

Anmeldung eines Themas für ein/e

Forschungsseminar
Methodenseminar
Masterarbeit (bitte eines oder mehrere ankreuzen)

Thema Datum	Simulated lower boundary effects on circulation and coupling characteristics with UA-ICON
Betreuer (Kontaktdaten)	Prof. Christoph Jacobi (jacobi@rz.uni-leipzig.de)
ggf. weitere Kontaktperson	Dr. Ales Kuchar (ales.kuchar@uni-leipzig.de)
Zweitgutachter	Prof. Johannes Quaas (johannes.quaas@uni-leipzig.de)
Kurzbeschreibung:	<p>Stationary waves are forced by asymmetries in the lower boundary, such as the land-ocean, sea-ice distribution and orography. The meridional overturning (residual) circulation in the middle atmosphere is known as the Brewer-Dobson circulation (BDC). While the BDC is believed to be driven mainly by planetary waves (PWs), its upper part, consisting of the mesospheric inter-hemispheric circulation from the summer to winter pole is dominated by internal gravity waves (GWs; Alexander, 2010). PWs indirect influence on the mesosphere is mediated via Sudden Stratospheric Warmings (SSWs) when the polar vortex collapses and GWs with eastward phase speeds can propagate upward and break. While previous studies investigated various boundary effects mainly on the troposphere or stratosphere (e.g. White et al., 2018), we aim to investigate these effects (based on student's interest) on circulation and coupling characteristics (i.e. residual circulation, tides) in the mesosphere with the upper atmosphere extension of the Icosahedral Nonhydrostatic (UA-ICON) global circulation model (Borchert et al, 2019). These modeling scenarios will be part of the model validation.</p>
Literatur:	<p>Alexander, M. J. (2010). Gravity waves in the stratosphere. In <i>The Stratosphere: Dynamics, Transport, and Chemistry</i> (pp. 109–121). https://doi.org/10.1029/2009GM000864</p> <p>Borchert, S., Zhou, G., Baldauf, M., Schmidt, H., Zängl, G., and Reinert, D., 2019: The upper-atmosphere extension of the ICON general circulation model (version: ua-icon-1.0), <i>Geosci. Model Dev.</i>, 12, 3541–3569, https://doi.org/10.5194/gmd-12-3541-2019.</p> <p>White, R. H., Battisti, D. S., & Sheshadri, A. (2018). Orography and the Boreal Winter Stratosphere: The Importance of the Mongolian Mountains. <i>Geophysical Research Letters</i>, 45(4), 2088–2096. https://doi.org/10.1002/2018GL077098</p>