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Sampling the Noise Field Recorded at the USArray TA Infrasound Stations

With the addition of acoustic sensors to the seismograph stations of the US National Science Foundation EarthScope USArray Transportable Array (TA), there is an opportunity for significant advances in our understanding of infrasound source physics and propagation, as well as coupling between seismic and infrasound waves. Central to these efforts is an improved understanding of infrasound noise. We present a comprehensive analysis of the ambient acoustic noise recorded at over 400 of the USArray TA stations. Owing to the spatial extent and the density of these stations (spacing of ~70 km) the noise field exhibits a large variability, diurnal and seasonal, influenced by local and long-range sources. The method of ambient noise characterization is based on power spectral density (PSD) estimates, often used in processing seismic noise records. Continuous time series are demeaned, detrended, and deconvolved with the instrument response. The waveform data are divided into overlapping sub-windows and FFT-based power estimates are averaged to reduce the PSD variance. To visualize the general spectral noise characteristics the processing also involves merging the PSD estimates into 2D histograms, resulting in probability density functions, for each single-channel station and for all the combined stations.

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