Geophysical Research Abstracts
Vol. 18, EGU2016-18316-1, 2016
EGU General Assembly 2016

Study of atmospheric gravity waves and infrasonic sources using the USArray Transportable Array pressure data

Michael Hedlin (1), Catherine de Groot-Hedlin (1), Lars Hoffmann (2), M. Joan Alexander (3), and Claudia Stephan (4)

(1) Institute of Geophysics and Planetary Physics, University of California, San Diego, La Jolla, CA USA (hedlin@ucsd.edu), (2) Forschungszentrum Juelich, Germany, (3) NorthWest Research Associates, Boulder CO, USA, (4) National Centre for Atmospheric Science - Climate, Department of Meteorology, University of Reading, Reading, United Kingdom

The upgrade of the USArray Transportable Array (TA) with microbarometers and infrasound microphones has created an opportunity for a broad range of new studies of atmospheric sources and the large- and small-scale atmospheric structure through which signals from these events propagate. These studies are akin to early studies of seismic events and the Earth's interior structure that were made possible by the first seismic networks. In one early study with the new dataset we use the method of de Groot-Hedlin and Hedlin (2015) to recast the TA as a massive collection of 3-element arrays to detect and locate large infrasonic events. Over 2,000 events have been detected in 2013. The events cluster in highly active regions on land and offshore. Stratospherically ducted signals from some of these events have been recorded more than 2,000 km from the source and clearly show dispersion due to propagation through atmospheric gravity waves. Modeling of these signals has been used to test statistical models of atmospheric gravity waves.

The network is also useful for making direct observations of gravity waves. We are currently studying TA and satellite observations of gravity waves from singular events to better understand how the waves near ground level relate to those observed aloft. We are also studying the long-term statistics of these waves from the beginning of 2010 through 2014. Early work using data bandpass filtered from 1-6 hr shows that both the TA and satellite data reveal highly active source regions, such as near the Great Lakes.

de Groot-Hedlin and Hedlin, 2015, A method for detecting and locating geophysical events using clusters of arrays, Geophysical Journal International, v203, p960-971, doi: 10.1093/gji/ggv345.