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Title: Global vs. Local MJO Forecast Skill of the ECMWF model during DYNAMO
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Abstract:
This study introduces a concept of global vs. local forecast skills of the Madden-Julian Oscillation (MJO). The global skill, measured by a commonly used MJO index (RMM), evaluates the model\222s capability of forecasting global patterns of the MJO, with an emphasis on zonal wind fields. The local skill is measured by a newly developed method of tracking the eastward propagation of MJO precipitation. It provides quantitative information of the strength, propagation speed and timing of MJO precipitation in a given region, such as the Indian Ocean. Both global and local MJO forecast skill measures are assessed for ECMWF forecasts of three MJO events during the 2011 \226 2012 DYNAMO field campaign. Characteristics of error growth differ substantially between global and local MJO forecast skill and between the three MJO quantities (strength, speed, timing) of the local skill measure. They all vary considerably among the three MJO events. Deterioration in global forecast skill for these three events appears to be related to poor local skill in forecasting the propagation speed of MJO precipitation. The global and local MJO forecast skill measures are also applied to evaluate numerical experiments of observation denial, humidity relaxation, and forcing by daily perturbations in sea surface temperature (SST). The results suggest that forecast skill or errors of convective initiation of the three MJO events have global origins. Effects of local (Indian Ocean) factors, such as enhanced observations in the initial conditions, variability of tropospheric humidity and tropical SST, on forecasts of MJO initiation and propagation are limited.
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