

Madden/Julian Oscillation: Recent Evolution, Current Status and Forecasts

Update prepared by
Climate Prediction Center / NCEP
July 17, 2006

Outline

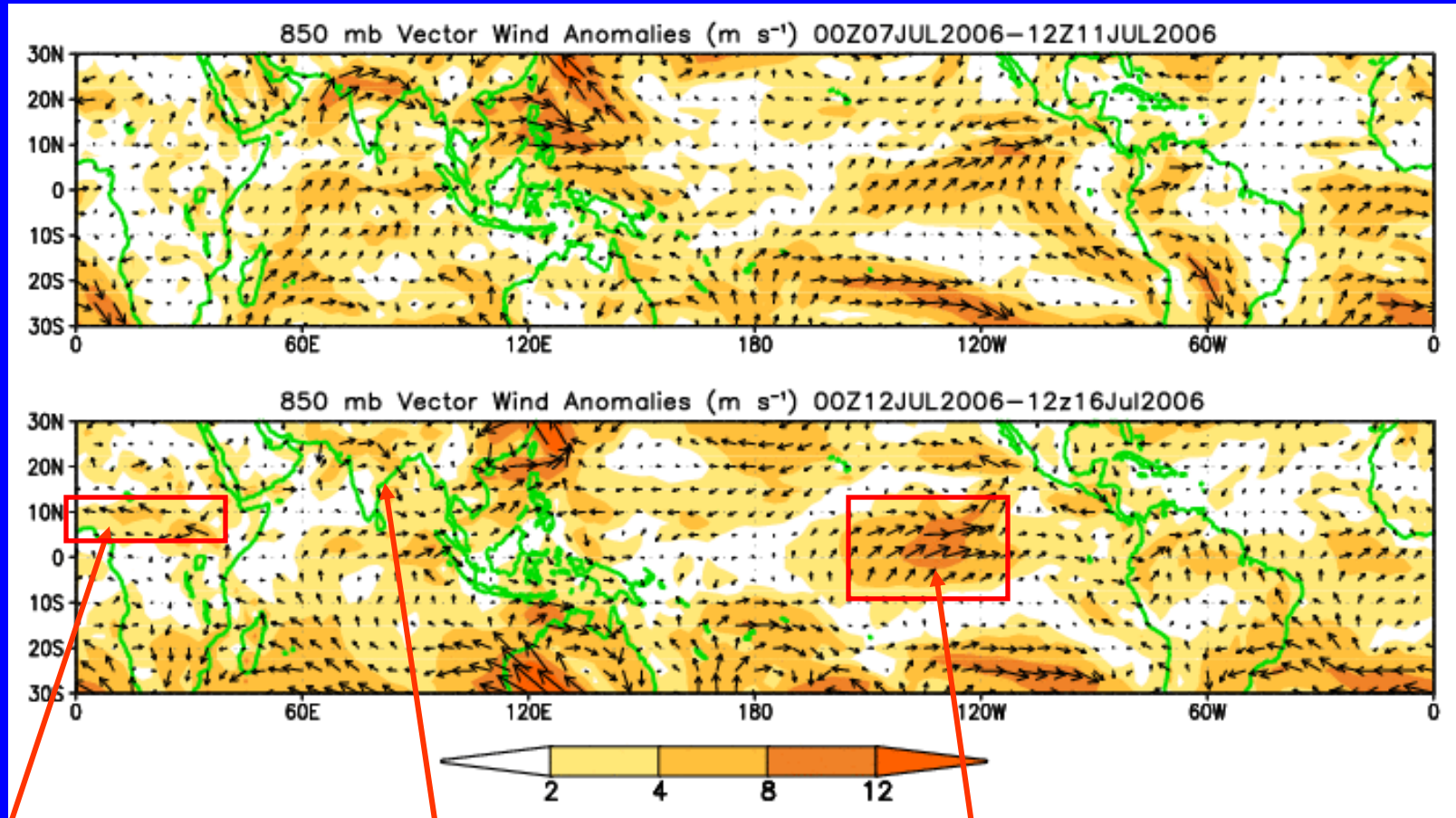
- **Overview**
- **Recent Evolution and Current Conditions**
- **Madden Julian Oscillation Forecast**
- **Summary**

Overview

- The latest observations indicate that the MJO remains weak.
- Potential impacts during week 1 include an increased chance for above normal rainfall over the eastern tropical Pacific, Central America and West Africa with favorable conditions for tropical cyclone development in the Pacific.
- During week 2, conditions are expected to remain favorable for tropical cyclone development in the eastern Pacific.

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

Note that shading denotes the magnitude of the anomalous wind vectors



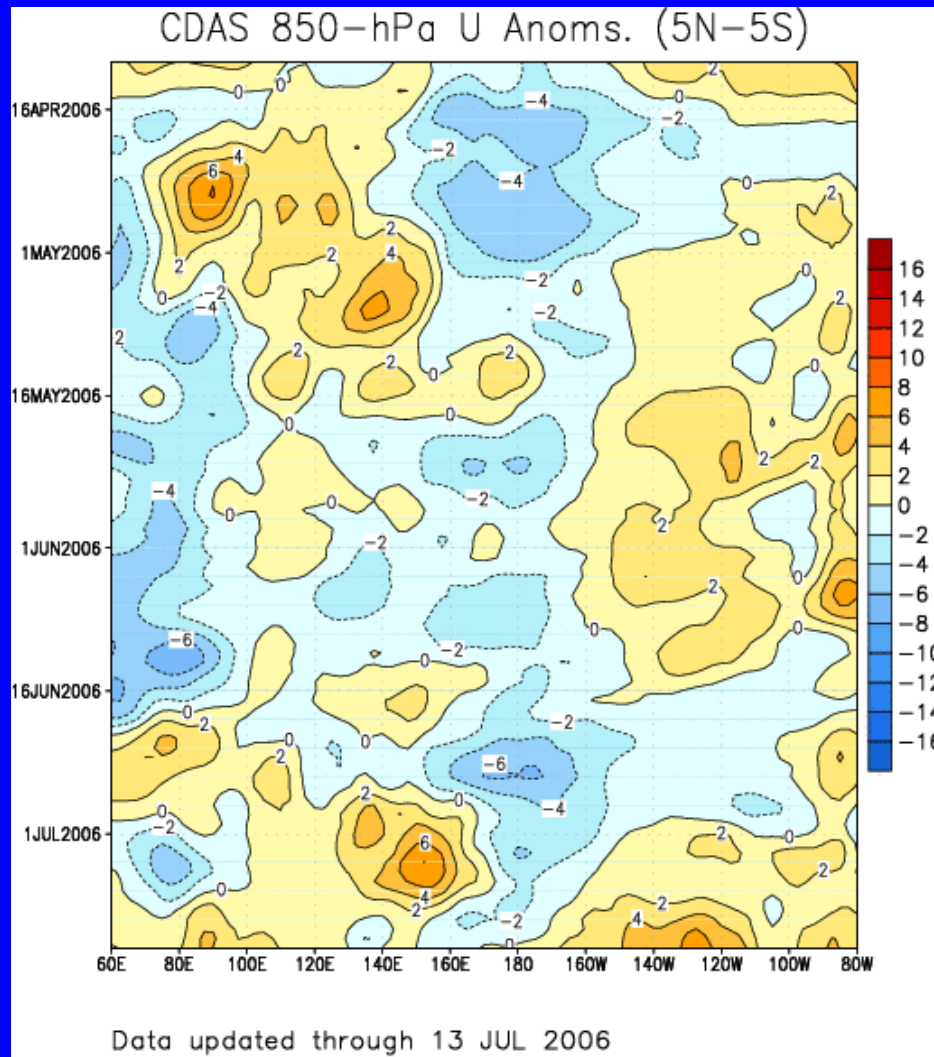
Weak easterly anomalies developed over West Africa.

Less favorable low level trajectory has resulted in a relaxation of the Monsoon in some parts of India.

Westerly anomalies strengthened over the eastern Tropical Pacific, but weakened over the western parts of the basin.

Low-level (850-hPa) Zonal (east-west) Wind Anomalies (m s^{-1})

Time

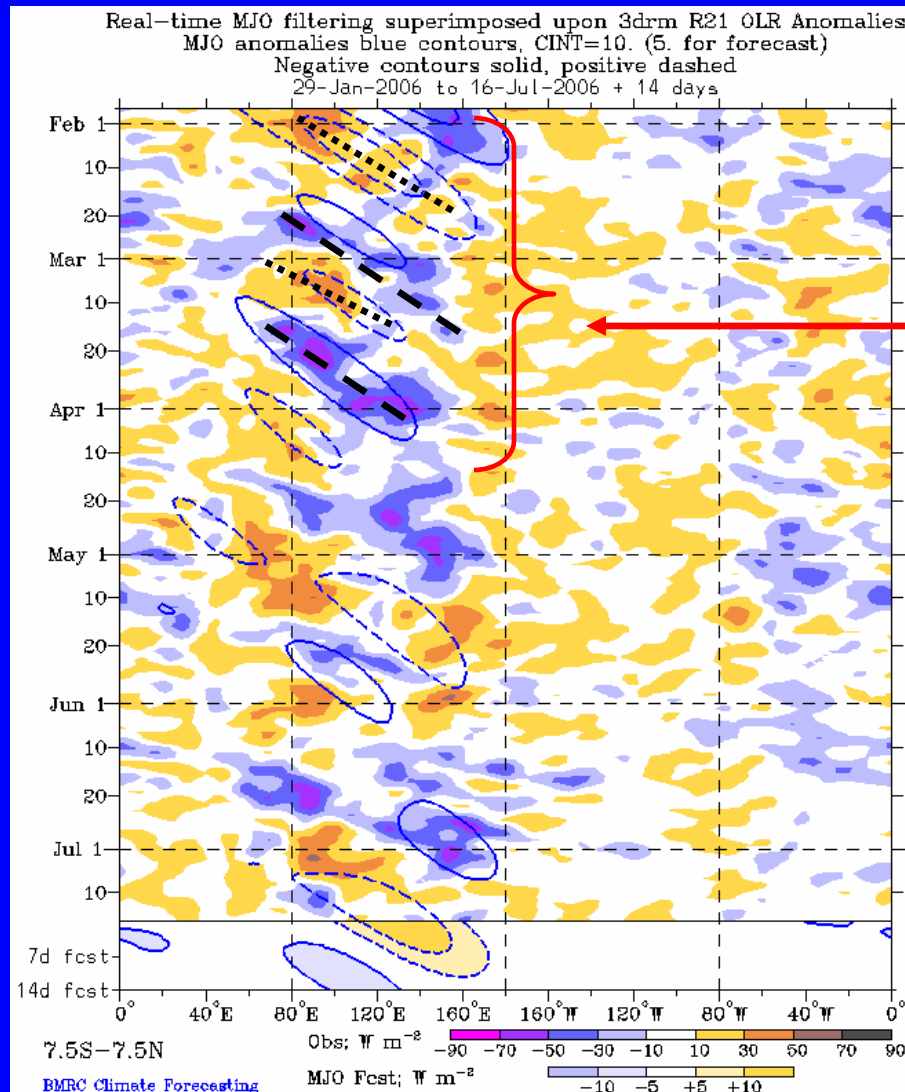


Weaker-than-average easterlies or westerlies (orange/red shading)

Stronger-than-average easterlies (blue shading)

Longitude

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

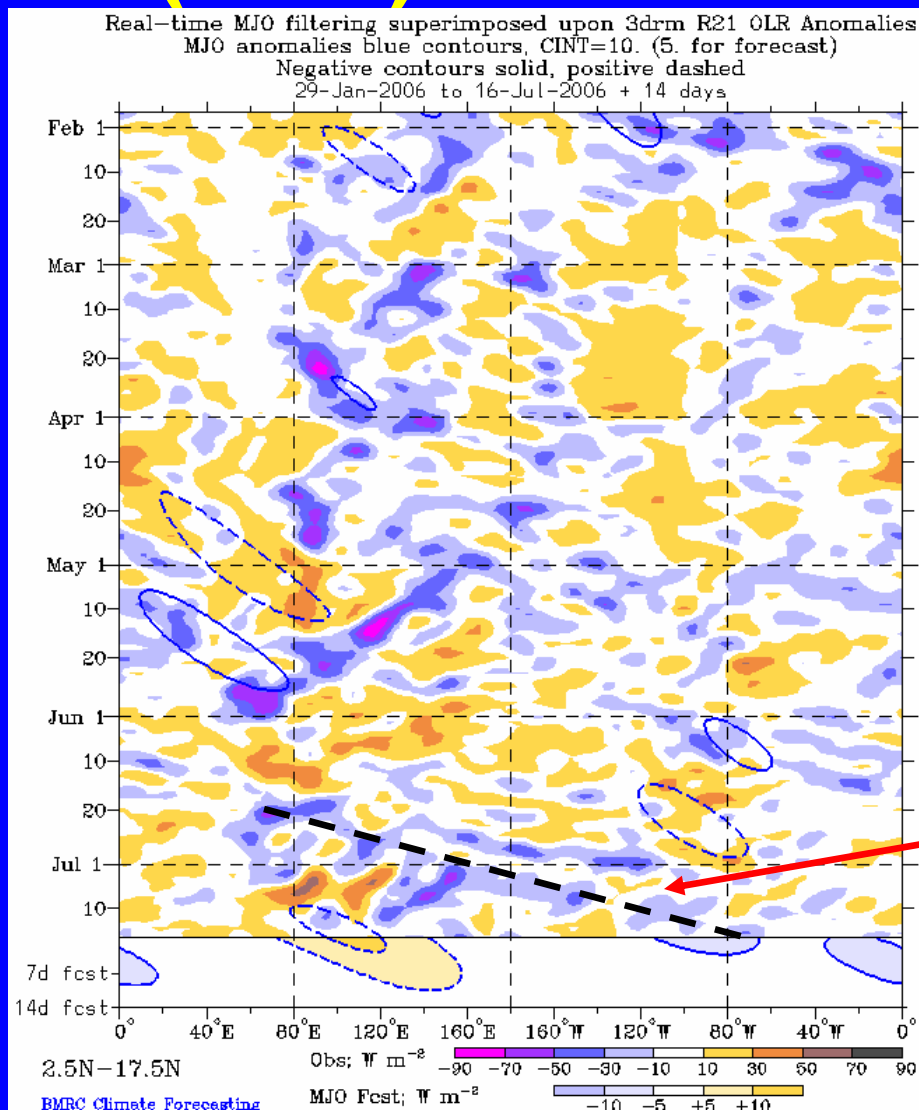


Drier-than-average conditions (/red shading)

Wetter-than-average conditions (blue shading)

Eastward propagation of OLR anomalies associated with the MJO was evident from February through early April.

Outgoing Longwave Radiation (OLR) Anomalies (2.5°N-17.5°N)

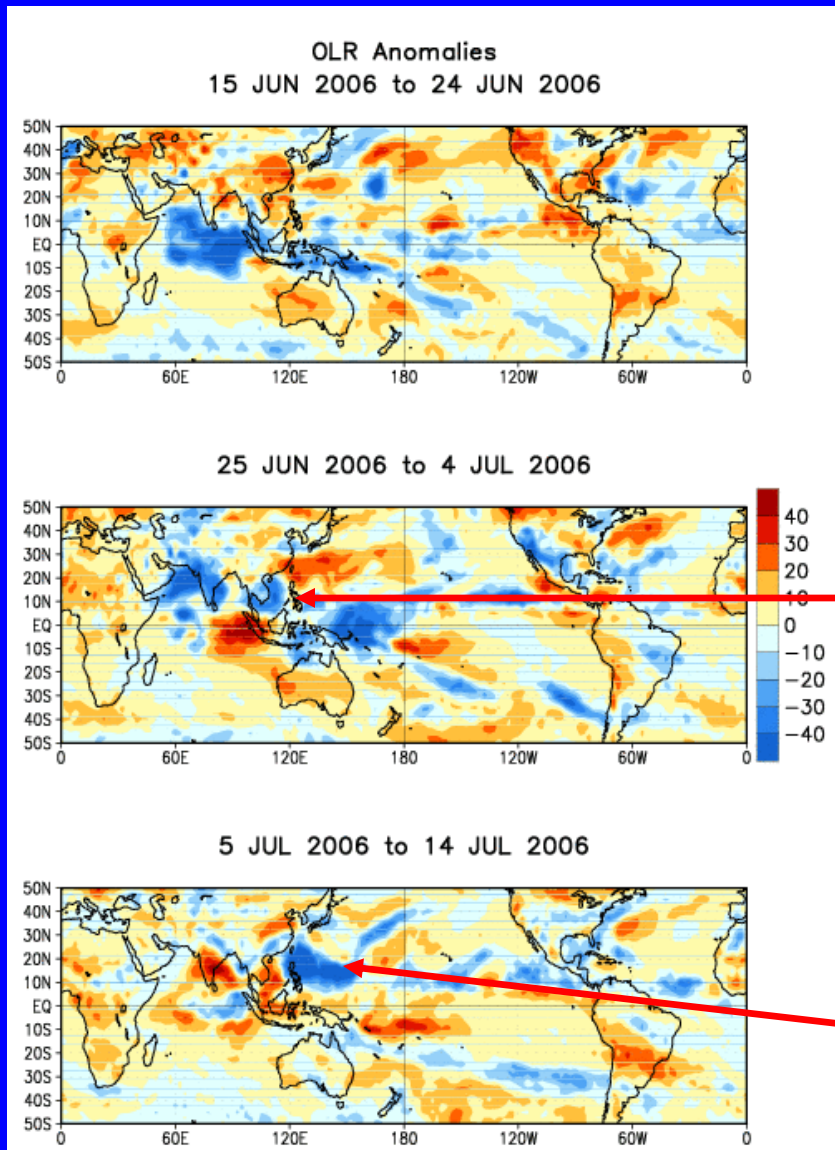


Drier-than-average conditions (/red shading)

Wetter-than-average conditions (blue shading)

Eastward propagation of a weak, yet coherent OLR anomaly from the Indian Ocean to Central America.

Anomalous OLR: Last 30 days

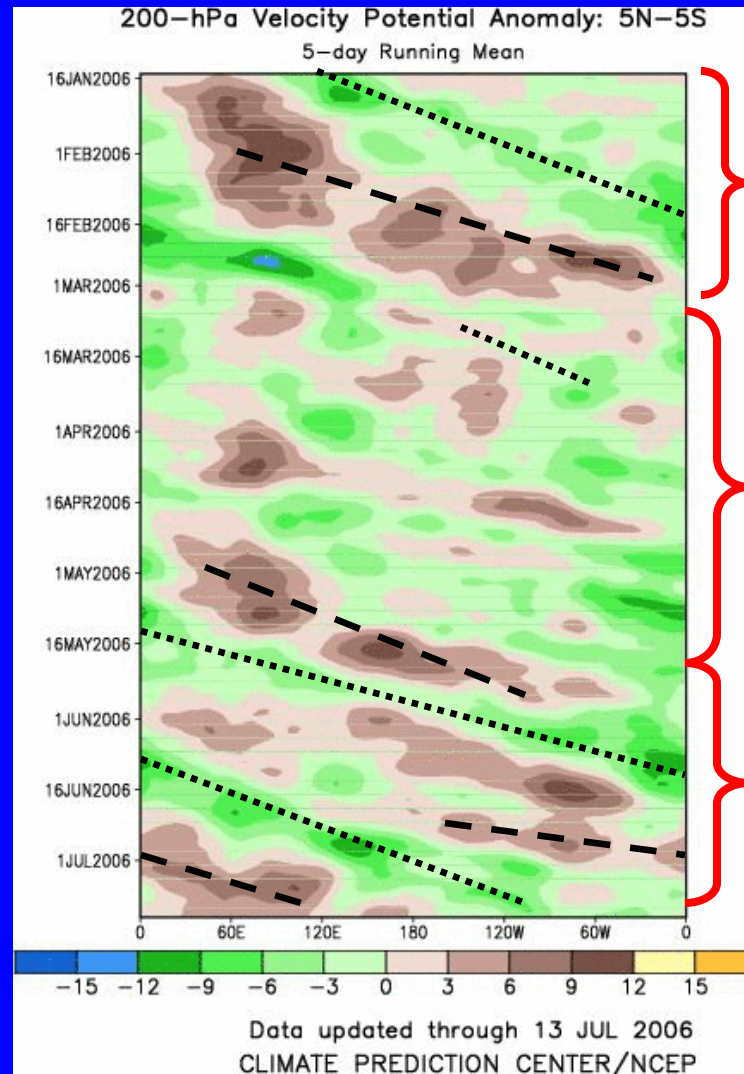


Wet conditions over India, the Indian Ocean and Indonesia in late June were replaced by dry conditions in early July.

Enhanced convection consolidated over the western Pacific east of the Philippines, while convection was suppressed over India.

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

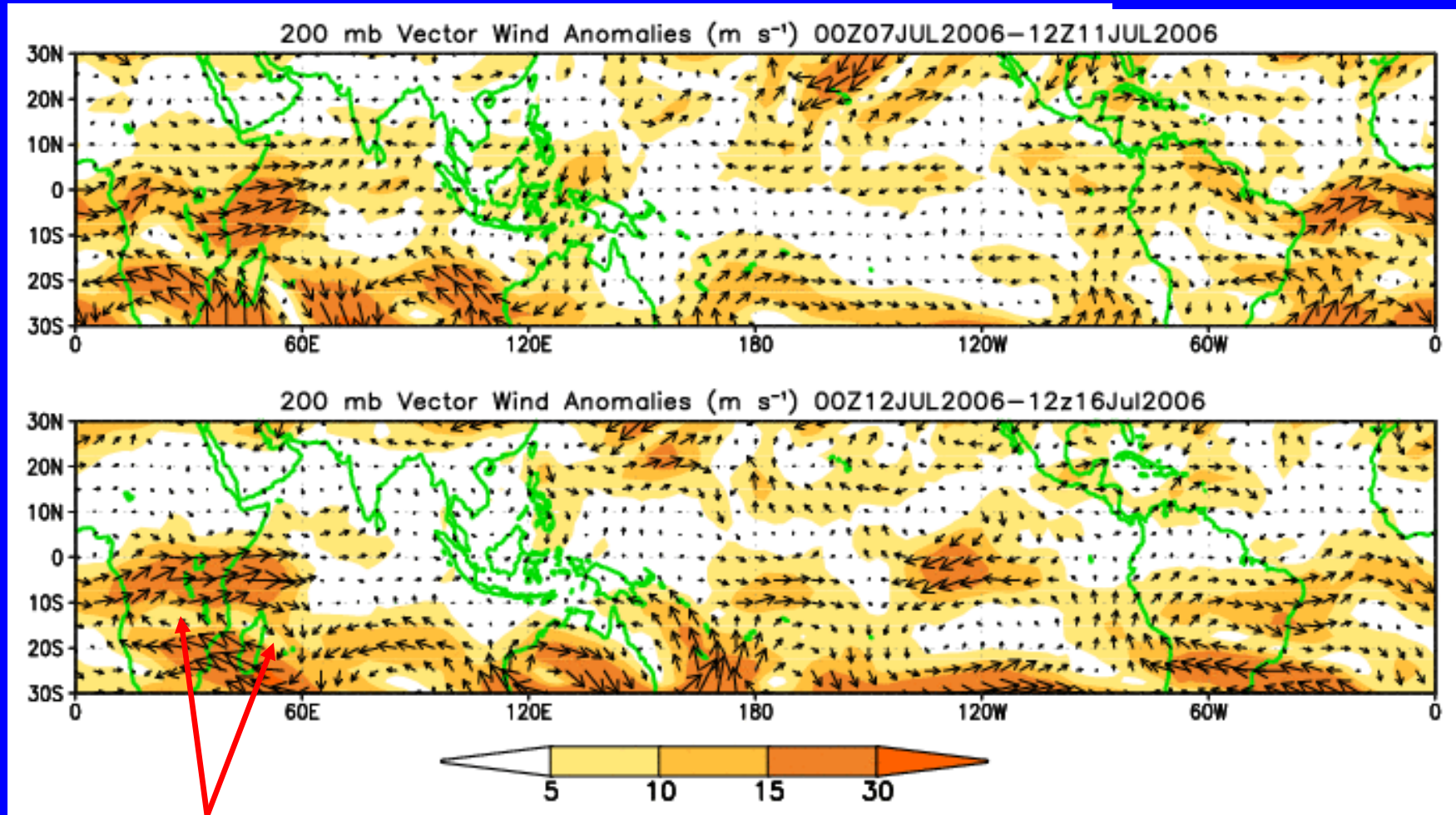
Weak to moderate MJO activity was observed during January and February.

The MJO was incoherent during much of March and April.

MJO activity strengthened during May and June. In late June and early July, VP anomalies accompanied OLR anomalies in the NH Tropics.

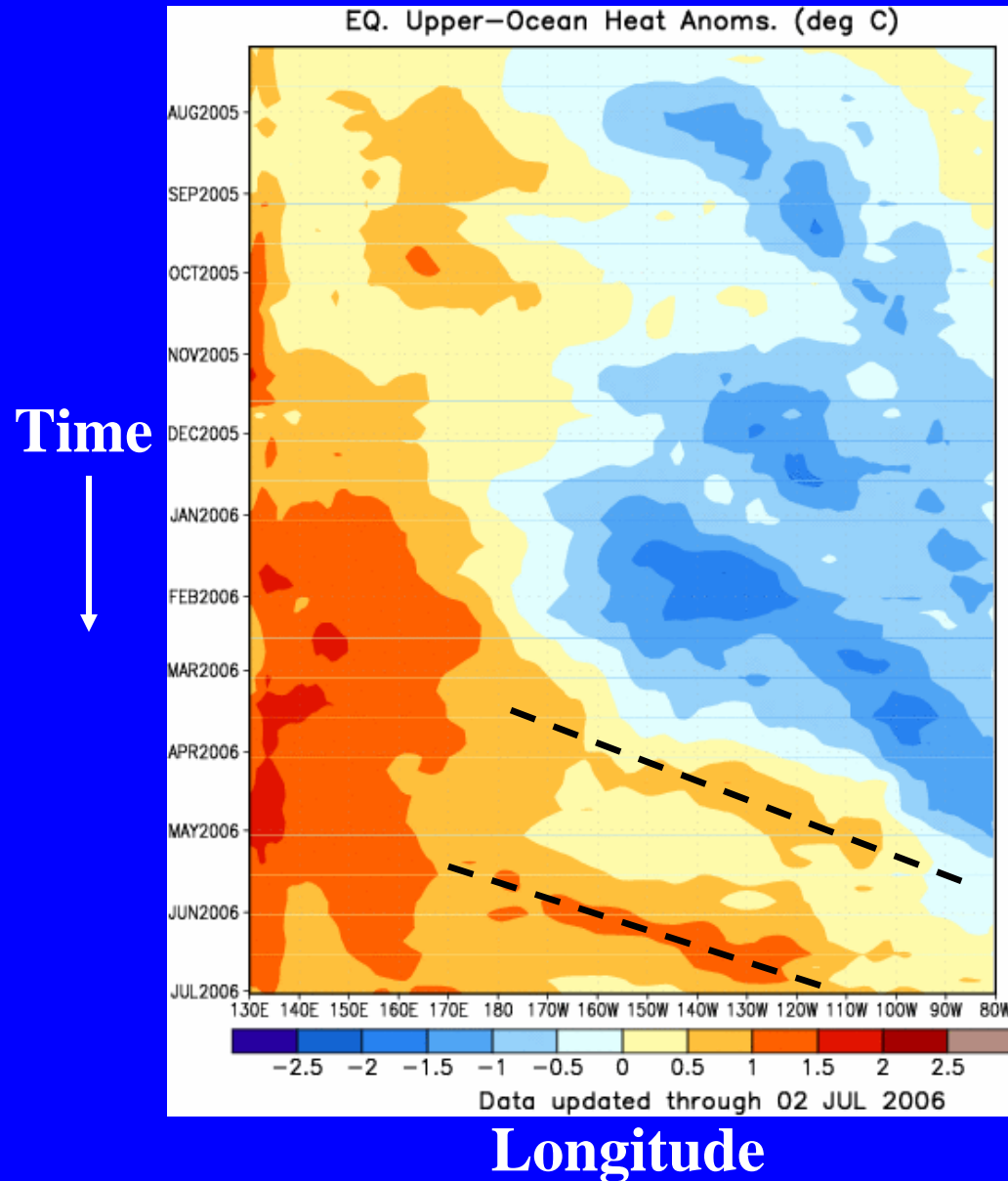
200-hPa Vector Winds and Anomalies (m s^{-1})

Note that shading denotes the magnitude of the anomalous wind vectors.



A strong cyclonic wind anomaly persisted over Sub-Saharan Africa and the Mozambique Channel.

Heat Content Evolution in the Eq. Pacific



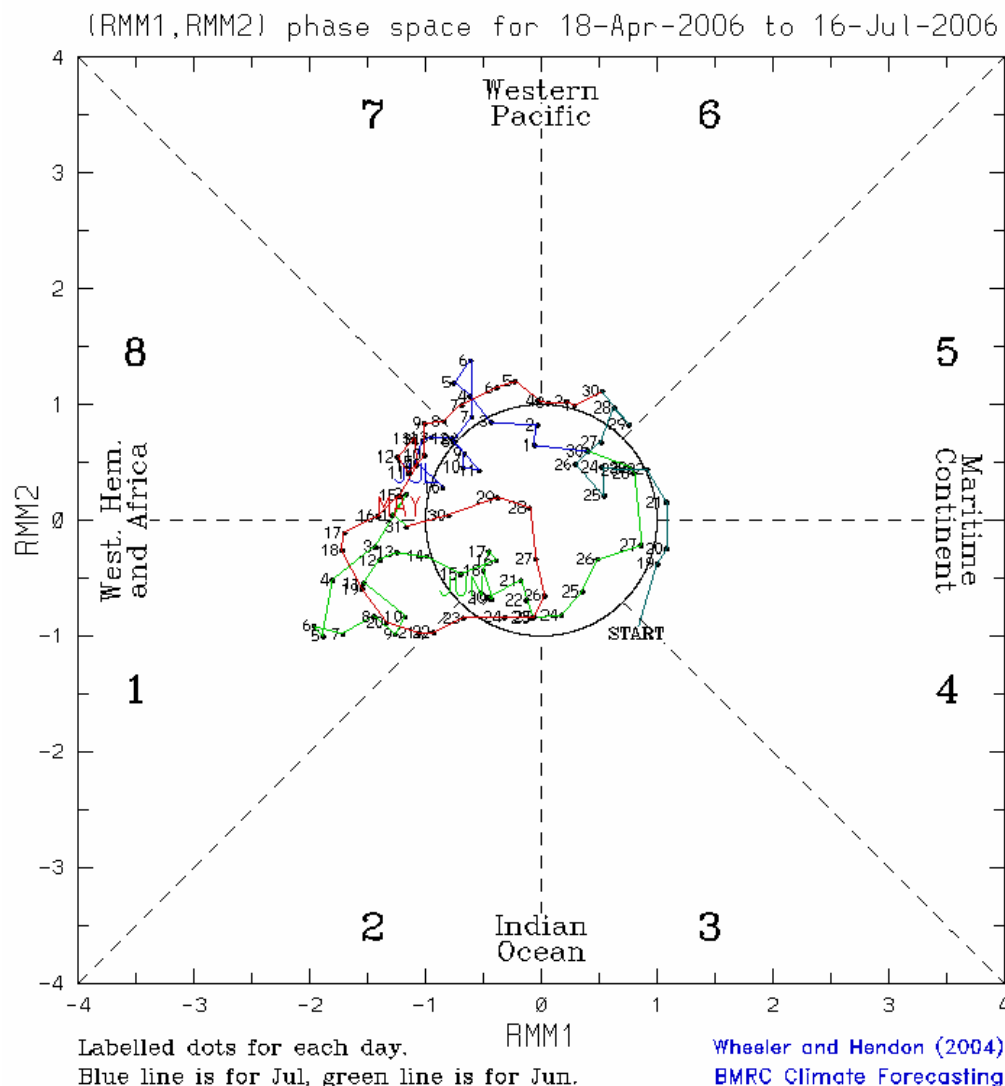
Above normal heat content expanded into the eastern Pacific beginning in April associated with Kelvin wave activity.

MJO Index (Magnitude and Phase)

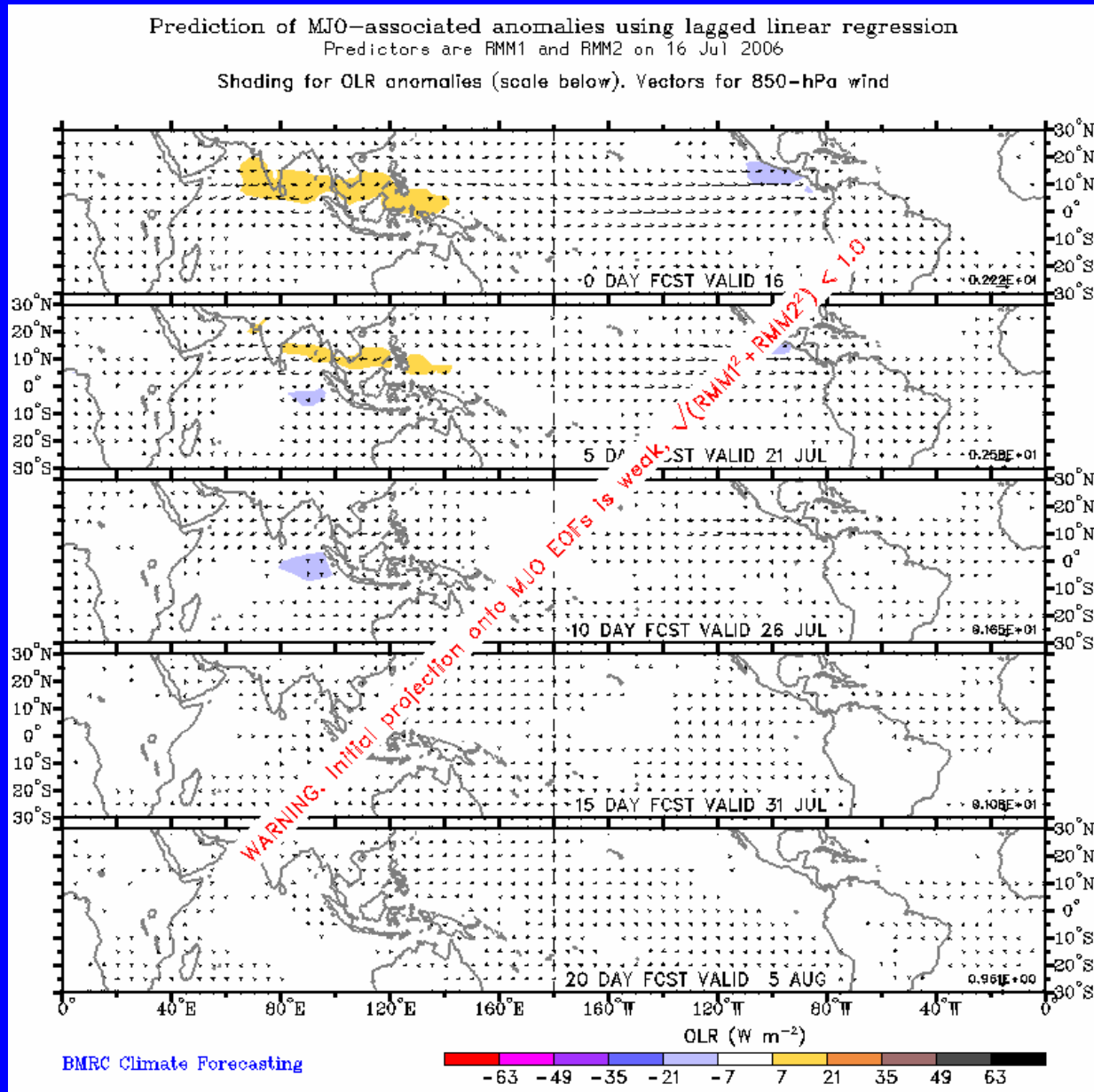
The current state of the MJO as determined by an index based on Empirical Orthogonal Function (EOF) analysis using combined fields of near-equatorially-averaged 850 hPa zonal wind, 200 hPa zonal wind, and satellite-observed outgoing longwave radiation (OLR) (Wheeler and Hendon, 2004).

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 signal remains weak.

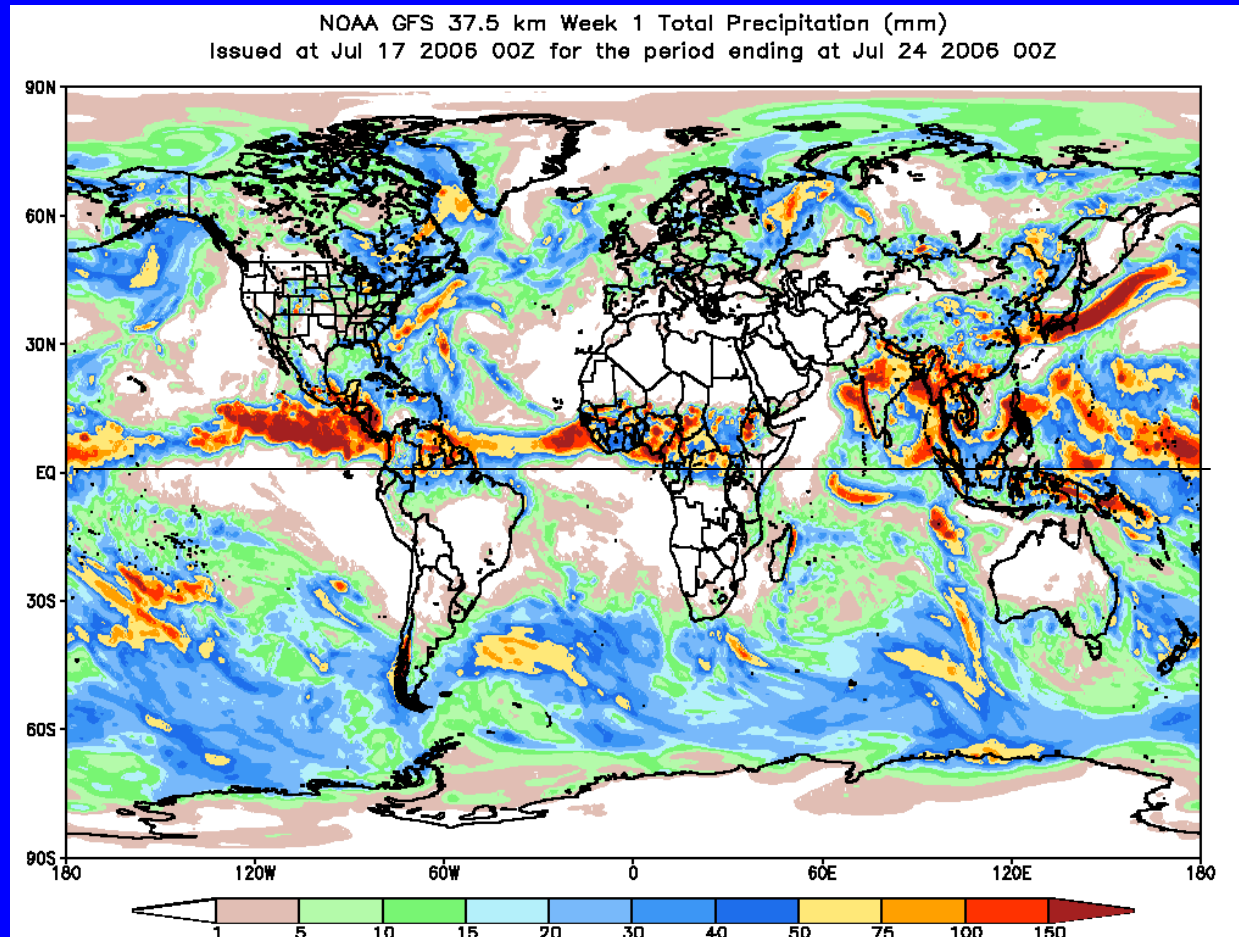


Statistical OLR MJO Forecast



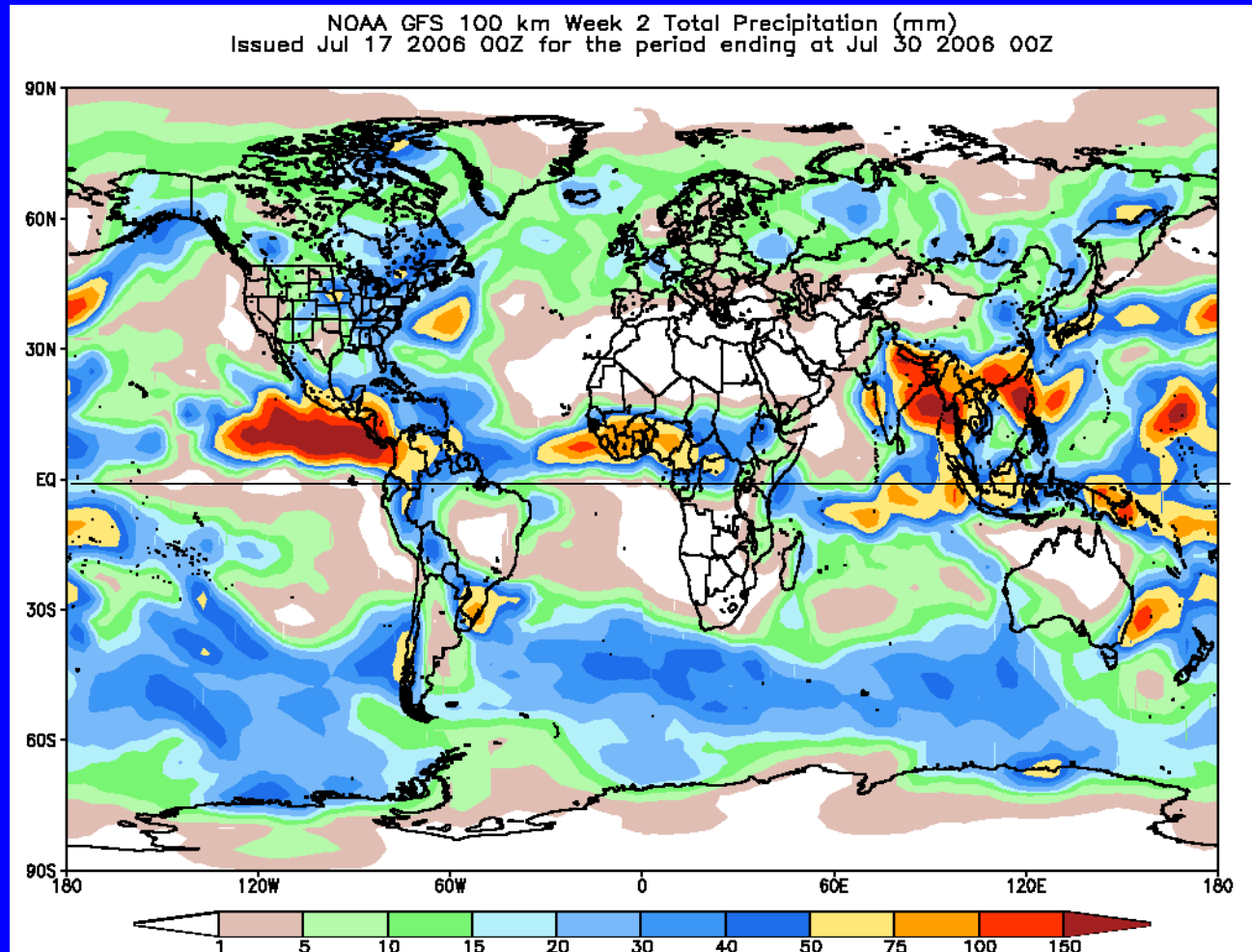
The statistical MJO forecast indicates suppressed convection over South Asia, Malaysia, southern Philippines and the South China Sea during week 1. However, the initial projection of the MJO is weak.

Global Forecast System (GFS) Week 1 Precipitation Forecast



GFS Week 1 Precipitation Forecast shows abundant precipitation over the eastern tropical Pacific, Central America, and parts of West Africa, while indicating relatively dry conditions over southern India.

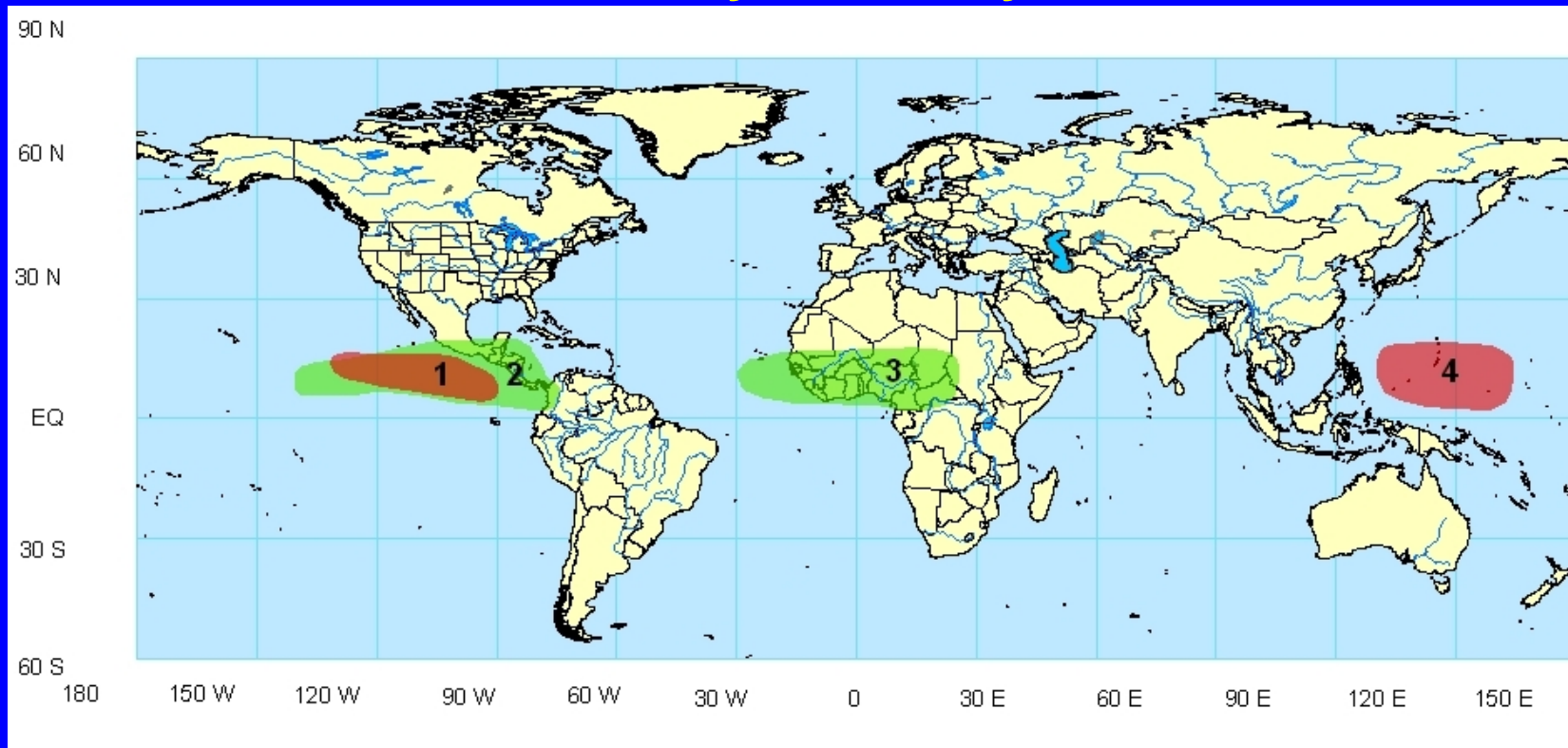
Global Forecast System (GFS) Week 2 Precipitation Forecast



GFS Week 2 Precipitation Forecast shows continued abundant precipitation over the eastern tropical Pacific, Central America, and parts of West Africa. It also shows an increase in rainfall over South and Southeast Asia.

Potential Benefits/Hazards – Week 1

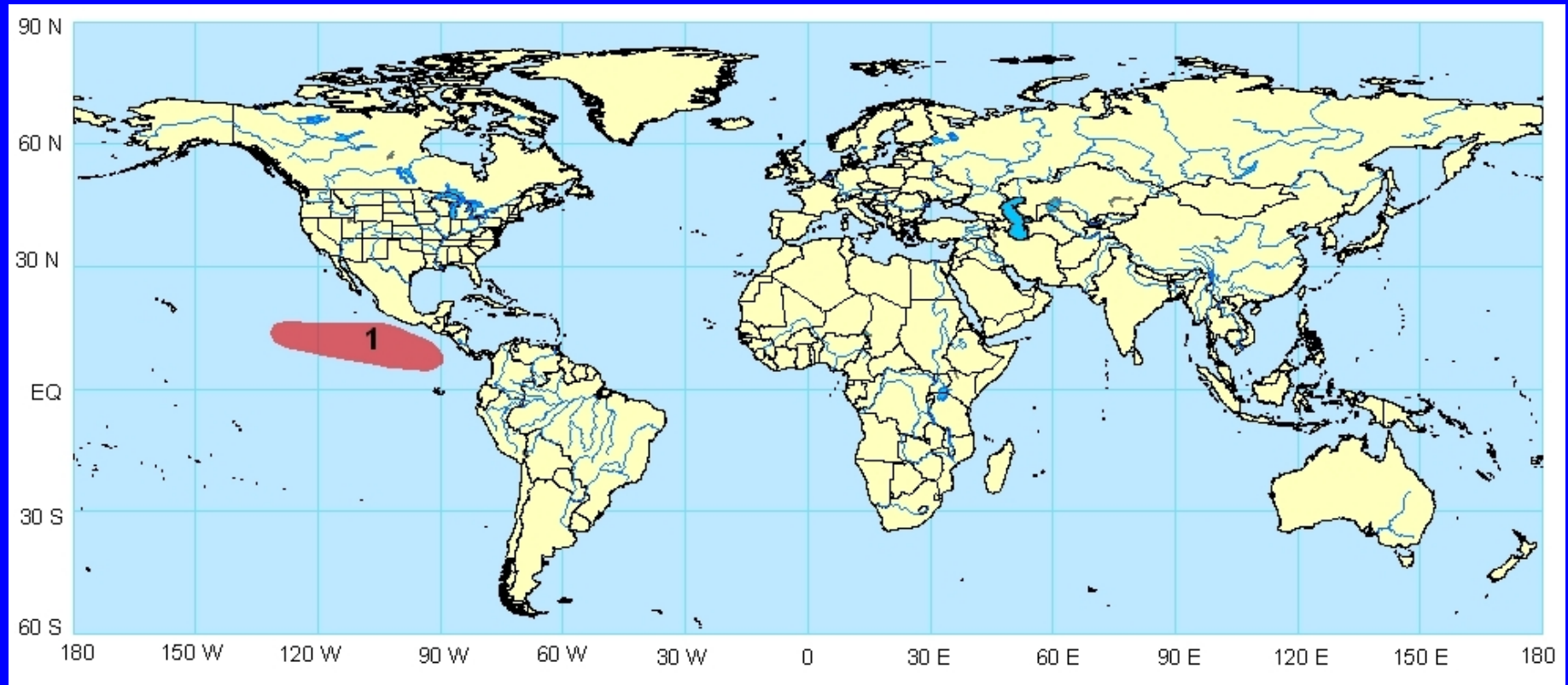
Valid July 18 – July 24, 2006



1. Conditions are expected to remain favorable for tropical cyclone development in the eastern Pacific. In the Atlantic, a disturbance over the Gulf Stream is being monitored for development.
2. There is an increased probability for above normal rainfall over the eastern Pacific and Central America.
3. There is an increased chance for above normal rainfall over West Africa.
4. Favorable conditions for tropical cyclone development are anticipated in the western Pacific.

Potential Benefits/Hazards – Week 2

Valid July 25 – July 31, 2006



1. Conditions are expected to remain favorable for tropical cyclone development in the eastern Pacific.

Summary

- The latest observations indicate that the MJO remains weak.
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- During week 2, conditions are expected to remain favorable for tropical cyclone development in the eastern Pacific.