

Windows of Opportunity in Decadal Predictions of North Atlantic SST

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The skill of decadal predictions in the North Atlantic region changed over time in the 20th century. Recent work based on a single model argued that times of high skill so-called windows of opportunity could be identified for average North Atlantic SST by knowing the strength of meridional ocean heat transport in the subpolar North Atlantic at the start of a prediction.

Here, we verify these previous findings for the period 1970-2015 in several prediction systems of the Decadal Climate Prediction Project (DCPP) based on models used in the Coupled Model Intercomparison Project Phase 6 (CMIP6). We find windows of opportunity for decadal predictions of average North Atlantic SST in all examined prediction systems. The timing of these windows of opportunity generally agrees with the published estimate, indicating their robustness around the end of the twentieth century.

Decadal SST prediction skill in the North Atlantic Subpolar Gyre (SPG) shows much less consistent windows of opportunity between prediction systems than average North Atlantic SST. We explore model differences that explain these inconsistencies, discussing the spatial and temporal representation of North Atlantic ocean circulation and heat redistribution in the different prediction systems. We then show that connecting windows of opportunity to observable climatic variables such as sea surface height anomalies in the subpolar North Atlantic can constrain future skill estimates to inform decision makers.