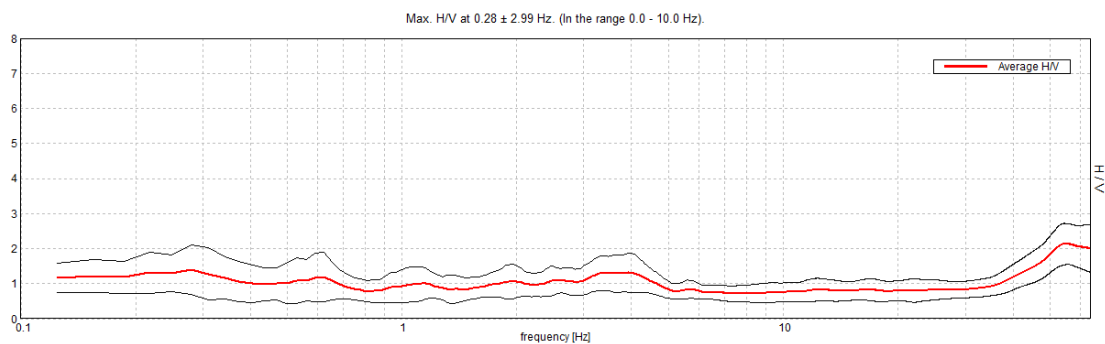
Sampling rate: 128 Hz

Window size: 20 s

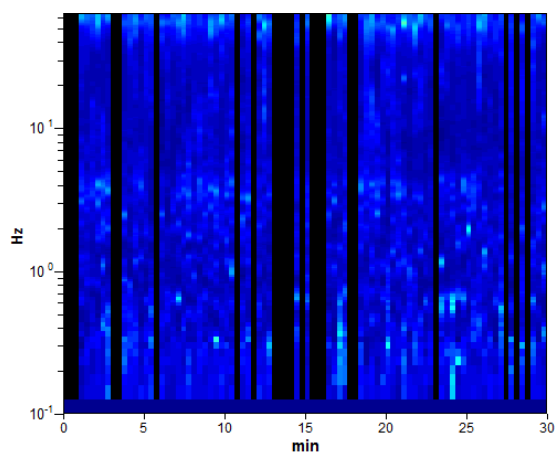
Smoothing type: Triangular window

Smoothing: 10%

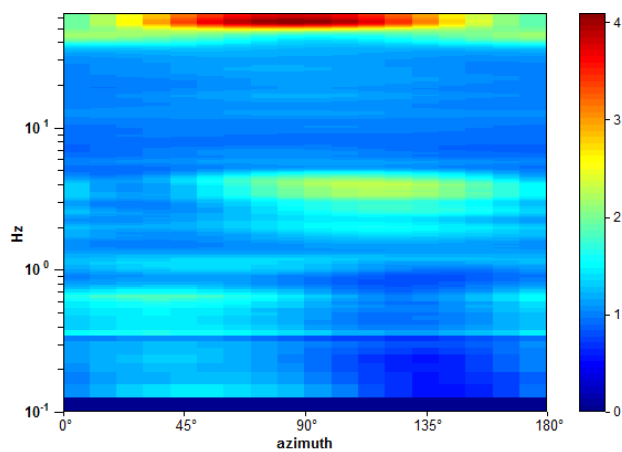
HORIZONTAL TO VERTICAL SPECTRAL RATIO



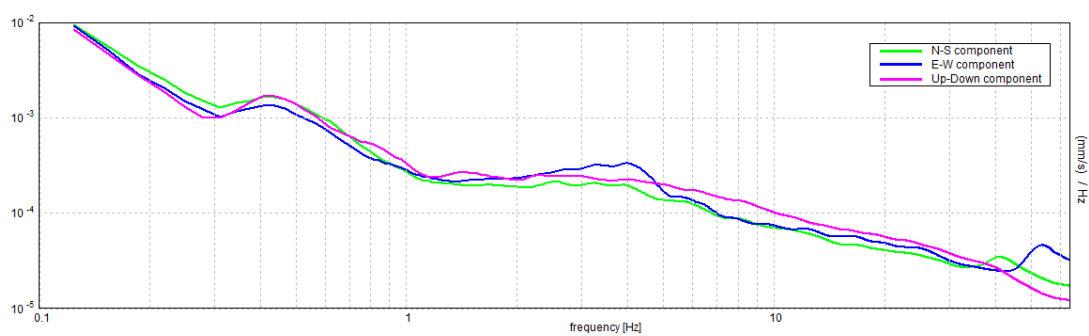
H/V TIME HISTORY



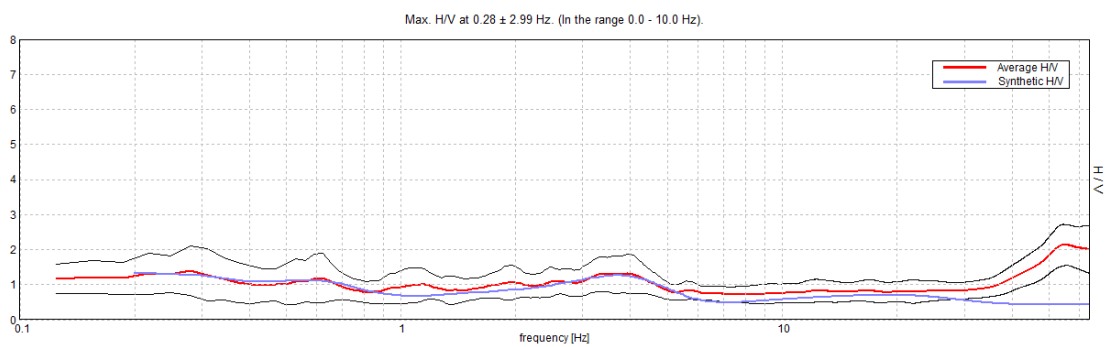
DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA

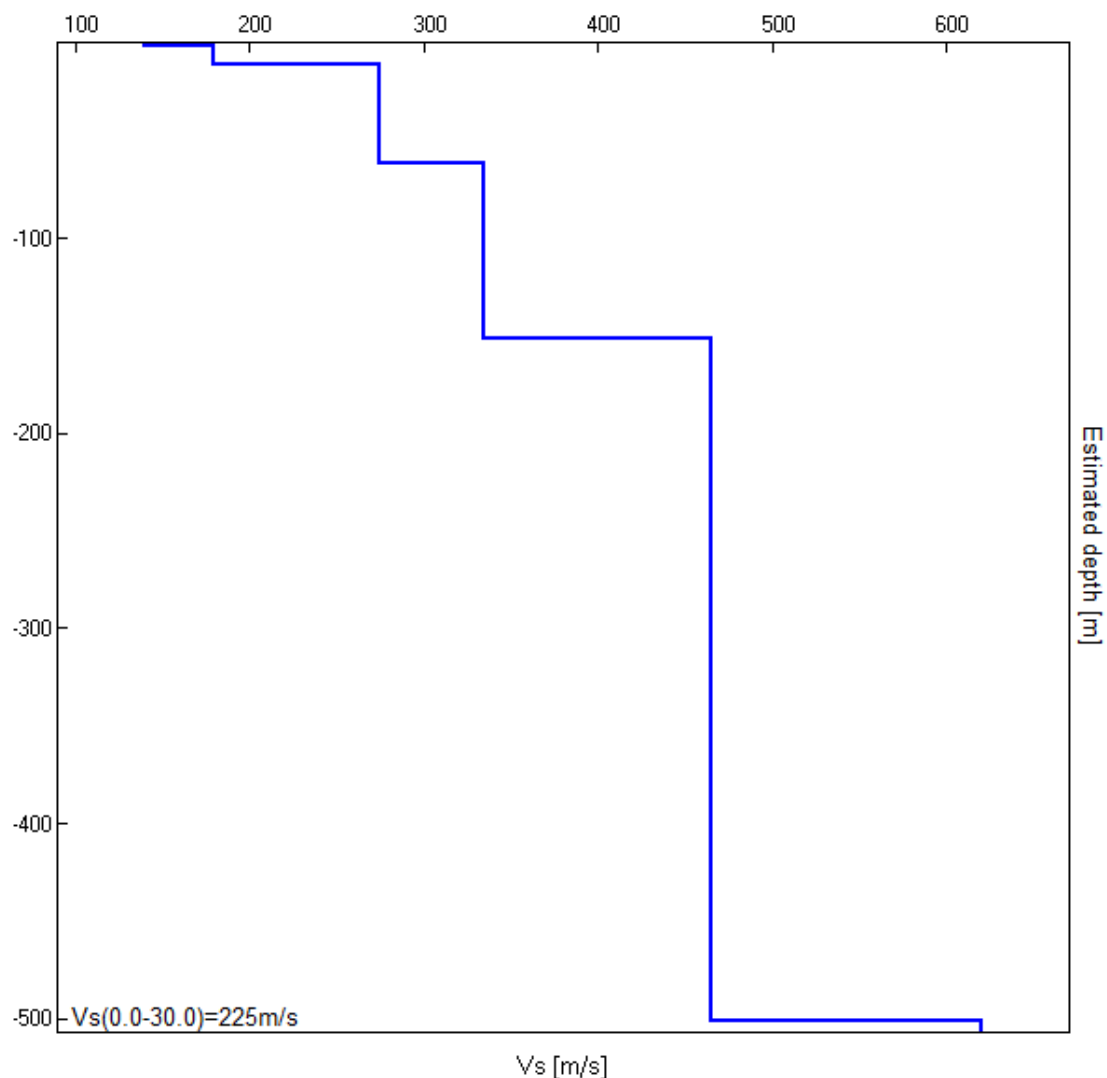


EXPERIMENTAL vs. SYNTHETIC H/V



Depth at the bottom of the layer [m]	Thickness [m]	Vs [m/s]	Poisson ratio
1.50	1.50	140	0.49
11.50	10.00	180	0.48
61.50	50.00	275	0.46
151.50	90.00	335	0.45
501.50	350.00	465	0.44
inf.	inf.	620	0.42

Vs(0.0-30.0)=225m/s



Max. H/V at 0.28 ± 2.99 Hz (in the range 0.0 - 10.0 Hz).

TROMINO N.4



Instrument: TRZ-0009/01-09

Start recording: 08/06/20 11:31:01 End recording: 08/06/20 12:01:01

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

Trace length: 0h30'00". Analyzed 73% trace (manual window selection)

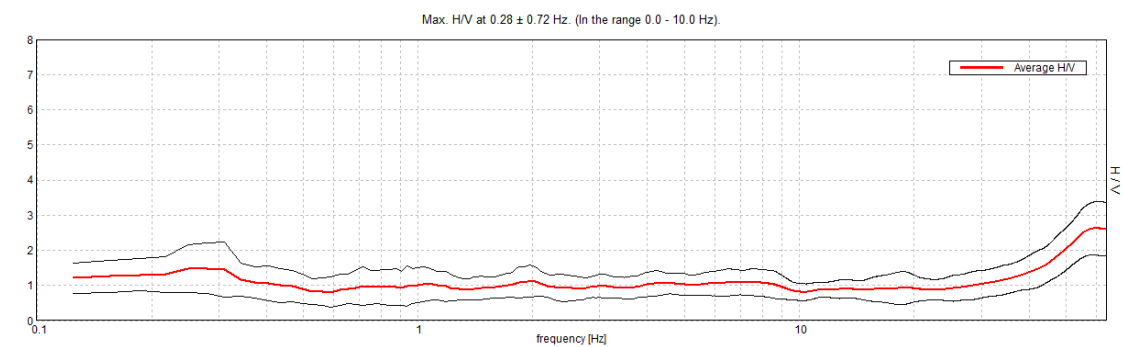
Sampling rate: 128 Hz

Window size: 20 s

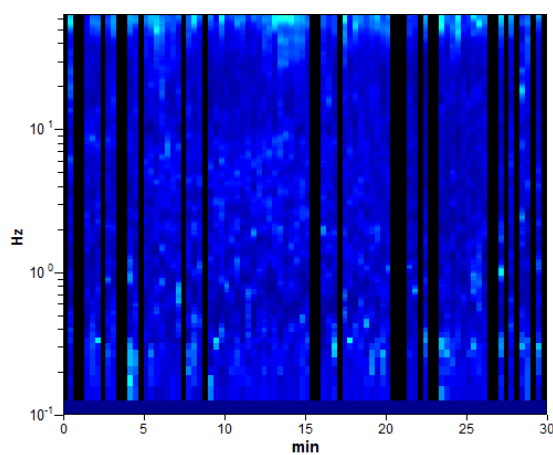
Smoothing type: Triangular window

Smoothing: 10%

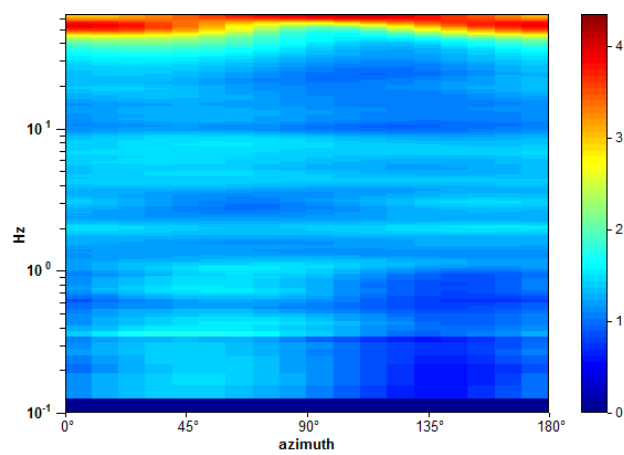
HORIZONTAL TO VERTICAL SPECTRAL RATIO



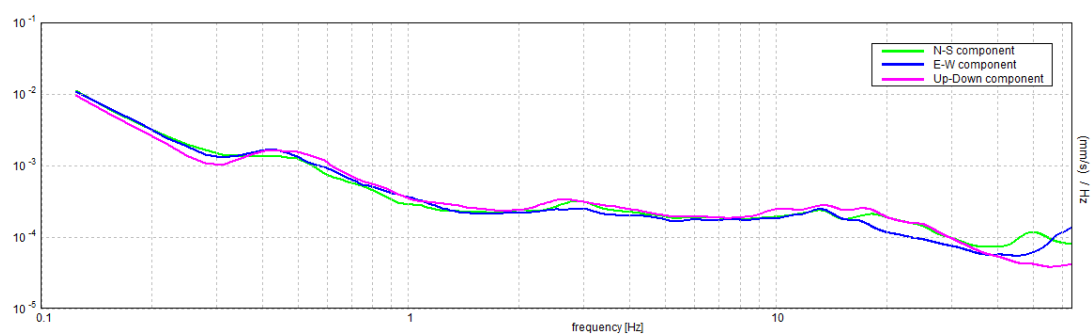
H/V TIME HISTORY



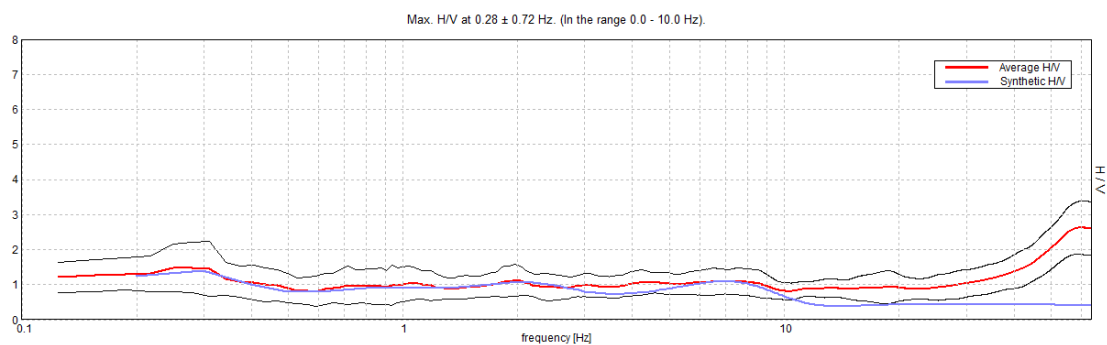
DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA

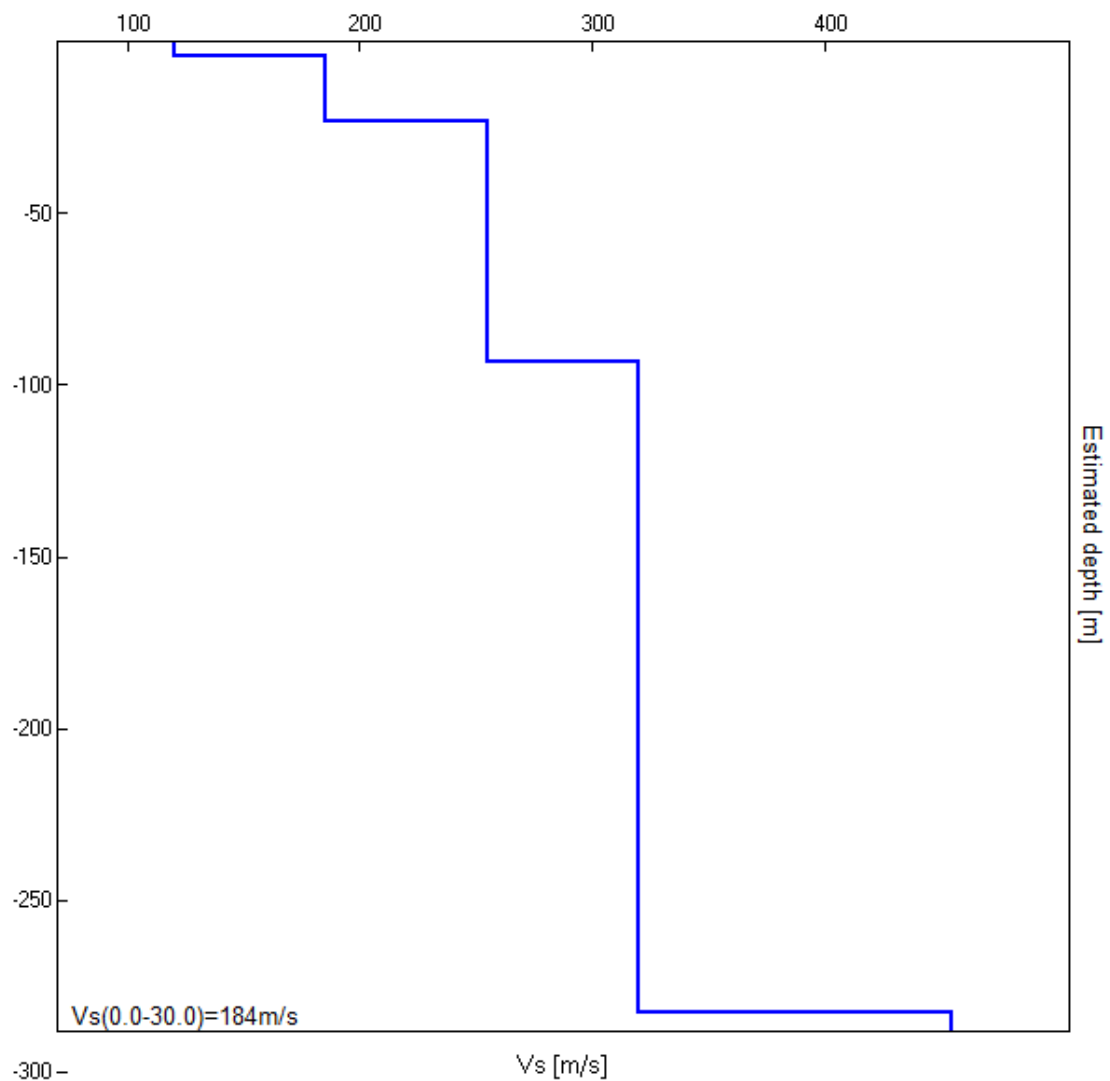


EXPERIMENTAL vs. SYNTHETIC H/V



Depth at the bottom of the layer [m]	Thickness [m]	Vs [m/s]	Poisson ratio
4.00	4.00	120	0.49
23.00	19.00	185	0.48
93.00	70.00	255	0.46
283.00	190.00	320	0.44
inf.	inf.	455	0.42

Vs(0.0-30.0)=184m/s



Max. H/V at 0.28 ± 0.72 Hz (in the range 0.0 - 10.0 Hz).

TROMINO N.5



Instrument: TRZ-0009/01-09

Start recording: 11/06/20 09:18:42 End recording: 11/06/20 09:48:42

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

Trace length: 0h30'00". Analyzed 79% trace (manual window selection)

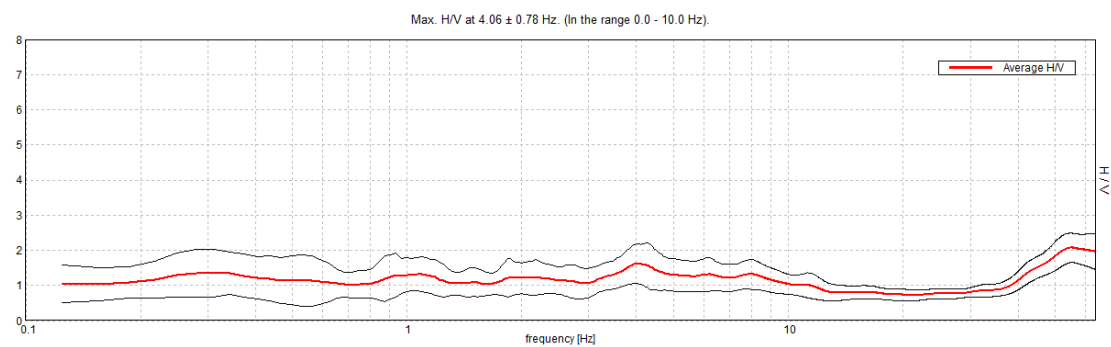
Sampling rate: 128 Hz

Window size: 20 s

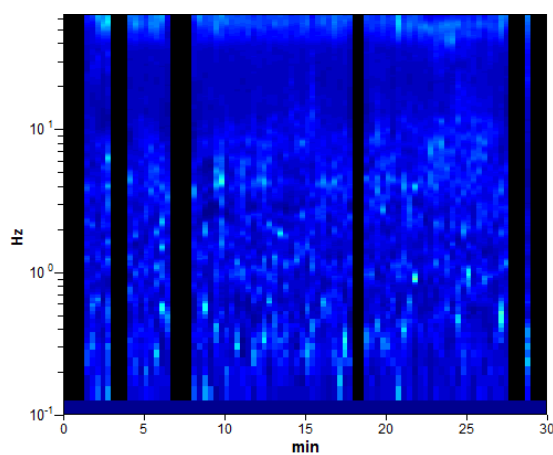
Smoothing type: Triangular window

Smoothing: 10%

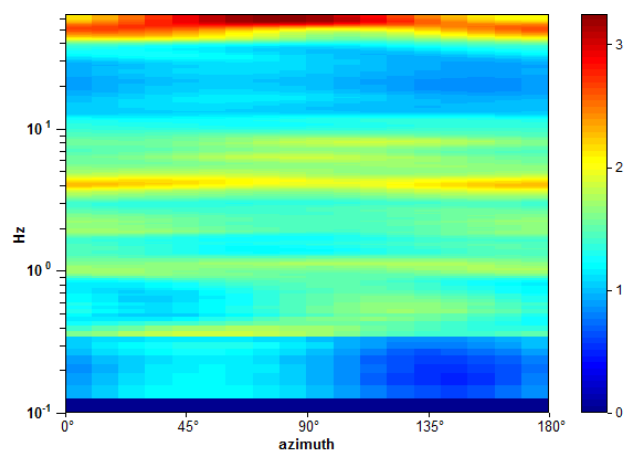
HORIZONTAL TO VERTICAL SPECTRAL RATIO



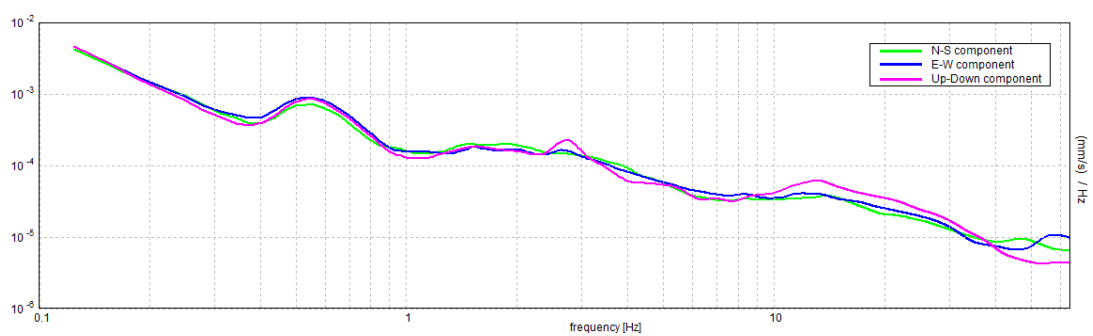
H/V TIME HISTORY



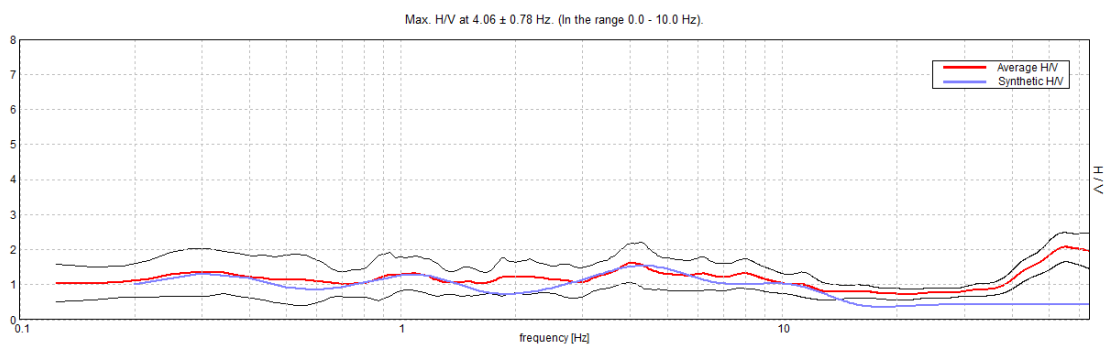
DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA

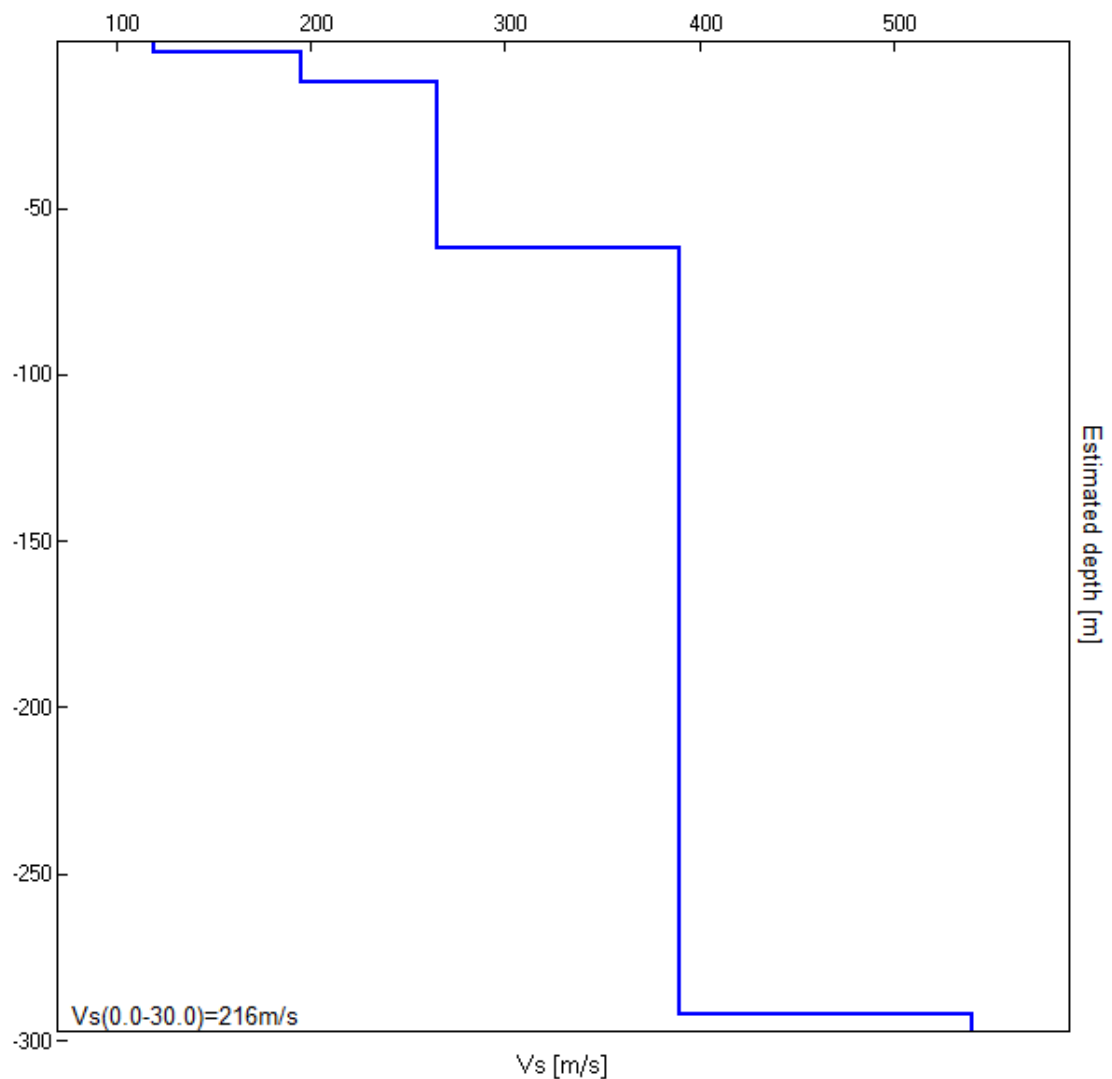


EXPERIMENTAL vs. SYNTHETIC H/V



Depth at the bottom of the layer [m]	Thickness [m]	Vs [m/s]	Poisson ratio
3.00	3.00	120	0.49
12.00	9.00	195	0.48
62.00	50.00	265	0.46
292.00	230.00	390	0.44
inf.	inf.	540	0.42

Vs(0.0-30.0)=216m/s



Max. H/V at 4.06 ± 0.78 Hz (in the range 0.0 - 10.0 Hz).

TROMINO N.6



Instrument: TRZ-0009/01-09

Start recording: 11/06/20 10:00:18 End recording: 11/06/20 10:30:18

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

Trace length: 0h30'00". Analyzed 81% trace (manual window selection)

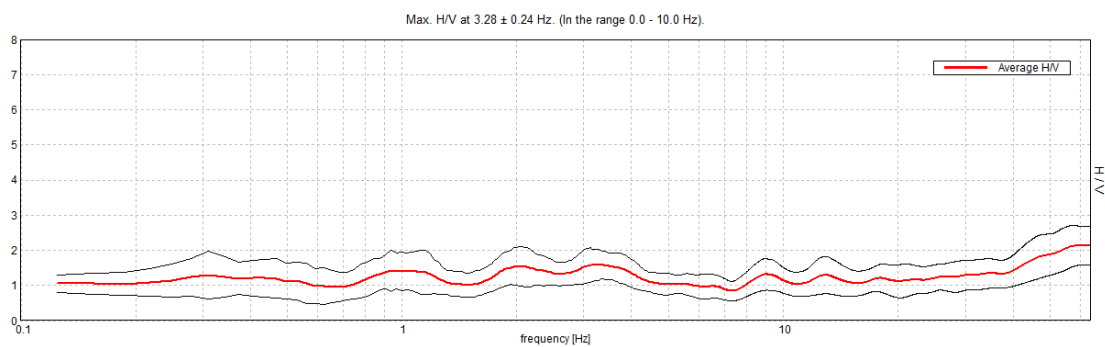
Sampling rate: 128 Hz

Window size: 20 s

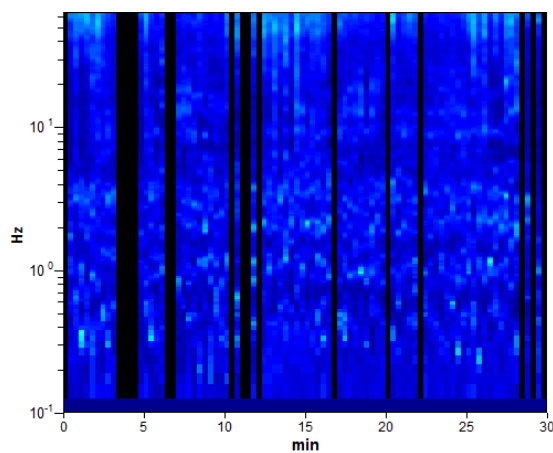
Smoothing type: Triangular window

Smoothing: 10%

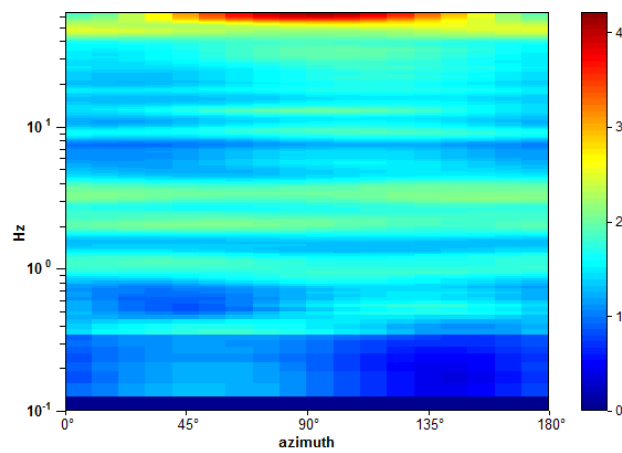
HORIZONTAL TO VERTICAL SPECTRAL RATIO



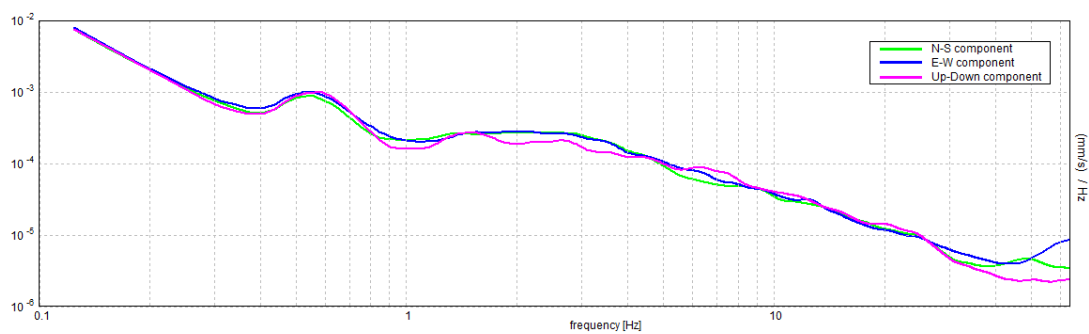
H/V TIME HISTORY



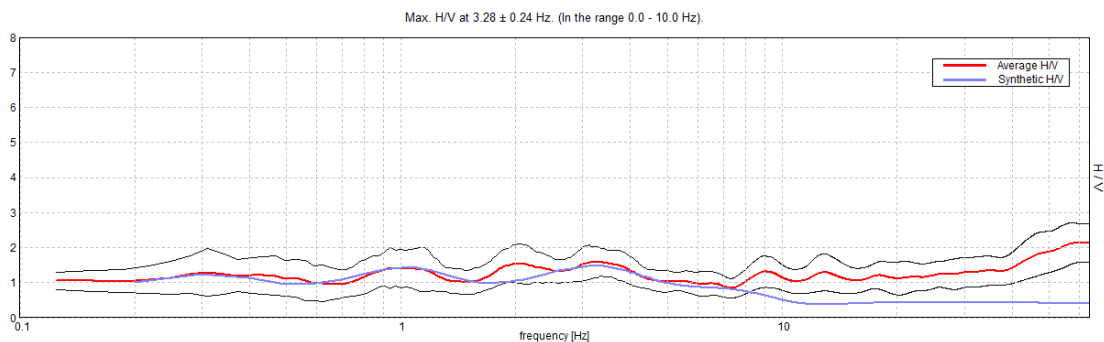
DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA

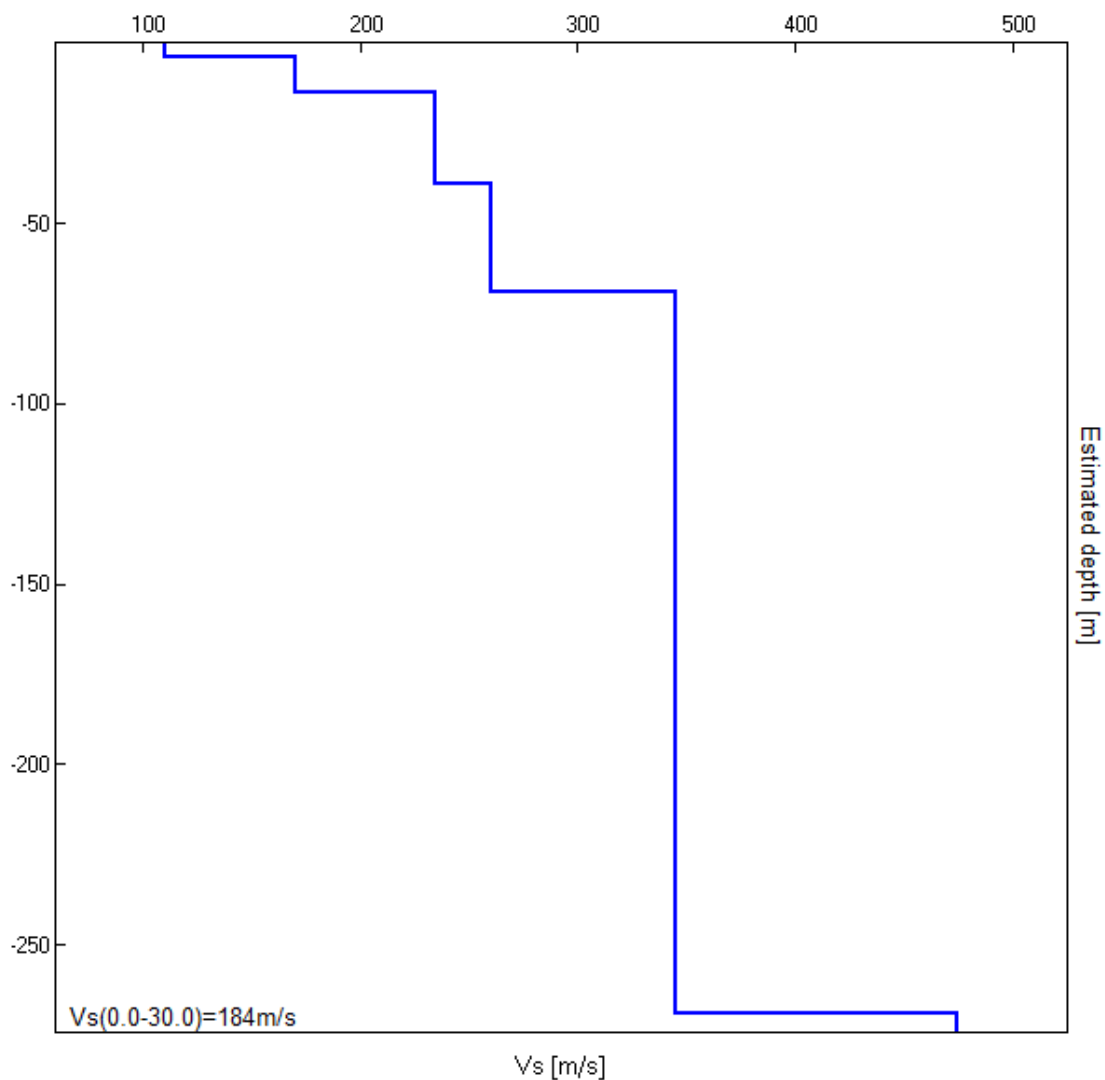


EXPERIMENTAL vs. SYNTHETIC H/V



Depth at the bottom of the layer [m]	Thickness [m]	Vs [m/s]	Poisson ratio
4.00	4.00	110	0.49
14.00	10.00	170	0.48
39.00	25.00	235	0.46
69.00	30.00	260	0.44
269.00	200.00	345	0.42
inf.	inf.	475	0.42

Vs(0.0-30.0)=184m/s



Max. H/V at 3.28 ± 0.24 Hz (in the range 0.0 - 10.0 Hz).

TROMINO N.7



Instrument: TRZ-0009/01-09

Start recording: 11/06/20 10:58:46 End recording: 11/06/20 11:28:46

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

Trace length: 0h30'00". Analyzed 93% trace (manual window selection)

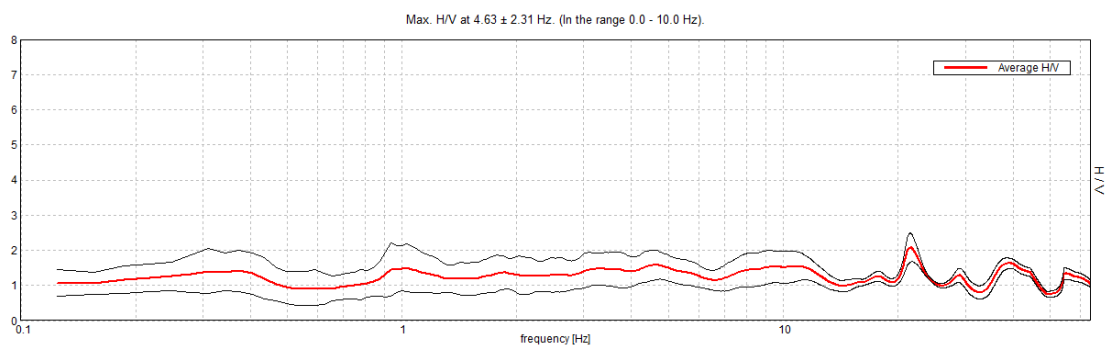
Sampling rate: 128 Hz

Window size: 20 s

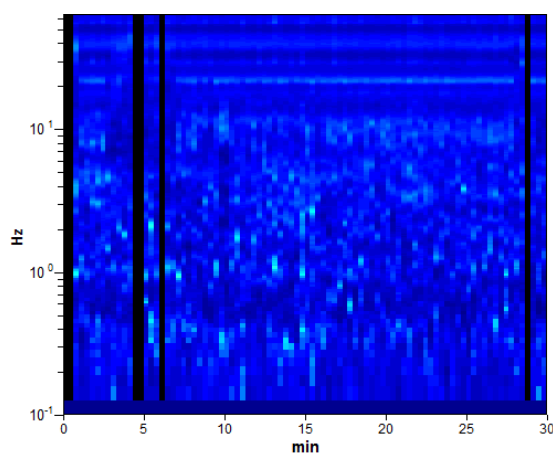
Smoothing type: Triangular window

Smoothing: 10%

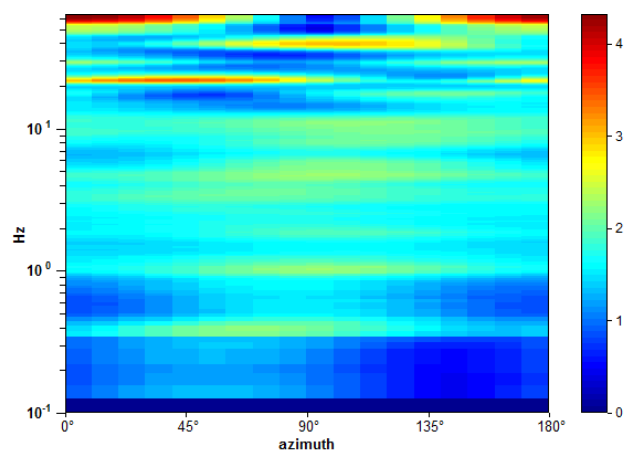
HORIZONTAL TO VERTICAL SPECTRAL RATIO



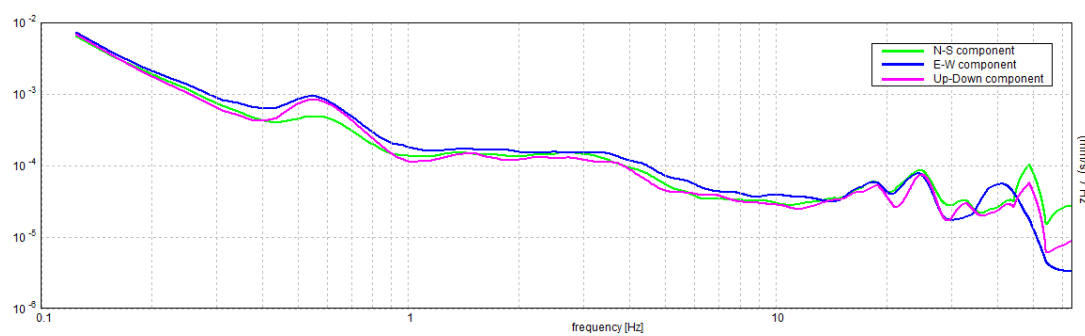
H/V TIME HISTORY



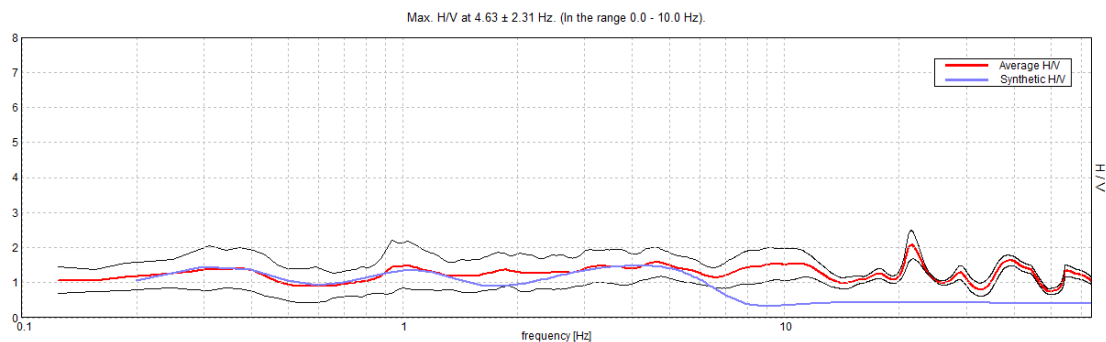
DIRECTIONAL H/V



SINGLE COMPONENT SPECTRA

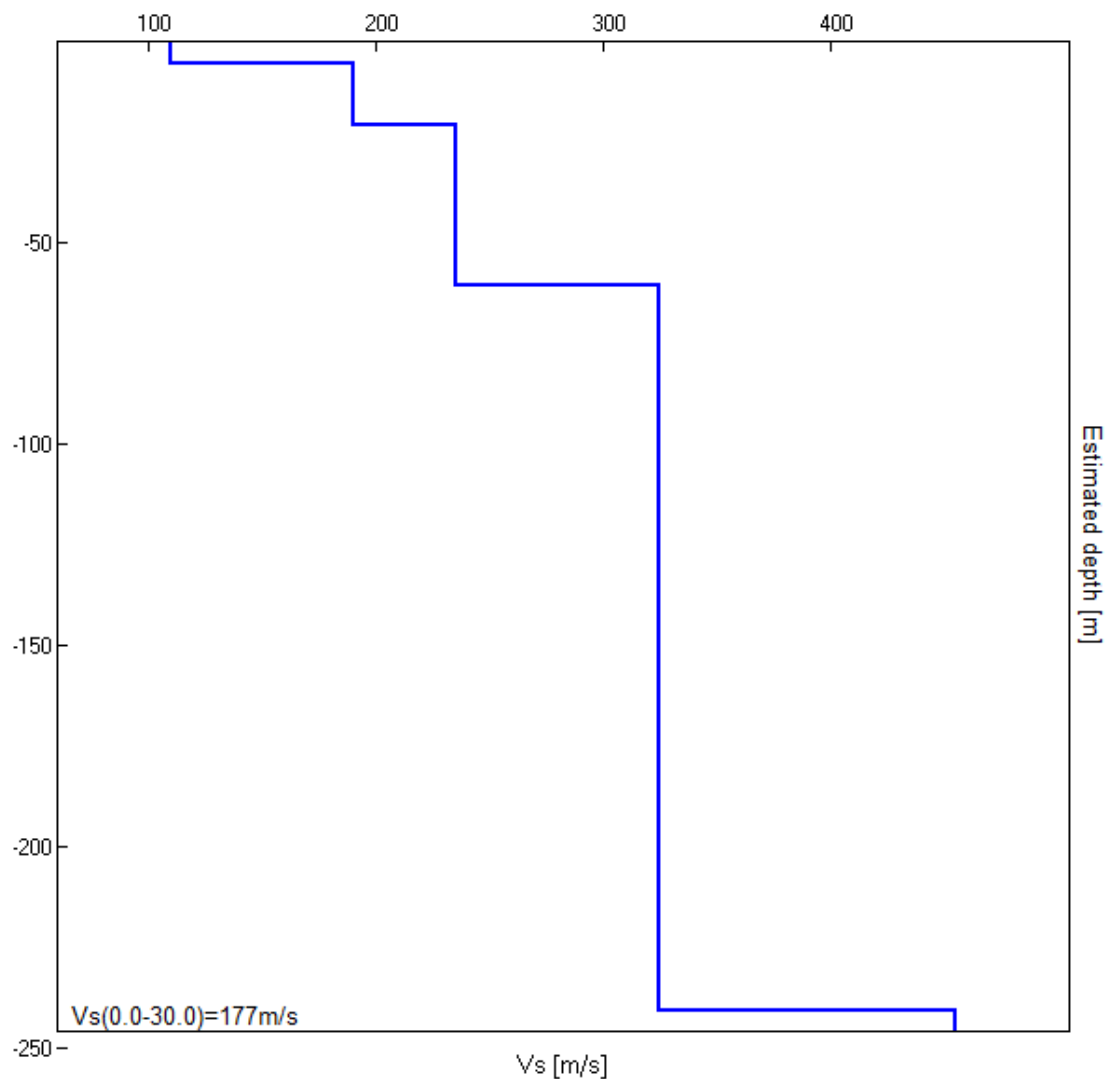


EXPERIMENTAL vs. SYNTHETIC H/V



Depth at the bottom of the layer [m]	Thickness [m]	Vs [m/s]	Poisson ratio
5.50	5.50	110	0.49
20.50	15.00	190	0.48
60.50	40.00	235	0.46
240.50	180.00	325	0.44
inf.	inf.	455	0.42

Vs(0.0-30.0)=177m/s



Max. H/V at 4.63 ± 2.31 Hz (in the range 0.0 - 10.0 Hz).

TROMINO N.8



Instrument: TRZ-0009/01-09

Start recording: 11/06/20 11:47:22 End recording: 11/06/20 12:17:22

Channel labels: NORTH SOUTH; EAST WEST ; UP DOWN

Trace length: 0h30'00". Analyzed 66% trace (manual window selection)

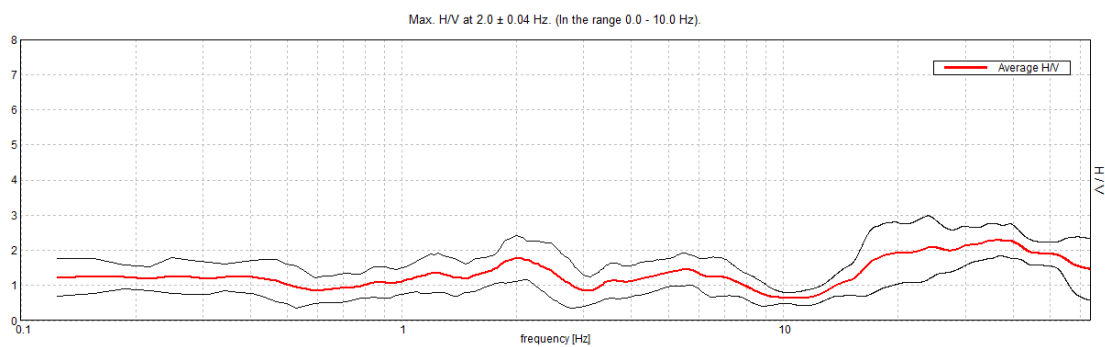
Sampling rate: 128 Hz

Window size: 20 s

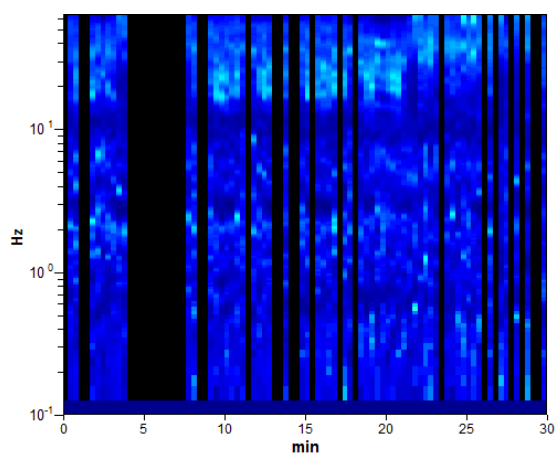
Smoothing type: Triangular window

Smoothing: 10%

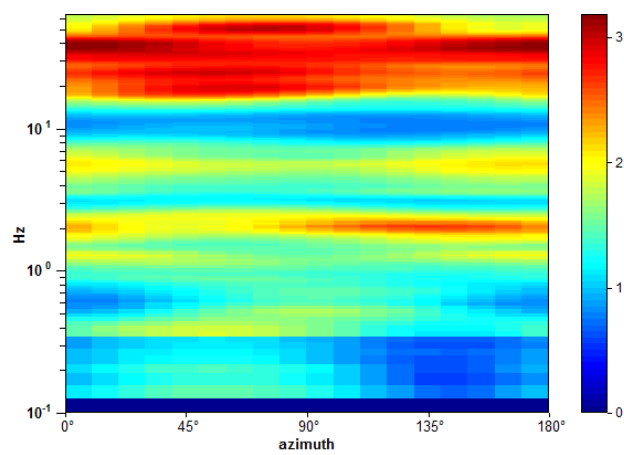
HORIZONTAL TO VERTICAL SPECTRAL RATIO



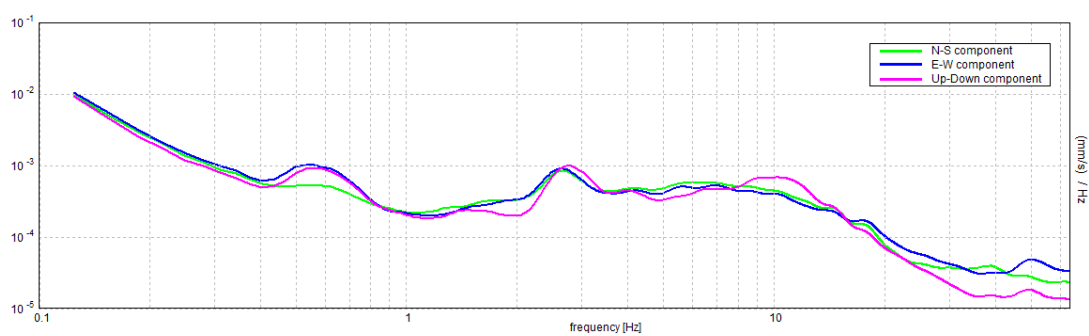
H/V TIME HISTORY



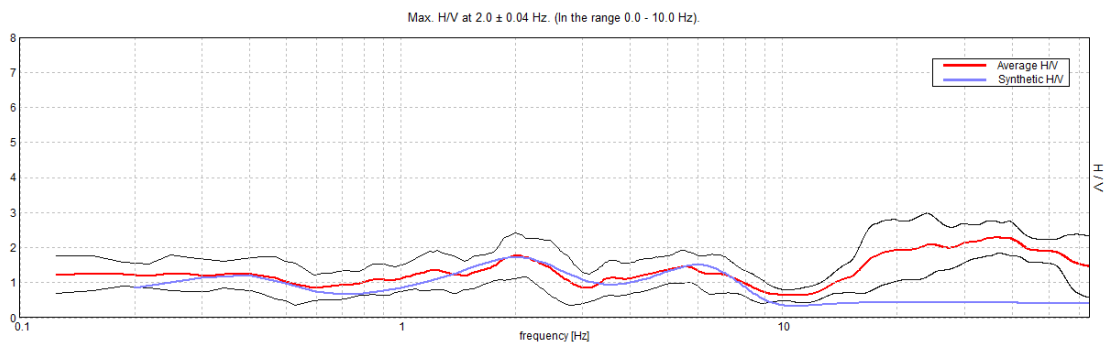
DIRECTIONAL H/V



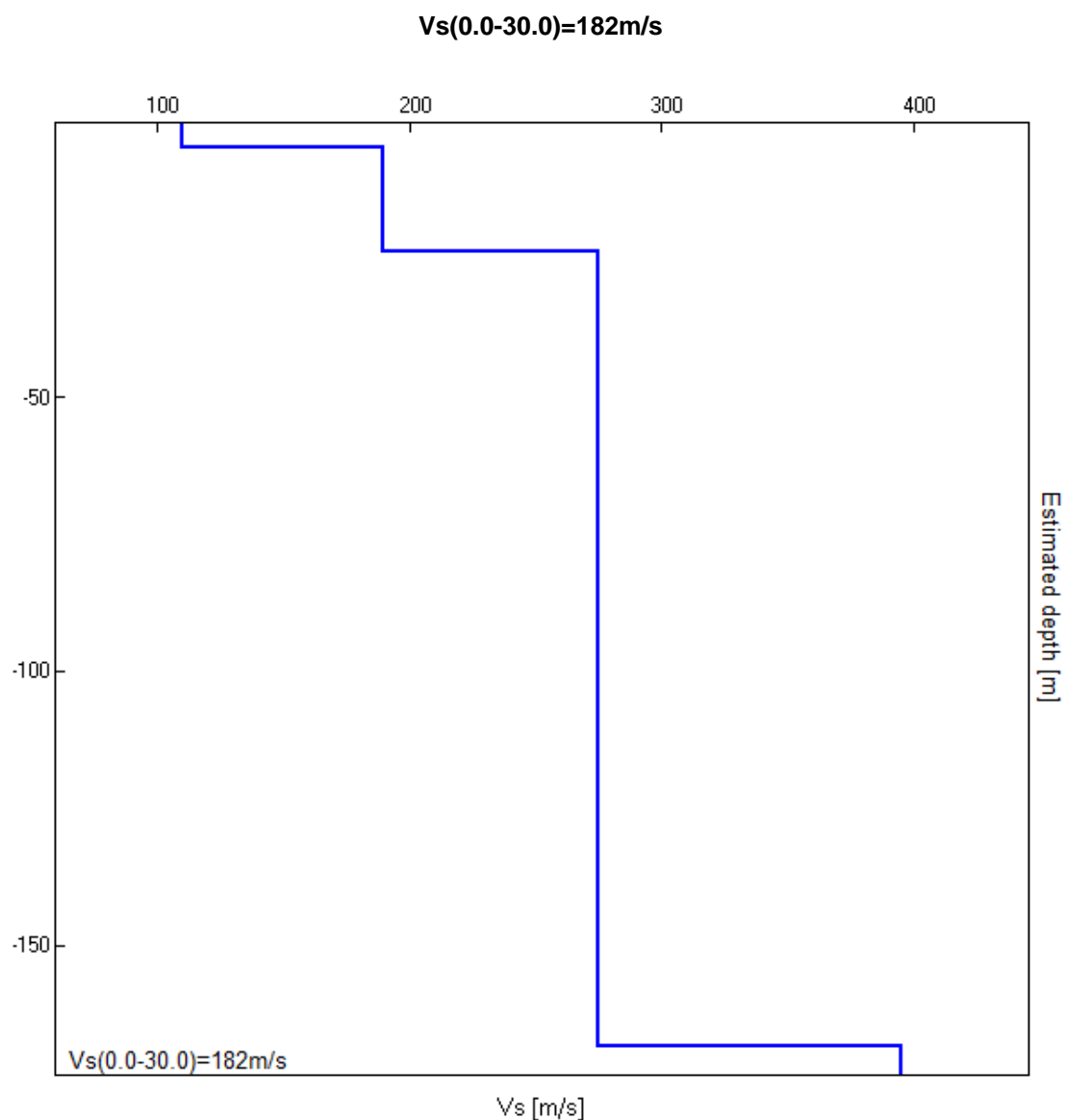
SINGLE COMPONENT SPECTRA



EXPERIMENTAL vs. SYNTHETIC H/V



Depth at the bottom of the layer [m]	Thickness [m]	Vs [m/s]	Poisson ratio
4.60	4.60	110	0.49
23.60	19.00	190	0.48
168.60	145.00	275	0.46
inf.	inf.	395	0.44



Max. H/V at 2.0 ± 0.04 Hz (in the range 0.0 - 10.0 Hz).