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Infrasound in Mesopause Temperatures: Modelling, Observations and Analyses

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Infrasound is typically observed in surface level measurements of the ambient air-pressure. A novel approach performed at the German Remote Sensing Data Center of the German Aerospace Center (DLR-DFD) is the detection of infrasonic signals in temperature time series of the mesopause altitude region (at about 80-100 km).
The infrasonic pressure fluctuations correspond to temperature fluctuations in the atmosphere via ideal gas law assumptions. The development and magnitude of these fluctuations can be modelled regarding propagation, attenuation and amplification processes in the atmosphere. The modelling results are quantified in order to compare it to instrumental observations of mesopause temperatures.
The observations are performed at DLR-DFD using the airglow measurement technique and the GRIPS instruments (GRound-based Infrared P-branch Spectrometers). Their temporal resolution of 15 seconds permits the observation of signals within the infrasound period range.
Spectral intensities are estimated applying the wavelet analysis to the complete data set of more than one year of routine measurements in order to derive a statistical distribution of wave activity in the frequency range from 0.5 to 5 minutes. Selected events are discussed with respect to the origin of the observed structures.