



Verification of Arctic sea ice seasonal predictive capacity in initialized re-forecasts with the CNRM-CM6-1 GCM

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Alongside the development of climate services based on seasonal-to-decadal prediction systems, seasonal prediction skill evaluations increasingly focus on user-oriented metrics and indices. The Arctic region is no exception, and several metrics have recently been developed to complement the usual assessment of pan-Arctic sea ice extent. For instance, Goessling et al. (2016) introduced an integrated ice edge error (IIIE) metric to quantify discrepancies between ice edge positions in forecast and reference data. A low error in total sea ice extent can mask dire mismatches between ice and no-ice regions.

The CNRM-CM6-1 GCM developed for CMIP6 is used to run 30-member ensemble seasonal re-forecasts up to 6 months, initialized on February 1st, May 1st, August 1st and November 1st 1993-2014 from ERA-Interim and Mercator-Ocean reanalyses. Beyond sea ice concentration bias and RMSE maps, ensemble mean IIIE and its decomposition in absolute error and misplacement error are computed with respect to NSIDC reference data. We study how forecast quality depends on several factors such as the target month, forecast time, region of interest and the threshold-based definition of sea ice extent. Using the range of the 30 ensemble members, we evaluate forecast quality in a probabilistic framework. Linkages with large-scale atmospheric variability (blocking frequency, North Atlantic Oscillation) are also explored, both in terms of model climate and skill in reproducing inter-annual anomalies.

These re-forecast experiments contribute to a first stream of seasonal re-forecasts in the framework of the H2020-APPLICATE project. Depending on data availability, results with CNRM-CM6-1 will be discussed in the light of other state-of-the-art seasonal forecast systems involved in this project.