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complex infrasound wavefields using a dense array

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Complex infrasound wavefields (containing multiple simultaneous waves with different slowness vectors) pose a challenge for traditional array analysis. We approach this problem using a dense array (22 sensors) as a field method, and secondary infrasound from earthquakes as a research target. Secondary infrasound from earthquakes contains potentially useful information on ground shaking, but the presence of many interfering waves from different radiators complicates source analyses. Using both direct waves from a local earthquake (M3.5, 10 km) and refracted waves from a regional event (M6.5, 720 km), we show that the detail and resolving power provided by array analyses can be improved dramatically by increasing the number of sensors in the array.

Many routine applications of infrasound face the challenge of distinguishing wave sources of interest from superposed waves from many sources, and single-channel rapid-deploy instrumentation suitable for "large-N" recording is increasingly available (e.g., the Gem infrasound logger used in this work). Consequently, we expect our methods and findings to be broadly applicable beyond our specific problem of earthquake infrasound.

Promotional text

Adding more sensors to infrasound arrays increases their resolving power, facilitating detection of weak signals and identification of multiple simultaneous waves from different directions.

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