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# Underground Cavities Due to UNE Using Seismic Ambient Noise

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Detection and location of a cavity generated by an underground nuclear explosion is an important proof in case of suspicion of violating the Comprehensive Nuclear-Test-Ban Treaty (CTBT). The resonance seismometry is one of the CTBT's permitted techniques during an on-site inspection (OSI).
We present a new method for detecting and locating a horizontal position of cavity which uses the Finite-interval Spectral Power (FISP) of seismic ambient noise. The method requires measurements at a set of points (possibly irregularly distributed) at the Earth's free surface around and over a suspected cavity. Because the method gives better results for undistorted segments of noise records, we also present a method of automatic identification of such segments. We verified our method using records from a site near the Felsőpetény, Hungary, which were collected by the CTBT Organisation during a field test in the framework of developing OSI capabilities. We also show that it is possible to make the noise measurements sequentially. The minimum number of simultaneously measured locations is two. This allows to perform additional measurements, if needed, or to use a limited number of seismometers. The FISP method is ready for further tests at other sites and applications.

## Promotional text

How to detect and locate a cavity at a site of a suspected UNE using records of seismic ambient noise?

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