# Influence of the Madden-Julian Oscillation on predictability in the extra-tropics

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The Madden-Julian Oscillation (MJO) is the main mode of tropical intraseasonal variation with significant influences on the Asian-Australian Monsoons, Indo-Pacific Thermocline variability and mid-latitude teleconnections.  This study examines the impact of the MJO on weather predictability in the extra-tropics. Ensembles of "twin" predictability experiments were carried out with the NASA/GLA atmospheric general circulation model (AGCM) using specified annual cycle SST's. Initial conditions were taken from a 10-year control simulation during periods of strong MJO activity identified via extended empirical orthogonal functions (EOF) analysis of 30-90 day anomalies.

From this analysis, 15 cases were chosen when the MJO convective center was located over the Indian Ocean, Maritime continent, western Pacific Ocean and central Pacific Ocean, respectively, making 60 MJO cases in total. In addition, 15 cases were selected which exhibited very little to no MJO activity. Two different sets of small random perturbations were added to these 75 initial states. Simulations were then performed for 90 days from each of these 150 perturbed initial conditions. The influence of the MJO on the predictability in the extra-tropics is examined by estimating signal-to-

noise ratios in the fields of geopotential height, rainfall and wind components. The implications of the MJO for subseasonal predictability in midlaitudes is discussed.