

Empirical Seasonal Forecast of Winter NAO and Surface Climate

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A key determinant of winter weather and climate in Europe and North America is the North Atlantic Oscillation (NAO). Skilful seasonal forecasting of the surface climate in both Europe and North America is reflected largely in how accurately models can predict the NAO. Most dynamical models, however, have limited skill in seasonal forecasts of the winter NAO. A new empirical model is proposed for the seasonal forecast of the December-January-February (DJF) mean NAO index using a multiple linear regression (MLR) technique with autumn conditions of sea-ice concentration, stratospheric circulation, and sea-surface temperature. This model's cross-validated forecast skill of 1980-2015 NAO index reaches as high as 0.76, more skilful than most numerical models. This MLR model also provides skilful seasonal outlooks of winter surface temperature and precipitation over many regions of Eurasia and eastern North America.

Key words: North Atlantic Oscillation, seasonal forecast, sea ice, stratospheric circulation