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A statistical-dynamical seasonal prediction of the North Atlantic Oscillation

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The North Atlantic Oscillation (NAO) has in winter and summer a major influence on European weather. Seasonal prediction of the NAO, done generally with the ensemble mean of dynamical models alone, is currently limited in its prediction skill. To overcome this, we apply statistical post-processing, which generates a higher prediction skill than the dynamical model alone.

The statistical post-processing merges the distribution given by the dynamical ensemble members with distributions generated from statistical predictors. We show that the post-processed predictions have a decreased spread, leading to a sharper prediction and with it in most cases to better prediction skill. Decisive is here apart from the forecast skill of the subcomponents also the balance between the spread of the distribution of the model and the predictors. Combining the statistical with the dynamical prediction and with this weighting the ensemble members of the dynamical prediction by applying statistical post-processing, leads to a reduction of noise.

In this contribution, we re-evaluate the statistical-dynamical prediction, in particular with respect to the insights gained into the processes and uncertainties driving the forecast skill. We investigate the seasonal hindcast of the NAO of the Max Planck Institute Earth System Model (MPI-ESM) seasonal prediction system with 30 ensemble members initialized every May and November between 1982 - 2017. We show with the help of new, non-parametric verification techniques the effect of the statistical-dynamical approach on the NAO prediction and the atmospheric variables over Europe.