Impact of model resolution on MJO teleconnections and blocking properties in sub-seasonal predictions with the ECMWF coupled model.

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During 2016, the resolution of both the atmosphere and ocean components of the ECMWF coupled model used for sub-seasonal ensemble predictions has been increased considerably. The atmospheric model grid size went from 64 km to about 36 km, while horizontal resolution in the NEMO ocean model decreased from 1 degree to ¼ degree. In this study we compare statistics of Northern-Hemisphere teleconnections associated with the Madden-Julian Oscillation (MJO) in two sets of re-forecast ensembles for the same 20-year period, made with the two operational model versions. Specifically, we investigate if the strength of the NAO-MJO connection, which is under-estimated in most models used for long-range forecasts and climate simulations, is affected by the resolution changes.

We also explore if the MJO teleconnections affect the frequency and spatial distribution of blocking events in the two model datasets, using two-dimensional versions of widely used blocking indices. We focus specifically on the western Atlantic and north Pacific, two regions where observational studies have shown a modulation of the observed blocking occurrence by large-scale teleconnection patterns.