



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

Update prepared by
Climate Prediction Center / NCEP
June 19, 2006



Outline

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



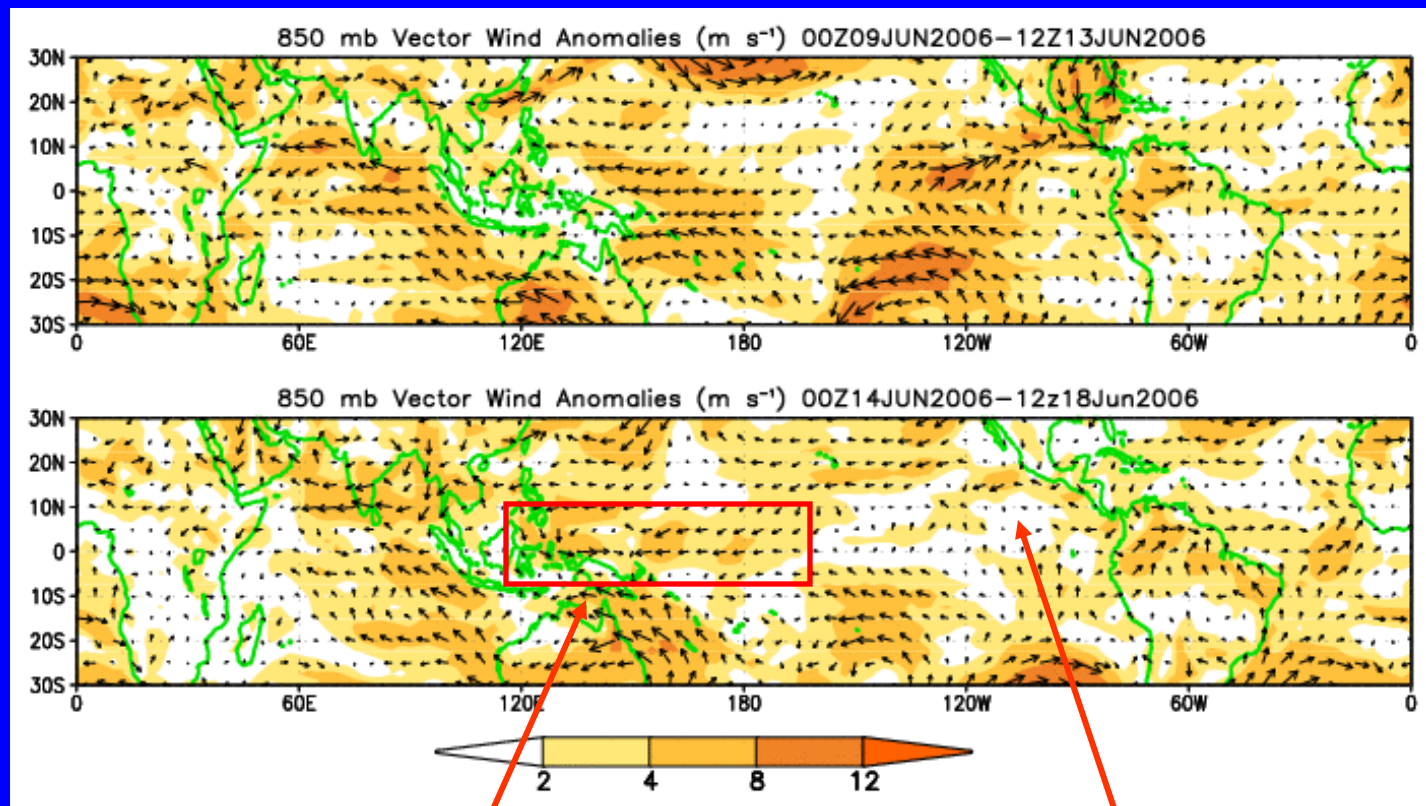
Overview

- 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 of above normal rainfall for sections of India, southeast Asia, the Maritime continent, and the Philippines. The threat of above average rainfall in the eastern Hemisphere is anticipated to shift northeast during week 2.
- Additional areas need to be closely monitored during week 2. The threat exists for above average rainfall for the West Indies and the eastern seaboard of the US. Also, the likelihood of tropical cyclone activity in the western Pacific is expected to slowly increase 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



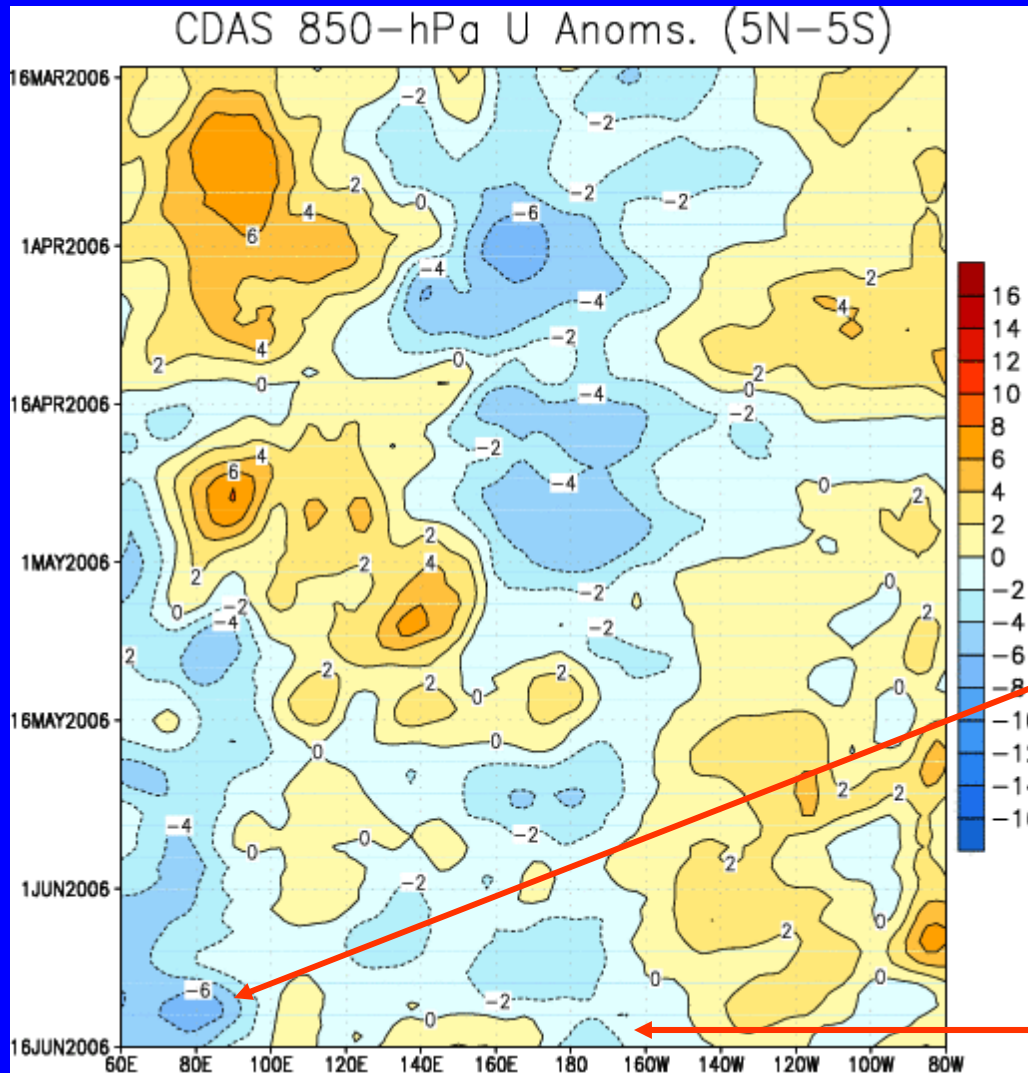
Equatorial westerly (easterly) anomalies are evident across the western Pacific.

Persistent widespread westerly anomalies in the eastern Pacific have ended.



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)

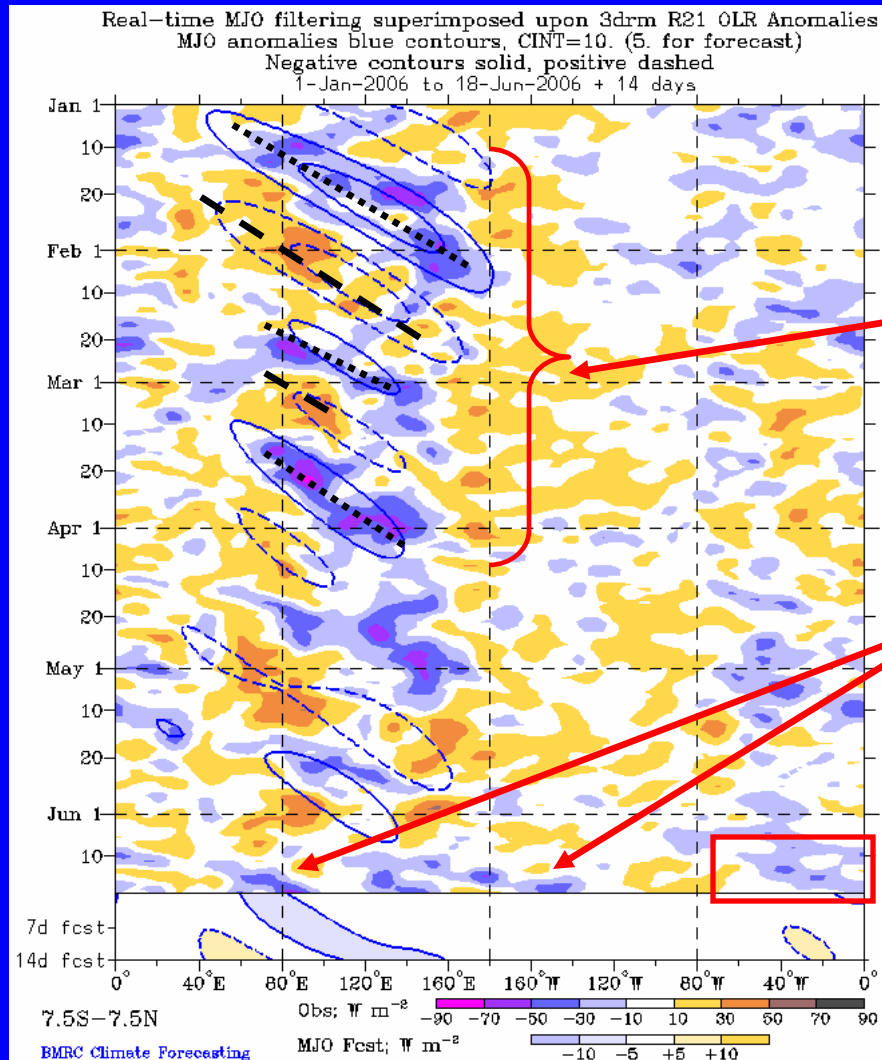
Easterly anomalies remain in the Indian Ocean.

Weak anomalies are evident in the western Pacific Ocean.

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.

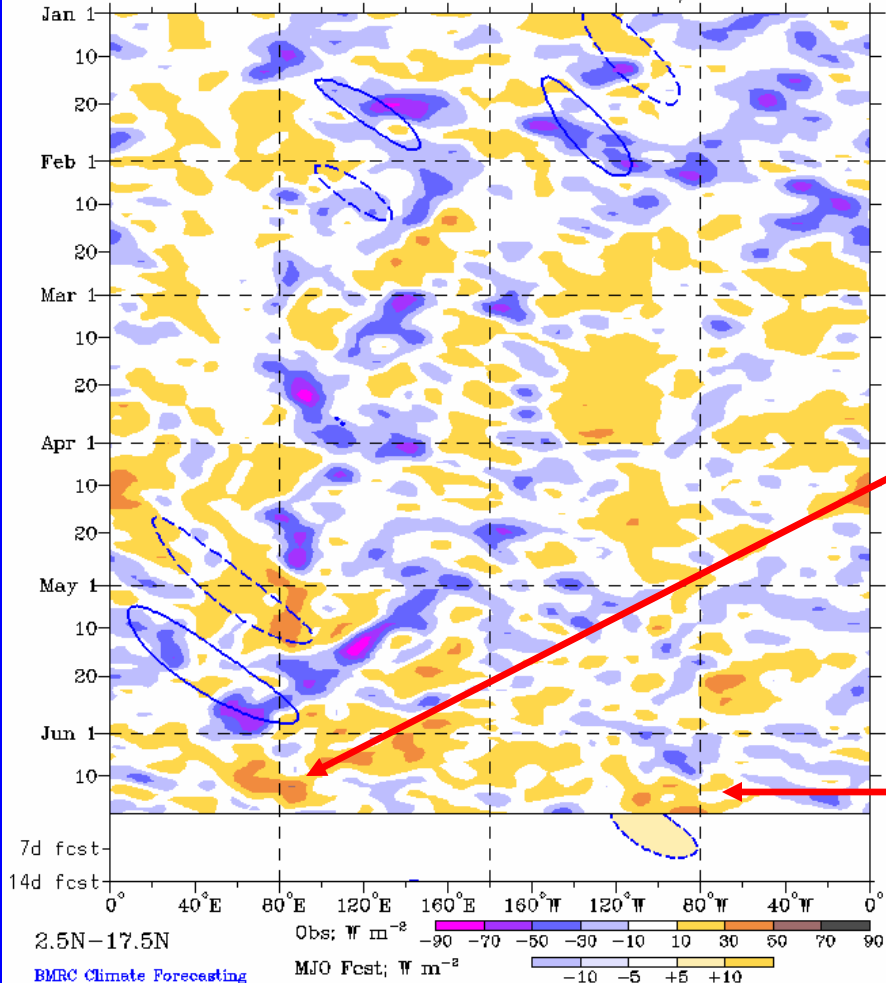
Enhanced convection is now evident across several areas in the Indian Ocean, Maritime Continent, and the western and central Pacific.

Enhanced convection in the Atlantic and Africa during the past week.



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

Real-time MJO filtering superimposed upon 3drn R21 OLR Anomalies
MJO anomalies blue contours, CINT=10. (5. for forecast)
Negative contours solid, positive dashed
1-Jan-2006 to 18-Jun-2006 + 14 days



Drier-than-average conditions (/red shading)
Wetter-than-average conditions (blue shading)

Time
↓

Strong suppressed convection for sections of India indicating a break in the monsoon.

Suppressed convection across the eastern Pacific and Central America during the past week.

Longitude

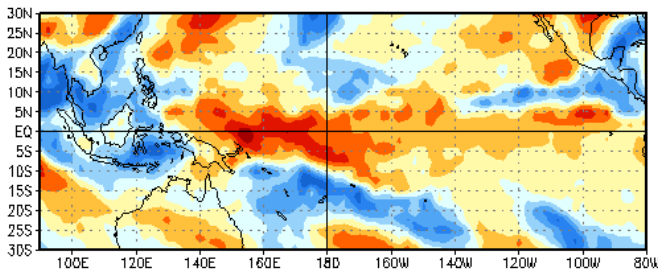
BMRC Climate Forecasting



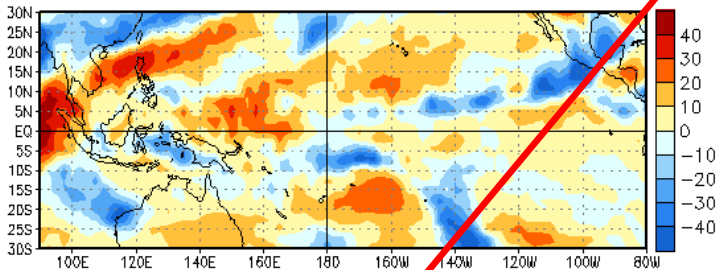
Anomalous OLR and 850-hPa Wind

Wind: Last 30 days

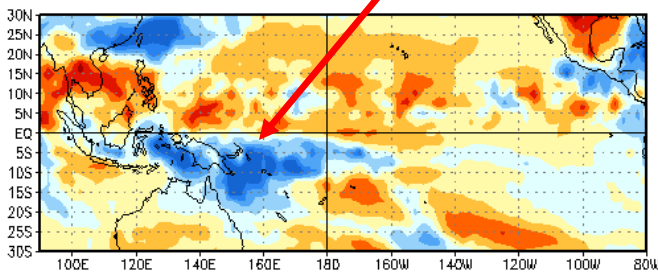
OLR Anomalies
16 MAY 2006 to 25 MAY 2006



26 MAY 2006 to 4 JUN 2006

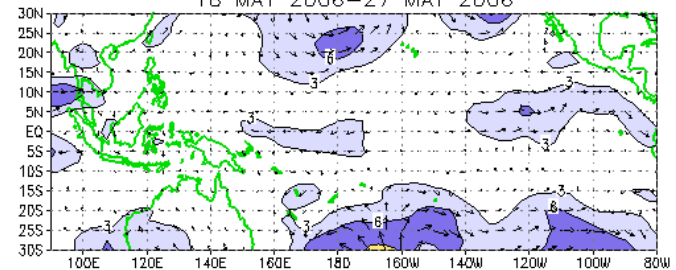


5 JUN 2006 to 14 JUN 2006

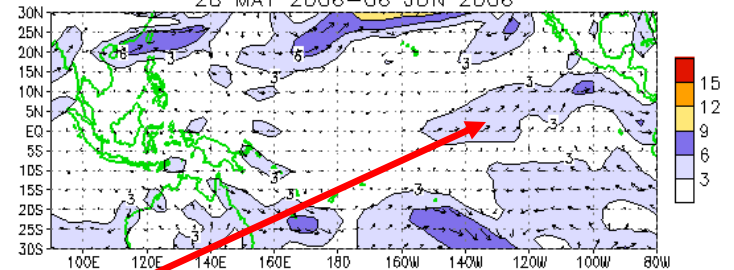


During the last ten days, wet conditions have returned to sections of the Maritime continent and western Pacific Ocean.

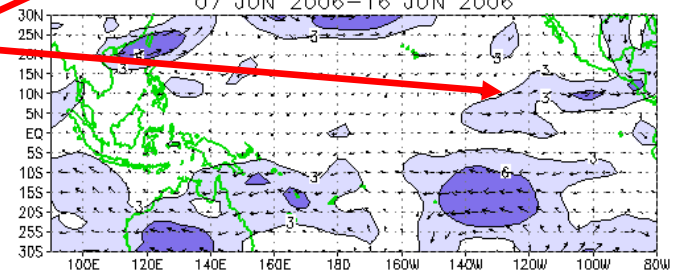
CDAS 850-hPa Wind Anoms
18 MAY 2006-27 MAY 2006



28 MAY 2006-06 JUN 2006



07 JUN 2006-16 JUN 2006



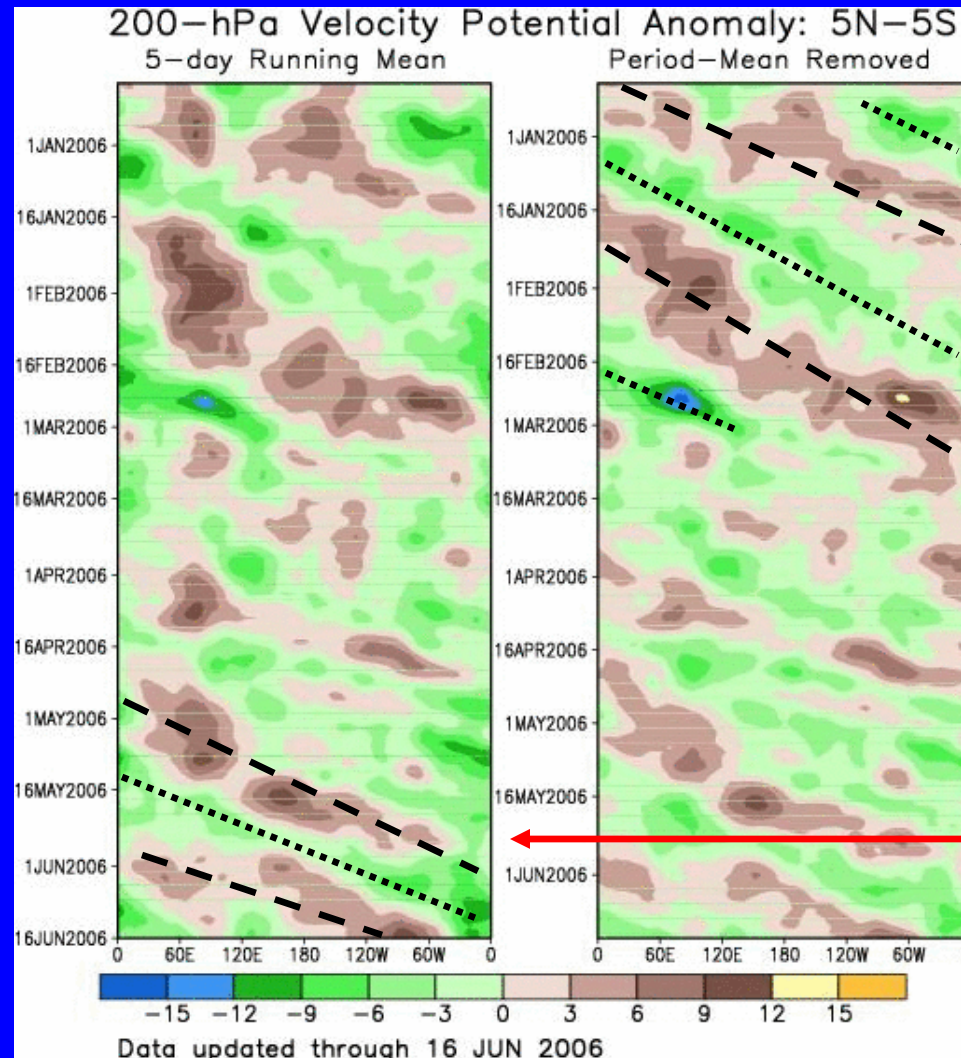
Westerly anomalies were evident in the eastern Pacific during the first half of June.



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.

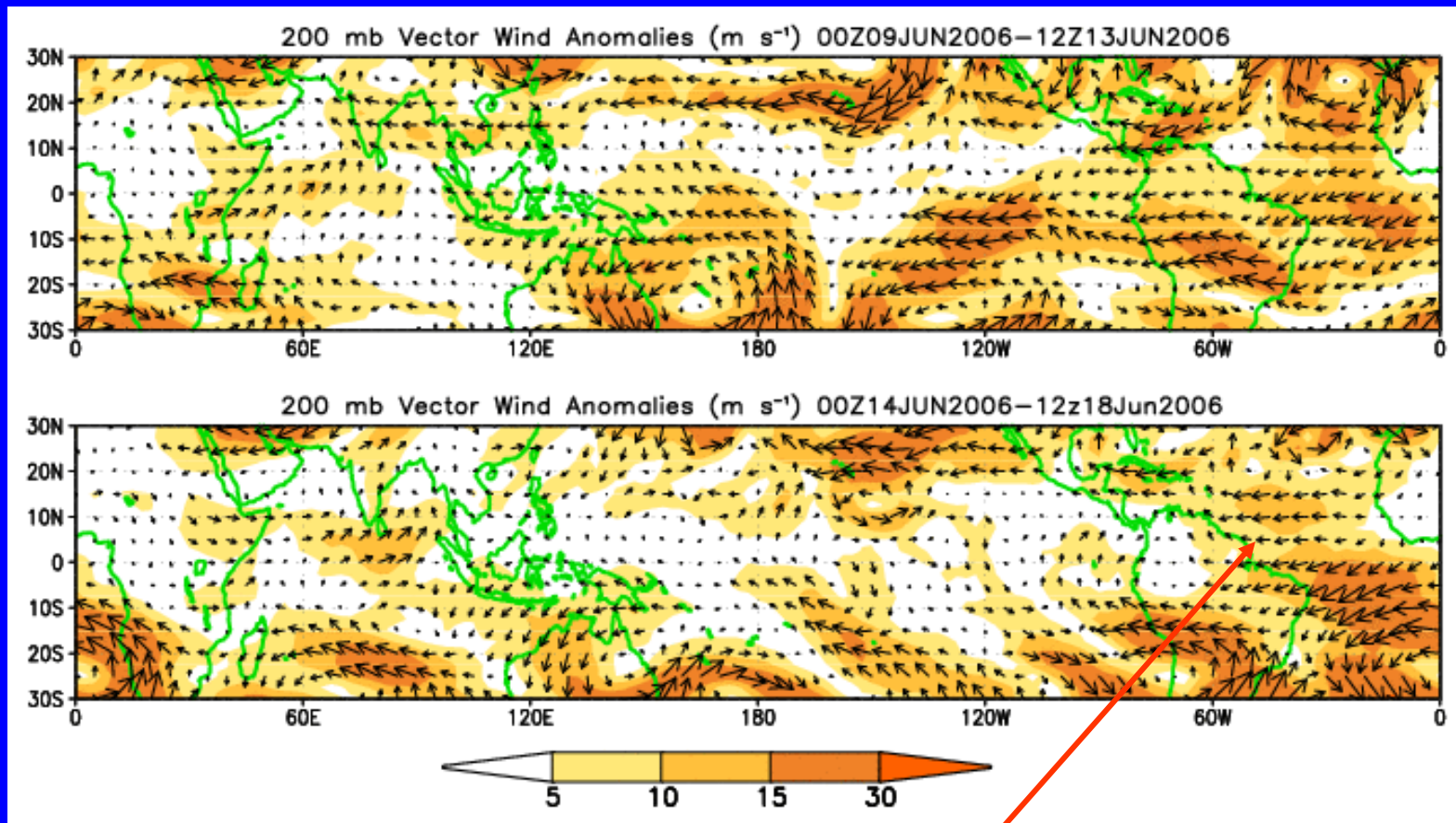
The MJO was incoherent during much of March and April.

MJO activity strengthened during May but remains weak.



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

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

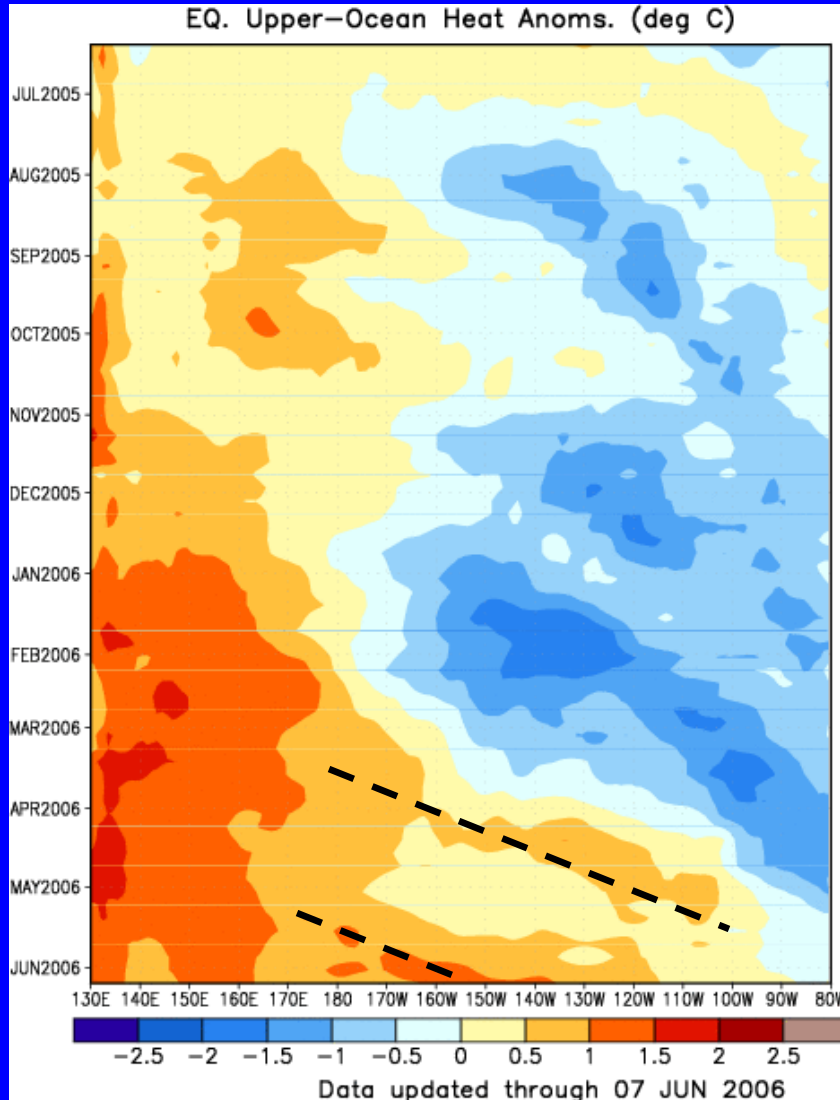


Easterly anomalies across the Atlantic.



Heat Content Evolution in the Eq. Pacific

Time



Longitude

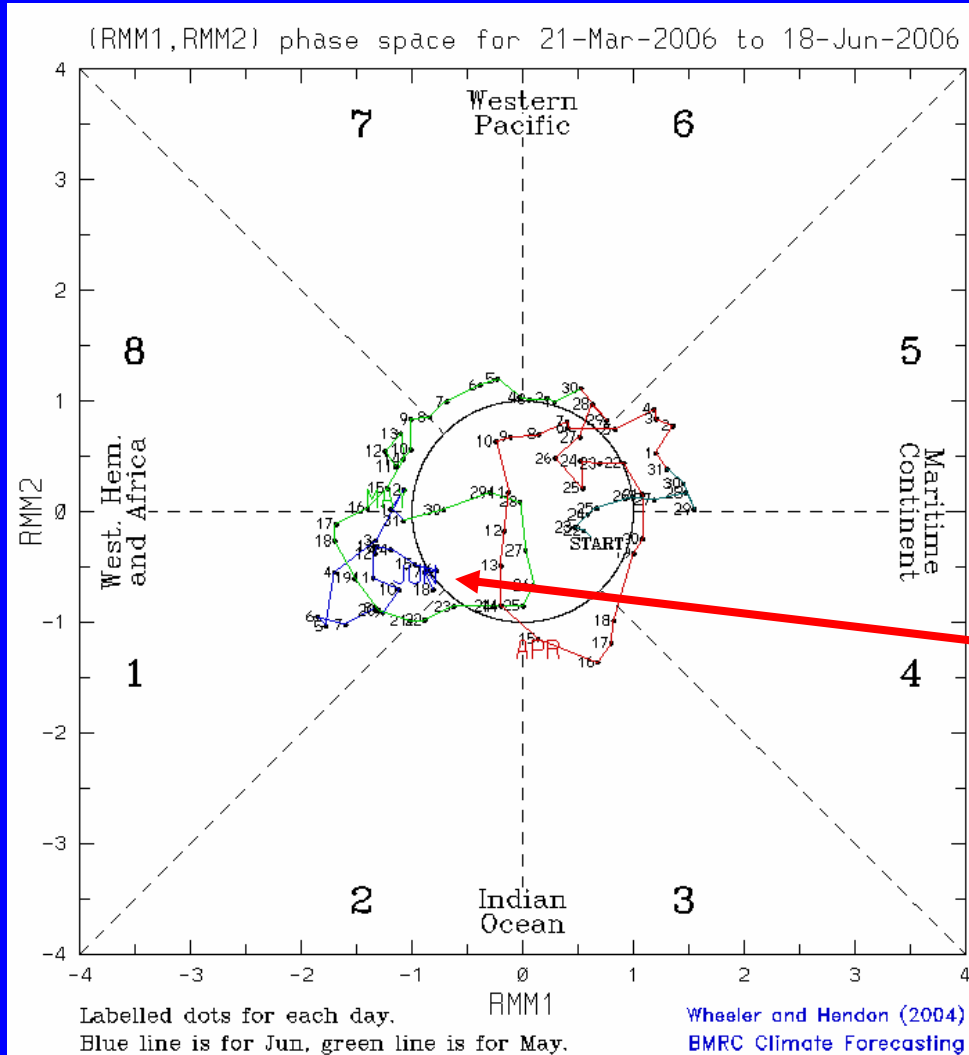
Above normal heat content expanded into the eastern Pacific during April and May 2006 associated with Kelvin wave activity.



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).

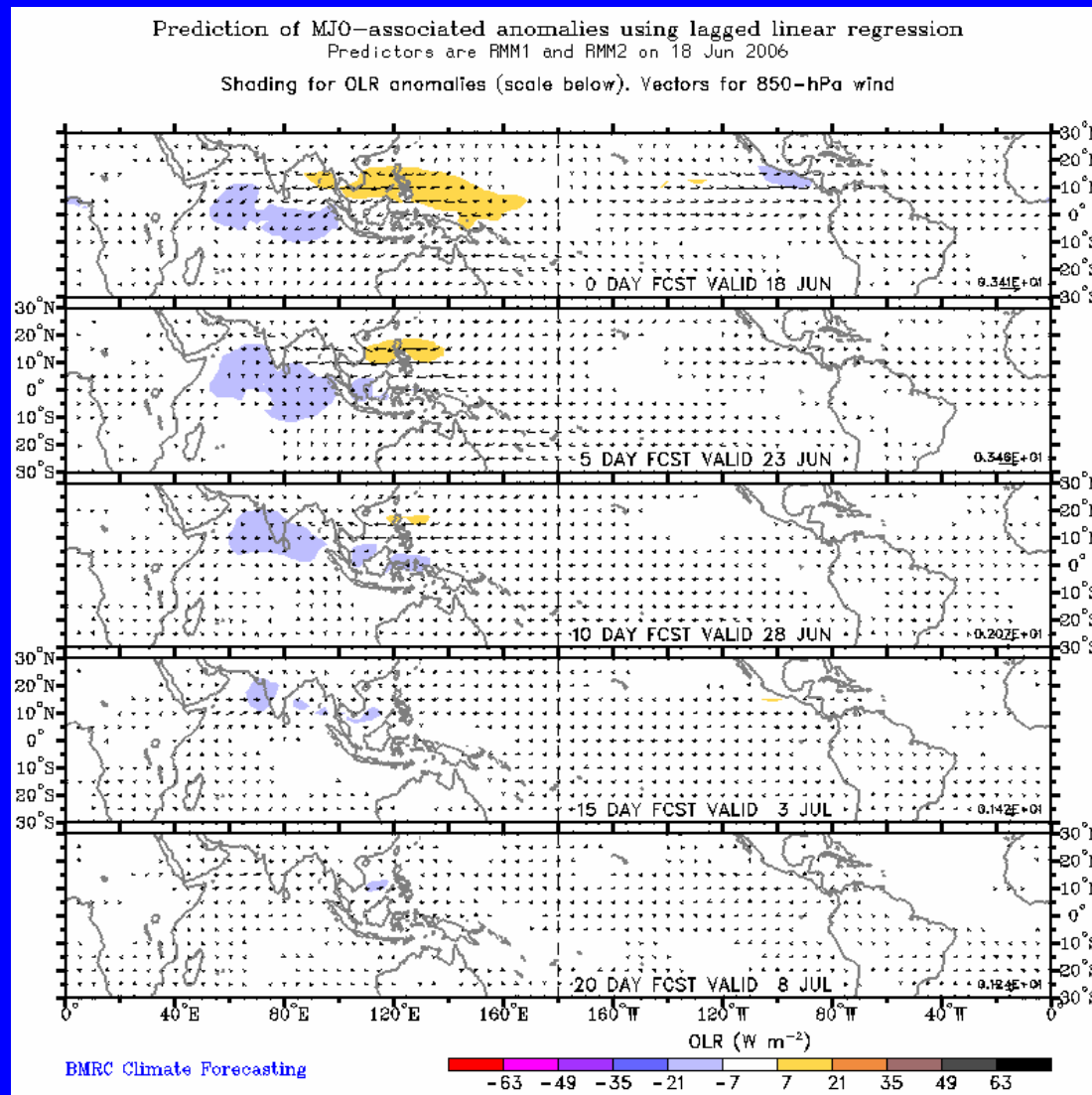
The axes represent the time series of the two leading modes of variability and are used to measure the amplitude while the triangular areas indicate the phase or location of the enhanced phase of the MJO. The farther away from the center of the circle the stronger the MJO. Different color lines indicate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



The MJO signal remains weak and centered over Africa.



Statistical OLR MJO Forecast

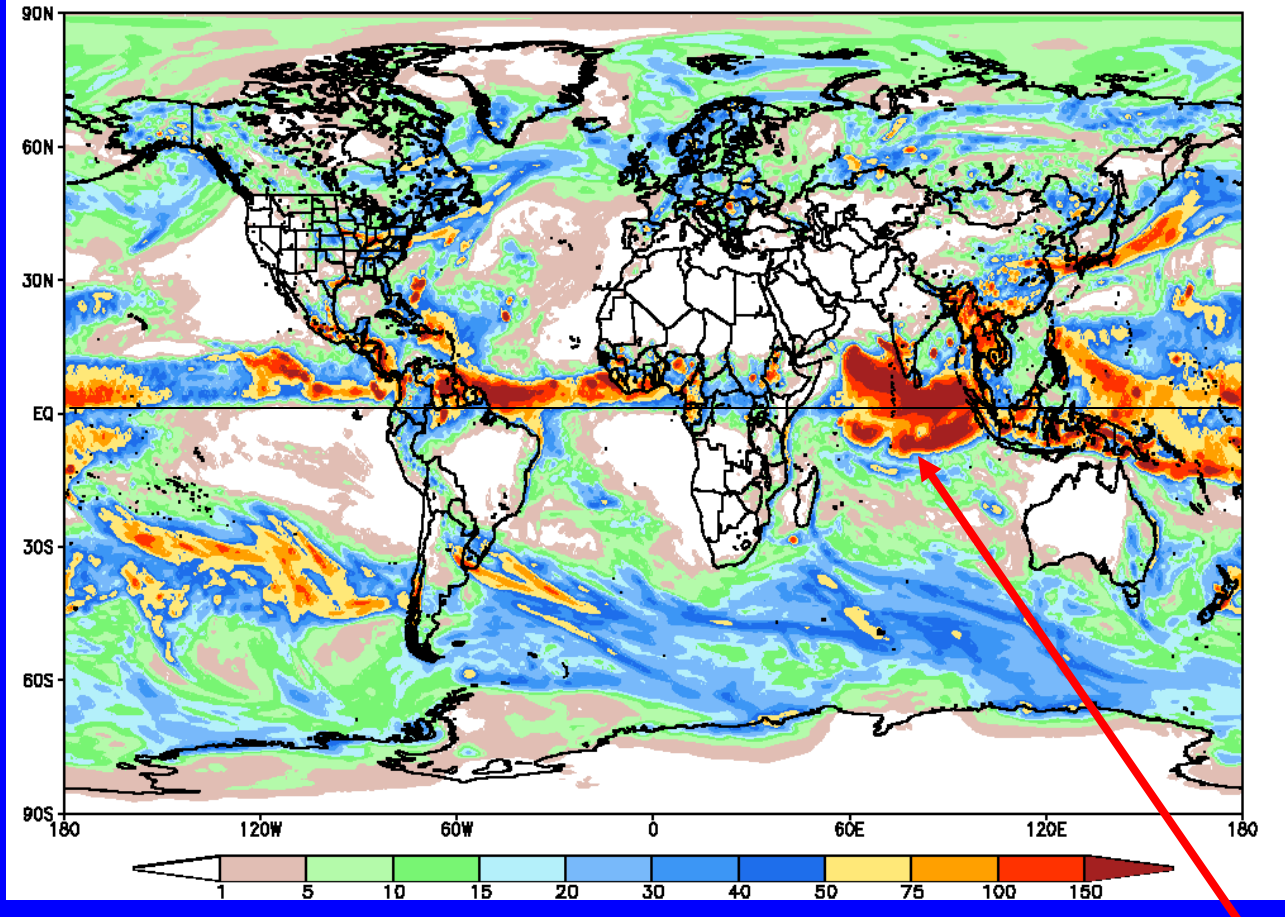


A statistical MJO forecast indicates enhanced convection in the Indian Ocean during the next ten days.



Global Forecast System (GFS) Week 1 Precipitation Forecast

NOAA GFS 37.5 km Week 1 Total Precipitation (mm)
Issued at Jun 19 2006 00Z for the period ending at Jun 26 2006 00Z

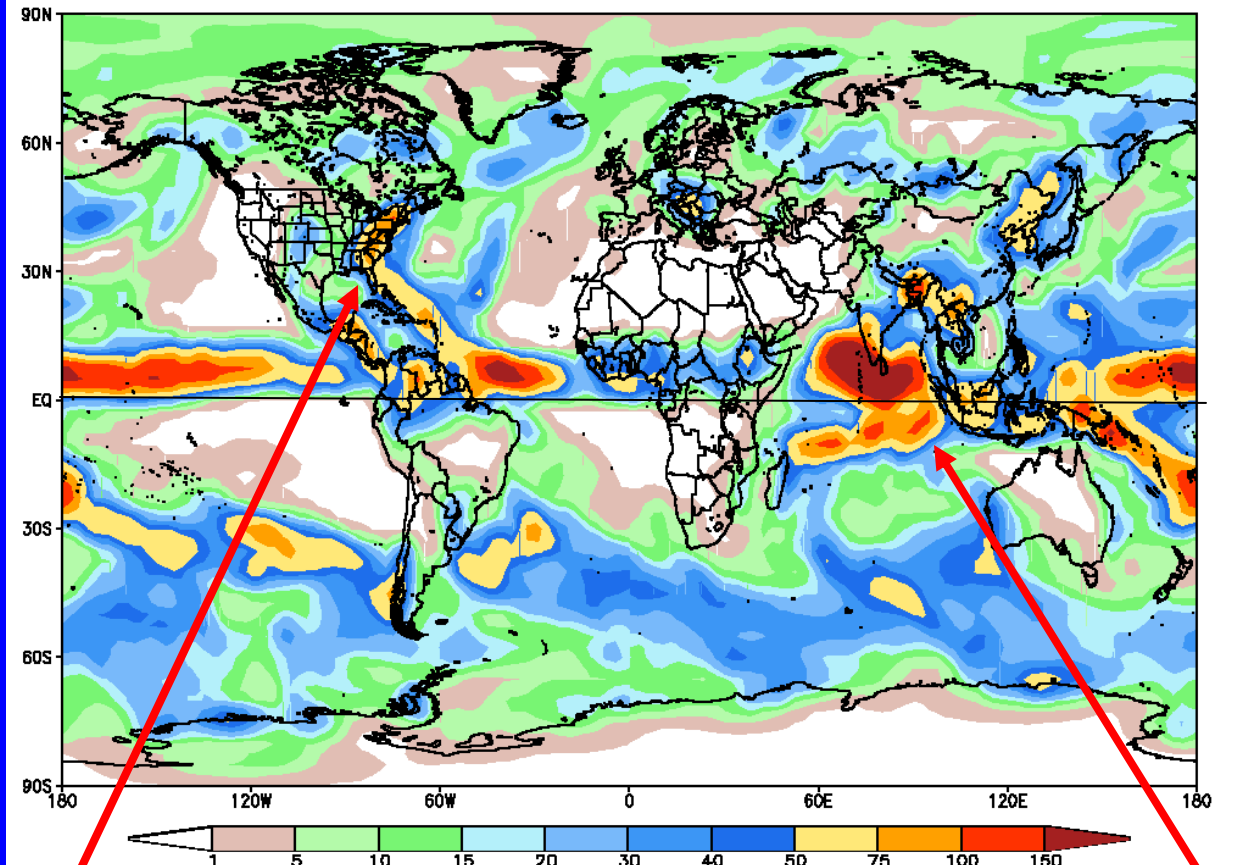


Abundant rainfall across
much of the Indian Ocean.



Global Forecast System (GFS) Week 2 Precipitation Forecast

NOAA GFS 100 km Week 2 Total Precipitation (mm)
Issued Jun 19 2006 00Z for the period ending at Jul 2 2006 00Z



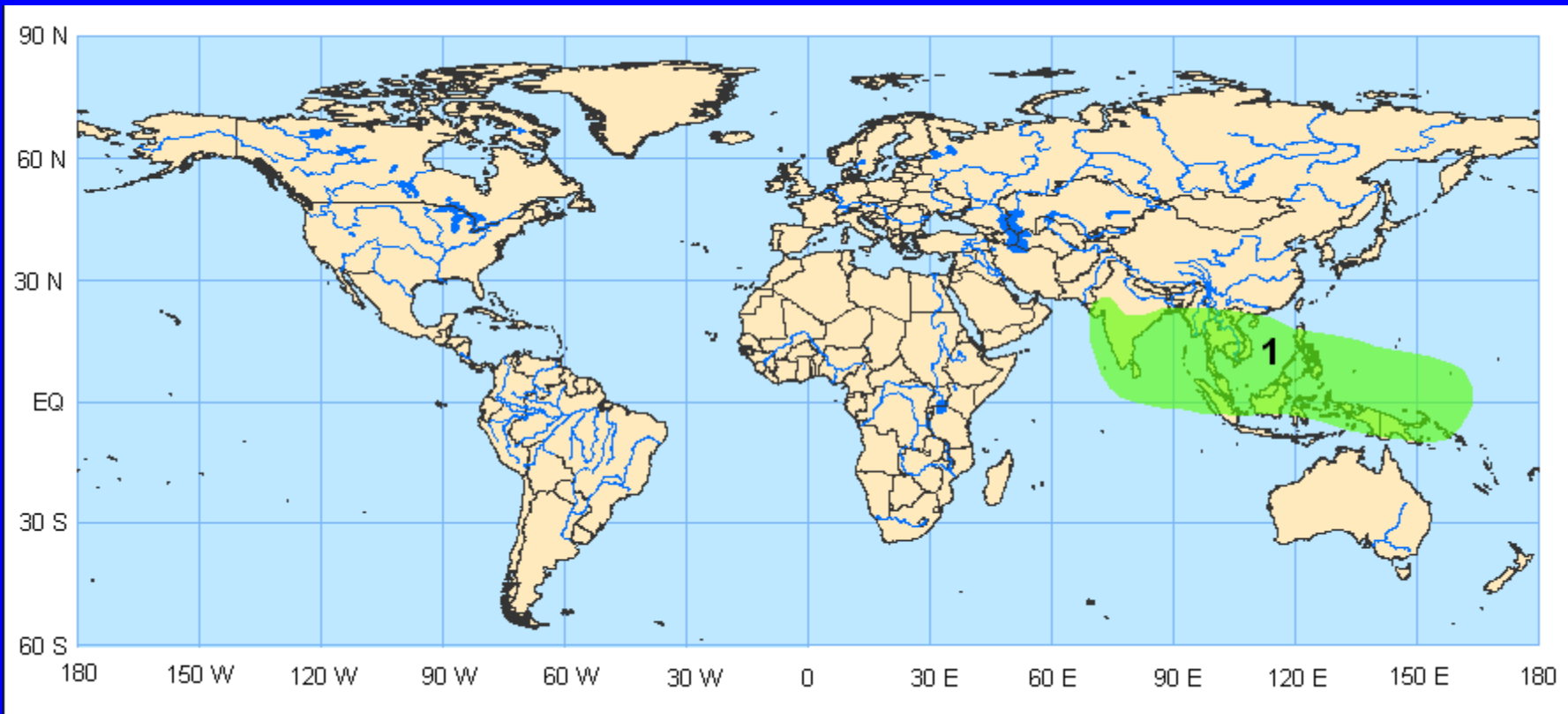
Tropical moisture may impact the eastern US.

Rainfall expected to remain during week 2 across the Indian Ocean.



Potential Benefits/Hazards – Week 1

Valid June 20 – June 26, 2006

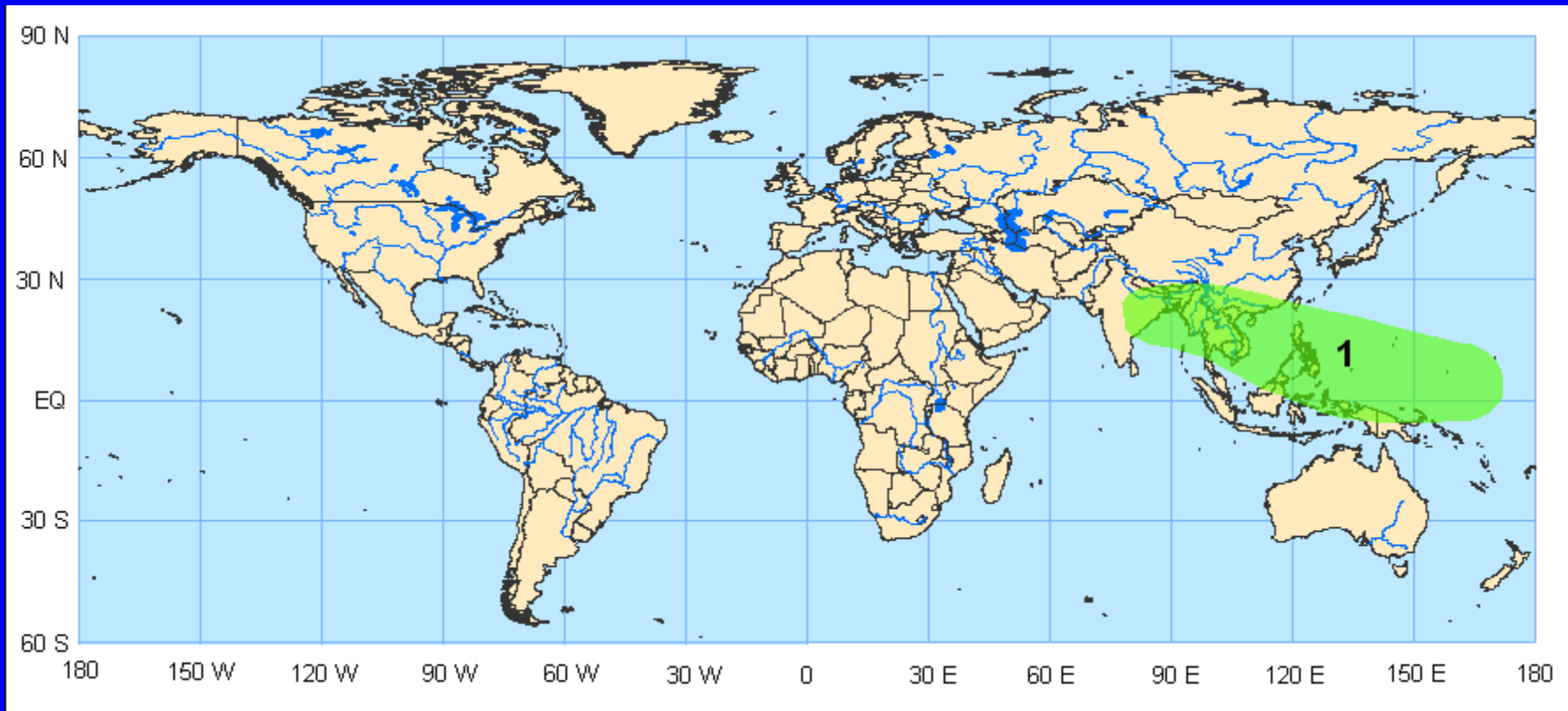


1. Increased chance of above normal rainfall for sections of India, southeast Asia, the Maritime Continent, and the Philippines.



Potential Benefits/Hazards – Week 2

Valid June 27 – July 3, 2006



1. Increased chance of above normal rainfall for sections of India, southeast Asia, the Maritime Continent, the western Pacific Ocean, and the Philippines.



Summary

- 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 of above normal rainfall for sections of India, southeast Asia, the Maritime continent, and the Philippines. The threat of above average rainfall in the eastern Hemisphere is anticipated to shift northeast during week 2.
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