



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

Update prepared by
Climate Prediction Center / NCEP
July 3, 2006



Outline

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



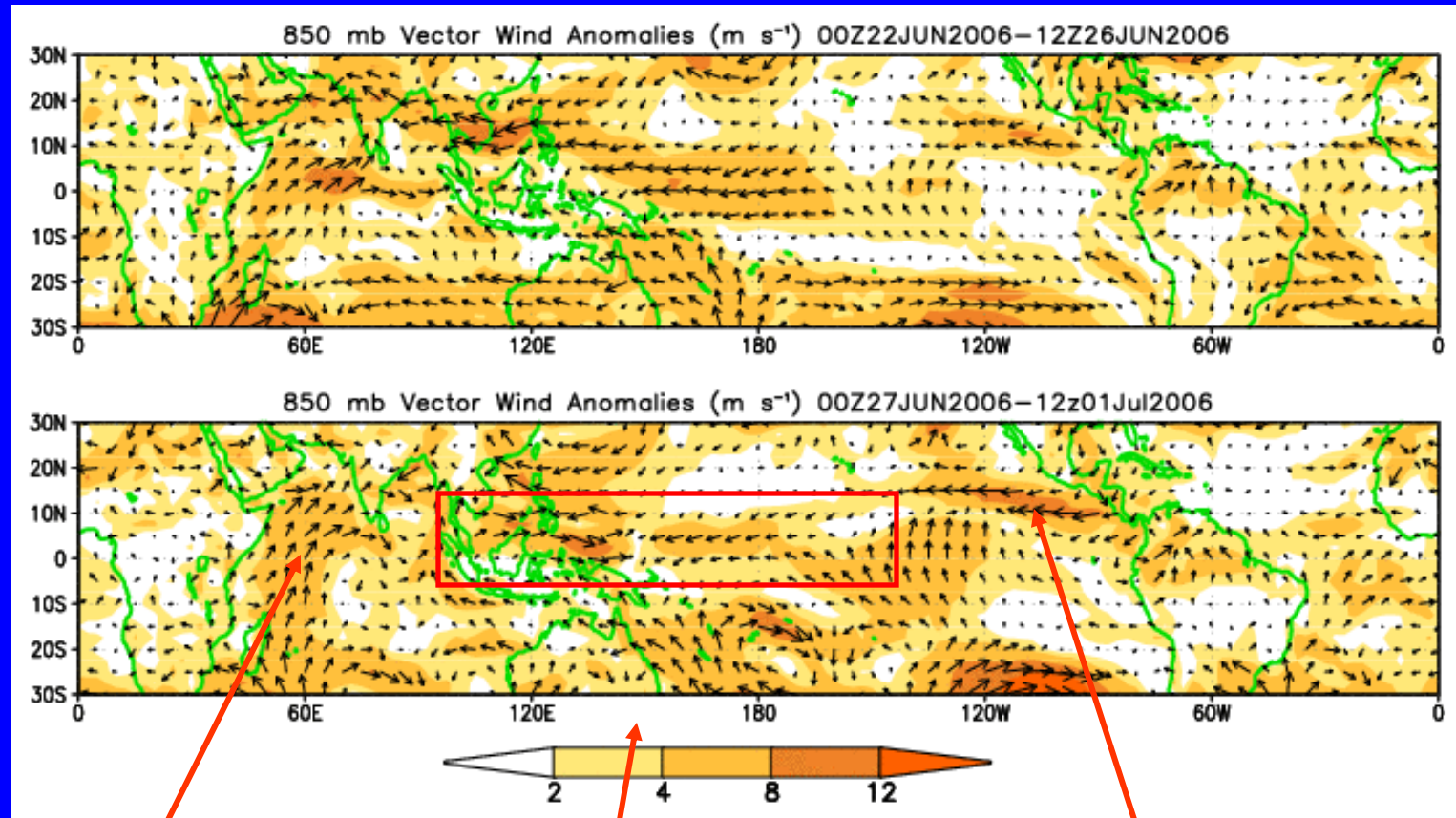
Overview

- The latest observations indicate a continued weak MJO.
- Based on the latest observations and model forecasts, the MJO is expected to remain weak during the next 1-2 weeks.
- Potential hazards during week 1 include an increased chance for above normal rainfall over much of southeast Asia and the Western Pacific while an increased chance for below normal rainfall exists over Africa and portions of the Indian Ocean and Indonesia. Typhoon Ewiniar will impact the western Pacific Ocean east of the Philippines and south of Japan. Conditions are favorable for tropical cyclogenesis for sections of both the western and eastern Pacific while conditions remain unfavorable for sections of the Atlantic Basin.
- During week 2, an increased chance of above average rainfall and favorable conditions for tropical cyclogenesis remain across the western Pacific Ocean.



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

Note that shading denotes the magnitude of the anomalous wind vectors



Active Indian monsoon with an enhanced Somali Jet.

Westerly (easterly) anomalies across Maritime Continent (western Pacific).

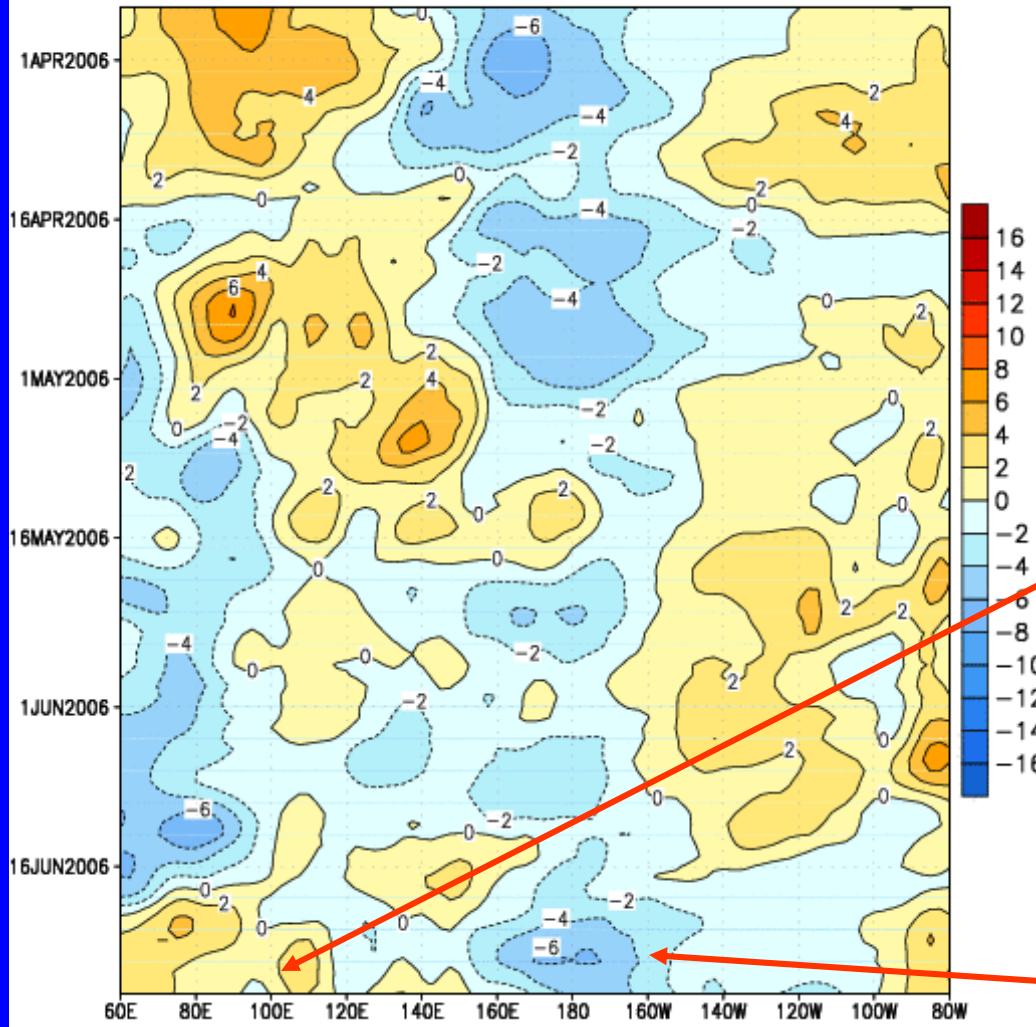
Strengthening Easterly anomalies in the eastern Pacific.



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

CDAS 850-hPa U Anoms. (5N-5S)

Time



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

Stronger-than-average easterlies (blue shading)

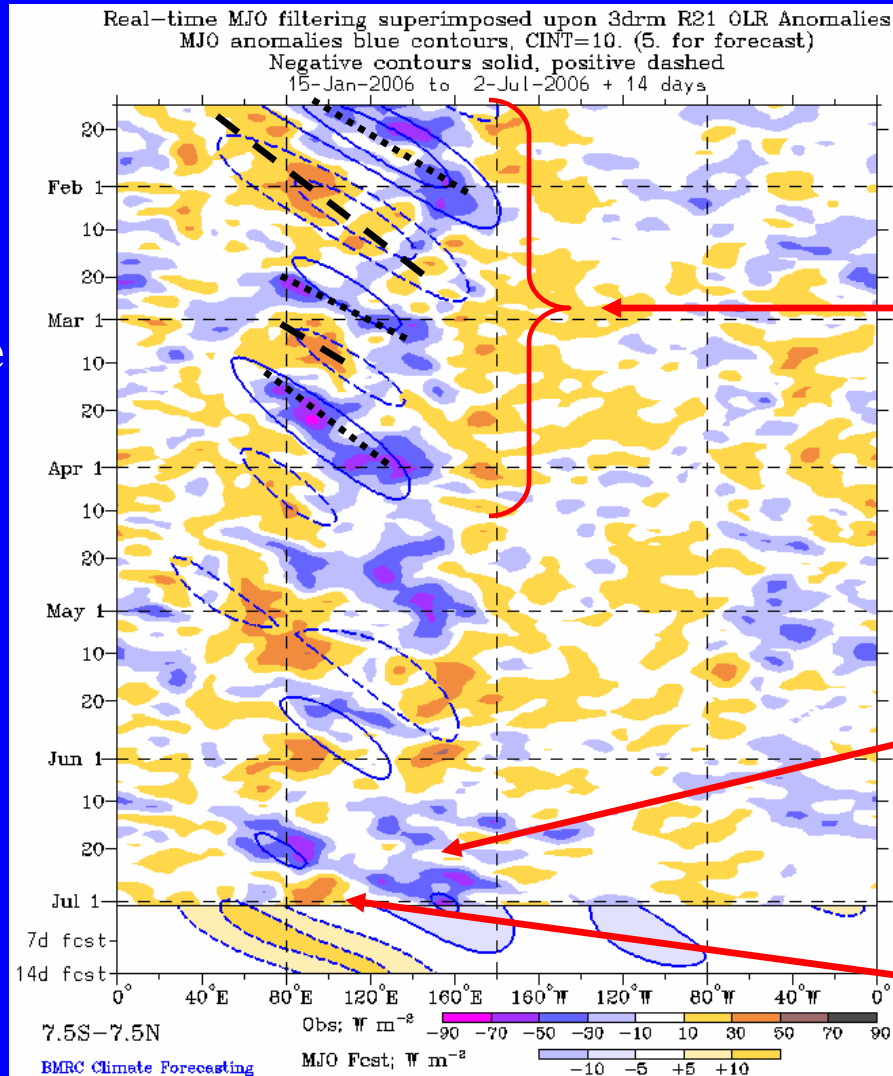
Westerly anomalies over the Indian Ocean and Indonesia.

Easterly anomalies near the Date Line during the past ten days.

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 mid-January through March.

Enhanced convection has rapidly shifted eastward into the Pacific Ocean during the past ten days.

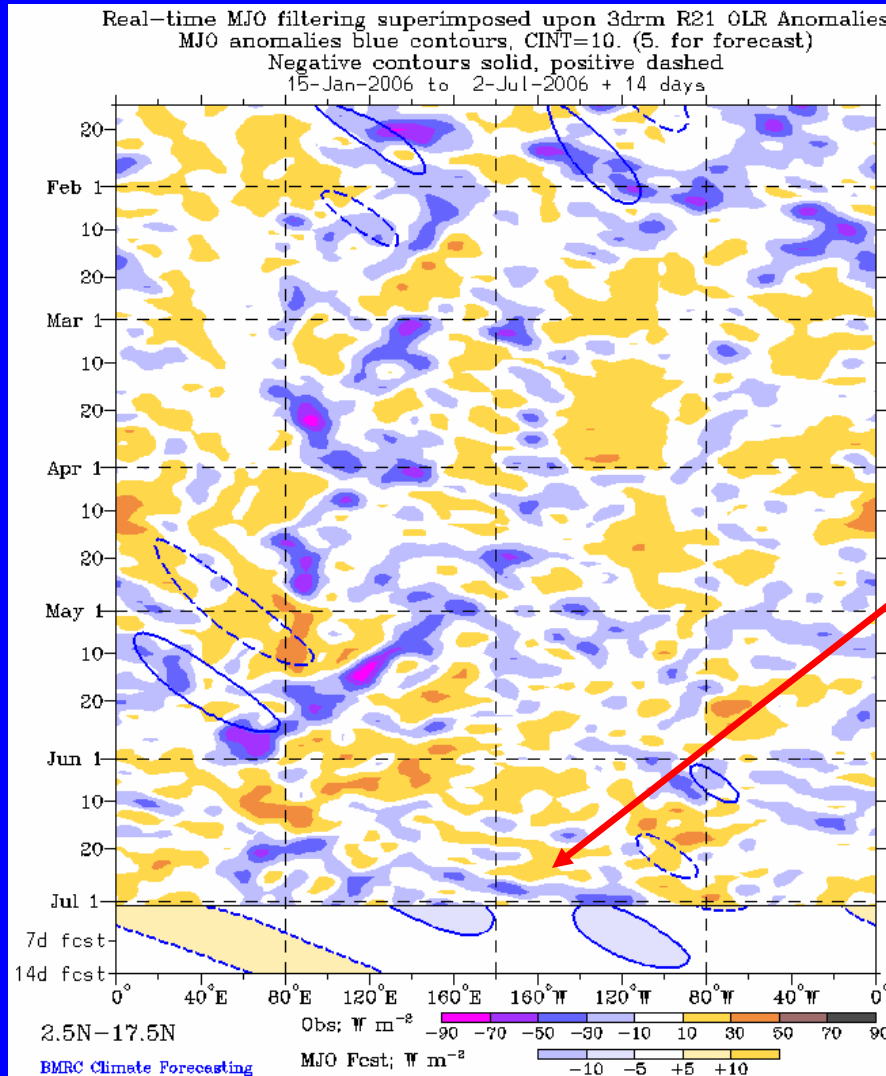
Suppressed convection is now evident in the eastern equatorial Indian Ocean.



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

Drier-than-average conditions (/red shading)

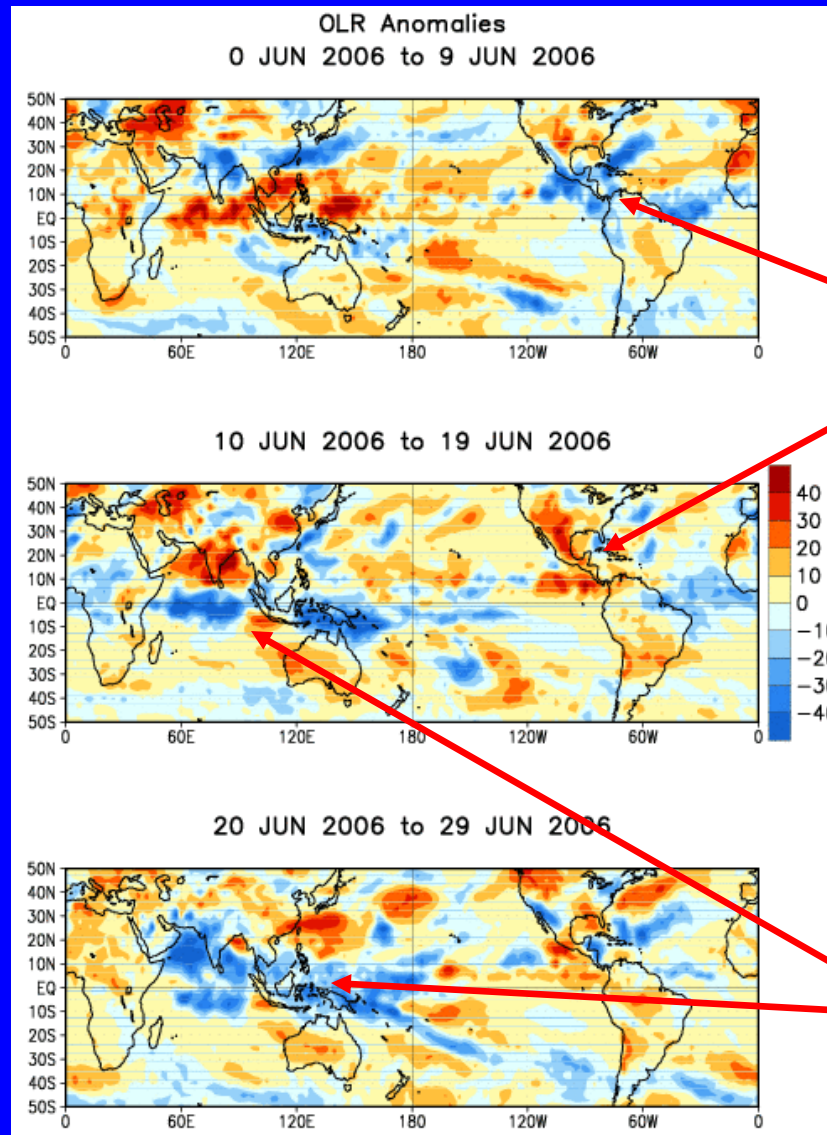
Wetter-than-average conditions (blue shading)



Enhanced convection shifted rapidly eastward north of the equator.



Anomalous OLR and 850-hPa Wind: Last 30 days



Wet conditions in the eastern Pacific during early June were replaced with drier than normal conditions during the last twenty days.

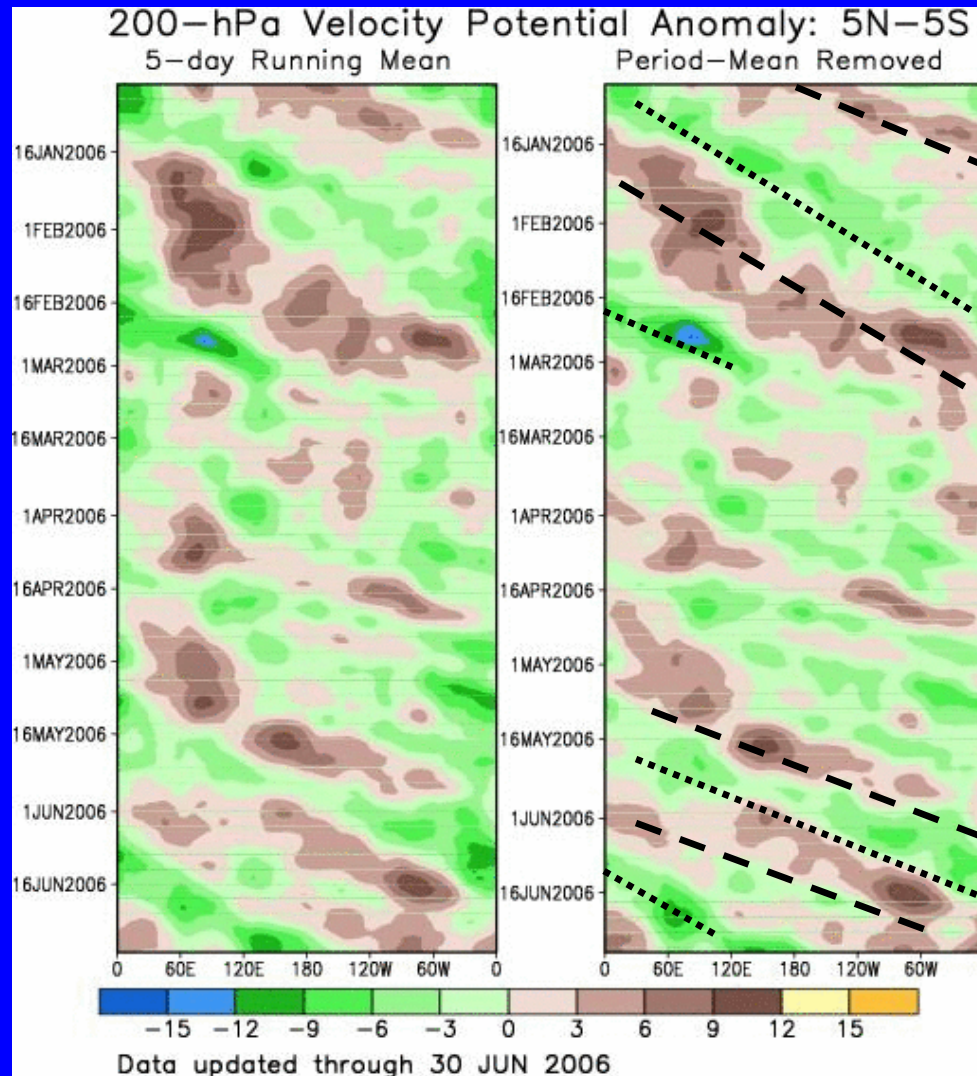
Enhanced convection in the Indian Ocean and the Maritime Continent has slowly moved northward.



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
↓



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

The MJO was incoherent during much of March and April.

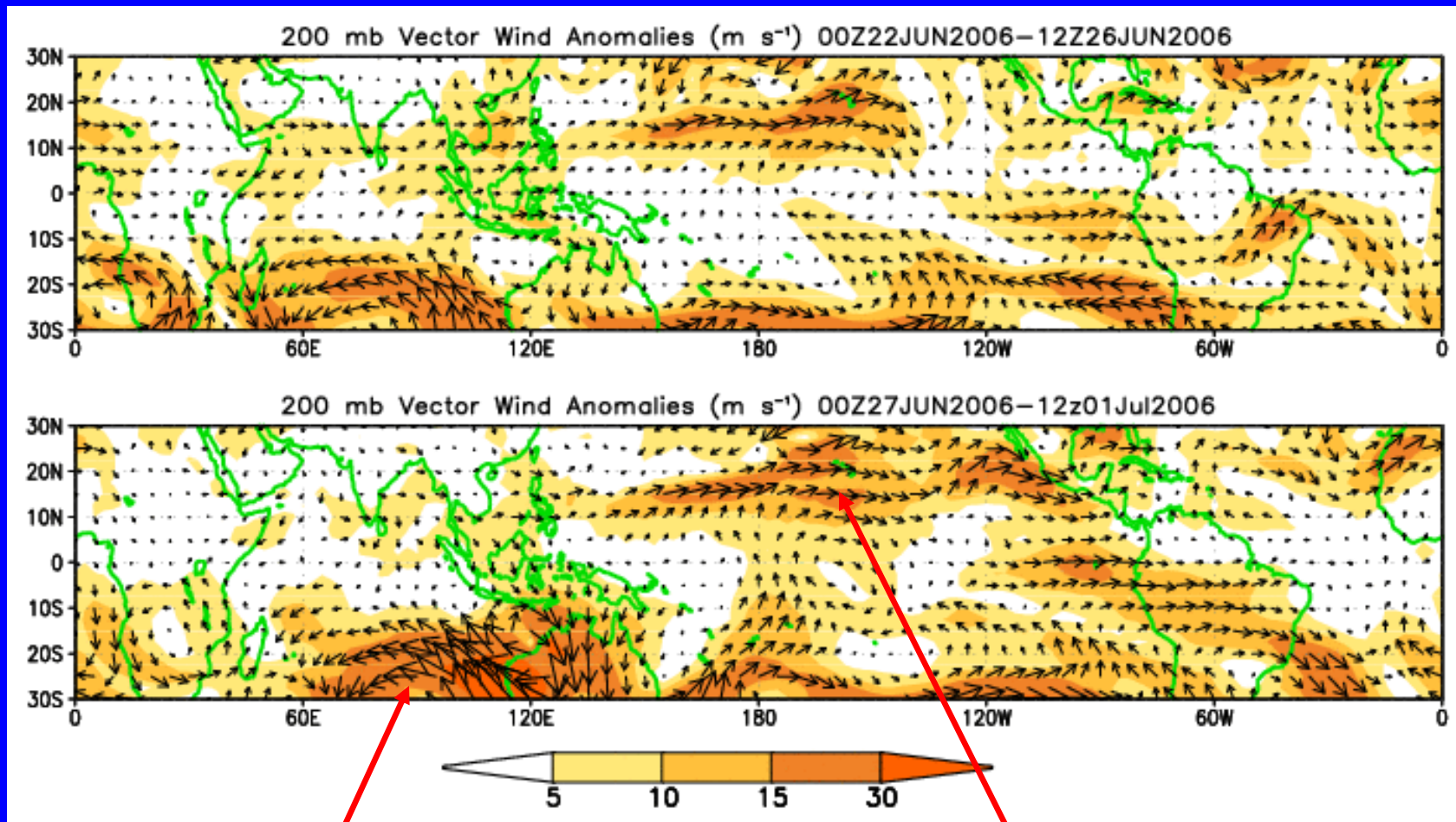
MJO activity strengthened during May and June but remains weak.

Longitude



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

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



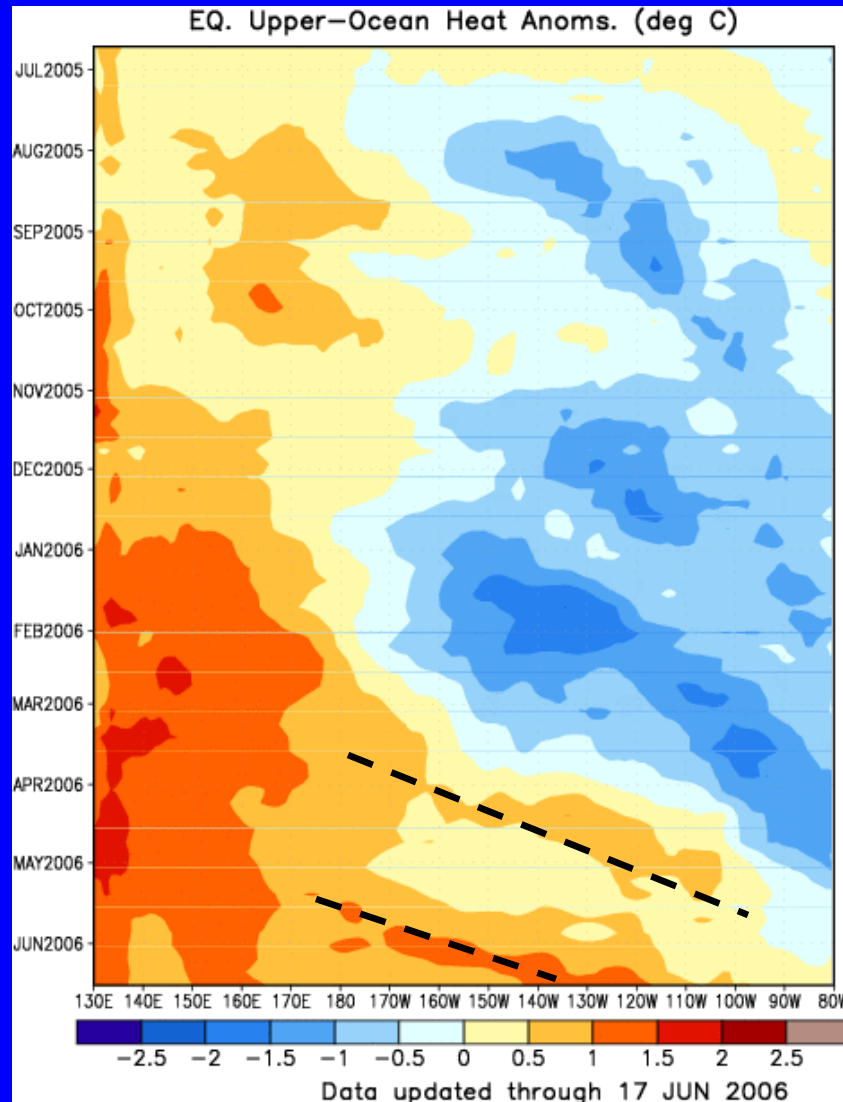
Strong mid-latitude induced anti-cyclonic wind anomaly over the South Indian Ocean.

Westerly anomalies north of the equator in the Pacific Ocean.



Heat Content Evolution in the Eq. Pacific

Time



Longitude

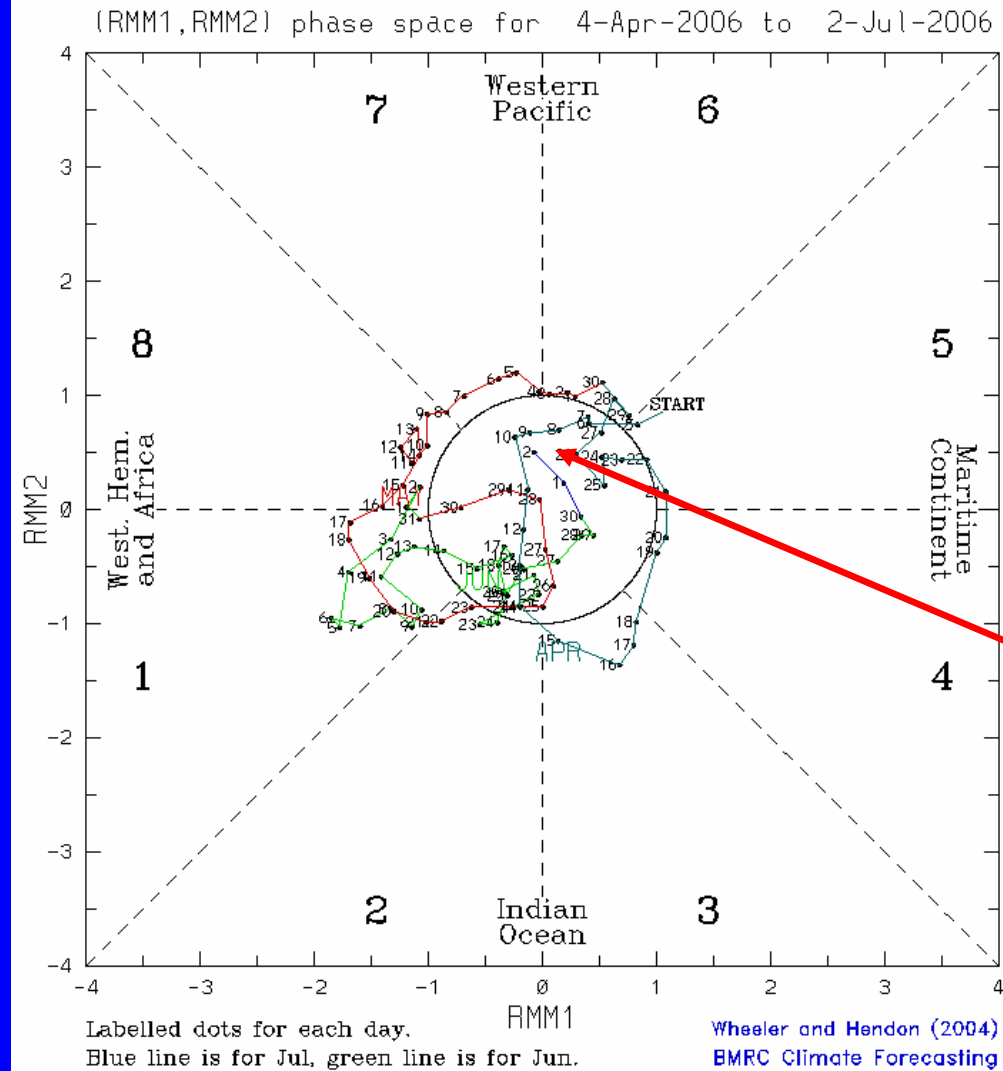
Above normal heat content expanded into the eastern Pacific beginning in April associated with Kelvin wave activity.



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).

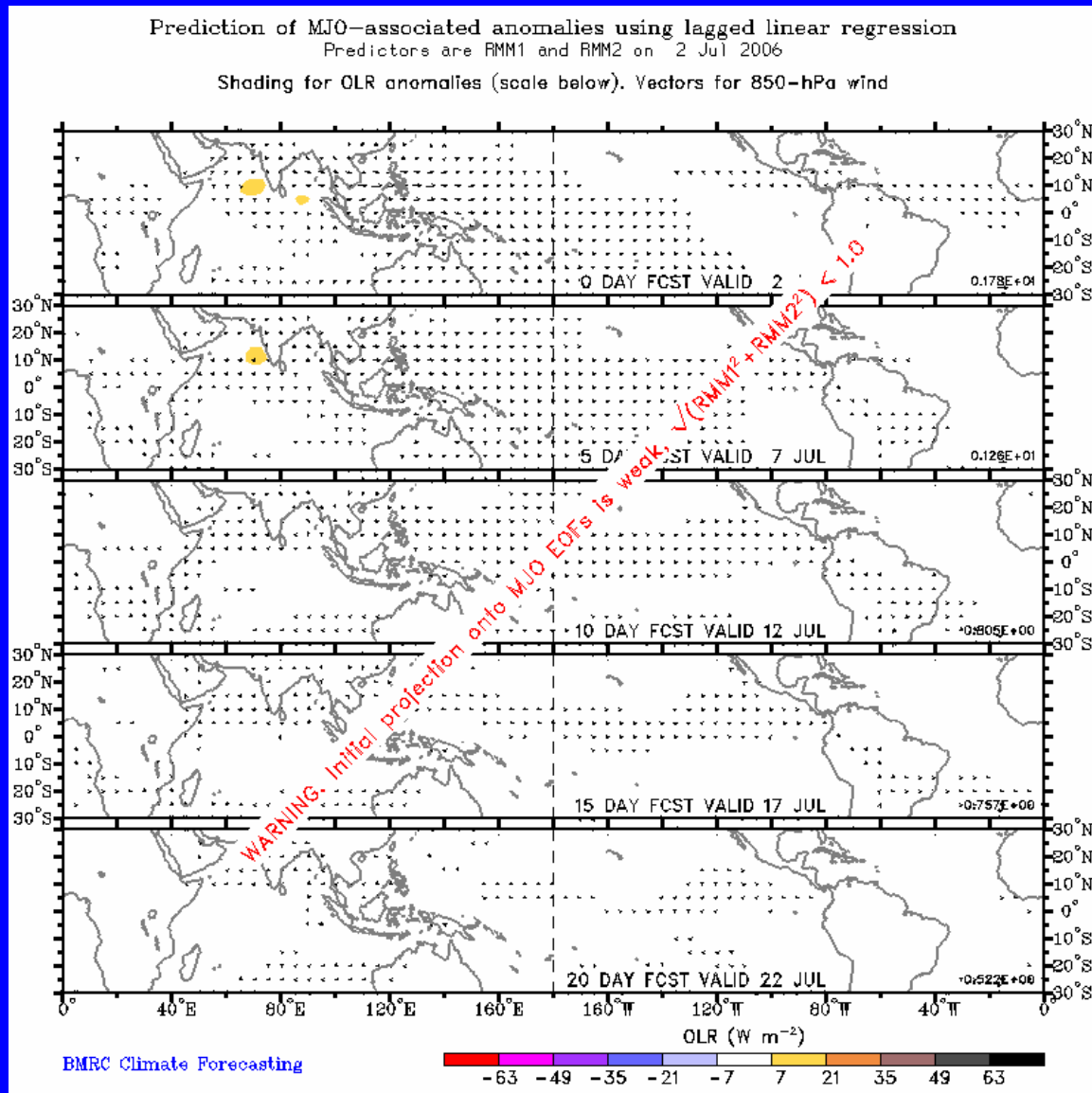
The axes represent the time series of the two leading modes of variability and are used to measure the amplitude while the triangular areas indicate the phase or location of the enhanced phase of the MJO. The farther away from the center of the circle the stronger the MJO. Different color lines indicate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



The MJO signal remains quite weak.



Statistical OLR MJO Forecast



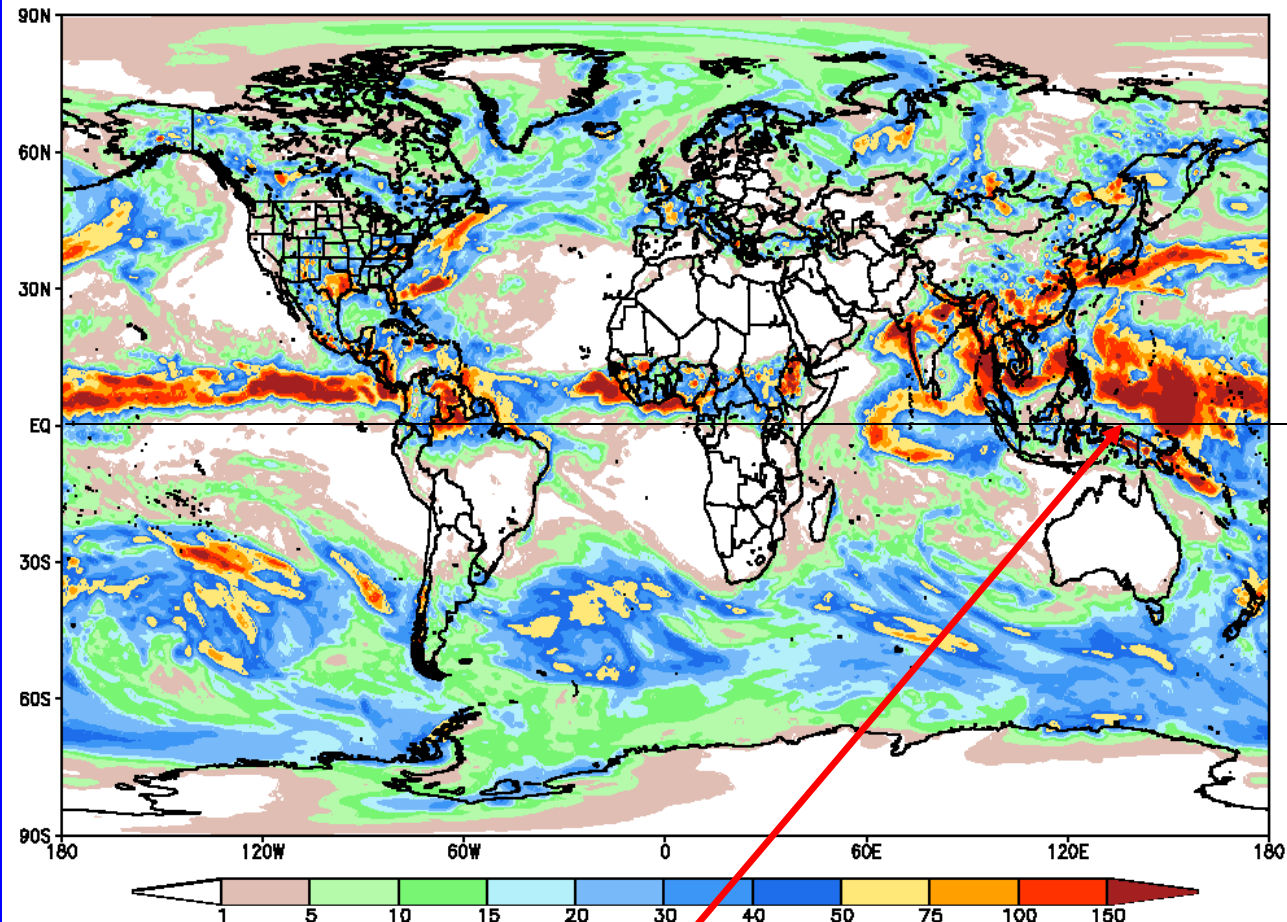
A statistical MJO forecast indicates weak MJO activity during the next 1-2 weeks.



Global Forecast System (GFS) Week 1

Precipitation Forecast

NOAA GFS 37.5 km Week 1 Total Precipitation (mm)
Issued at Jul 03 2006 00Z for the period ending at Jul 10 2006 00Z



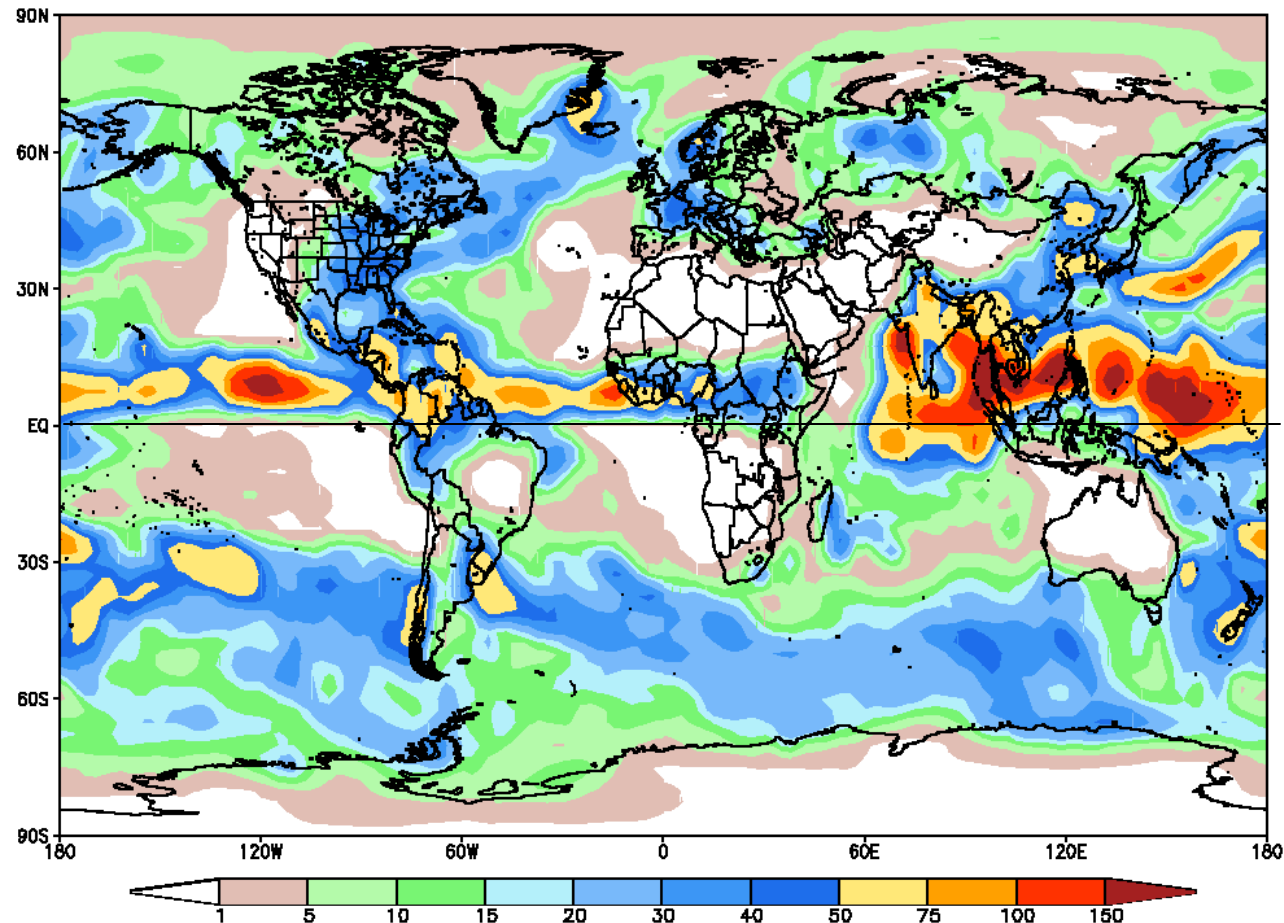
Convection in the western Pacific Ocean is expected to remain enhanced.



Global Forecast System (GFS) Week 2

Precipitation Forecast

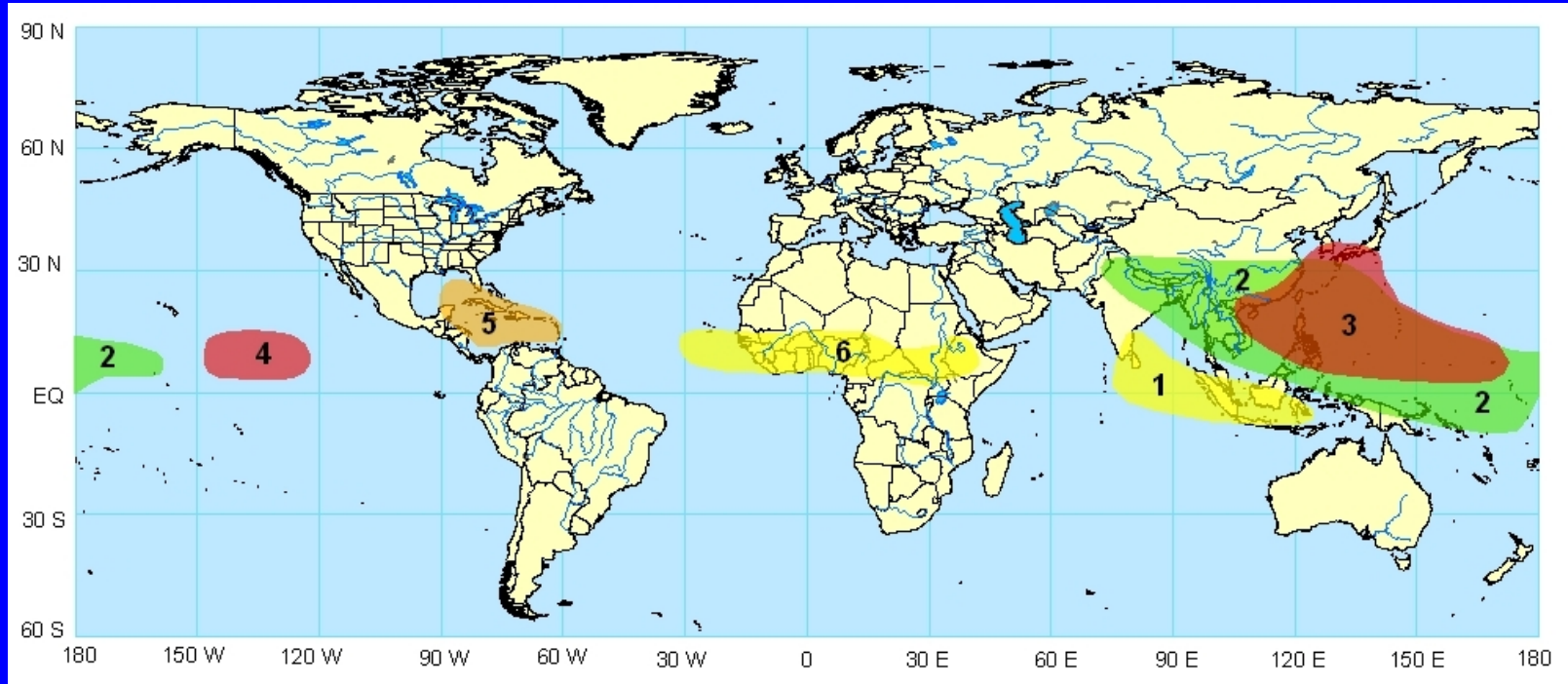
NOAA GFS 100 km Week 2 Total Precipitation (mm)
Issued Jul 3 2006 00Z for the period ending at Jul 16 2006 00Z





Potential Benefits/Hazards – Week 1

Valid July 4 – July 10, 2006

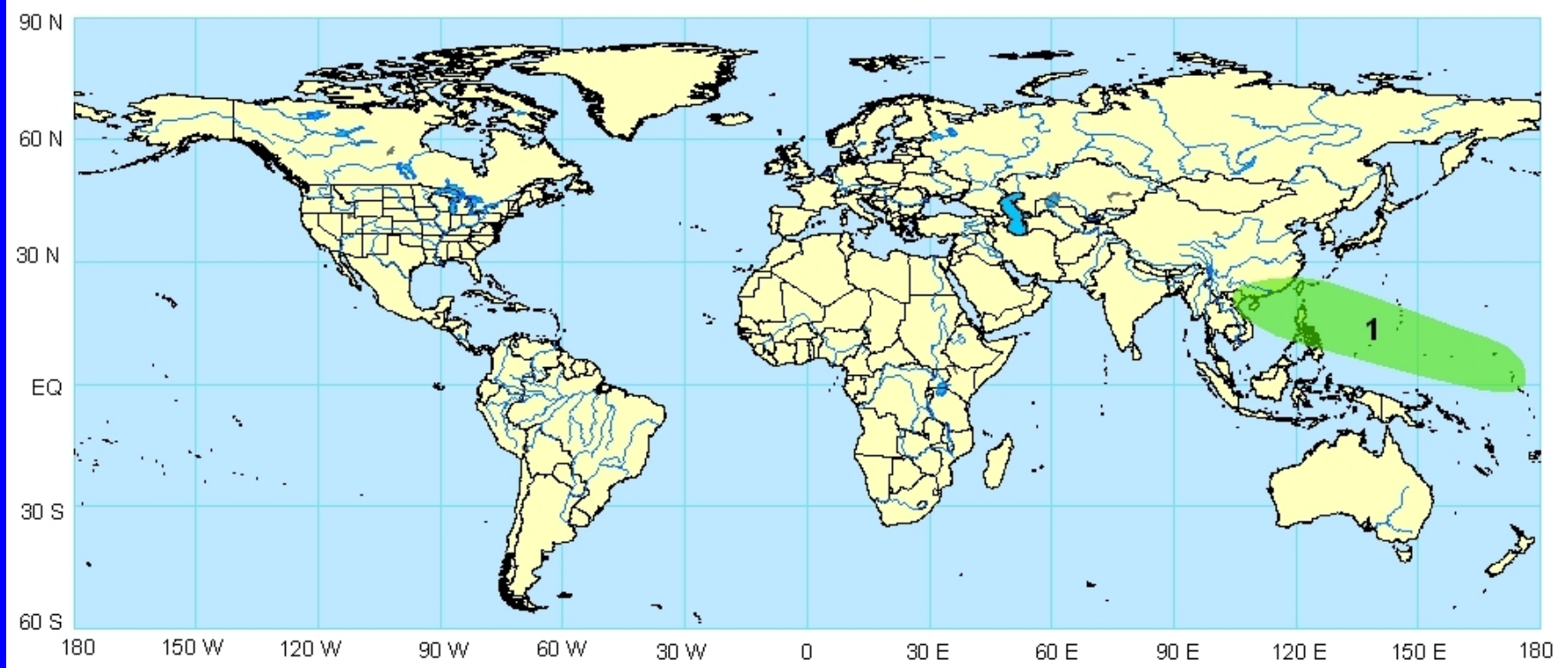


1. There is an increased chance of below normal rainfall across Sumatra, southern Borneo, the eastern equatorial Indian Ocean, Sri Lanka and southeastern India.
2. There is an increased chance of above normal rainfall across southeast Asia, the Philippines and the western Pacific.
3. TC Ewiniar will impact the western Pacific Ocean east of the Philippines and south of Japan. Also, conditions are favorable for tropical cyclogenesis in the western Pacific Ocean and the South China Sea.
4. Conditions are favorable for tropical cyclogenesis for portions of the eastern Pacific Ocean.
5. Conditions will be unfavorable for tropical cyclogenesis over the Caribbean and the Gulf of Mexico.
6. There is an increased chance for below normal rainfall across the Sahel, Gulf of Guinea Coast and Africa's Greater Horn.



Potential Benefits/Hazards – Week 2

Valid July 11 – July 17, 2006



1. There is an increased chance of above normal rainfall for the western Pacific Ocean, the Philippines and southeast China. Conditions may continue to be favorable for tropical cyclogenesis in the South China Sea and the western Pacific Ocean.



Summary

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