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Title: Assessing seasonal predictability from stratospheric variability
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Abstract:
The predictability arising from stratospheric variability is analyzed in a seasonal prediction system including a high top atmosphere model and a full ocean. Stratospheric variability is suggested to enhance tropospheric predictive skill through the downward influence of Sudden Stratospheric Warmings as well as the remote influence of El Niño pathways through the stratosphere. Here, we aim to quantify predictive skill on seasonal timescales with a focus on the extratropical Northern Hemisphere. We use a seasonal prediction model based on the MPI-ESM coupled climate model system (as used for the CMIP5/IPCC-AR5 simulations) initialized from reanalysis data for the atmosphere, ocean, and for sea ice. Hindcast ensemble runs are performed for the satellite era 1981 to 2011, with start dates every May and November. Stratospheric variability is reproduced well in the hindcast runs with a realistic frequency of sudden warmings, with the ensemble spread representing the variability of reanalysis data. ENSO variability is captured in the tropical Pacific with a high predictive skill for 5 months. The suggested relationship between El Niño and stratospheric polar cap temperatures is reproduced. We also investigate predictive skill in the North Atlantic / European sector as a function of stratospheric variability. While the North Atlantic / Europe sector traditionally exhibits little skill in seasonal prediction models, our analysis of a seasonal forecast system presents a promising step towards assessing the influence of stratospheric variability on the predictability of tropospheric variability on seasonal timescales.
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