## DATA_SISMA, CASASELVATICA HVSR 14

Instrument: TEP-0059/01-10
Start recording: 29/06/12 13:38:42        End recording:   29/06/12 13:48:43
Channel labels:   NORTH SOUTH;   EAST  WEST ;   UP   DOWN
GPS data not available

Trace length:    0h10'00''.        Analyzed 63% trace (manual window selection)
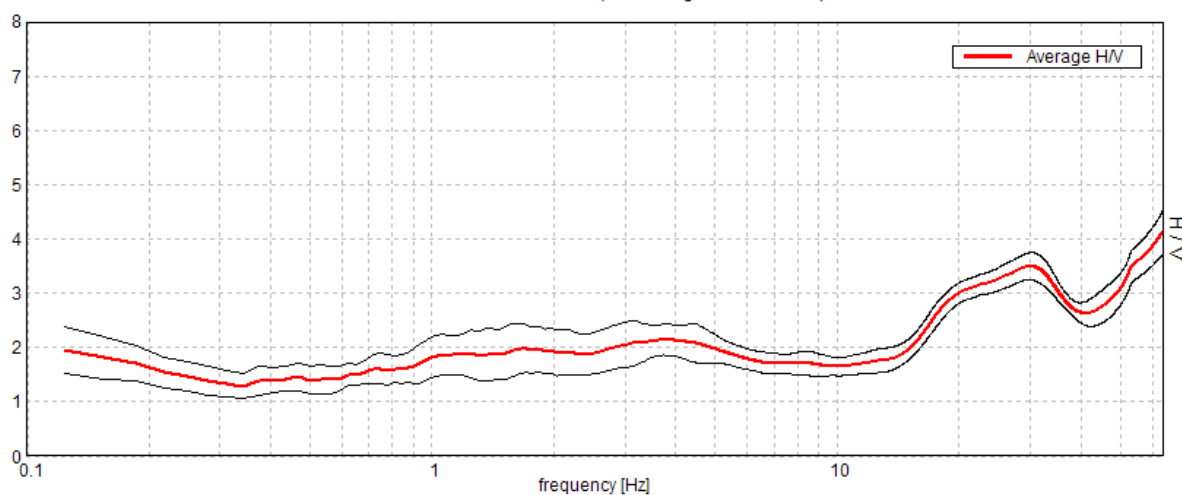Sampling frequency:   128 Hz
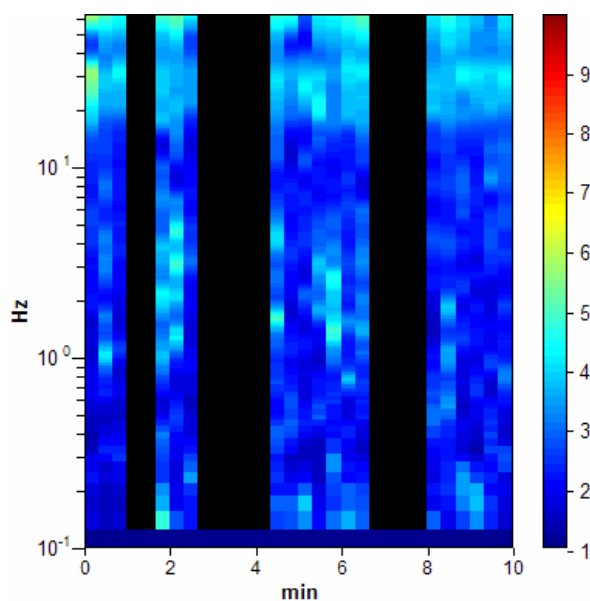Window size:  20 s
Smoothing window: Triangular window
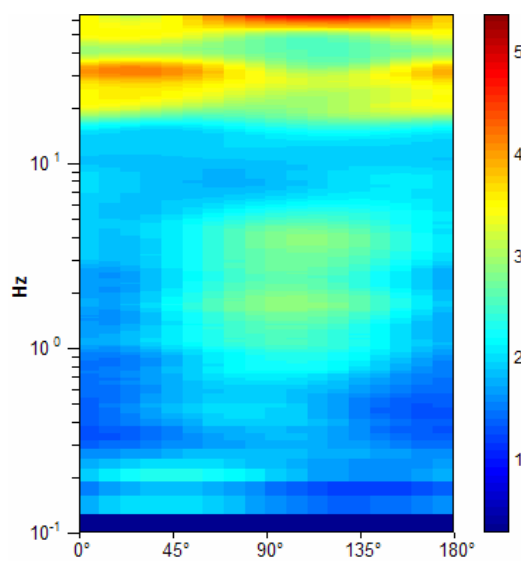Smoothing:  20%

### HORIZONTAL TO VERTICAL SPECTRAL RATIO

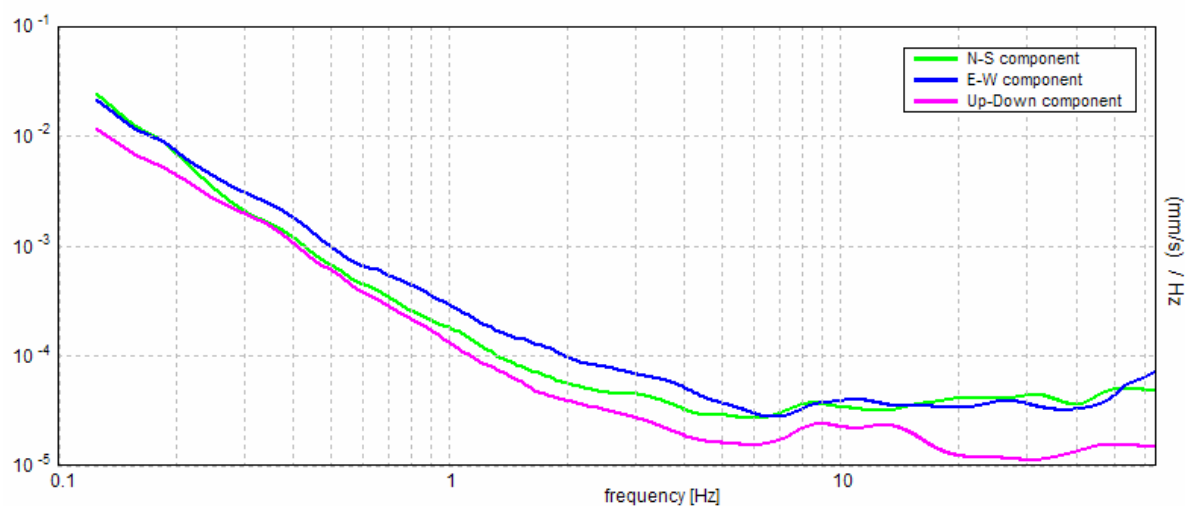Max. H/V at 63.97 ± 0.0 Hz (in the range 0.0 - 64.0 Hz).



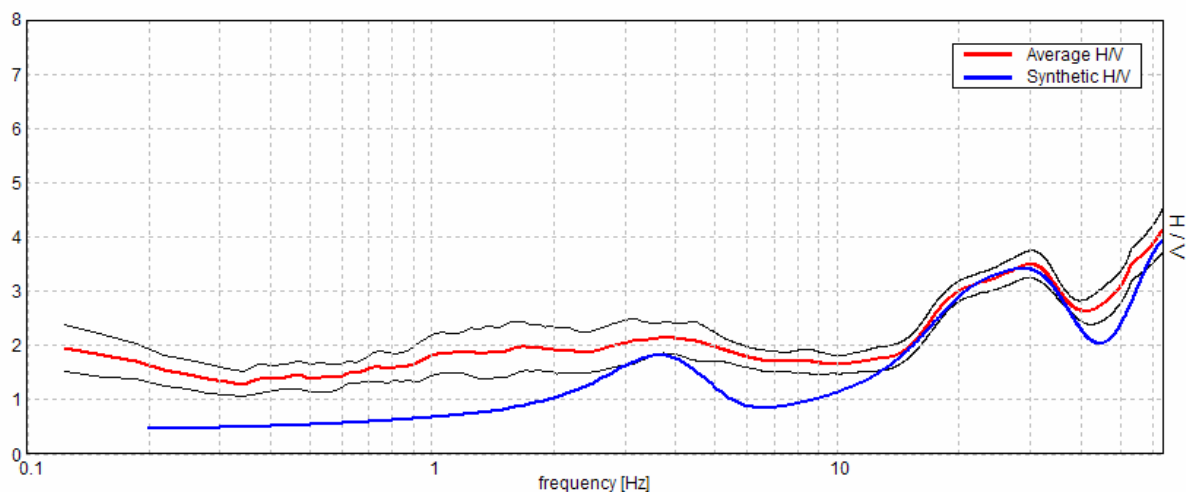### H/V TIME HISTORY



### DIRECTIONAL H/V

## SINGLE COMPONENT SPECTRA



## EXPERIMENTAL VS. SYNTHETIC H/V

Max. H/V at 63.97 ± 0.0 Hz (in the range 0.0 - 64.0 Hz).



| Depth at the bottom of the layer [m] | Thickness [m] | Vs [m/s] | Poisson ratio |
|---|---|---|---|
| 0.25 | 0.25 | 68 | 0.35 |
| 0.45 | 0.20 | 130 | 0.35 |
| 1.66 | 1.21 | 190 | 0.35 |
| 2.86 | 1.20 | 343 | 0.35 |
| 4.26 | 1.40 | 355 | 0.35 |
| 5.06 | 0.80 | 360 | 0.35 |
| 5.36 | 0.30 | 390 | 0.35 |
| 16.36 | 11.00 | 470 | 0.35 |
| 31.36 | 15.00 | 550 | 0.35 |
| 41.36 | 10.00 | 660 | 0.35 |
| inf. | inf. | 900 | 0.35 |

**Vs(0.0-30.0)=427m/s**

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

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**Max. H/V at 63.97 ± 0.0 Hz (in the range 0.0 - 64.0 Hz).**

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

| | | | |
|---|---|---|---|
| $f_0 > 10 / L_w$ | 63.97 > 0.50 | **OK** | |
| $n_c(f_0) > 200$ | 24308.1 > 200 | **OK** | |
| $\sigma_A(f) < 2$ for $0.5f_0 < f < 2f_0$ if $f_0 > 0.5$Hz $\sigma_A(f) < 3$ for $0.5f_0 < f < 2f_0$ if $f_0 < 0.5$Hz | Exceeded 0 out of 1026 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** |
| $A_0 > 2$ | 4.15 > 2 | **OK** | |
| $f_{peak}[A_{H/V}(f) \pm \sigma_A(f)] = f_0 \pm 5\%$ | \|0.0\| < 0.05 | **OK** | |
| $\sigma_f < \varepsilon(f_0)$ | 0.0 < 3.19844 | **OK** | |
| $\sigma_A(f_0) < \theta(f_0)$ | 0.1879 < 1.58 | **OK** | |

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

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