

**Challenging Dynamical Forecast Systems with Spatial Damped Anomaly Persistence for the Sea-Ice Edge**

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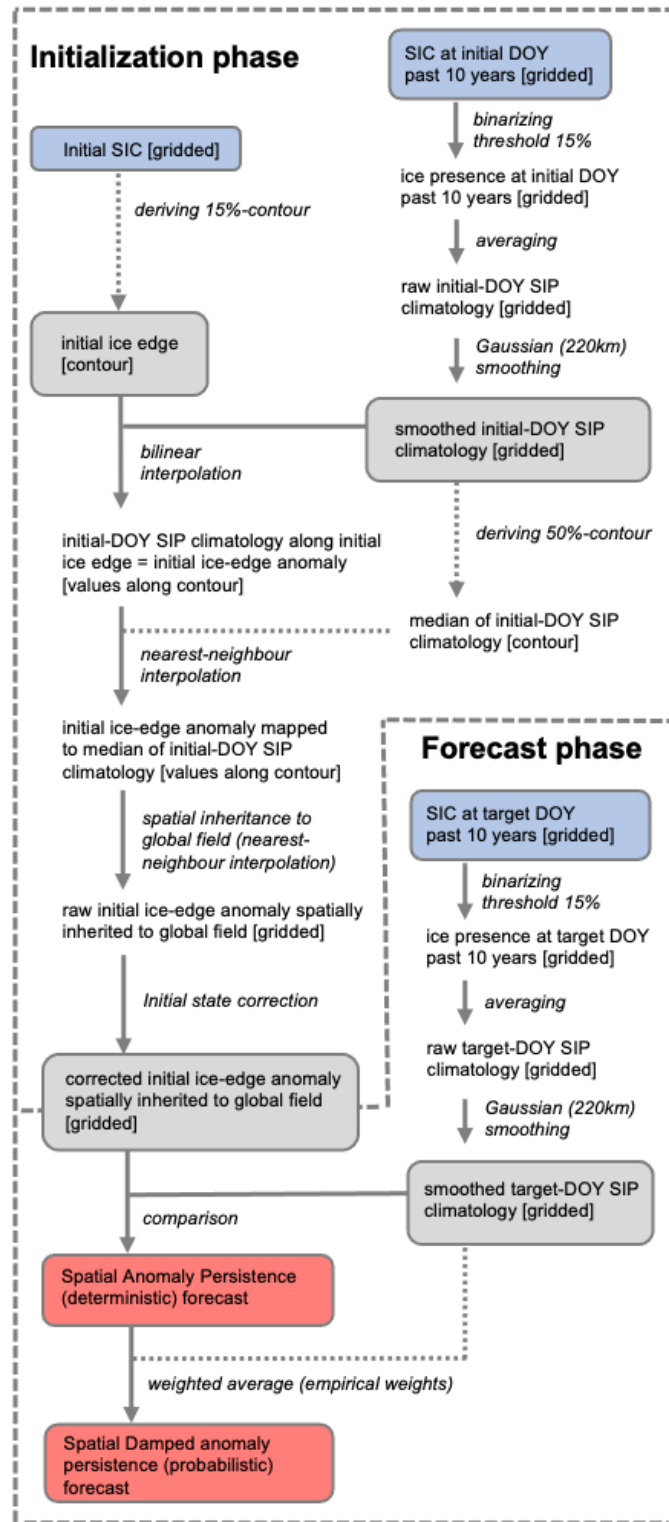
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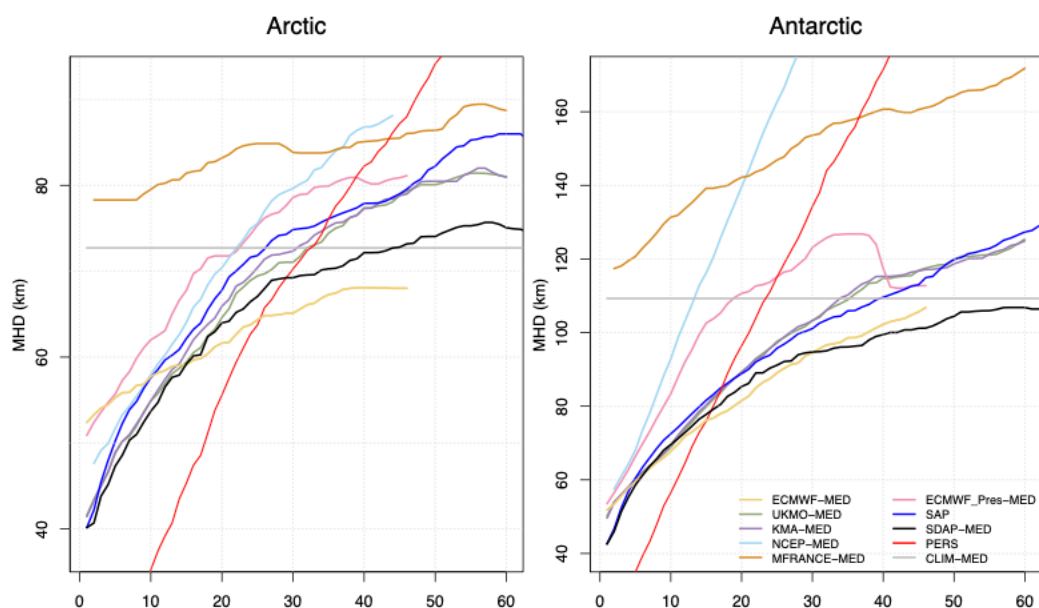
Figures S1 to S3

**Introduction**

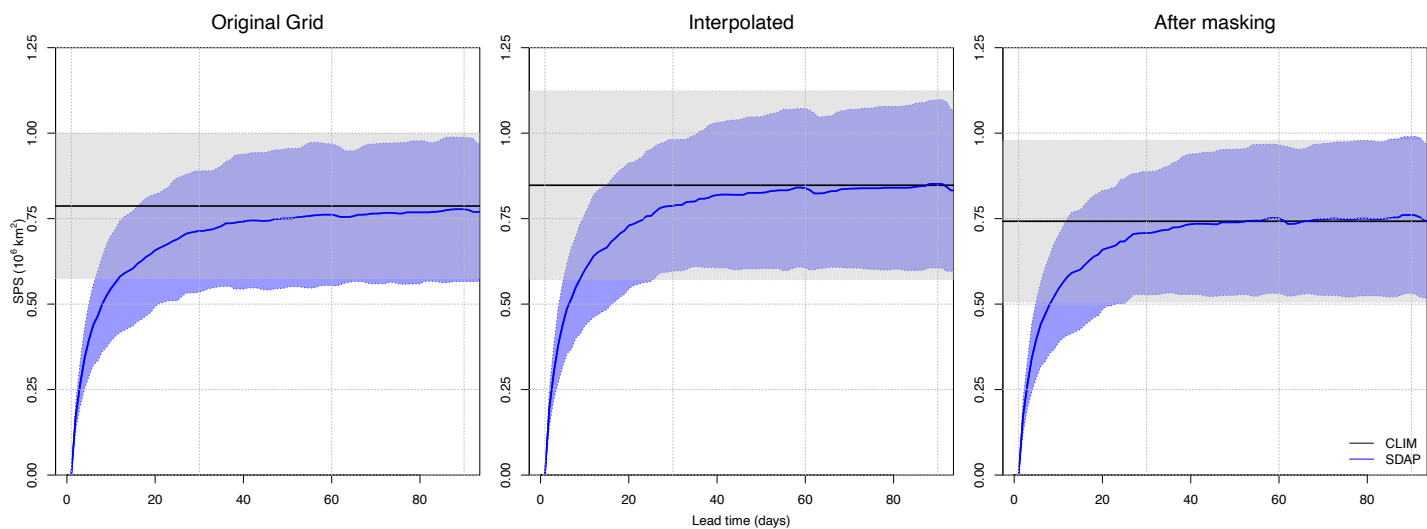
This file contains three figures. The first figure shows a schematic showing the steps taken in deriving the Spatial Damped Anomaly Forecast from initial and climatological sea-ice concentration data. The second figure is the result of the average Modified Hausdorff Distance (MHD) for forecasts from the S2S database, as well as the traditional reference and anomaly forecasts. The third figure shows the change in mean SPS for CLIM and SDAP forecast after interpolation into the common S2S grid and after applying the common mask. Each figure has an attached caption with additional information.



**Figure S1.** Schematic of the Spatial Damped Anomaly Persistence method as described in the main publication. The only data used as input for the method is SIC at initial date and climatological SIC, found using the SIC for the same DOY for the past 10 years. Further information is in the main text.



**Figure S2.** Same as figure 7, but for Modified Hausdorff Distance (MHD), using the 50% probability threshold to create the binary forecasts. For the probabilistic forecasts, the median probability of ice presence is used to determine the predicted ice edge. Due to the resolution of the S2S grid and the disconnected segments of the ice-edge, the MHD measurements do not precisely mirror the results of the SPS measurements. Nevertheless, the ranking of the models is similar to that found using SPS and we can confirm that the SDAP forecasts perform better than all models in the S2S database except ECMWF.



**Figure S3.** A comparison between the SPS of climatological forecast (CLIM) and the Spatial Damped Anomaly Persistence forecast (SDAP) in the original grid, after interpolation to the common S2S grid and after applying a common mask. The mask is derived by finding all grid-cells, where each of the forecast systems being compared has either ice or ocean. Results show the average of all forecasts for years 1999 to 2010, while the shaded areas show  $\pm 1$  standard deviation.