

# **On the role of anomalous ocean surface temperatures for promoting the record Madden-Julian Oscillation in March 2015**

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A Madden-Julian Oscillation (MJO) event exhibited record amplification at the beginning of March 2015 as the convective phase traversed an unusually warm central Pacific Ocean. Strong El Niño conditions in the eastern Pacific have subsequently developed through July 2015. This record amplification also resulted in record amplitude of the MJO based on index measurements since 1974. We explore the possible role of the anomalously high ocean surface temperatures in the equatorial central Pacific at the onset of El Niño 2015 for promoting the extraordinary amplification of this MJO event. We conduct a set of forecast sensitivity experiments with the Predictive Ocean Atmosphere Model for Australia and show that the enhanced growth of the MJO was promoted by amplification of the convective anomaly as it encountered the unusually warm central Pacific. Our results indicate a primary role for the anomalous SST at the onset of El Niño 2015 for promoting the intensification of the MJO, and thus support the hypothesis of a two-way interaction whereby initial SST anomalies at the onset of El Niño promote enhanced MJO activity which then leads to enhanced El Niño development (e.g., Kessler and Kleeman 2000; Eisenman 2006; Vecchi et al. 2006).

Eisenman, I. (2005), Westerly wind bursts: ENSO's tail rather than the dog? *J. Clim.*, 18, 5224–5238.

Kessler, W. S., and R. Kleeman (2000), Rectification of the Madden-Julian Oscillation into the ENSO cycle, *J. Clim.*, 15, 3560–3575.

Vecchi, G. A., A. T. Wittenberg, and A. Rosati (2006), Reassessing the role of stochastic forcing in the 1997–1998 El Niño, *Geophys. Res. Lett.*, 33, L01706, doi:10.1029/2005GL024738