

Anmeldung eines Themas für ein/e

Forschungsseminar
Methodenseminar
Masterarbeit (bitte eines oder mehrere ankreuzen)

Thema Datum	The influence of the El Nino and La Nina on the Polar Vortex variability in the ICON-NWP model 22.2.2022
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Kurzbeschreibung:	<p>El Nino and La Nina events, the irregular warming and cooling of the tropical Pacific that occurs every couple of years, have significant impacts on the global atmospheric and oceanic circulation. Understanding the influence of the El Nino-Southern Oscillation (ENSO) on the tropospheric and stratospheric polar vortices can help interpreting seasonal model predictions and hence improving the seasonal forecasts. On the other hand, it is well-recognised that the polar vortices have a great impact on the mid-latitude weather and climate including extreme weather events. However, there are discrepancies between the observed and modeled relationship between ENSO-polar vortices and it is unclear if the discrepancy between models and observations is due to the low number of observed ENSO and different states of the polar vortex events in the observations, or non-linearity in the ENSO teleconnections which the models are unable to simulate.</p> <p>In the current master thesis, the candidate will run ICON-NWP with two different scenarios: Experiment 1 involves simulations with the specified observed inter-annually varying sea surface temperatures, sea ice content and other external forcing such as greenhouse gases for 1 January 1980 to 31 December 2015. Experiment 2 (time-slice) is similar to Experiment 1 except employing repeated annual cycle sea surface temperatures, sea ice content and other external forcing such as greenhouse gases for El-Nino, La-Nina and neutral conditions. The main differences between these two experiments are expected to arise from the differences between their specified sea surface temperatures. Then the candidate will diagnose how different status of the ENSO affect the polar vortex via calculations of the heat and momentum fluxes as well as other wave-mean flow interaction diagnostics.</p>
Literatur:	<p>Domeisen, D. I., Garfinkel, C. I., and Butler, A. H.: The teleconnection of El Niño Southern Oscillation to the stratosphere, <i>Rev. Geophys.</i>, 57, 5–47, https://doi.org/10.1029/2018RG000596, 2019.</p> <p>Iza, M., Calvo, N., & Manzini, E.: The stratospheric pathway of La Niña. <i>Journal of Climate</i>, 29(24), 8899–8914, 2016.</p>