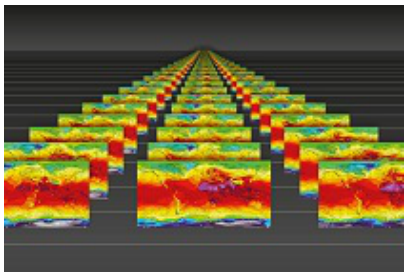

Contribution ID: **23** Type: **Oral presentation**

# MJO Impact on Temperature Extremes over Australia during Austral Spring

*Tuesday, 2 April 2019 16:15 (15 minutes)*

As a potential source of multiweek predictability, we investigate the MJO's impact on temperature extremes during Austral spring. We find a significant MJO influence on weekly mean temperature extremes (defined here as exceeding the upper and lower quintiles) over southeastern Australia when the MJO is in phases 2, 3, and 6 and 7. During these phases, the occurrence of maximum and minimum temperature exceeding the weekly top quintile or falling below the bottom quintile can increase by more than 50% in large areas over southeastern Australia.

The physical mechanism for MJO influence on the temperature extreme is via a Rossby wave train forced by the MJO convection. This wave train results in a persistent local circulation anomaly centered around southeastern Australia, thus promoting warm northerly or cool southerly flow across southern Australia. Excitation of this Rossby wave train is strongly influenced by the presence of the subtropical westerly jet. The large positive meridional gradient of mean absolute vorticity (denoted as beta*) along the core of the subtropical jet acts to provide a strong localized Rossby wave source as the MJO convection traverses west top east to the north of Australia. On the poleward side of the tropical jet beta* weakens and together with the strong mean zonal winds results in an undefined stationary Rossby wave number (Ks=sqrt(beta*/Ubar)), and so Rossby wave propagation is prevented across the subtropical jet. However, in a small region at the longitude of Australia, there is a local maximum in Ks, so allowing Rossby waves to disperse poleward and influence south eastern Australia temperatures. .

The depiction of this wave train and the predictability of the MJO impacts on extreme temperatures are also examined using the Bureau of Meteorology's new S2S prediction system.

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**Session Classification:** Predictability and dynamics

**Track Classification:** Workshop on Predictability, dynamics and applications research using the TIGGE and S2S ensembles