

Impact of the MJO on Tropical Cyclones and Northern Extratropical Weather in the ECMWF Forecast System

Frederic Vitart and Franco Molteni

European Centre for Medium-Range Weather Forecasts
Reading, United Kingdom

Abstract

The Madden Julian Oscillation (MJO) simulated by a set of 46-day hindcasts has been diagnosed using the Wheeler and Hendon (2004) MJO index. The model is able to maintain the amplitude of the MJO during the 46 days of integrations, although its propagation is on average slower than observed, and the ECMWF forecast system has difficulties to propagate the MJO across the Maritime continent.

Composites have been performed for each phase of the MJO to assess the impact of the MJO simulated by the numerical model on the tropical cyclone activity and the frequency of weather regimes in the northern extratropics. The model simulates a realistic impact of the MJO on the tropical cyclone activity and on the frequency of TC landfalls, which leads to skillful weekly prediction of tropical cyclone occurrences up to week 4. In the northern Extratropics, the model simulates an impact of the MJO on the NAO, although this impact is weaker than in 20 years of ERA Interim. Finally, the presence of an MJO in the initial conditions has a significant impact on the skill of the ECMWF monthly forecasts in the northern Extratropics.