HVSR computation in winMASW® and HoliSurface®

DOUBLE-PICK CURVE

winMASW® & HoliSurface®: Horizontal-to-Vertical Spectral Ratio
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HOLI3C geophone - SN: 272232-04

Dataset: 2020-02-14_15-22_secondDUNE.seg2

DATA PROCESSING
Date: 15 2 2020
Time: 13 37
Sampling frequency (Hz): 64
Window length (sec): 60
HVSR computation: quadratic mean
Minimum frequency soundly determined [10 cycles]: 0.16667Hz
Length of analysed dataset (min): 21.6
Tapering (%): 5
Linear Smoothing (%): 15

########################## SESAME criteria
Results considering the data in the 0.2-0.9 Hz frequency range
Peak frequency (Hz): 0.4 (±0.0)
Peak HVSR value: 5.8 (±0.9)
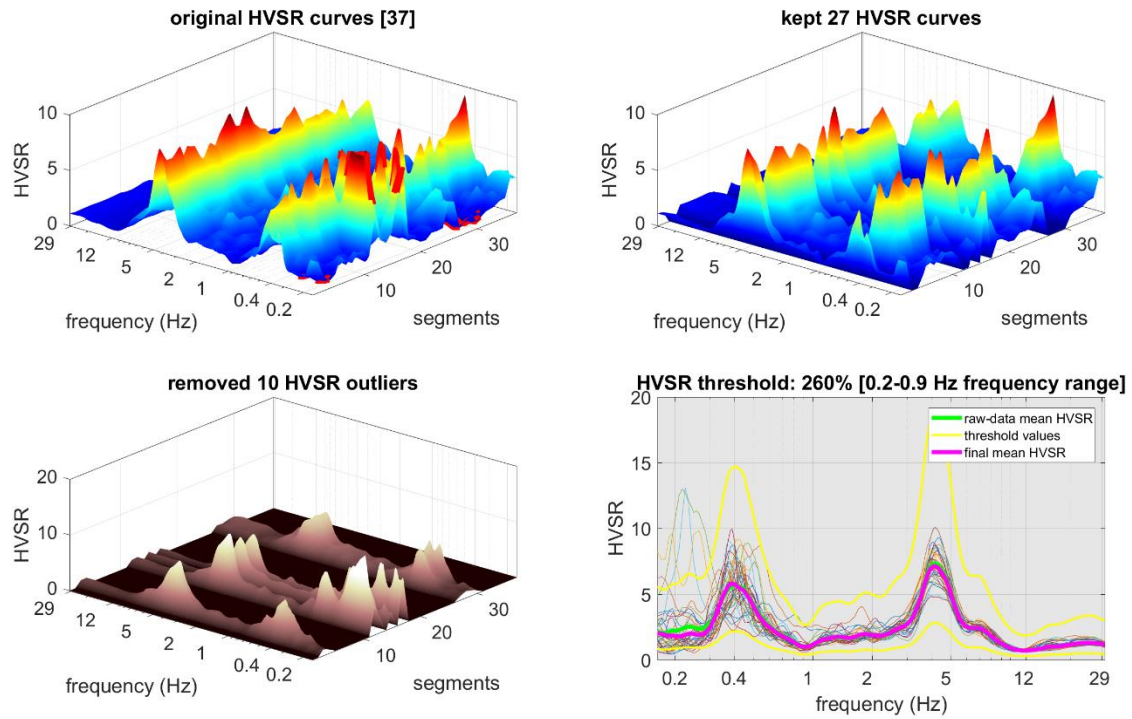
== Criteria for a reliable H/V curve ===============================
#1. [f0 > 10/Lw]: 0.391 > 0.16667 (OK)
#2. [nc > 200]: 867 > 200 (OK)
#3. [f0<0.5Hz; sigmaA(f) < 3 for 0.5f0 < f < 2f0] (OK)

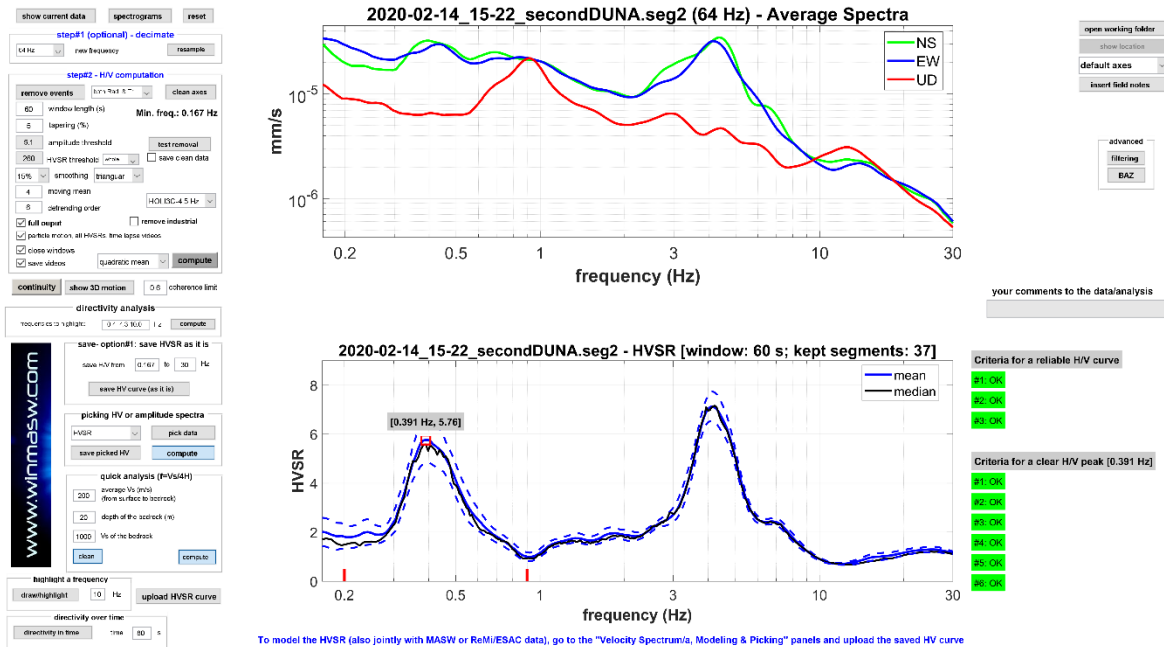## == Criteria for a clear H/V peak (at least 5 should be fulfilled) ===========
#1. [exists f- in the range [f0/4, f0] | AH/V(f-) < A0/2]: yes, at frequency 0.1Hz (OK)
#2. [exists f+ in the range [f0, 4f0] | AH/V(f+) < A0/2]: yes, at frequency 0.2Hz (OK)
#3. [A0 > 2]: 5.8 > 2 (OK)
#4. [fpeak[Ah/v(f) ± sigmaA(f)] = f0 ± 5%]: (OK)
#5. [sigmaf < epsilon(f0)]: 0.038 < 0.078 (OK)
#6. [sigmaA(f0) < theta(f0)]: 1.047 < 2.5 (OK)

Please, be aware of possible industrial/man-induced peaks or spurious peaks due to meaningless numerical instabilities.
Remember that SESAME criteria should be considered in a flexible perspective and that if you modify the processing parameters the results may change.

original HVSR curves [37] — kept 27 HVSR curves

removed 10 HVSR outliers — HVSR threshold: 260% [0.2-0.9 Hz frequency range]

Removal of the outlier HVSR curves

Both peaks satisfy the SESAME criteria for a reliable peak. The high-frequency peak is due to the contact between peats and sand-like sediments, the low-frequency peak refer to the deep (several hundreds of meters) bedrock.
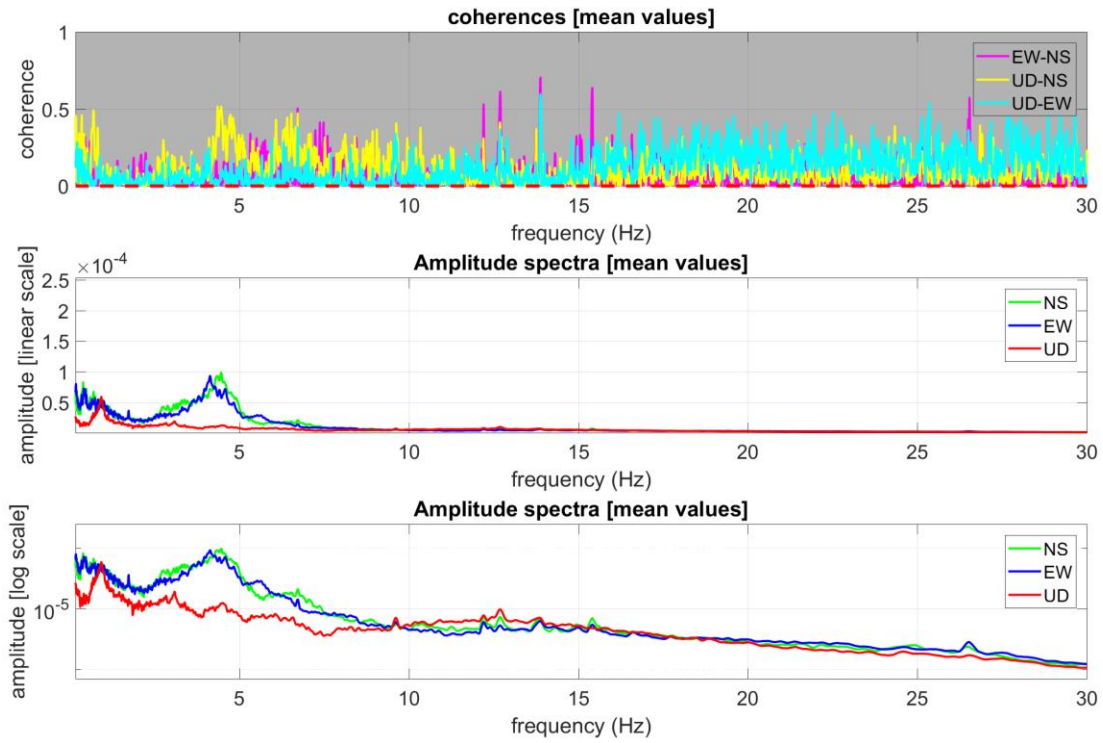
No evidence of significant industrial signals/components (see Dal Moro, 2020).

Continuity of the H/V Spectral Ratio

Directivity of the H/V Spectral Ratio
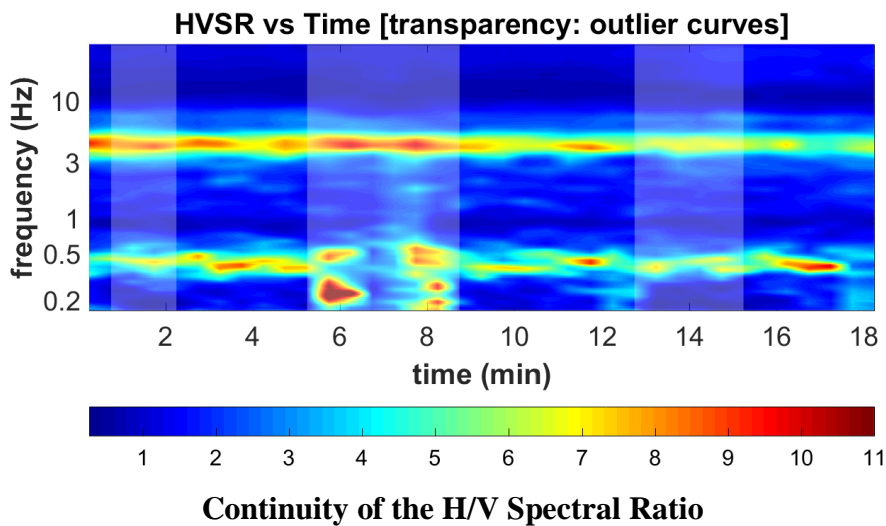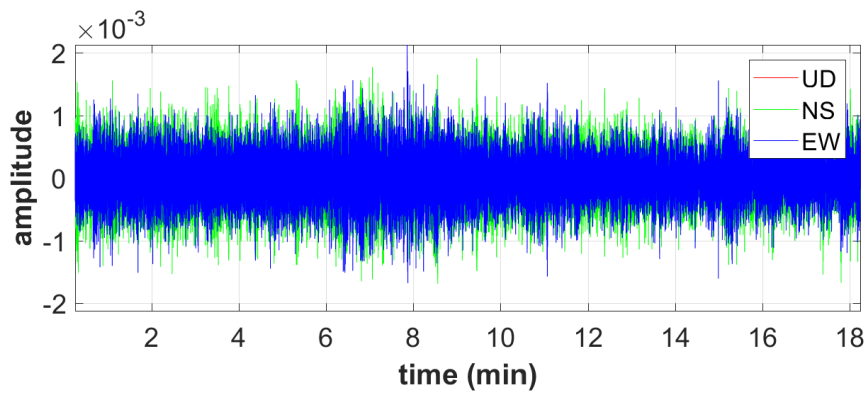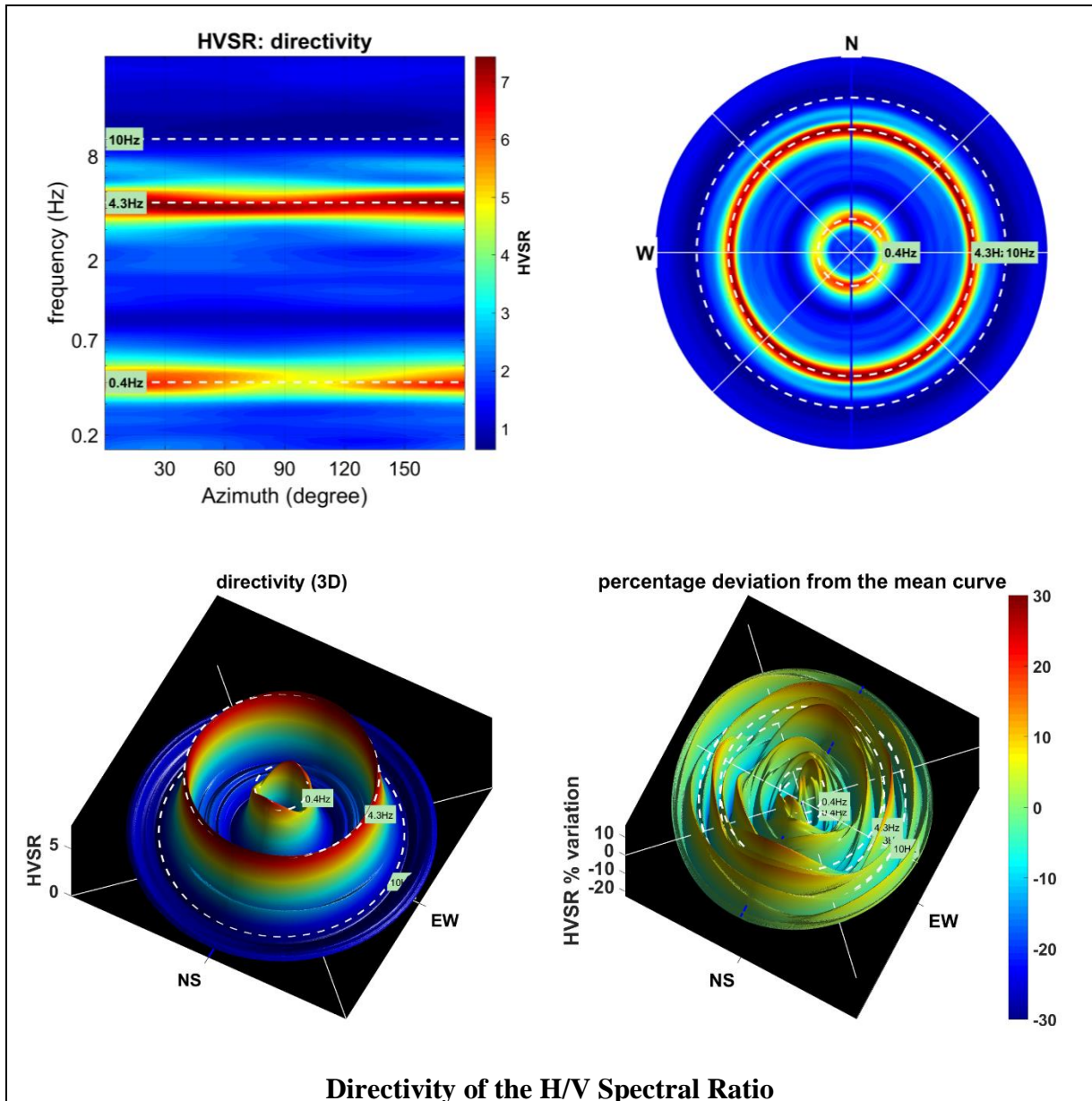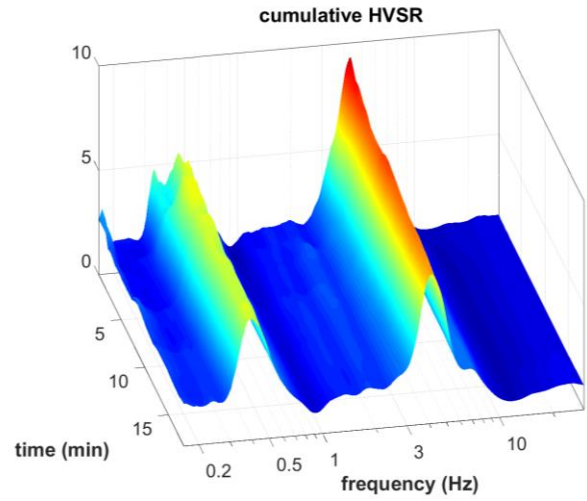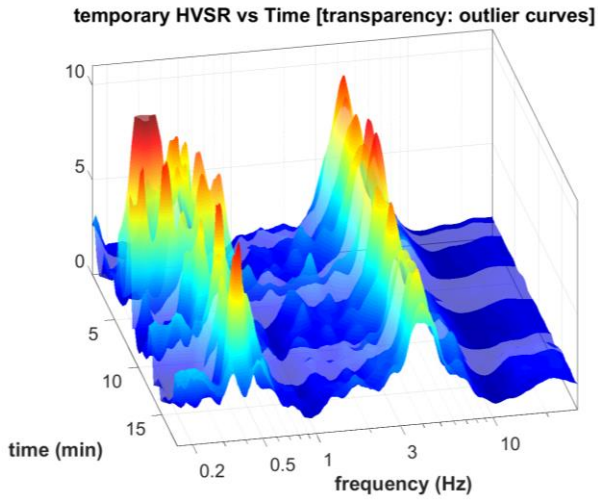
winMASW® & *HoliSurface®* - Surface Waves and Beyond - **www.winmasw.com**

REFERENCES

Dal Moro, 2020. **Efficient Joint Analysis of Surface Waves and Introduction to Vibration Analysis: Beyond the Clichés**. A new book available in May 2020 by Springer

Dal Moro G., 2020. **On the identification of industrial components in the Horizontal-to-Vertical Spectral Ratio (HVSR) from microtremors**. Pure and Applied Geophysics (in press)

Dal Moro G., 2019. **Acquisizione e analisi di dati sismici e vibrazionali per studi di caratterizzazione sismica e geotecnica**. Dario Flaccovio Editore, 279 pp. (in Italian)

Dal Moro G., 2018. **Effective Active and Passive Seismics for the Characterization of Urban and Remote Areas: Four Channels for Seven Objective Functions.** Pure and Applied Geophysics, 2018, https://doi.org/10.1007/s00024-018-2043-2. Available for online reading at the following link: **https://rdcu.be/bbT04**

Dal Moro G., 2014. **Surface Wave Analysis for Near Surface Applications**. Elsevier, ISBN 978-0-12-800770-9, 252pp (theory, field practice and advanced joint analysis)