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An operational approach for infrasound multi-array processing

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The infrasound network of the International Monitoring Network (IMS) of the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) is currently not fully established. However, it has demonstrated its capability for detecting and locating infrasonic sources like meteorites as well as volcanic eruptions on a global scale. Unfortunately, such ground truth events are rare. Therefore, regions with dense infrasound networks have to be considered in order to test and calibrate detection and location procedures (Le Pichon. et al. 2008, *J. Geophys. Res.*, 113, D12115, doi:10.1029/2007JD009509).

In Central Europe, several years of continuous infrasound recordings are available for many infrasound arrays, where not all of them are part of the IMS. Infrasound waveforms are routinely processed in the 0.1 to 4 Hz frequency band using PMCC as a real-time detector. After applying a categorization procedure to remove detections associated with environmental noise, a blind fusion provides a list of events to be reviewed by the analyst. In order to check the geophysical consistency of the located events, an interactive tool has been developed. All results of the automatic processing are presented along with a realistic estimate of the network detection capability which incorporates near-real time atmospheric updates. Among the dominant acoustic sources of human origin, peaks in the geographical distribution of infrasound events correspond well with seismically active regions where operational mines have been identified.

With the increasing number of IMS and regional cluster infrasound arrays deployed around the globe, conducting consistent analyses on a routine-basis provides an extensive database for discriminating between natural and artificial acoustic sources. Continuing such studies may also help quantifying relationships between infrasonic observables and atmospheric specification problems, thus opening new fields for investigations into inverse problems.