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Identification and Discrimination Using Nearby Infrasonic and Seismic Sensors

An experimental infrasound array, combined with collocated seismic sensors, detected in Southern Brazil an event characterized by waves arriving simultaneously at both types of sensors. This suggests a common source for the waves, traveling at the same velocity. However, different source types could satisfy these conditions. This study analyzes signals recorded by a four-element infrasound array, three triaxial seismic broadband stations, five uniaxial seismic sensors and five infrasound sensors. The goal is to identify the most plausible source responsible for generating these signals based on factors such as event location, wave velocity, frequency content, energy and ground vibrations. By examining the characteristics of the detected signals, the analysis identified an acoustic event, primarily based on wavefront velocity measurements. The acoustic waves were located far enough to be perceptible to local inhabitants. This raises several questions: What type of event could generate these signals? How could the local population perceive the event if no seismic signals were detected? If ground vibrations were felt, it would indicate a seismic event, which was not the case here. In this work, we present and discuss a methodology for event localization, interpretation and source identification, providing insights into the nature of the detected signals.

E-mail

lucas.v.barros@gmail.com

In-person or online preference

Primary author: Mr BARROS, Lucas (University of Brasilia, Seismological Observatory)

Co-authors: Mr PORTELA FONTENELE, Darlan (University of Brasilia, Seismological Observatory); Dr F. DE ALBUQUERQUE, Diogo; Dr MARIO DE CARVALHO, Juraci; Ms GUEDES ASSUNÇÃO, Leticia; Dr QUINTERO, Ronnie

Presenter: Mr BARROS, Lucas (University of Brasilia, Seismological Observatory)

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