



Madden-Julian Oscillation: Recent Evolution, Current Status and Predictions

**Update prepared by
Climate Prediction Center / NCEP
August 27, 2007**



Outline

- **Overview**
- **Recent Evolution and Current Conditions**
- **Madden-Julian Oscillation Forecast**
- **Summary**



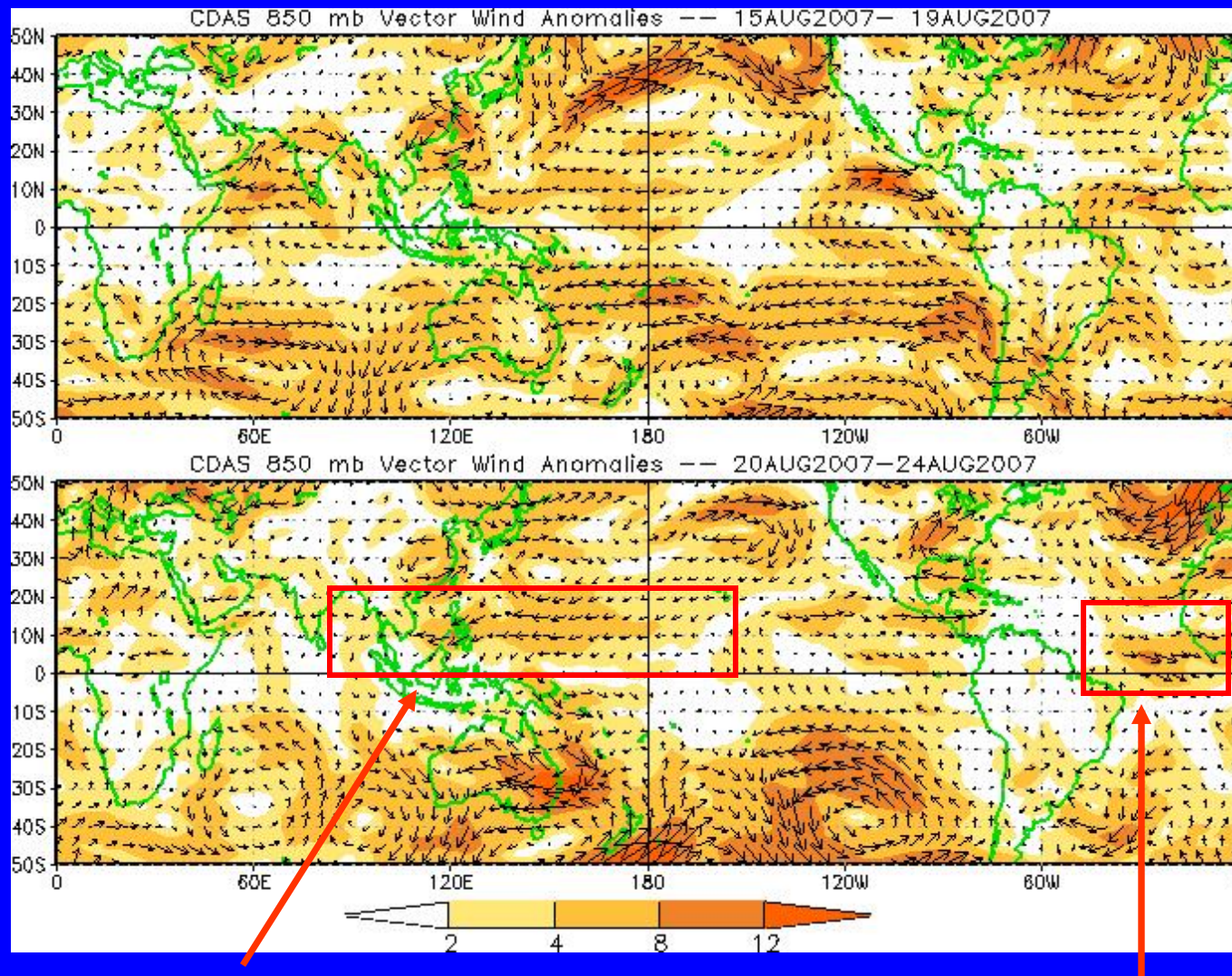
Overview

- **The latest observations indicate that the MJO remains incoherent.**
- **During the past week, convective anomalies have generally been weak across the deep tropics, with slightly wetter than average conditions across the eastern Indian Ocean and western Maritime Continent.**
- **Areas of strong enhanced convection have been more local and mainly associated with tropical cyclones (north of the Philippines, the western Caribbean)**
- **Based on the latest monitoring and forecast tools, weak MJO activity is expected during the next 1-2 weeks.**



850-hPa Vector Wind Anomalies (m s^{-1})

Note that shading denotes the magnitude of the anomalous wind vectors



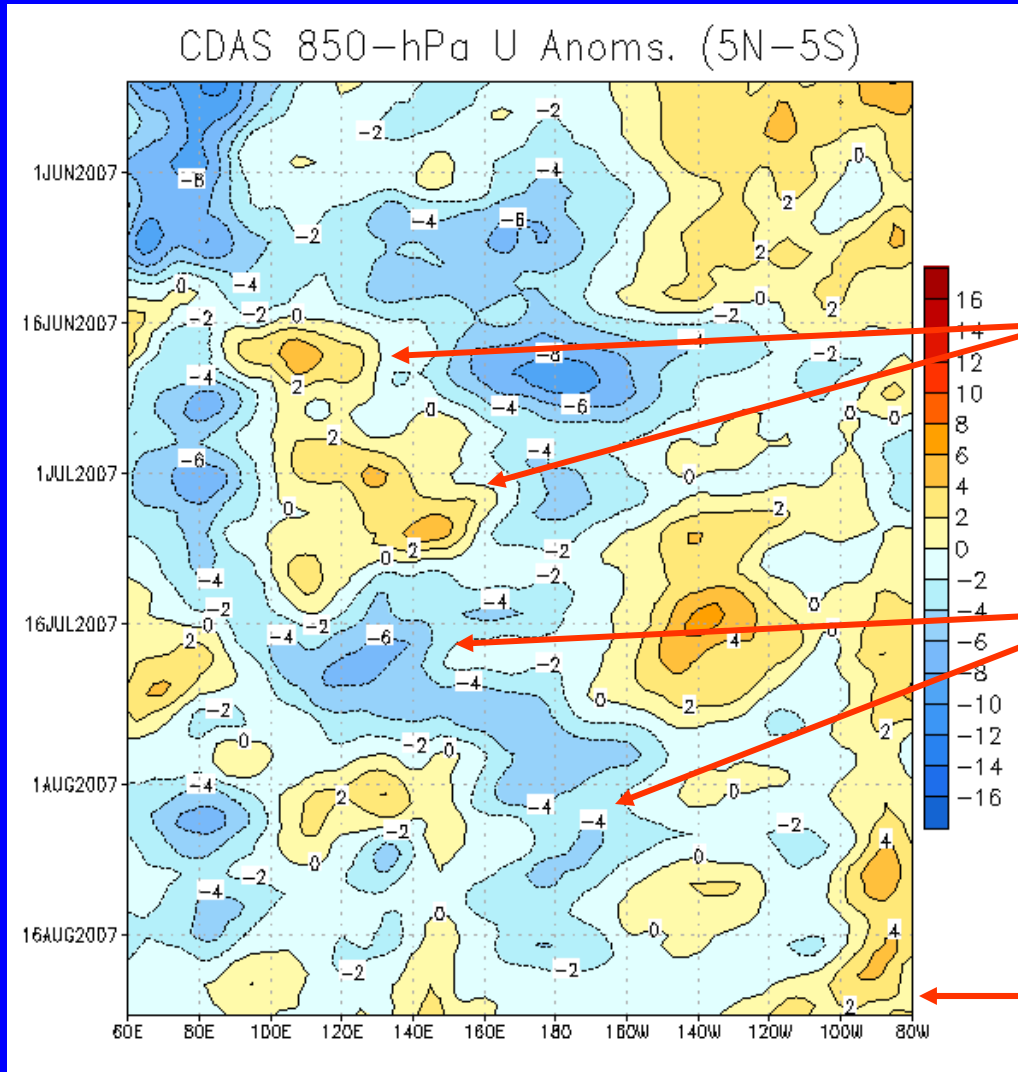
Easterly anomalies continue across the western Pacific north of the equator. The anomalies have expanded slightly westward.

Westerly anomalies continue in the Atlantic deep tropics.



850-hPa Zonal Wind Anomalies (m s^{-1})

Time



Longitude

Westerly anomalies (orange/red shading) represent anomalous west-to-east flow.

Easterly anomalies (blue shading) represent anomalous east-to-west flow.

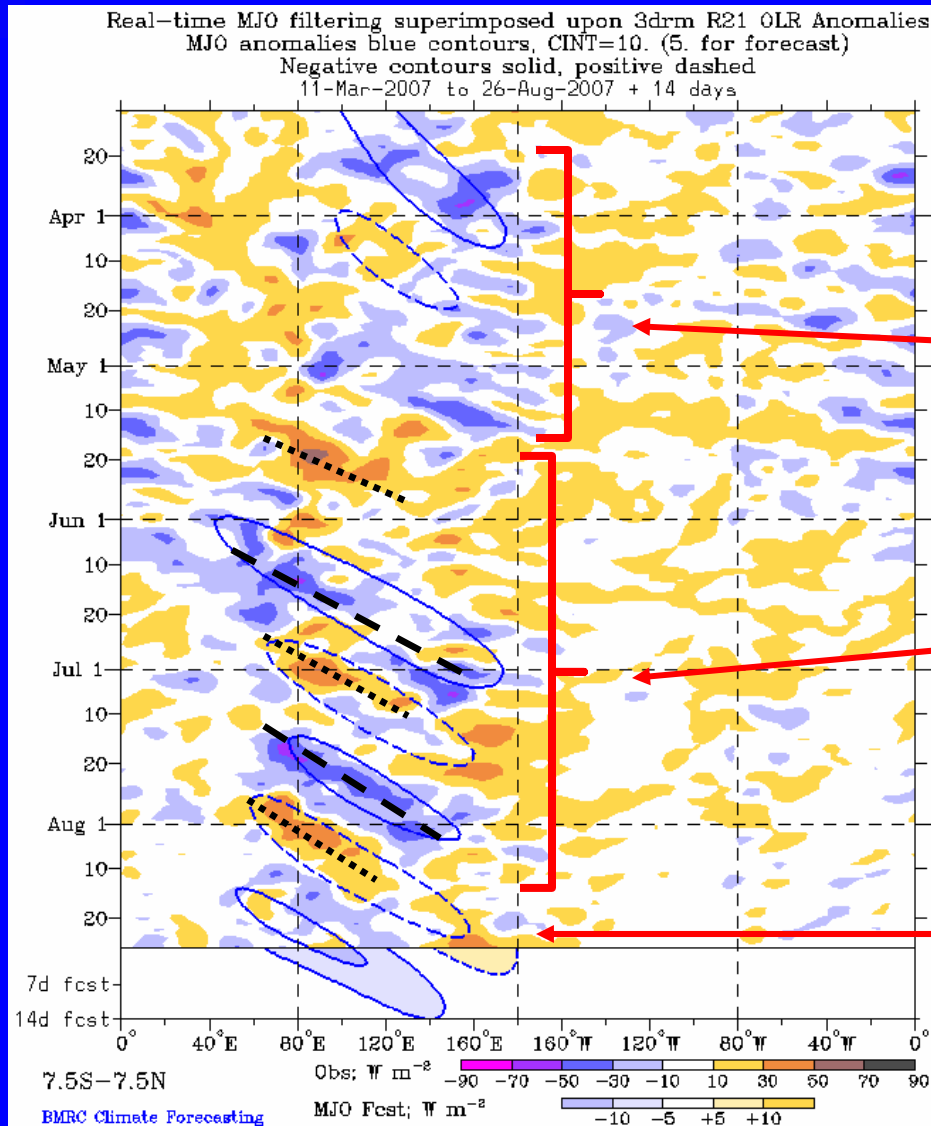
Westerly anomalies were evident across sections of the Maritime continent and the western Pacific Ocean from the latter half of June into mid-July.

Easterly anomalies increased during mid-July over the Maritime continent and western Pacific and shifted eastward during mid-late July.

Generally, low-level winds remain near average with small anomalies evident in the far western and eastern Pacific



Outgoing Longwave Radiation (OLR) Anomalies (7.5°S-7.5°N)



Drier-than-normal conditions, positive OLR anomalies (yellow/orange shading)

Wetter-than-normal conditions, negative OLR anomalies (blue shading)

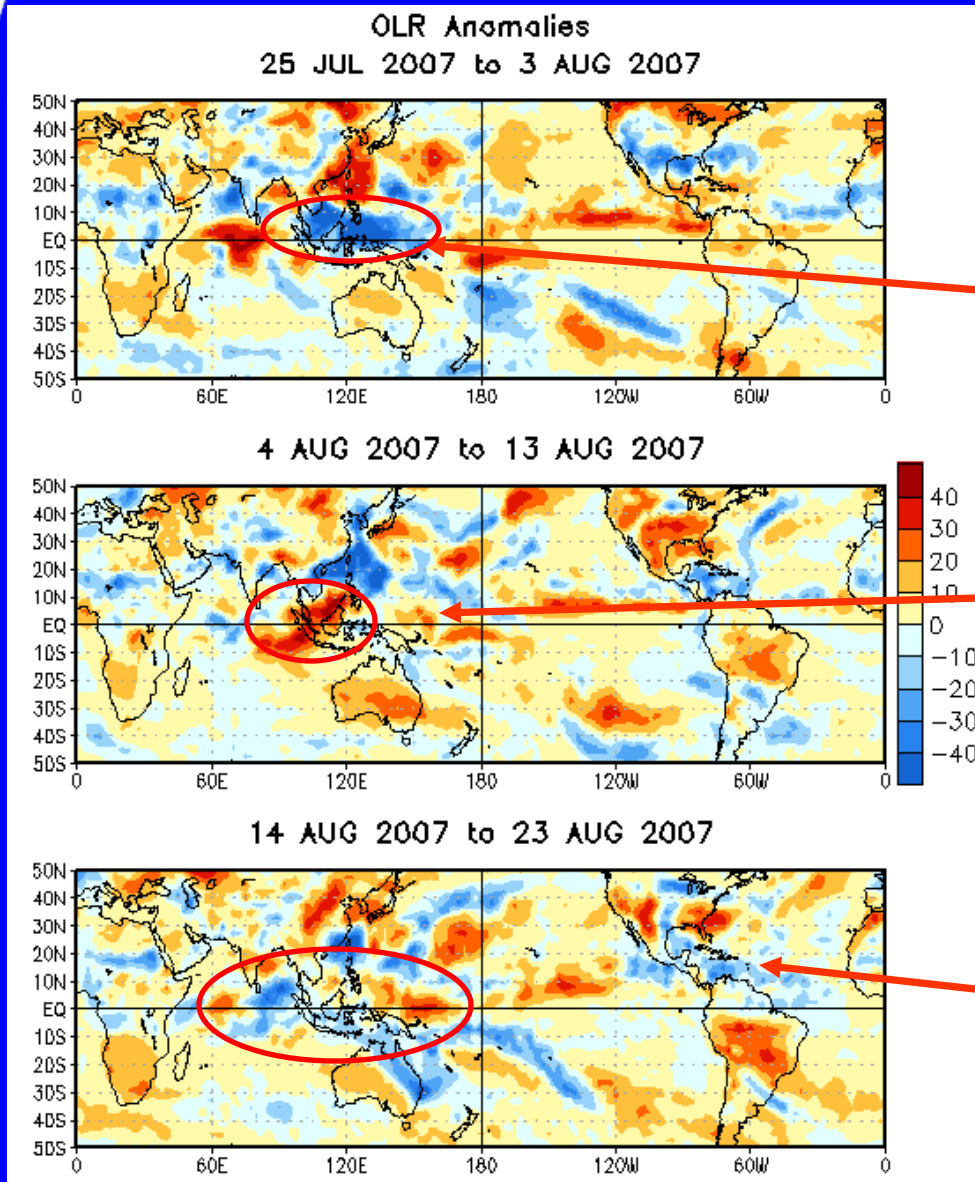
Intermittent periods of enhanced convection were evident in the western Pacific Ocean from late March into May.

Beginning in mid May, weak-moderate MJO activity has been observed as regions of suppressed and enhanced convection have shifted eastward from the Indian Ocean into the far western Pacific.

Most recently, convection has become near average across much of the equatorial tropics with only dry conditions evident just west of the Date Line.



OLR Anomalies: Last 30 days



Drier-than-normal conditions, positive OLR anomalies (red shading)

Wetter-than-normal conditions, negative OLR anomalies (blue shading)

During later July and early August, wet conditions were evident in the Maritime Continent. Dry conditions prevailed in the central Indian Ocean.

Wet conditions shifted northward of the Maritime Continent and dry conditions shifted eastward over the Maritime Continent

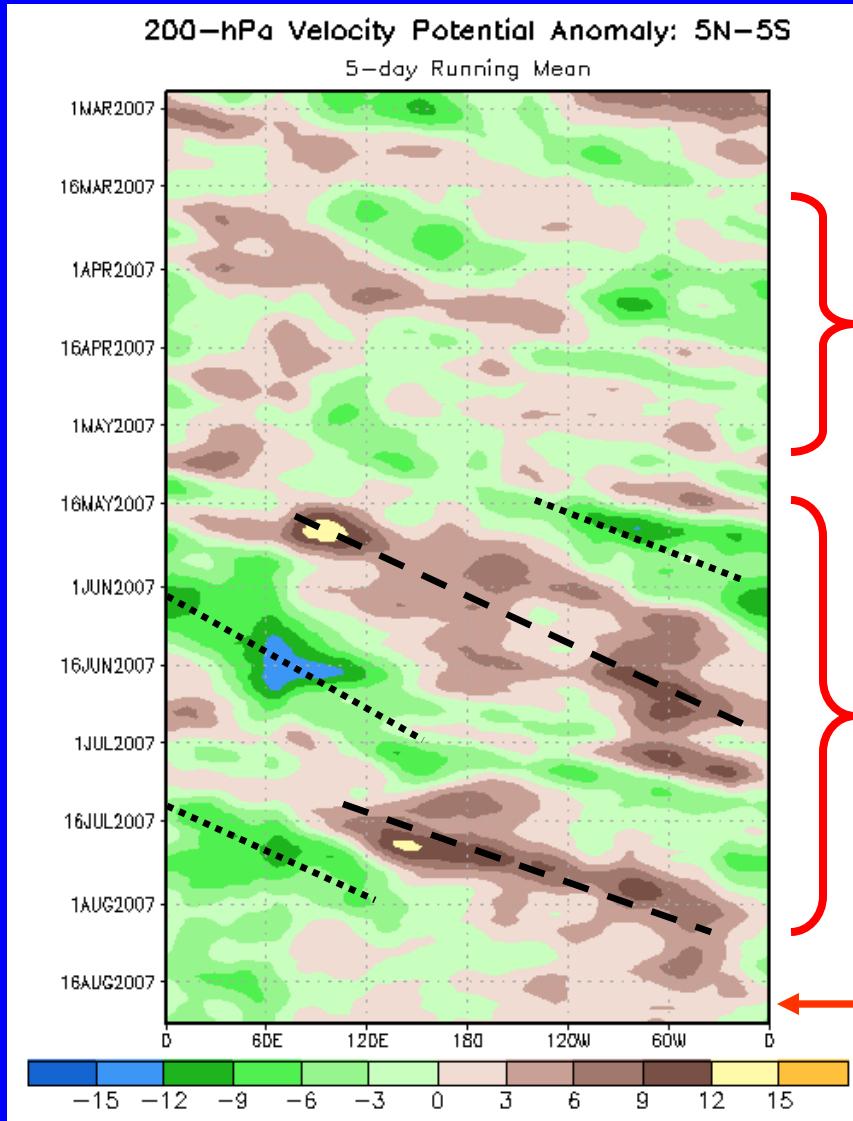
Anomalous convection has been weak over much of the eastern hemisphere during mid-late August. Wet conditions have dominated the Caribbean Sea, Gulf of Mexico, and the eastern Pacific - much of which is related to tropical cyclone activity.



200-hPa Velocity Potential Anomalies (5°S-5°N)

Positive anomalies (brown shading) indicate unfavorable conditions for precipitation.

Negative anomalies (green shading) indicate favorable conditions for precipitation.



The MJO was weak or incoherent from mid-March to mid-May.

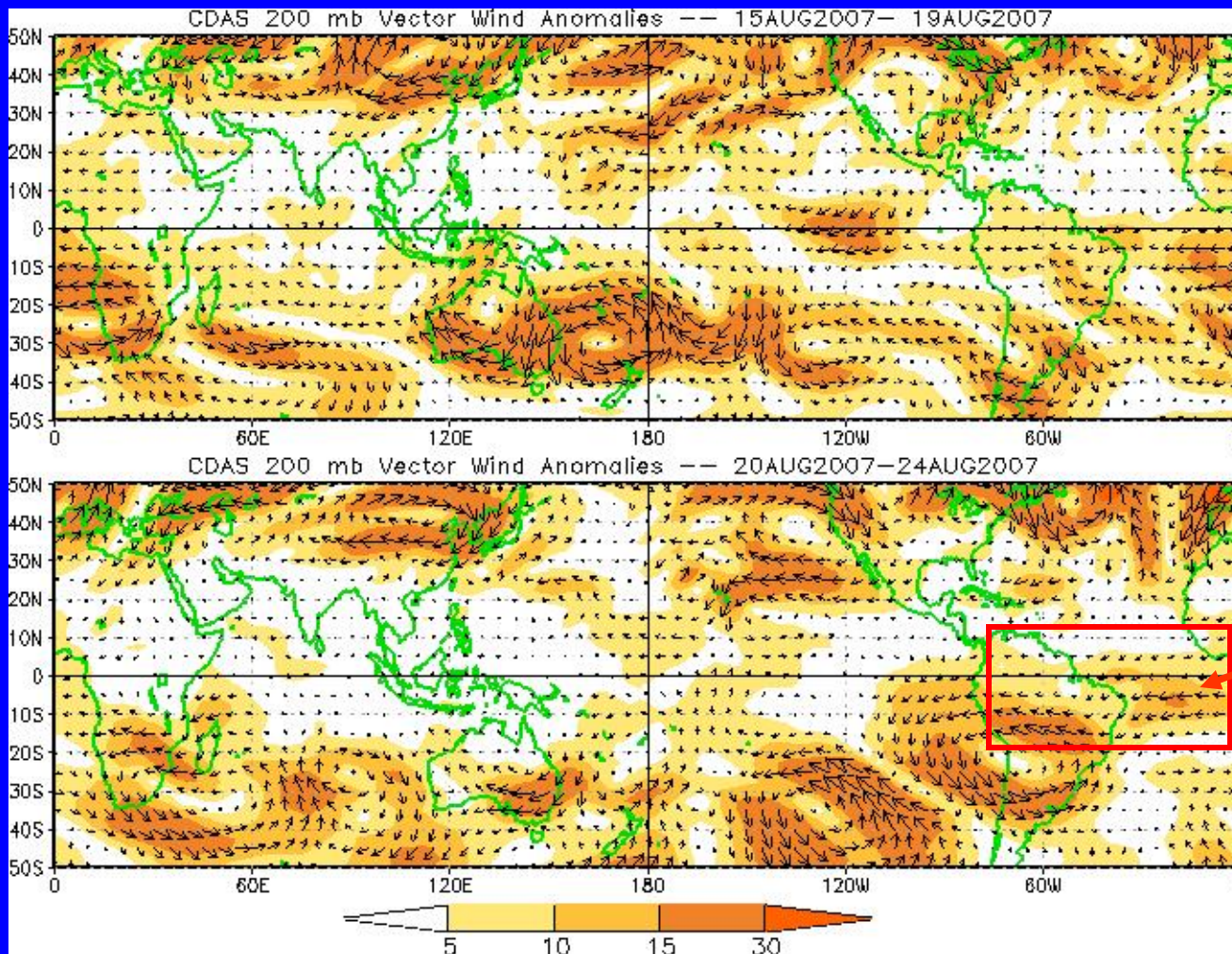
From mid-May into early August, weak to moderate MJO activity was observed as velocity potential anomalies increased and propagated eastwards.

During mid-August, anomalies have weakened and become more stationary.



200-hPa Vector Wind Anomalies ($m s^{-1}$)

Note that shading denotes the magnitude of the anomalous wind vectors

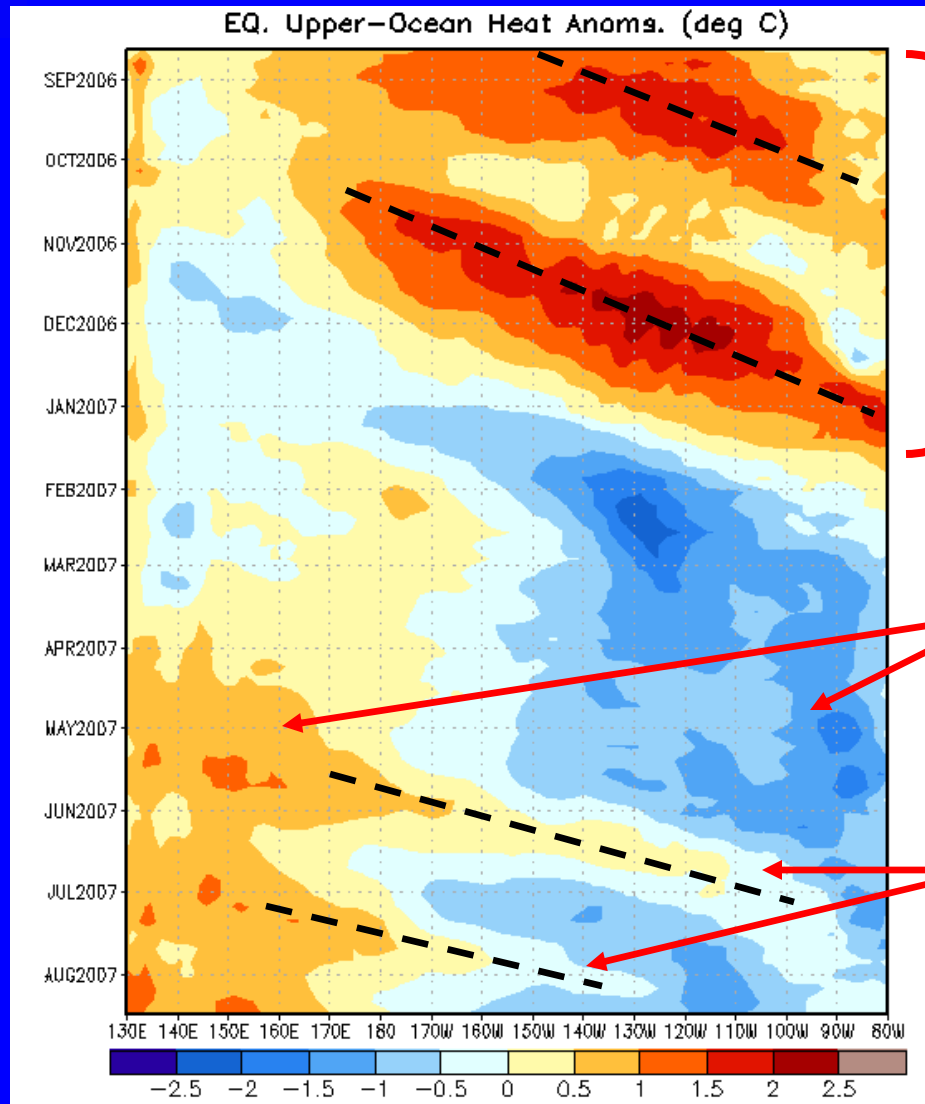


Easterly wind anomalies continue over the Atlantic Ocean mainly along and just south of the equator.



Weekly Heat Content Evolution in the Equatorial Pacific

Time
↓



During late 2006, eastward-propagating Kelvin waves (warm phases indicated by dashed lines) have caused considerable month-to-month variability in the upper-ocean heat content.

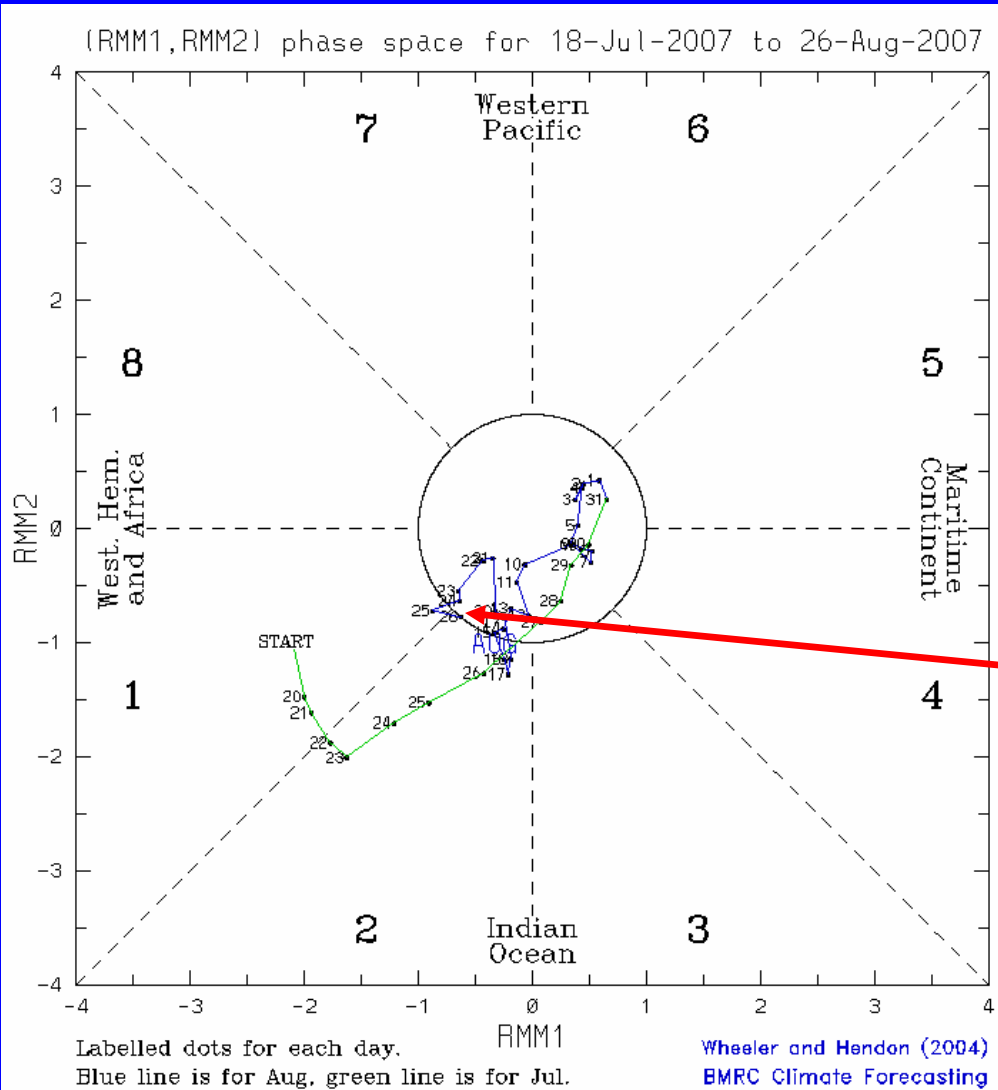
Since January, negative heat content anomalies are evident across the eastern equatorial Pacific and since late March larger positive anomalies have prevailed in the far western Pacific Ocean.

A weak Kelvin wave developed in mid-May, propagated eastwards and reached the eastern Pacific in early July. Another weak Kelvin wave developed in early July, but its eastward progress was limited.

Longitude



MJO Index



The current state of the MJO as determined by an index based on Empirical Orthogonal Function (EOF) analysis using combined fields of near-equatorially-averaged 850-hPa and 200-hPa zonal wind and outgoing longwave radiation (OLR) (Wheeler and Hendon, 2004).

The axes represent the time series of the two leading modes of variability and are used to measure the amplitude while the triangular areas indicate the phase or location of the enhanced phase of the MJO. The farther away from the center of the circle the stronger the MJO. Different color lines indicate different months.

The MJO rapidly weakened in late July (green line) and has remained incoherent afterwards.



*****NOTICE OF CHANGE*****

The slides depicting potential benefits and hazards normally located here will no longer be placed within the MJO weekly update. Expected impacts during the upcoming 1-2 week time period can now be found as part of a new product:

Experimental Global Tropics Benefits/Hazards Assessment

The product can be found at:

<http://www.cpc.ncep.noaa.gov/products/precip/CWlink/ghazards/ghaz.shtml>

Please send questions/comments/suggestions to

Jon.Gottschalck@noaa.gov