



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

**Update prepared by
Climate Prediction Center / NCEP
May 7, 2007**



Outline

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



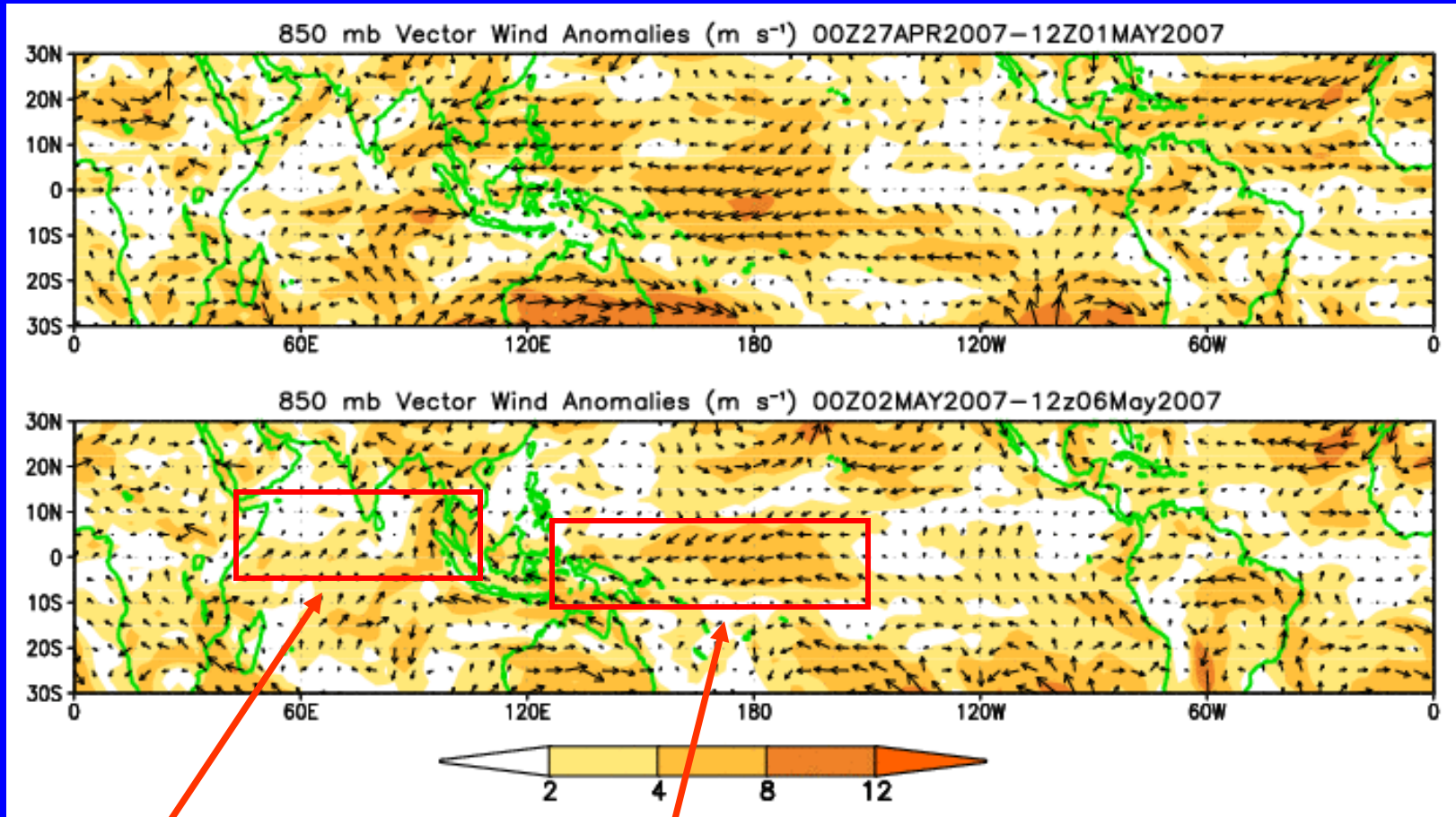
Overview

- **The MJO remains incoherent.**
- **Active convection continues across sections of the eastern Indian Ocean, western Maritime continent, and Southeast Asia.**
- **In addition, in recent days, rainfall across areas of the western Pacific Ocean has increased.**
- **Based on the latest monitoring and forecast tools, the MJO is expected to remain weak during the upcoming 1-2 week period.**



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

Note that shading denotes the magnitude of the anomalous wind vectors

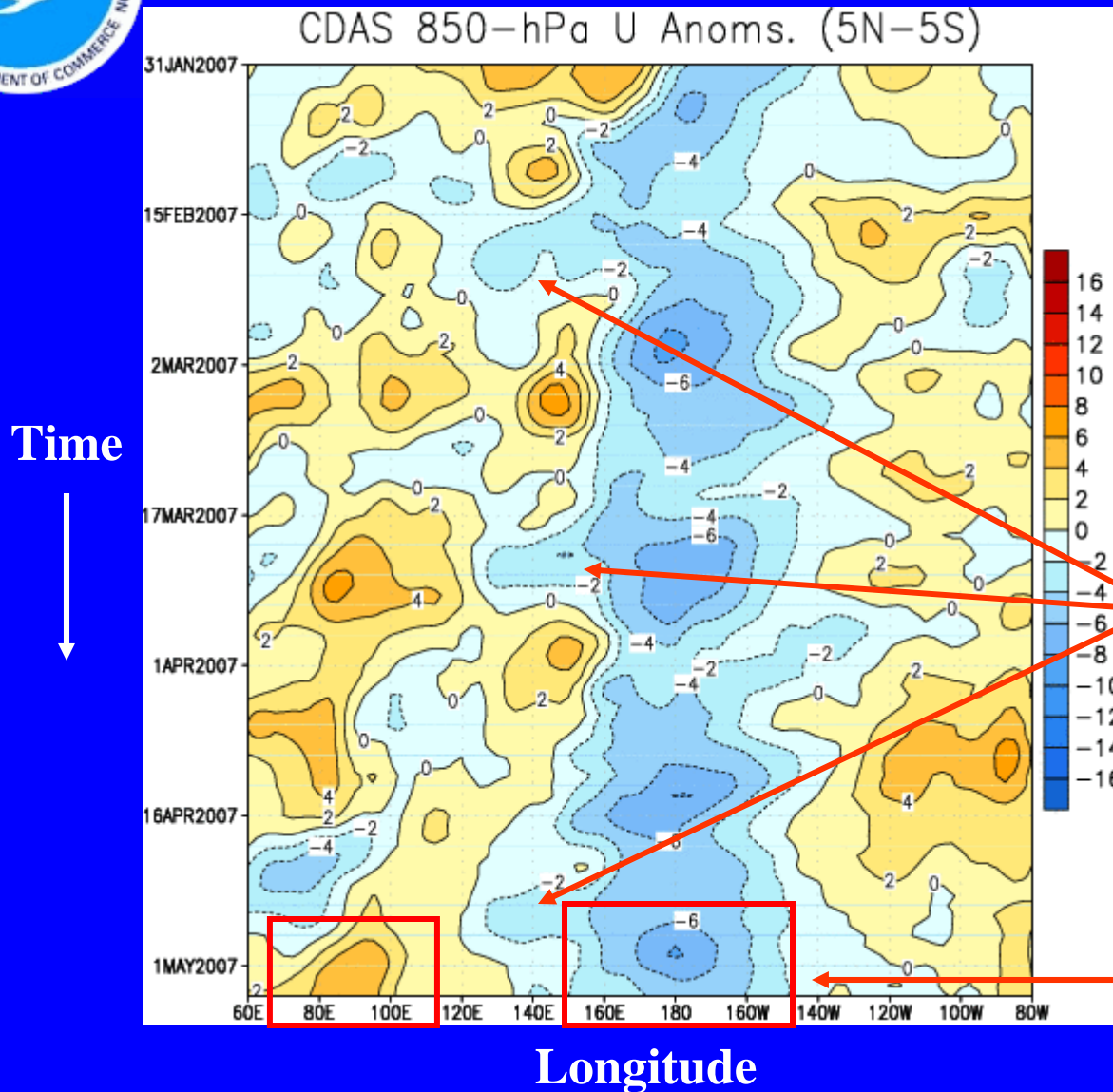


Enhanced westerly and southwesterly anomalies across the Indian Ocean into Southeast Asia.

Easterly anomalies in the western Pacific continue but have weakened during the last five days.



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



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

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

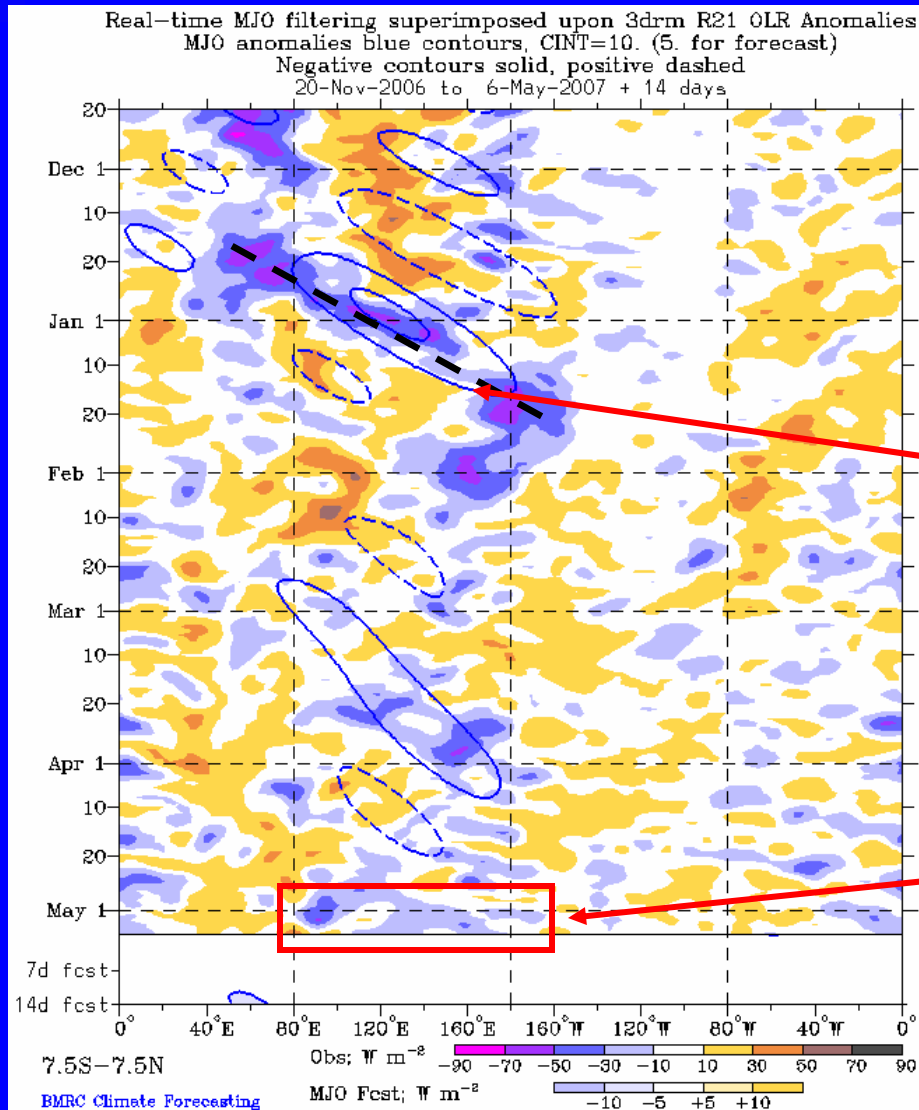
Easterly anomalies have been persistent near the Date Line since the beginning of the year.

An extension of easterly anomalies to the west is evident during the past week similar to periods during mid-late February and March.

Easterly anomalies have weakened near the Date Line during the last few days while westerly anomalies have become stronger in the Indian Ocean.



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)

Enhanced convection, associated with the MJO in late December and January, shifted eastward from the Indian Ocean across the Maritime Continent and western Pacific.

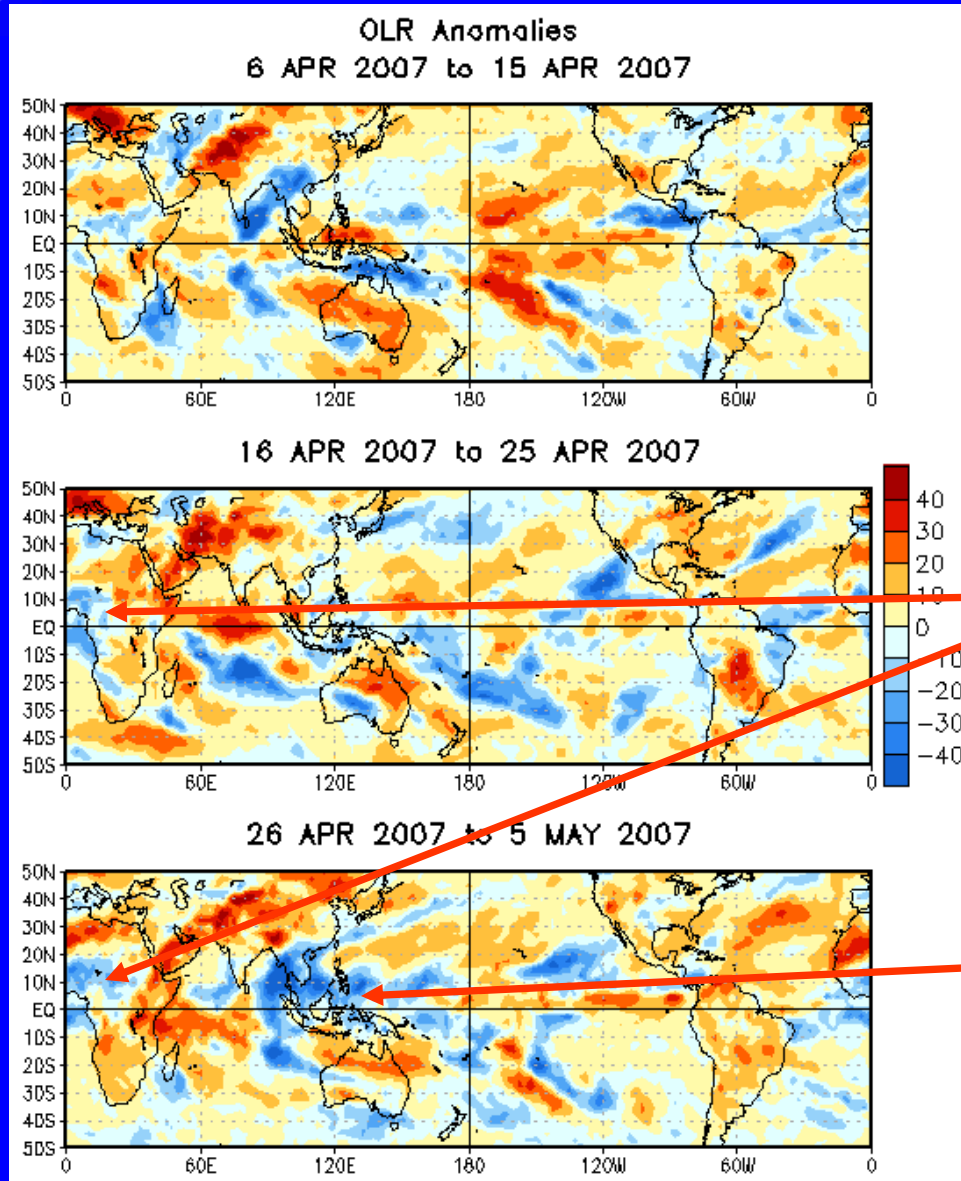
In early May, convection increased in the region from 80°E to near the Date Line.



OLR Anomalies: Last 30 days

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

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



During the second half of April, the Gulf of Guinea region of Africa has seen wet conditions.

During late April and early May, enhanced convection was observed across the eastern Indian Ocean, the western Maritime Continent, and sections of Southeast Asia.

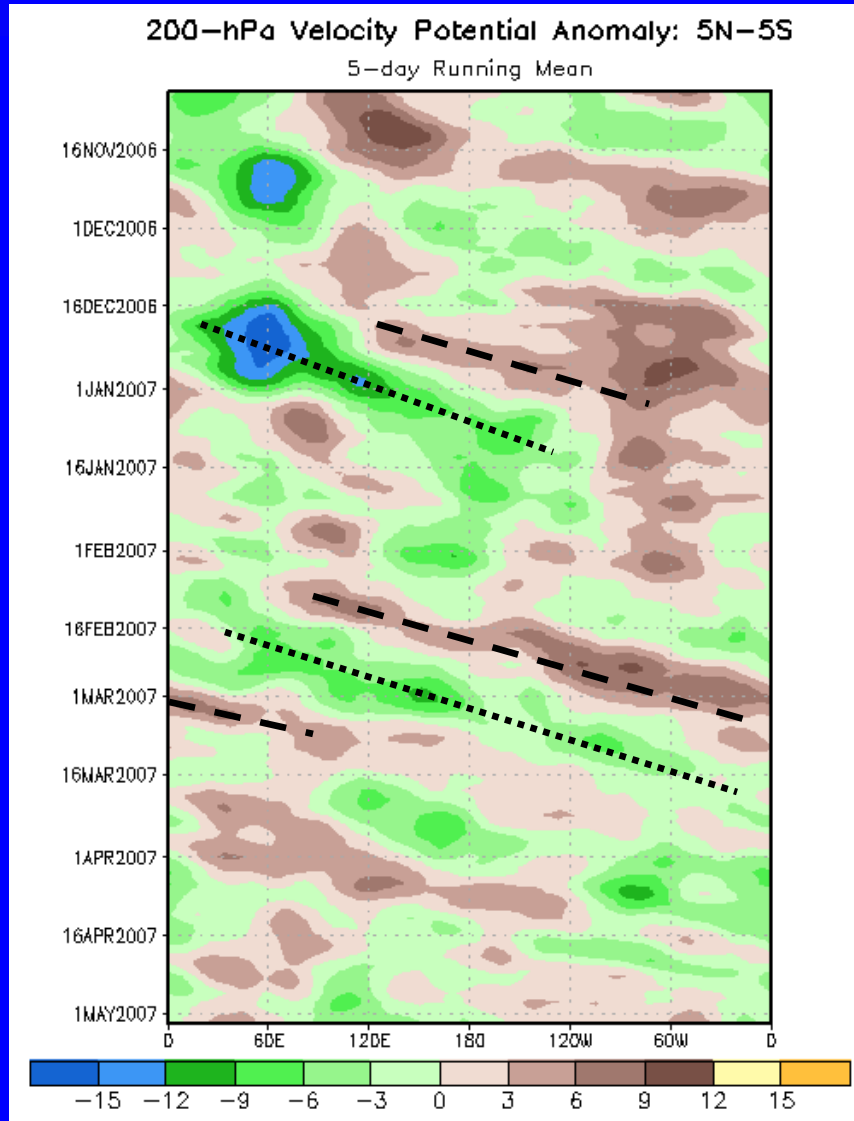


200-hPa Velocity Potential Anomalies (5°S-5°N)

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

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

Time



Longitude

The MJO intensified in late December 2006. Negative OLR anomalies shifted eastward from the Maritime continent into the central tropical Pacific.

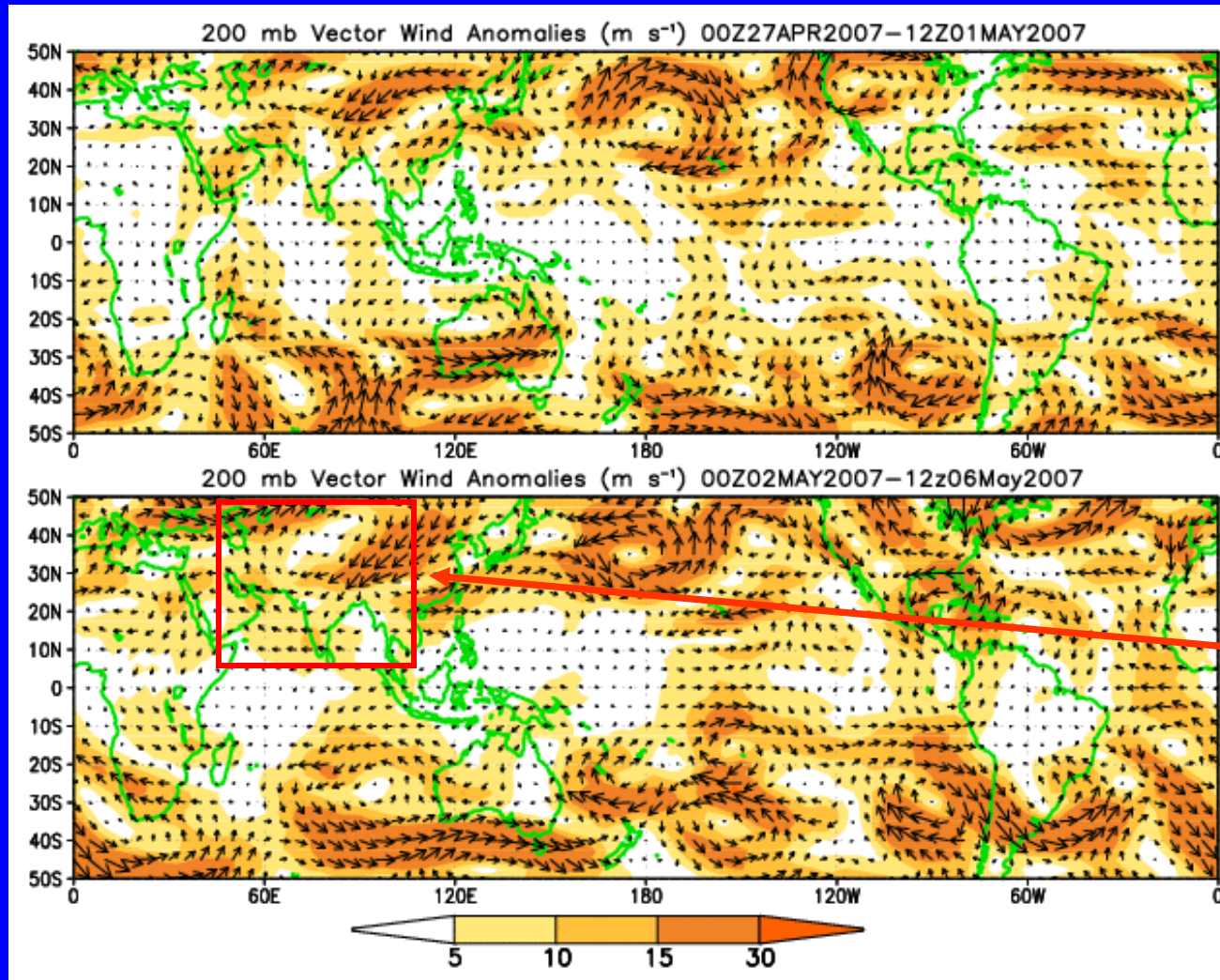
Weak to moderate MJO activity was observed during late February and early March as velocity potential anomalies shifted eastward.

The MJO has been weak or incoherent since mid-March.



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

Note that shading denotes the magnitude of the anomalous wind vectors

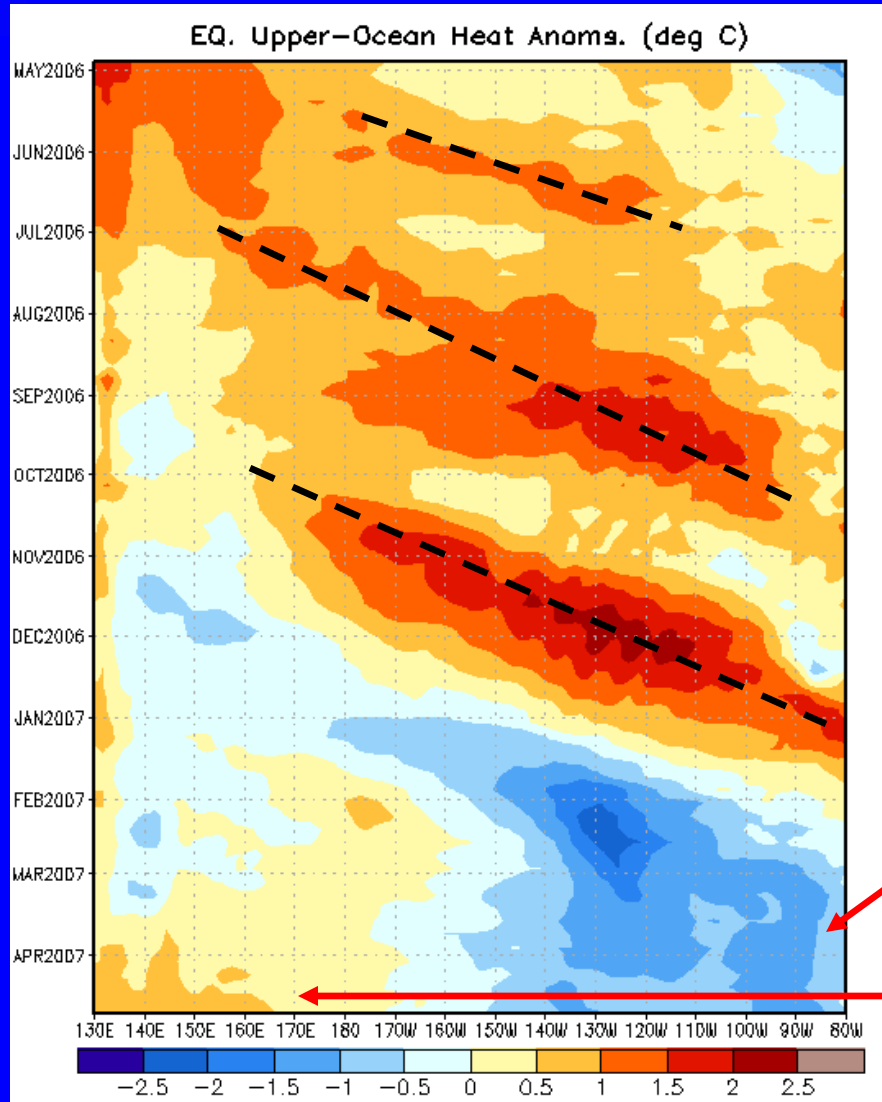


Anomalous anti-cyclonic circulation across southern Asia in recent days.



Weekly Heat Content Evolution in the Equatorial Pacific

Time



Longitude

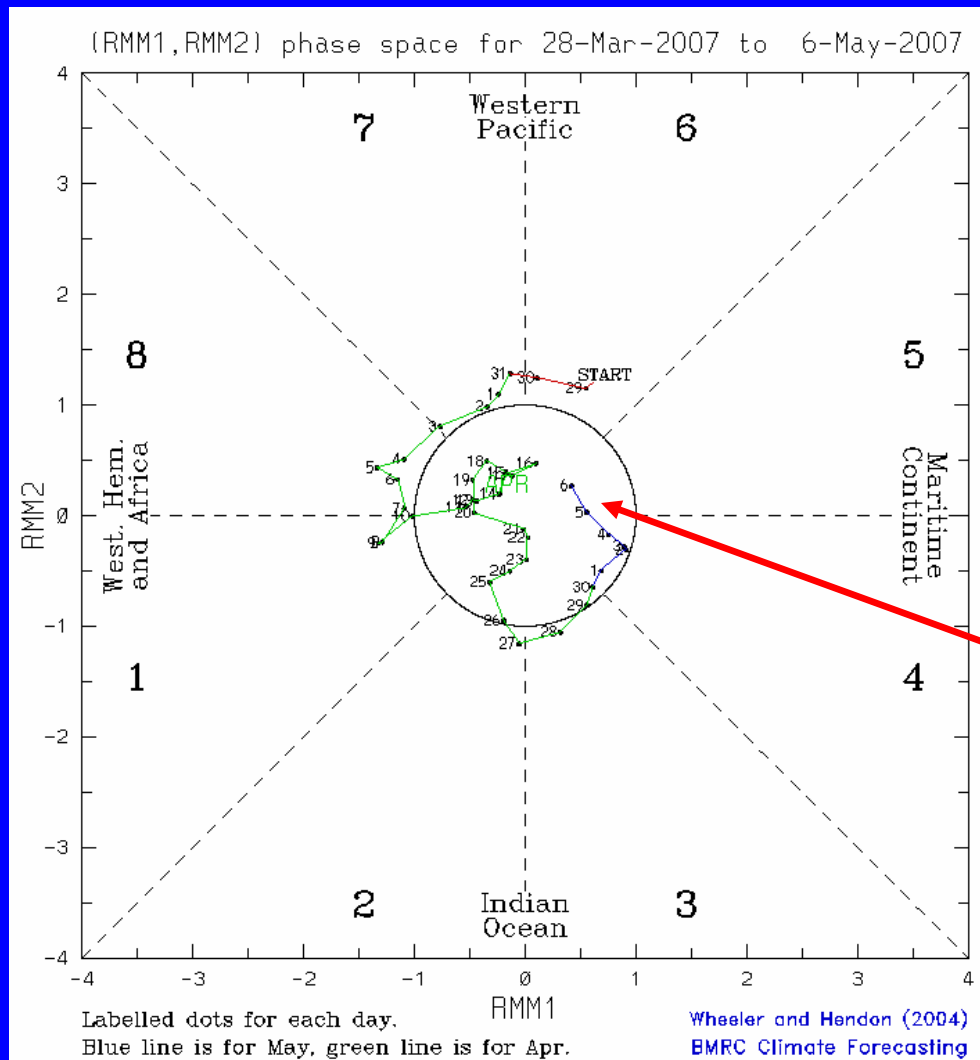
During this period eastward-propagating Kelvin waves (warm phases indicated by dashed lines) have caused considerable month-to-month variability in the upper-ocean heat content.

Since January, negative heat content anomalies are evident across the eastern equatorial Pacific.

Since late March, slightly larger positive anomalies are evident in the far western Pacific Ocean.



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).

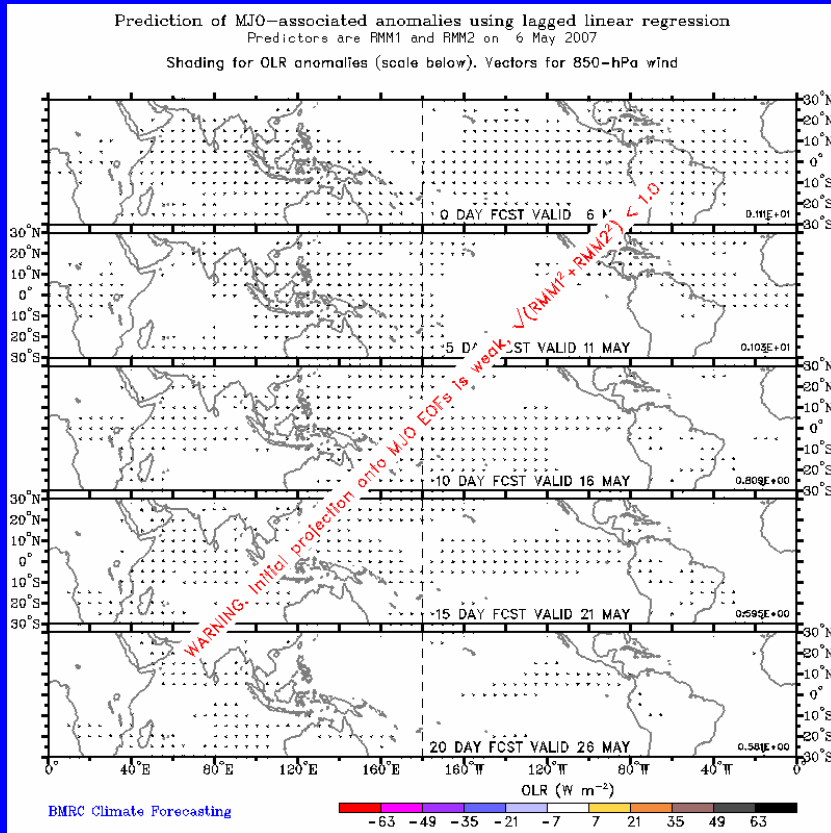
The axes represent the time series of the two leading modes of variability and are used to measure the amplitude while the triangular areas indicate the phase or location of the enhanced phase of the MJO. The farther away from the center of the circle the stronger the MJO. Different color lines indicate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

The MJO index indicates weak MJO activity.



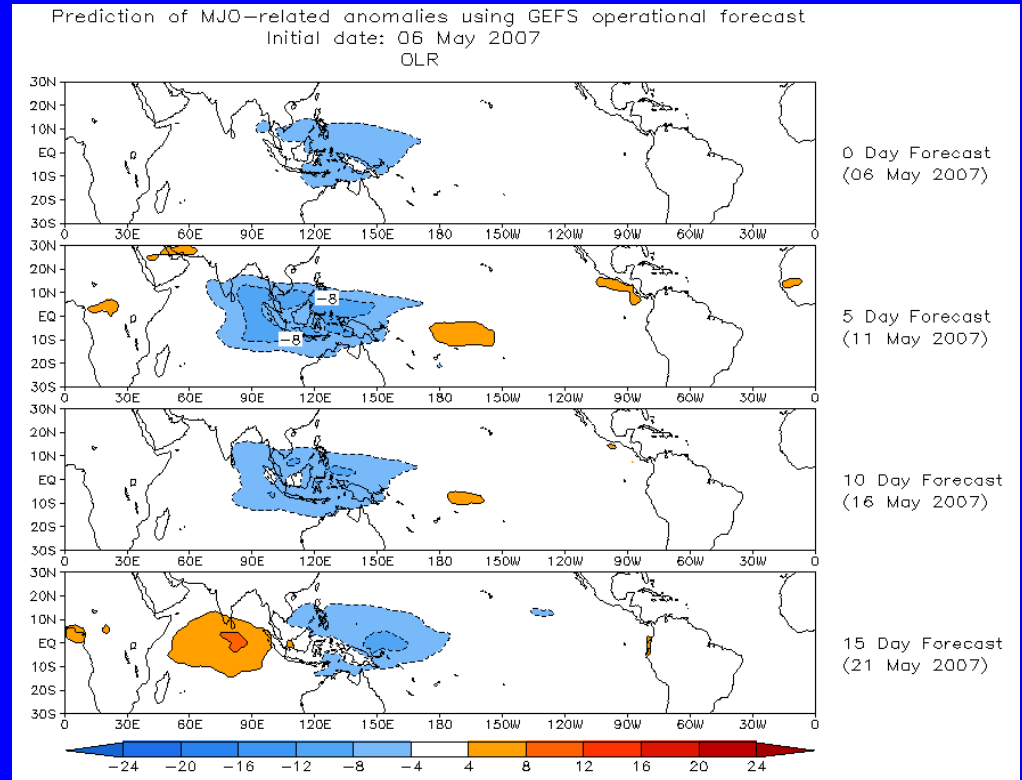
MJO Forecasts

Statistical



Weak MJO signal so no forecast can be made.

GFS

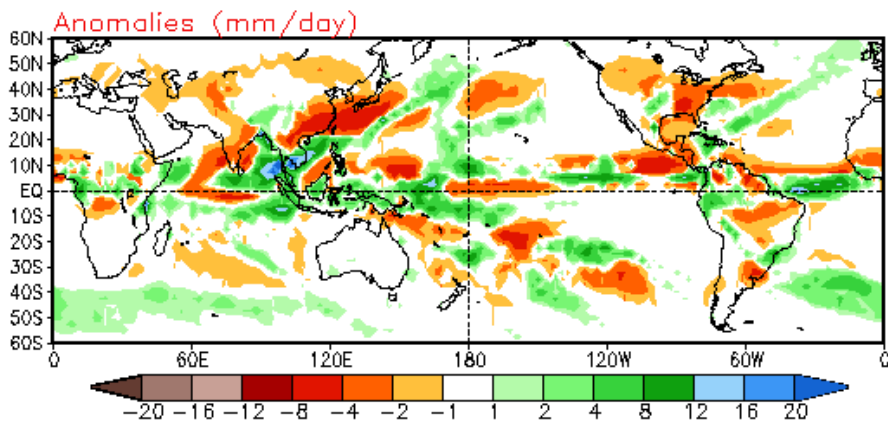
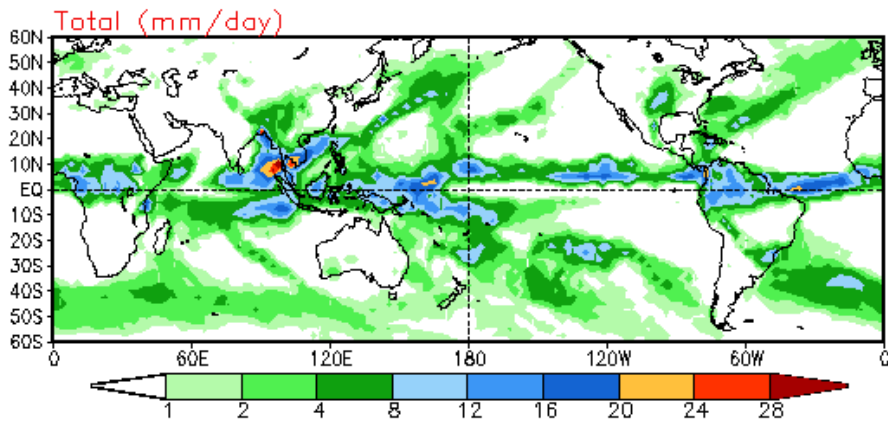


The GFS MJO associated anomalies indicate weak enhanced convection across the Maritime continent.

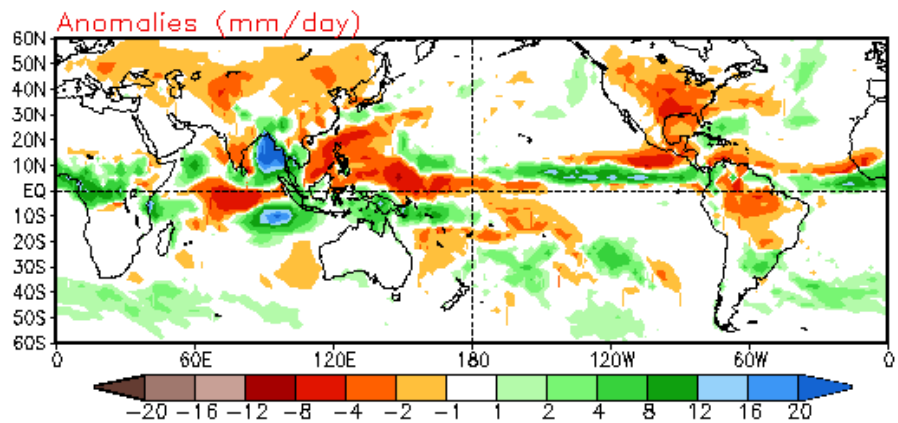
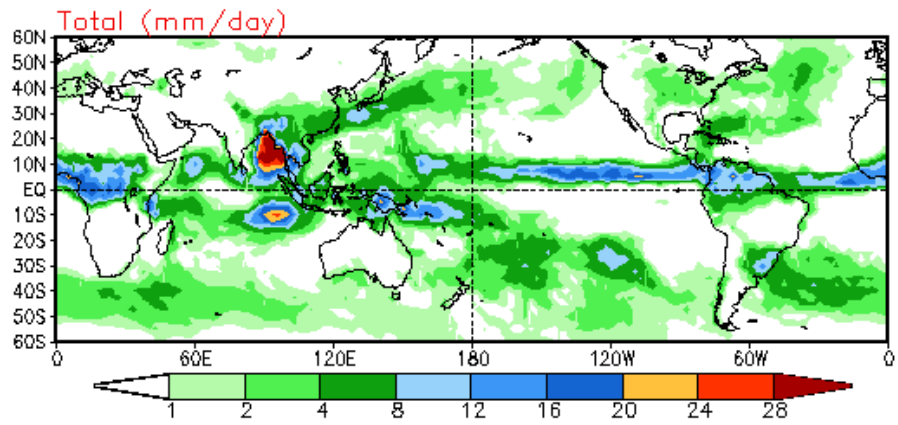


Experimental Bias-Corrected GFS Precipitation

Week 1 Precipitation
Forecast from 06May2007



Week 2 Precipitation
Forecast from 06May2007





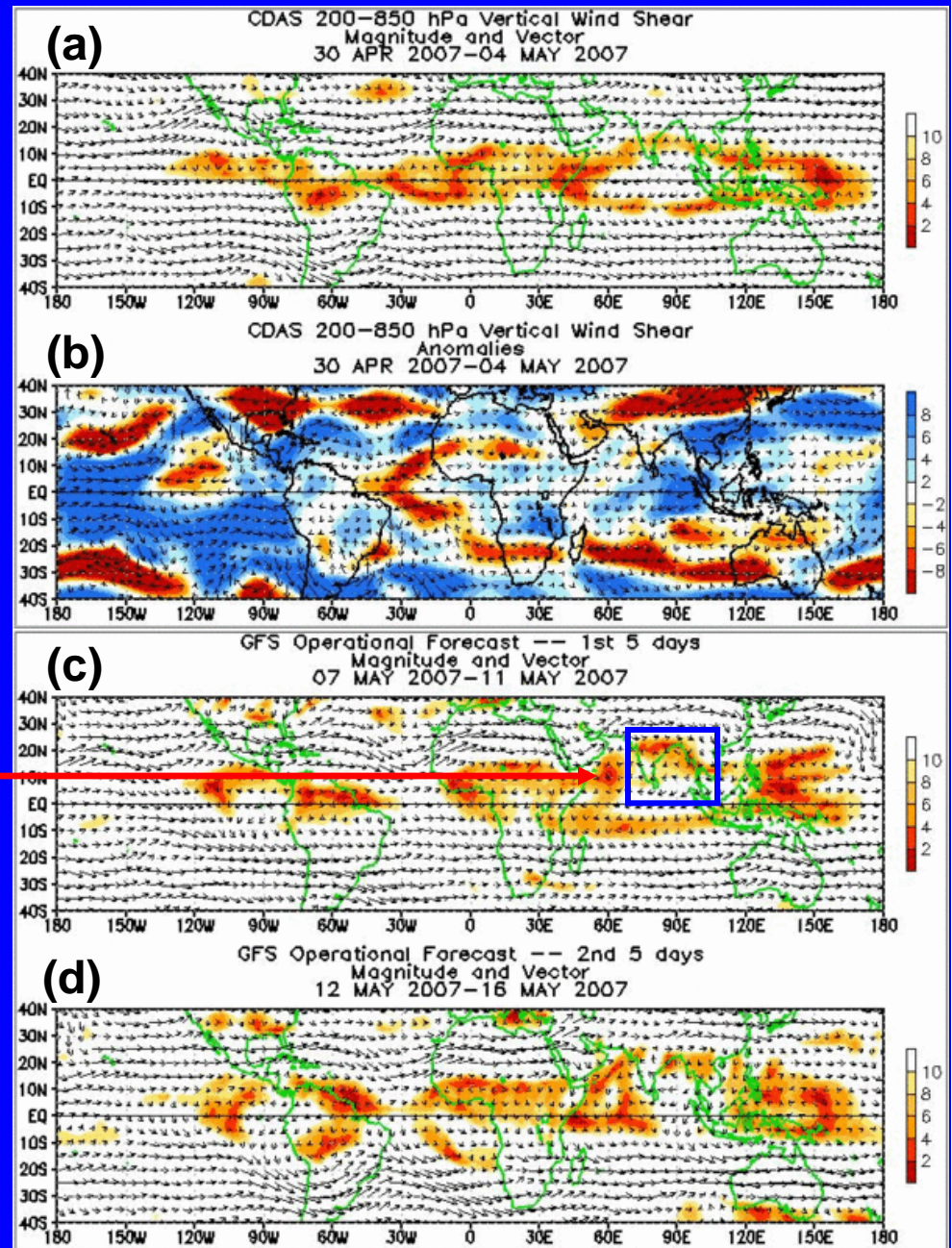
200–850 hPa Vertical Wind Shear

All plots: Shading denotes magnitude of vectors

Plots (a),(c),(d): low shear (red), high shear (yellow/white)

Plot (b): Shear greater than average (blue) Shear less than average (yellow/red)

The GFS forecast indicates areas of low shear over sections of the Bay of Bengal early in the period. This area needs to be monitored as convection is expected to remain active in this region.





*****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

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