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Improved seasonal prediction of winter precipitation over Iberia through optimal estimation of NAO pattern and ensemble weighting

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Nowadays, the predictive skill of the North Atlantic Oscillation (NAO) by most of seasonal forecasting systems based on AOCGC models is generally not high enough to produce skilful winter precipitation forecasts over the Southwestern European façade. On the other hand, Cohen and Jones (2011) have shown that, part of NAO wintertime variability, may be externally forced by the autumn boreal snow cover advance. In this study, we apply statistical estimation theory to attempt an optimal estimation of this dominant mode of extratropical variability and its uncertainty, using a priori estimations of forecast NAO from operational seasonal forecasting systems and from empirical relationships, and its errors characteristics.
The assumption of ensemble members' equiprobability is generally applied to atmospheric ensembles generated from a single model. Weighting of members from an ensemble seasonal forecasting system is not a trivial task and frequently depends on the particular application or target region of the forecast. Considering that our final goal is to improve winter precipitation over the Iberian Peninsula, the forecasted precipitation pdf is obtained by ensemble weighting following the original idea by Dobrynin et al. (2016) and using a posteriori estimated forecasted NAO pdf. We show the noticeable improvement of winter precipitation forecasts over our region of interest when members are weighted compared with the usual approach based on equiprobability of ensemble members. Alternative empirical relationships are also explored.
In summary, with this point of view, we are trying to explore a way to improve seasonal forecasting for some specific application in some specific area using the available information that we have.