



Assessing predictability over the North Atlantic / Europe arising from stratosphere - troposphere coupling in a seasonal prediction system

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Predictability on seasonal timescales over the North Atlantic / Europe region is assessed using a seasonal prediction model based on an initialized version of the Max Planck Institute Earth System Model. The two dominant predictors are El Niño and sudden stratospheric warming (SSW) events. In the prediction system, the evolution of El Niño events is reliably predicted, and stratospheric variability is reproduced well in hindcast runs with a realistic frequency of SSW events.

While multiple studies have shown a potential for improved predictability for either predictor, we here aim to quantify the predictive skill arising for both types of events, which are shown to not be independent. An El Niño teleconnection exists in the model involving a deepened Aleutian Low in the Northern Pacific, which influences the Northern winter stratosphere. The stratospheric anomaly then propagates downward into the troposphere on seasonal timescales while being amplified by SSW events. Predictability of 500hPa geopotential height over Northern Europe is then shown to be increased for El Niño events for lead times of 3-5 months.