Geophysical Research Abstracts
Vol. 19, EGU2017-6097, 2017
EGU General Assembly 2017

On modeling internal gravity wave dynamics from infrasound propagation

Bruno Ribstein (1,2), Christophe Millet (3), and Francois Lott (2)

(1) CMLA, ENS, F-94230 Cachan, France (ribstein@lmd.ens.fr), (2) LMD, ENS, F-75005 Paris, France, (3) CEA, DAM, DIF, F-91297 Arpajon, France (christophe.millet@cea.fr)

Low frequency acoustic waves (infrasounds) are generally used to remotely detect strong explosions, using their possibility of long-distance and coherent propagation. Numerical prediction of infrasounds is a complex issue due to constantly changing atmospheric conditions and to the random nature of small-scale flows. Although it is well-known that part of the upward propagating wave is refracted at stratospheric levels, where gravity waves significantly affect both the temperature and the wind, yet the process by which the gravity wave field changes some infrasound arrivals remains not well understood. In the present work, we use a stochastic parameterization to model the subgrid scale gravity wave field from atmospheric states provided by ECMWF. Numerical evidence are presented showing that regardless of whether the superimposed gravity wave field possesses relatively small or large features the sensitivity of ground-based infrasound signals can be significantly different. A version of the gravity wave parameterization previously tuned by co-authors for climate modeling purpose is shown to not retrieve the duration of recorded acoustic signals. A new version of the wave-parameterization is here proposed which more accurately predict the small scale content of gravity wave fields, especially in the middle atmosphere. Compare to other semi-empirical approaches one value of this new parameterization is that the gravity wave drag obtained is in agreement with observations.