

Uncertainties in Atmospheric Dynamics and Infrasound Monitoring

The atmosphere is a complex system submitted to a large set of disturbances including i) high frequency waves from volcanoes, thunderstorms, tornadoes, explosions, ii) gravity and planetary waves at lower frequencies iii) stratospheric warming events which can impact the troposphere during weeks. The infrasound network of the International Monitoring System (IMS) developed for the verification of the CTBT (Comprehensive nuclear-Test-Ban Treaty) showed a high capacity to detect, localize and identify most of these atmospheric disturbances. However, these disturbances are at the origin of uncertainties in atmospheric models and infrasound monitoring analysis. They are determined using complementary observations, including the infrasound IMS, the lidar Network for the Detection of Atmospheric Composition Changes, radars and satellites, in the framework of the ARISE (Atmospheric dynamics research InfraStructure in Europe) project. Differences in the temperature and wind between models and observations can reach 30K and 20 m/s respectively in the stratosphere. The integration of the atmospheric variability in the stratosphere constitutes a challenge for the development of future models of atmosphere and climate. It could lead to improvements of medium range weather predictions and operational infrasound monitoring. The ARISE objective is to provide new data sets in the middle atmosphere for assimilation in models.

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