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On the localization capability of a regional infrasound network

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The 60 element infrasound network is part of the International Monitoring Network (IMS) for monitoring the compliance with the Comprehensive Nuclear-Test-Ban Treaty (CTBT). Although not fully established, 48 homogeneously distributed infrasound stations are currently recording data. This allows to study the infrasonic activity on a global scale, which has been demonstrated for ground-truth sources like meteorites, as well as volcanic eruptions or even the detection of continuous and persistent microbaroms generated by the ocean swells. Based on a new implementation of the Progressive Multi-Channel Correlation (PMCC) algorithm and a full reprocessing of the IMS infrasound waveform data, we are studying again the detection and location capabilities of a global network, because with the reprocessing new sets of bulletins have been compiled, which comprise a better characterization of all recorded coherent signals in their wave parameter space (e.g., frequency-azimuth space, frequency-trace-velocity space).
First location results for globally detected microbaroms are shown, which are compared with numerical hind-casted wave height and period models. Nevertheless, since ground-truth events are rare, regions providing a denser network of infrasound stations have to be considered to study location procedures in detail. On a regional scale, in Europe data from several stations in Norway, Sweden, France, and Germany is available. Together with the IMS stations in and around Europe this region provides exquisite setting with an average inter-station distance below 500 km allowing the analysis of natural and artificial infrasonic activity across Europe. The association of multiple arrays demonstrates the potential to advance the development of automatic location procedures using continuous infrasound data. Beside the seasonal variation of the network's detection capability, which is dominated by the prevailing stratospheric winds, dominant source regions showing repeating events will be discussed in detail.