Geophysical Research Abstracts
Vol. 18, EGU2016-12871-2, 2016
EGU General Assembly 2016

Contribution of the infrasound technology to characterize large scale atmospheric disturbances and impact on infrasound monitoring

Elisabeth Blanc (1), Alexis Le Pichon (1), Lars Ceranna (2), Christoph Pilger (2), Andrew Charlton Perez (3), and Pieter Smets (4)

(1) CEA DAM DIF F-91297 Arpajon France (elisabeth.blanc@cea.fr), (2) BGR, B4.3, Hannover, Germany, (3) Department of Meteorology, University of Reading, Reading, United Kingdom, (4) R&D Department Seismology and Acoustics, KNMI, De Bilt, Netherlands

The International Monitoring System (IMS) developed for the verification of the Comprehensive nuclear-Test-Ban Treaty (CTBT) provides a unique global description of atmospheric disturbances generating infrasound such as extreme events (e.g. meteors, volcanoes, earthquakes, and severe weather) or human activity (e.g. explosions and supersonic airplanes). The analysis of the detected signals, recorded at global scales and over near 15 years at some stations, demonstrates that large-scale atmospheric disturbances strongly affect infrasound propagation. Their time scales vary from several tens of minutes to hours and days. Their effects are in average well resolved by the current model predictions; however, accurate spatial and temporal description is lacking in both weather and climate models.

This study reviews recent results using the infrasound technology to characterize these large scale disturbances, including (i) wind fluctuations induced by gravity waves generating infrasound partial reflections and modifications of the infrasound waveguide, (ii) convection from thunderstorms and mountain waves generating gravity waves, (iii) stratospheric warming events which yield wind inversions in the stratosphere, (iv)planetary waves which control the global atmospheric circulation. Improved knowledge of these disturbances and assimilation in future models is an important objective of the ARISE (Atmospheric dynamics Research InfraStructure in Europe) project. This is essential in the context of the future verification of the CTBT as enhanced atmospheric models are necessary to assess the IMS network performance in higher resolution, reduce source location errors, and improve characterization methods.