

# Correlation between the MJO and the ITCZ in the central to eastern Pacific

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## Abstract

Variability of vorticity structures in the lower troposphere of the tropics is analyzed in 23 years of daily averaged high resolution reanalysis data (ERA-40) using wavenumber-frequency spectral analysis. The 850mb vorticity field has been shown to represent the dynamics of synoptic timescale ITCZ activity best.

Using vorticity field nicely eliminates the signal of some of the equatorial trapped waves such as Kelvin, MRG, and gravity waves which have been studied in detail. The wavenumber-frequency diagram shows strong signals of the ITCZ and the MJO in the north eastern Pacific during the summer half years (May--Oct). The signals of the ITCZ and the MJO can be separated by applying different filters on the data in the spectral domain. The filter we choose for the ITCZ is 2--25 days in time dimension, and 30--90 days for the MJO.

After filtering, we found that the maximum variance of the ITCZ-filtered band is at 10°N where the ITCZ tends to be located in the eastern to central Pacific during summer. The composite of the ITCZ is zonally elongated and propagates westward over several days before dissipating. The MJO-filtered band shows large variance at the ITCZ location and its 90-day running variance is significantly correlated with the 25-day running variance of the ITCZ-filtered band. The length of the running window is determined by the lowest frequency of the filter.

We analyzed the correlation between the ITCZ and the MJO running variance. The result shows that the MJO is clearly correlated with synoptic timescale variability of the ITCZ. Further analysis and results will be discussed in the poster.

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