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Seminar über Microwave Physics and Atmospheric Physics

Referent/in: Dr. Kathrin Baumgarten, Leibniz-Institute of Atmospheric Physics at the Rostock University, Kuehlungsborn, Deutschland

Titel: Characterizing atmospheric waves and evaluating their variability based on lidar measurements

The circulation of the Earth's atmosphere is driven by a huge variety of waves with different origin. Those waves propagate through the atmospheric layers and couple them by transferring energy and depositing momentum. Typical general circulations models need a parameterization scheme for such small-scale waves. For this further knowledge is needed as input data.
A Rayleigh-Mie-Raman (RMR) lidar is used to investigate different fractions of atmospheric waves, like gravity waves (GW) and thermal tides (with diurnal, semidiurnal and terdiurnal components) at day and night in the middle atmosphere by measuring the relative air density, from which the temperature is calculated. About 12000 h of data have been acquired until Sept. 2019. The general challenge for such observations is the separation of different wave contributions from the observed superposition of GW, tides, or even longer periodic waves. Unfiltered lidar data always include such a superposition. By applying spectral filtering techniques, characteristics of atmospheric waves are derived in an altitude range between ~30 and ~70 km and related to global information from reanalysis data sets. Here, the temporal variability and intermittency of atmospheric waves are presented during the season as well as on a day-to-day basis. While inertia gravity waves and tides show an annual variation with a summer minimum, small periodic gravity waves show an unexpected strong activity during the summer, which is not resolved by any general circulation model. These findings clearly demonstrate the importance of a data acquisition on a routine basis with high temporal and spatial resolution and the benefit of combining global data assimilation products with ground-based observations.

Zeit: Freitag, 22.11.2019, 10:15 Uhr

Ort: **Hörsaal A97**, Gebäude Exakte Wissenschaften, Sidlerstrasse 5, Bern, Schweiz