



Tropical-extratropical teleconnections associated with the MJO in long-range simulations with the ECMWF Ensemble Prediction System

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The influence of the Madden-Julian Oscillation (MJO) on the wintertime circulation in the Northern Hemisphere has long been debated. Recent observational studies based on the analysis of extratropical regime frequencies suggest a relationship between the phase of the MJO and the frequency of positive and negative NAO anomalies. If properly reproduced in general circulation model (GCM) simulations, such a link should lead to increased predictability on 1-to-2-month time scales over the North Atlantic/European sector during active MJO episodes.

Until the end of 2007, simulations of the MJO by the ECMWF coupled GCM used for monthly forecasting have been generally poor, with systematic errors affecting both the amplitude and the speed of propagation of the MJO. However, a combination of substantial improvements in physical parametrizations, and the merging of the monthly and medium-range Ensemble Prediction Systems (EPS) in March 2008 led to notable improvements in the quality of MJO simulation.

This paper discusses the teleconnections between MJO activity and NH extratropical anomalies in a 20-year sample of 46-day ensemble simulations with a recent version of the ECMWF EPS, with specific attention to the frequency of NAO-like regimes. The model results are broadly consistent with recent claims on a MJO-NAO link, although the strength of such a link (especially over Europe) is subject to significant sampling uncertainties. An analysis of the reliability of monthly-scale predictions over Europe indicates that reliability measures are significantly increased during periods when the MJO is active at the beginning of the forecast range.