Interaction of the MJO with intraseasonal extratropical waves of the Western Hemisphere

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Roundy (2014, JAS)
- 86% of Indian basin MJO events are preceded by easterly wind anomalies over the equatorial Western Hemisphere
- Events Preceded by easterly wind anomalies behave differently from those preceded by westerly wind anomalies
OLR-based MJO index, based on OLR anomalies filtered for 30-100 day periods
- PCs extracted, and phase numbers rotated to overlap best with Wheeler and Hendon’s RMM Index
- Western Hemisphere equatorial zonal wind anomaly index: 140W to 40W
- Identify events in phase 1 simultaneous with easterly or westerly winds
- Composite average over the two sets of events
Composite OLR and 200 hPa Height Easterly, Lag -8

Composite OLR and 200 hPa Height, Westerly Lag -8
a. Composite 350K PV and 200 hPa Height, Lag –18

b. Composite OLR and 850 hPa Height, Lag –18
a. Composite 350K PV and 200 hPa Height, Lag –9

b. Composite OLR and 850 hPa Height, Lag –9
a. Composite 350K PV and 200 hPa Height, Lag -4

b. Composite OLR and 850 hPa Height, Lag -4
a. Composite 350K PV and 200 hPa Height, Lag −8

b. Composite OLR and 850 hPa Height, Lag −8
a. Zonal Wind Anomaly, Lag 0, 90W

- Mean: $-5.4 \pm 0.4$
- Median: $-5.8$
- Standard Deviation: 5.8

b. Zonal Wind Anomaly, Lag = $-10$ Days, 180E

- Mean: $-2.5 \pm 0.6$
- Median: $-2.5$
- Standard Deviation: 4.3
a. Zonal Wind Anomaly, Lag 0, 90W

- Mean: $-5.3 \pm 0.6$
- Median: $-5.5$
- Standard Dev.: $6.2$

b. Zonal Wind Anomaly, Lag = $-10$ Days, 180E

- Mean: $-2.2 \pm 0.9$
- Median: $-2.4$
- Standard Dev.: $4.1$
The global circulation response to the MJO includes circumnavigating signals in the extratropics.

Acceleration of easterly wind over the equatorial Western Hemisphere is timed both with the arrival of easterly wind anomalies from the west along the equator as well as from the north in extratropical waves.

Most zonal momentum on the equator over the Western Hemisphere comes from the extratropics rather than directly from the west.