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Using High Resolution Global Atmospheric Simulations to Investigate Gravity Wave Impact on Infrasound Transmission Losses Across the International Monitoring System

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Infrasound propagation is mainly driven by the seasonal changes in stratospheric winds. However, small scale perturbations like gravity waves also affect the detection capability of the infrasound station network of the International Monitoring System. Simulations of atmospheric models explicitly resolving gravity waves are used to investigate the effect of these perturbations on infrasound transmission losses using parabolic equation simulations. We use high resolution atmospheric specification fields obtained in the framework of Dynamics of the Atmospheric General Circulation Modeled on Nonhydrostatic Domains (DYAMOND). DYAMOND is an international project, initiated by the Max Planck Institute for Meteorology and the University of Tokyo. It describes a framework for the intercomparison of high resolution global models. It mainly focuses on the troposphere, but some models extend well into the stratosphere. Lidar observations are used to validate the model at Observatoire de Haute Provence (France). By filtering out small scale perturbations (gravity waves) in atmospheric specifications and comparing parabolic equation simulations with and without gravity waves, respectively, we quantify the impact of gravity waves and discuss how it is related to the gravity wave activity (energy) and the mean atmospheric waveguide, across the International Monitoring System.

E-mail

constantino.listowski@cea.fr

Promotional text

Simulated atmospheric fields explicitly resolving gravity waves are used to investigate the effect of these small scale perturbations on infrasound surface transmission losses using parabolic equation simulations, across the IMS.

Oral preference format

in-person

Primary author: LISTOWSKI, Constantino (Commissariat à l'énergie atomique et aux énergies alternatives (CEA))

Co-authors: Dr HAUCHECORNE, Alain (LATMOS/IPSL, UVSQ Université Paris-Saclay, Sorbonne Université, CNRS, Guyancourt, France); Mr LE PICHON, Alexis (Commissariat à l'énergie atomique et aux énergies alternatives (CEA)); STEPHAN, Claudia (Max Planck Institute for Meteorology, Hamburg, Germany); Dr BÖLÖNI, Gergely (Deutscher Wetterdienst (DWD)); Dr ACHATZ, Ulrich (Goethe-Universität Frankfurt, Frankfurt, Germany); Dr KIM, Young-Ha (Goethe-Universität Frankfurt, Frankfurt, Germany)

Presenter: LISTOWSKI, Constantino (Commissariat à l'énergie atomique et aux énergies alternatives (CEA))

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