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“Listening to the Earth’s atmosphere: Tuning into the sounds of our dynamic planet”

Abstract: The global aggregate of systems we use to study and monitor our planet continues to grow. A relatively recent addition is the global network of infrasound arrays. The network has been deployed as part of the International Monitoring System for nuclear treaty monitoring, but has also proven valuable for basic study of the generation and propagation of infrasound – that is subaudible sound below 20 Hz. Infrasound is generated by a broad suite of large natural and anthropogenic events. Infrasound propagates with relatively little loss and, as a result, can be used to remotely detect and probe these sources and study the structure of the atmosphere.

Our research has focused on dense seismic and barometric network recordings of infrasound for detailed study of infrasound propagation. It is clear that infrasound signals are highly modified during propagation by atmospheric gravity waves, which disperse infrasound energy. This talk will present an overview of the field, including the meteor that burst above Chelyabinsk, Russia in early 2013. The talk then focuses on recent findings from dense seismic network recordings of infrasound-seismic coupled signals in the western continental United States. We also discuss the recent upgrade of the USArray Transportable Array (TA) with atmospheric pressure sensors, and the use of this unprecedented network to study singular events and observe the occurrence of gravity waves in the eastern United States from the beginning of 2010 to the present.