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Using teleconnections to predict the weather in Europe -- theory and application

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Most climate and weather prediction models, especially high-top models with sufficient resolution in the stratosphere, show a response to stratospheric variability over Europe and the North Atlantic, which consists of a negative NAO anomaly for increased stratospheric polar cap temperatures, as e.g. observed after major stratospheric sudden warming events. The strength of this response depends on the model and the strength and vertical extent of the forcing, which is modulated by teleconnections affecting the stratosphere, such as El Nino and the Quasi-Biennial Oscillation.

The skill of seasonal forecasts therefore depends in part on the skill of the models in representing the origins and propagation of these remote signals. Statistical models, on the other hand, use these teleconnections alike, but do not evaluate the exact propagation of the signal or the interaction of the different forcings. This can lead to differing forecasts between dynamical and statistical models. On seasonal timescales, evaluating both types of models would be expected to add forecast skill.

The forecasts from both dynamical and statistical models are therefore of crucial importance to industry applications, of which this contribution will present a case study.