

Microwave Physics and Atmospheric Physics

Referent/in/speaker: Arthur Gauthier, Deutsches Zentrum für Luft-und Raumfahrt, Deutschland

Titel/title: Neutral Wind Measurements in the Mesosphere and Thermosphere: From Satellite Climatologies to Ground-Based Fabry–Perot Observations

Neutral winds in the mesosphere, lower thermosphere, and thermosphere play a central role in the vertical coupling of the atmosphere by controlling the propagation and dissipation of atmospheric waves and tides. These processes strongly influence the dynamics and variability of the ionosphere–thermosphere system across a wide range of spatial and temporal scales. In this seminar, I will present recent work on the observation and analysis of neutral winds using both satellite- and ground-based measurement techniques.

The first part focuses on neutral wind measurements from the TIMED Doppler Interferometer (TIDI) onboard the TIMED satellite. A climatology of mesospheric and lower thermospheric winds is derived and compared with meteor radar observations at different latitudes. The comparison demonstrates that TIDI reproduces the main seasonal characteristics of the zonal circulation, including the summer wind reversal, while larger discrepancies are found for the meridional component, particularly at polar latitudes. The results further highlight hemispheric asymmetries and the altitude dependence of the large-scale circulation.

The second part presents the newly developed SOFPIT Fabry–Perot interferometer installed on Tenerife in 2024 for thermospheric wind measurements using the 630.0 nm oxygen airglow emission. Two independent wind retrieval methods are implemented and compared: a directional-pair approach and a forward-modeling technique based on the instrumental response. The comparison shows very good agreement between both methods and demonstrates the reliability of the retrieved thermospheric winds. Finally, the observations are compared with WACCM-X simulations, showing good agreement in the large-scale seasonal and local-time variability of the thermospheric circulation.

Zeit/time: Friday, May 22, 2026, 10:15

Ort/place: Room A97
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