

Monitoring of Volcanoes: A Remote Sensing Method of the Upper Atmosphere

Volcanic eruptions represent a significant source of low-frequency acoustic energy radiated directly into the atmosphere. During explosive volcanic eruptions, release of overpressure and rapid and sustained injection of mass into the atmosphere are the primary sources of infrasound waves (0.01-20 Hz). The International Monitoring System (IMS) infrasound network of the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) permits detection of volcanic activity throughout the globe. Over the past 10 years, the International Data Centre (IDC) has collected a significant number of infrasound recordings related to volcanic activity worldwide. These recordings are outstanding natural calibration sources to improve atmospheric models in ranges of altitude where routine measurements still remain illusive. We present case studies on the use of infrasound as a remote sensing technique for horizontal winds in the upper atmosphere. Of specific interest are planetary waves and solar tides which are not well resolved by the current atmospheric specifications. Within the Atmospheric dynamics Research and InfraStructure in Europe (ARISE) framework, we focus on infrasound measurements from the Etna volcano in Italy. Through the ARISE network, we will have access to independent temperature and wind measurements that can be used for valuable cross-comparison studies, in addition to various infrasound arrays in the region.

Primary author: LE PICHON, Alexis (CEA/CENTRE Ile-de-France)

Presenter: LE PICHON, Alexis (CEA/CENTRE Ile-de-France)

Track Classification: Theme 1: The Earth as a Complex System