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What explains the successful Met Office seasonal forecast of winter 10/11

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Seasonal forecast systems typically display poor levels of forecast skill for Europe in winter. However, the Met Office seasonal forecasting system 4 (GloSea4) predicted the negative NAO in early Winter 2010/11 from a lead time of around one to two months. Here we look at the underlying physical mechanisms that have been identified in the literature (la Nina-early winter negative NAO correlation, snow cover over Eurasia, extend of Arctic sea-ice, Autumn re-emergence of the sea surface temperature anomaly in the Atlantic) and analyse the ability of the coupled model used in our seasonal forecasting system to reproduce them. The teleconnection with Atlantic SST and perhaps also the strong La Nina seem the most promising candidates in explaining the success of the model in capturing cold conditions in December. The real time forecasts were run with a fully initialised dynamical ocean and sea ice and a well resolved middle atmosphere with high resolution in the vertical, so were well placed to predict ocean-atmosphere interactions and also to reproduce any teleconnections mediated by a stratospheric bridge. We analyse the hindcast performance and present an ensemble of atmosphere-only runs forced with predicted ocean conditions (from (a) the operational coupled seasonal forecasts and (b) average conditions derived from hindcast data) to better understand the successful seasonal forecast of this extreme Winter event.