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High frequency noise studies at the Hartousov mofette area (CZE)

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Ambient noise analysis has been used as a reliable tool to investigate sub-surface structures at seismological quiet regions with none or less specific seismic events. Here, we consider the acoustic signals from a single mofette at the Hartoušov area (CZE) as a noise-like high frequency source caused by multiple near surface degassing processes in a restricted location. From this assumption we have used different array geometries for recording at least one hour of continuous noise. We installed triangular arrays with 3 component geophones: the first deployment consisted on two co-centric triangles with side length of 30 and 50 m with the mofette in the center; the second deployment consisted on two triangular arrays, both with side length of 30 m, co-directional to the mofette. Furthermore, we also installed profiles with 24 channels and vertical geophones locating them in different positions with respect to the mofette.
In this work, we present preliminary results from the data analysis dependent on the geometry, to show the characteristics of the noise wave-field referring to frequency content and propagation features, such as directionality and surface wave velocity. The spectral analysis shows that the energy is concentrated in a frequency band among 10 and 40 Hz. However, in this interval there is no evidence of any exclusive fundamental frequencies. From this, man-induced influences can be identified as intermittent signal peaks in narrow frequency bands and can be separated to receive the revised mofette wave-field record.
The inversion of dispersive surface waves, that were detected by interferometric methods, provides a velocity model down to 12 m with an S-wave velocity between 160 and 180 m/s on the uppermost layer. Furthermore, the interferometric signal properties indicate that it is not possible to characterize the mofette as a punctual source, but rather as a conglomerate of multiple sources with time and location variations.