



How Will the Madden-Julian Oscillation Change in a Warmer Climate?

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The Madden-Julian oscillation (MJO) is associated with coherent intraseasonal wind and precipitation anomalies that propagate eastward across the tropical Indian and west Pacific Oceans. The MJO produces teleconnections in tropical and high latitude winds, where they modulate precipitation, tropical cyclones, temperatures, blocking, and other remote weather impacts. This presentation will synthesize current understanding of how the MJO may change under anthropogenic warming, relying on recent projections from CMIP5 models. Climate models suggest that MJO-related precipitation variations will increase in intensity in a warmer climate, but wind variations may increase at a slower rate or even decrease in intensity. However, climate models are not unanimous in projecting increased MJO precipitation amplitude. Reasons for possible increases in MJO precipitation intensity in a warmer climate will be explored, including the competing effects of an increased lower tropospheric moisture gradient and more top-heavy MJO diabatic heating profile. The differing changes to MJO precipitation and wind anomaly amplitude will be interpreted through increases in the dry tropical static stability in a warmer climate. The implications of potential weakening of MJO teleconnections for future subseasonal prediction will be discussed.