

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

Update prepared by
Climate Prediction Center / NCEP
October 2, 2006

Outline

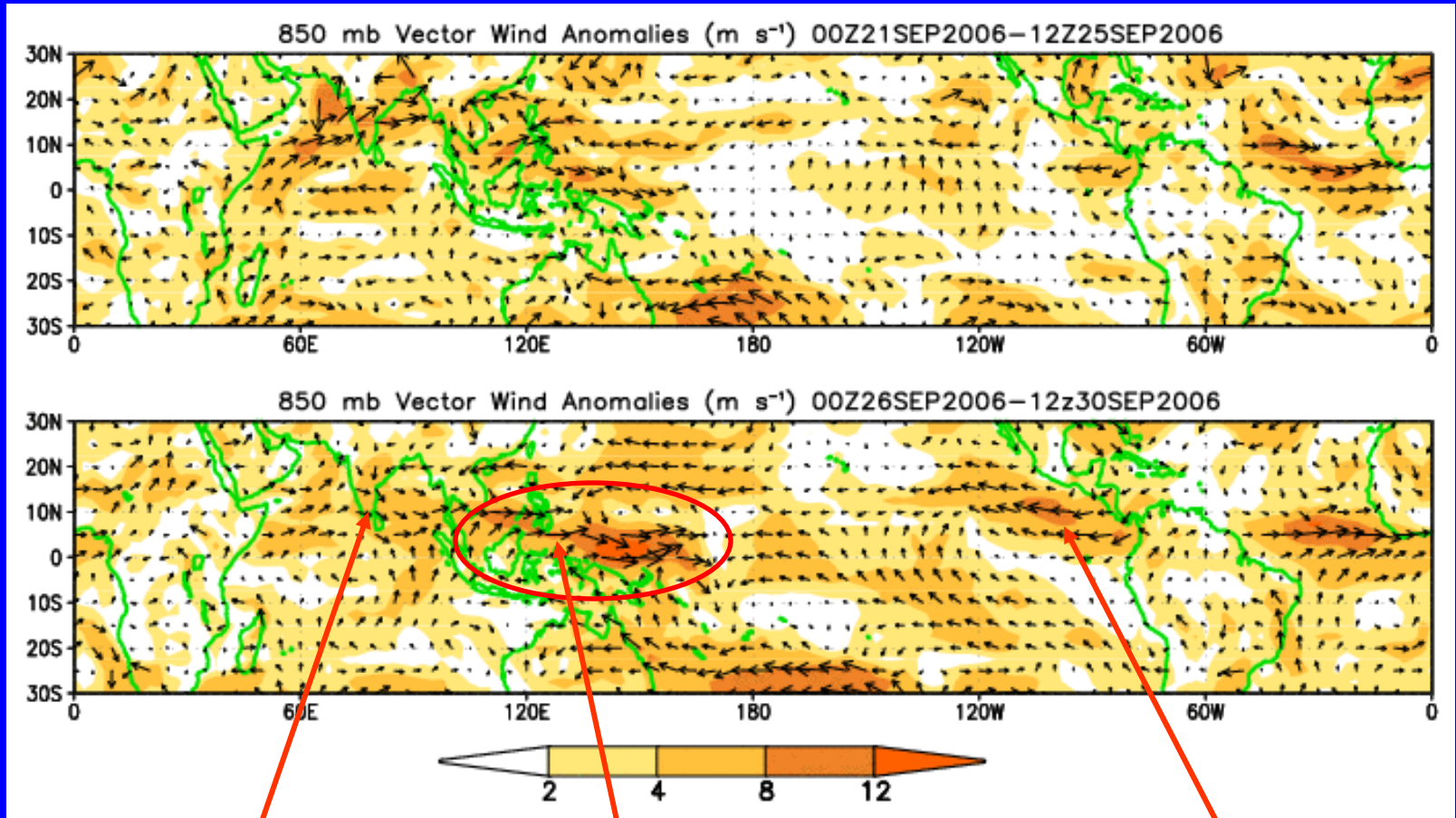
- **Overview**
- **Recent Evolution and Current Conditions**
- **Madden Julian Oscillation Forecast**
- **Summary**

Overview

- The latest observations indicate that a moderate MJO has developed.
- Potential benefits/hazards during week 1 include an increased chance for above (below) average rainfall for the western and south-central Pacific Ocean (eastern Indian Ocean and Indonesia). In addition, increased chances of below average rainfall also exist for the Caribbean Sea and tropical Atlantic. Favorable conditions for tropical cyclogenesis exist for the western Pacific Ocean.
- During week 2, below average rainfall is expected for the Maritime Continent with an increased chance of above average rainfall for the eastern Pacific. Favorable conditions for tropical cyclogenesis may develop over the eastern Pacific.

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

Note that shading denotes the magnitude of the anomalous wind vectors

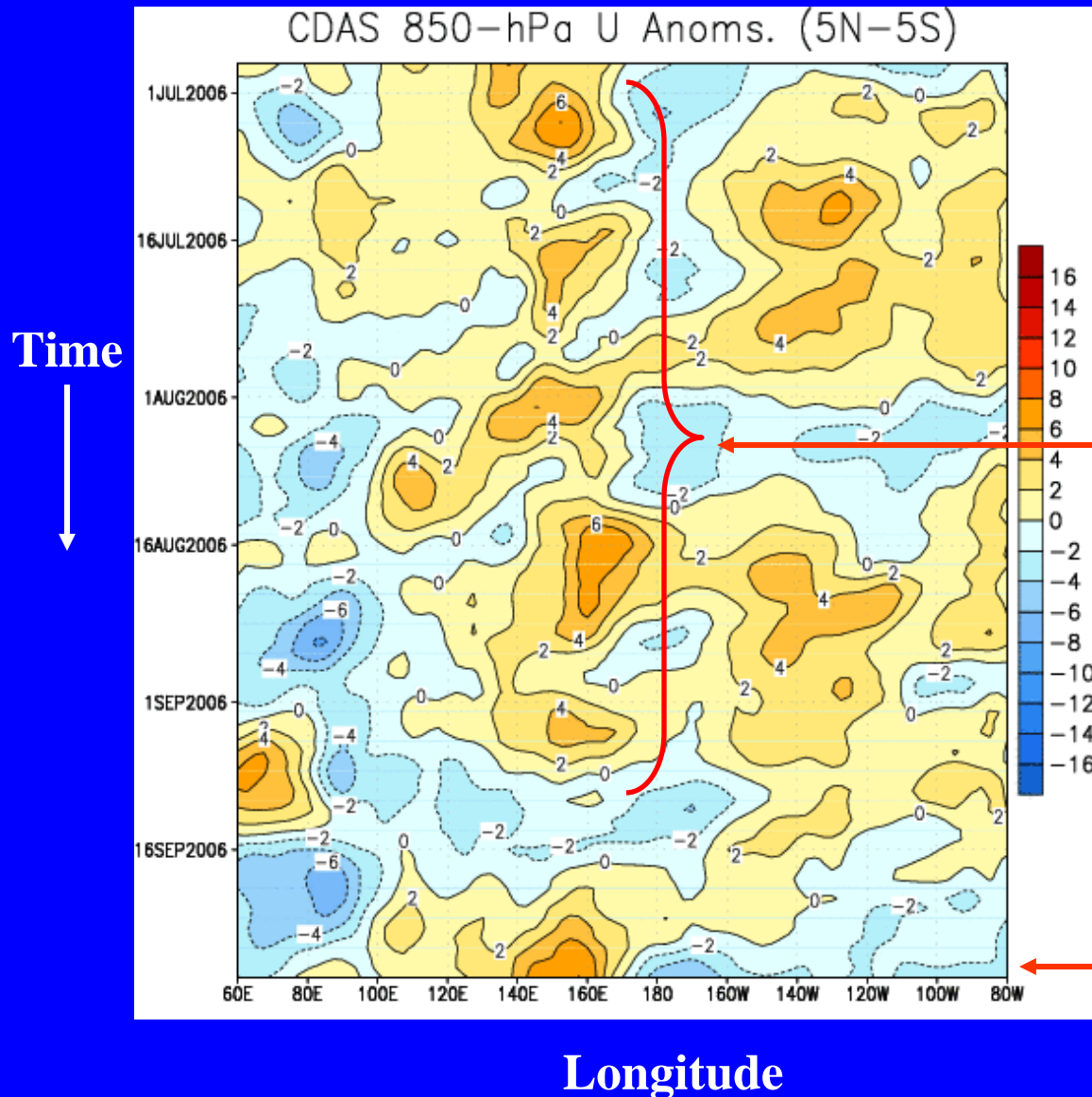


Monsoonal flow has weakened across India.

Westerly anomalies prevail from the South China Sea to the Date Line.

Easterly anomalies have strengthened in the eastern Pacific.

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



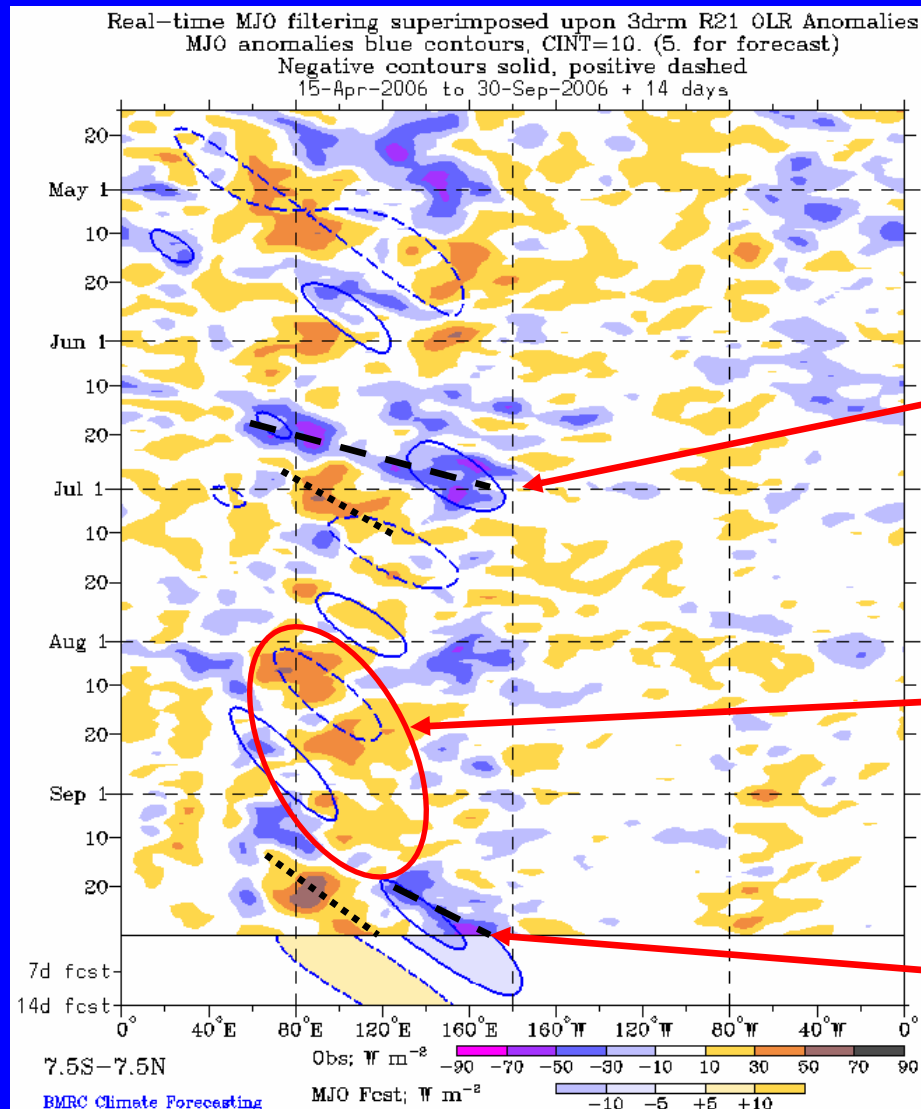
Weaker-than-average easterlies or westerlies (orange/red shading)

Stronger-than-average easterlies (blue shading)

From July until early September, anomalous westerly wind “bursts” were observed just west of the Date line. Also westerly anomalies were persistent in the eastern Pacific ocean.

Since mid-September, westerly anomalies have returned to the western Pacific along with easterly anomalies near and east of the Date line.

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



Drier-than-average conditions (/red shading)

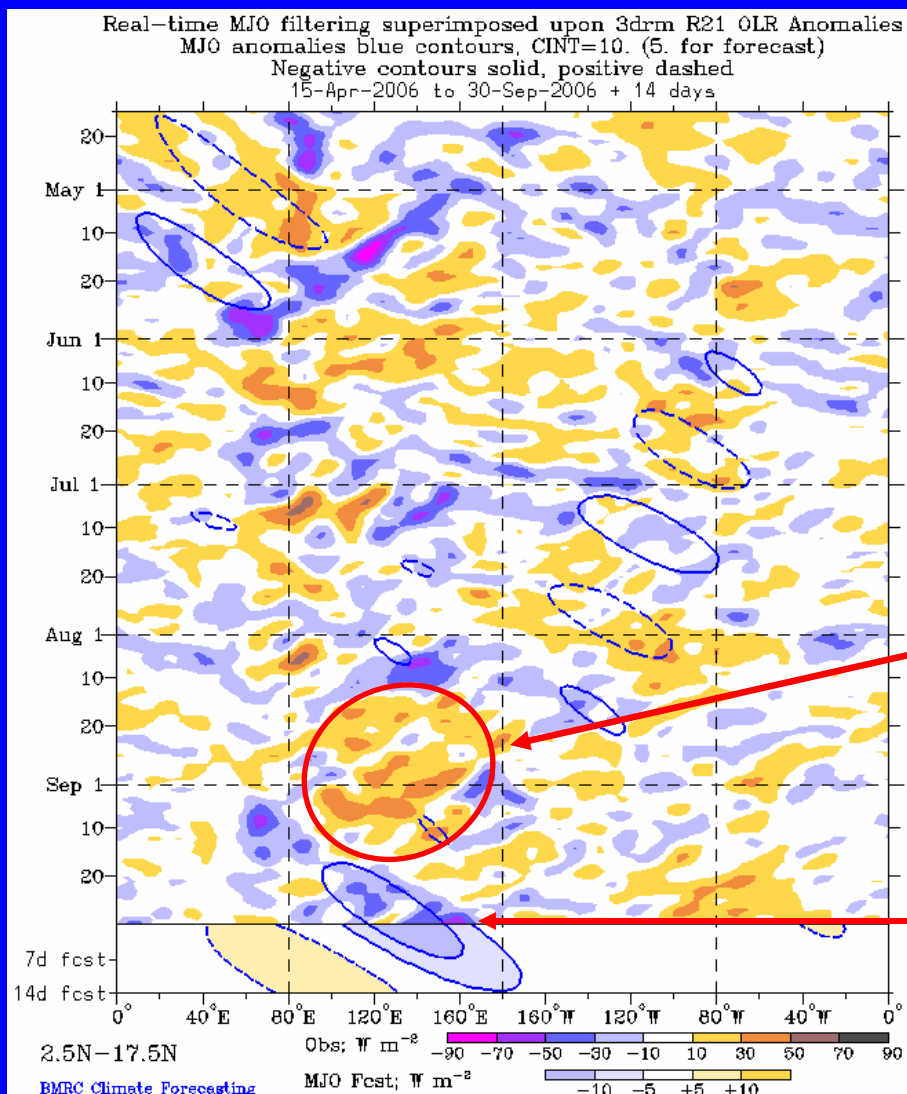
Wetter-than-average conditions (blue shading)

Coherent OLR anomalies moved across the Eastern Hemisphere in June.

Through August and the beginning of September, generally dry conditions were observed for the eastern Indian Ocean and the Maritime Continent.

Recently, wet conditions have spread from the west into the central Pacific, while dry conditions are present in the Indian Ocean.

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



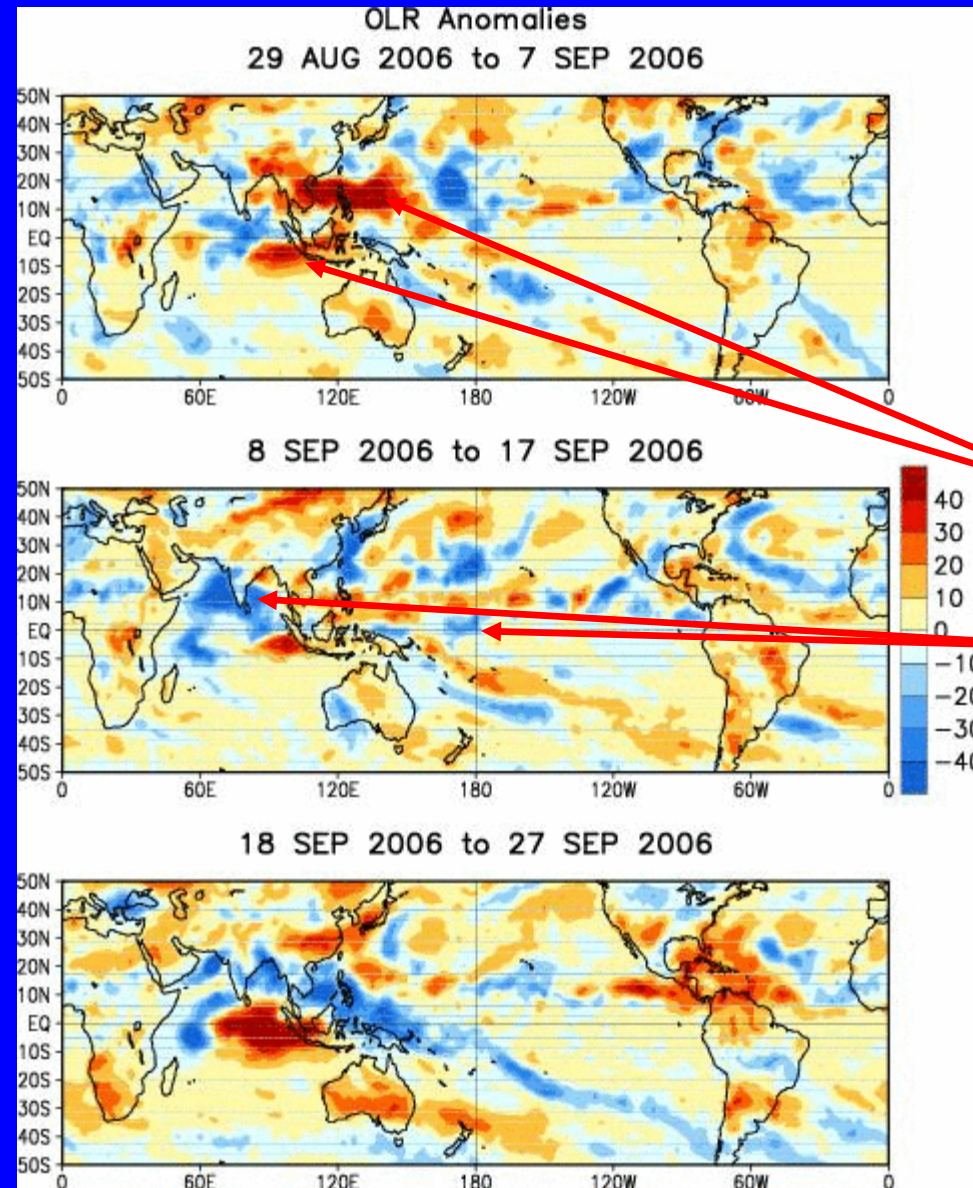
Drier-than-average conditions (/red shading)

Wetter-than-average conditions (blue shading)

Since mid-August through mid-September, generally dry conditions were evident north of the equator across Indonesia and the western Pacific.

Recently, however, wetter than average conditions have been observed over the Maritime continent.

Anomalous OLR: Last 30 days



Drier-than-average conditions (/red shading)

Wetter-than-average conditions (blue shading)

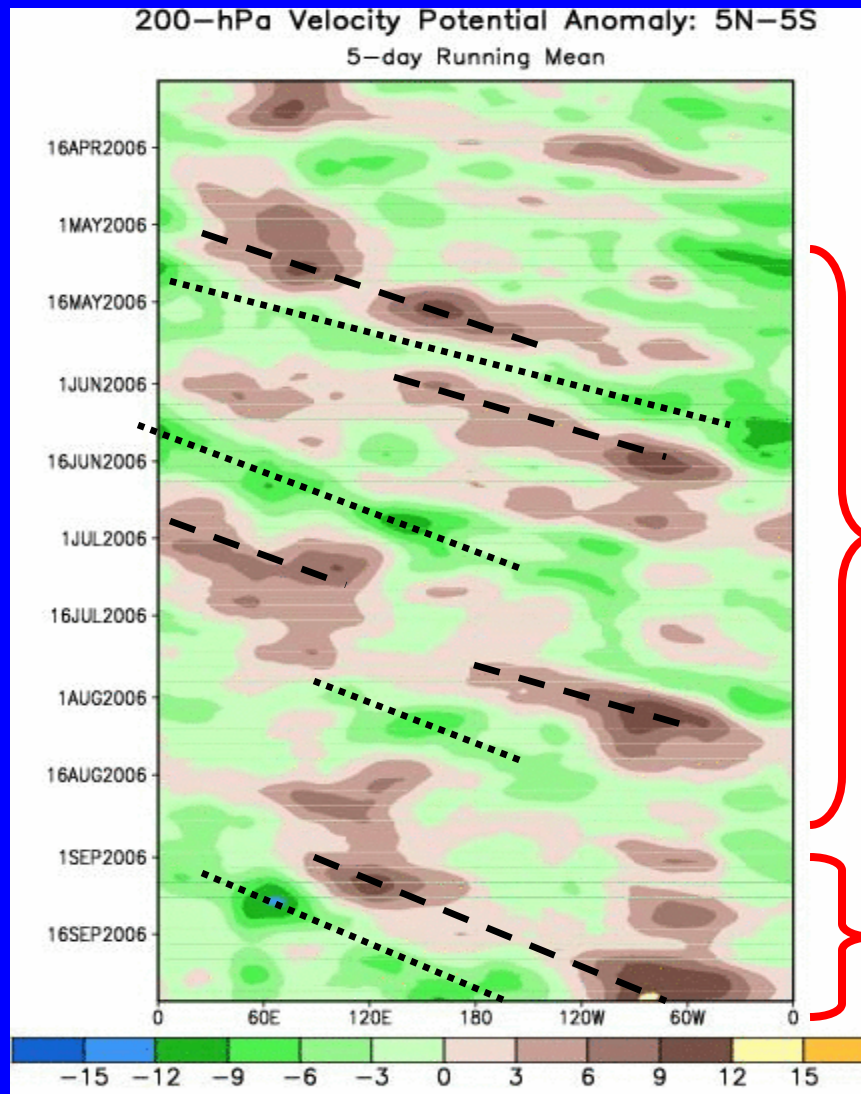
During mid-August to early-September, dry conditions impacted areas in and around the Maritime Continent. Wetter conditions were observed in the Indian ocean and near the date line.

During the most recent ten days, wet conditions have shifted east into Southeast Asia. Dry conditions are observed in the central and eastern equatorial Indian Ocean.

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
↓



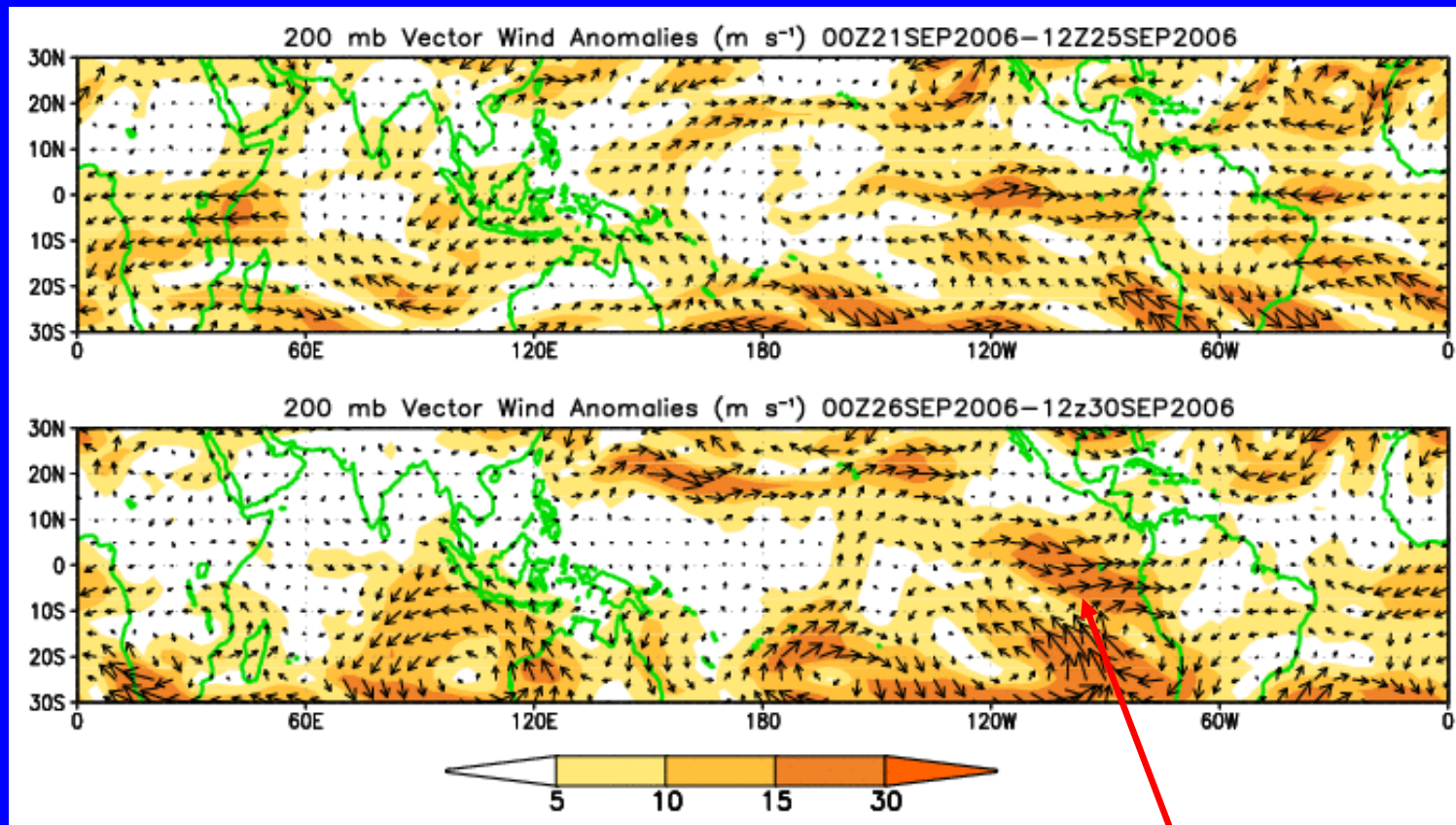
Longitude

MJO activity strengthened some during parts of May through June and early August but remained weak.

Recently, upper-level divergence (convergence) over Africa/Indian ocean (Maritime Continent/western Pacific) has shifted east.

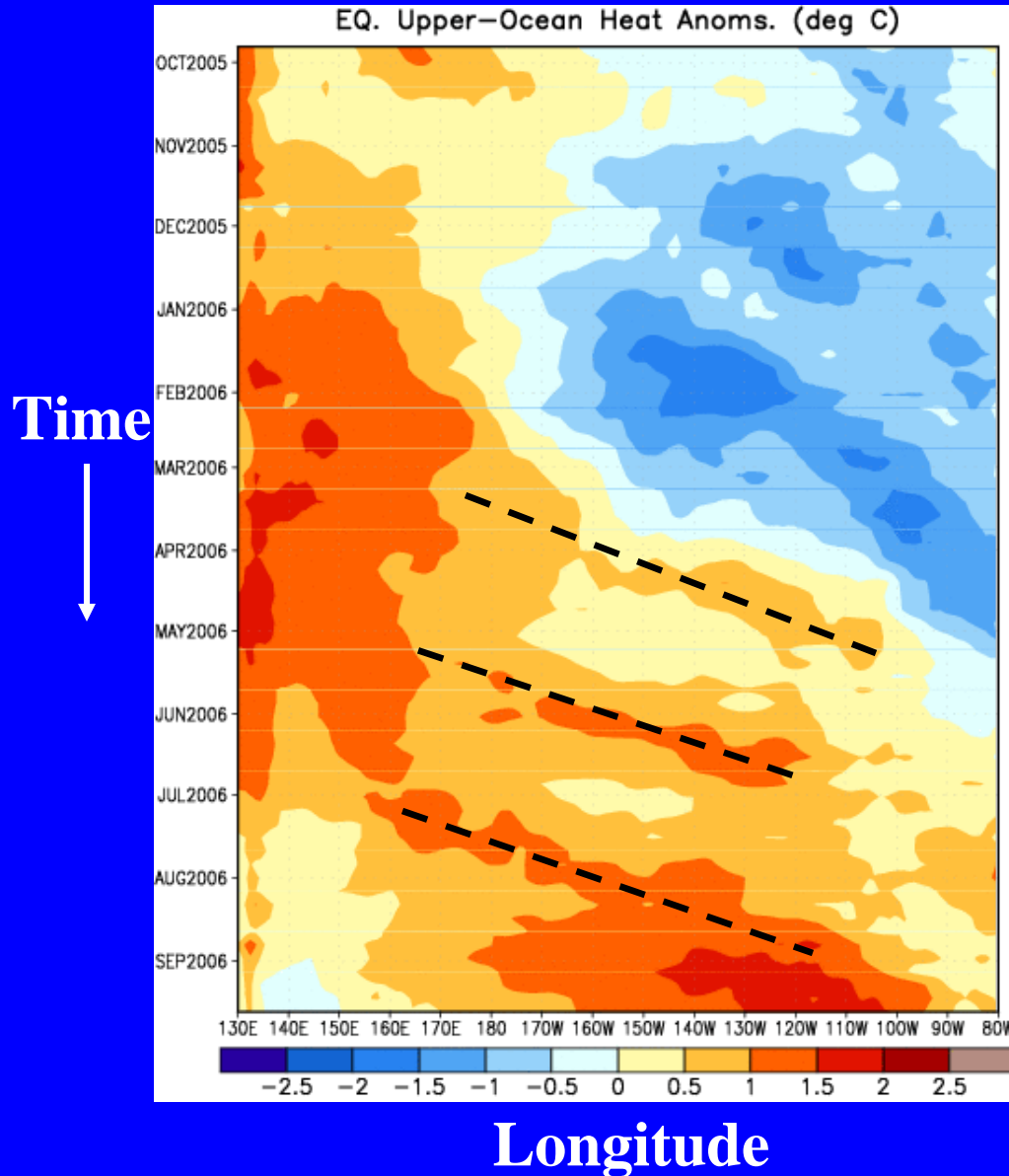
200-hPa Vector Winds and Anomalies (m s^{-1})

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



Westerly anomalies
are observed in the
eastern Pacific Ocean.

Heat Content Evolution in the Eq. Pacific

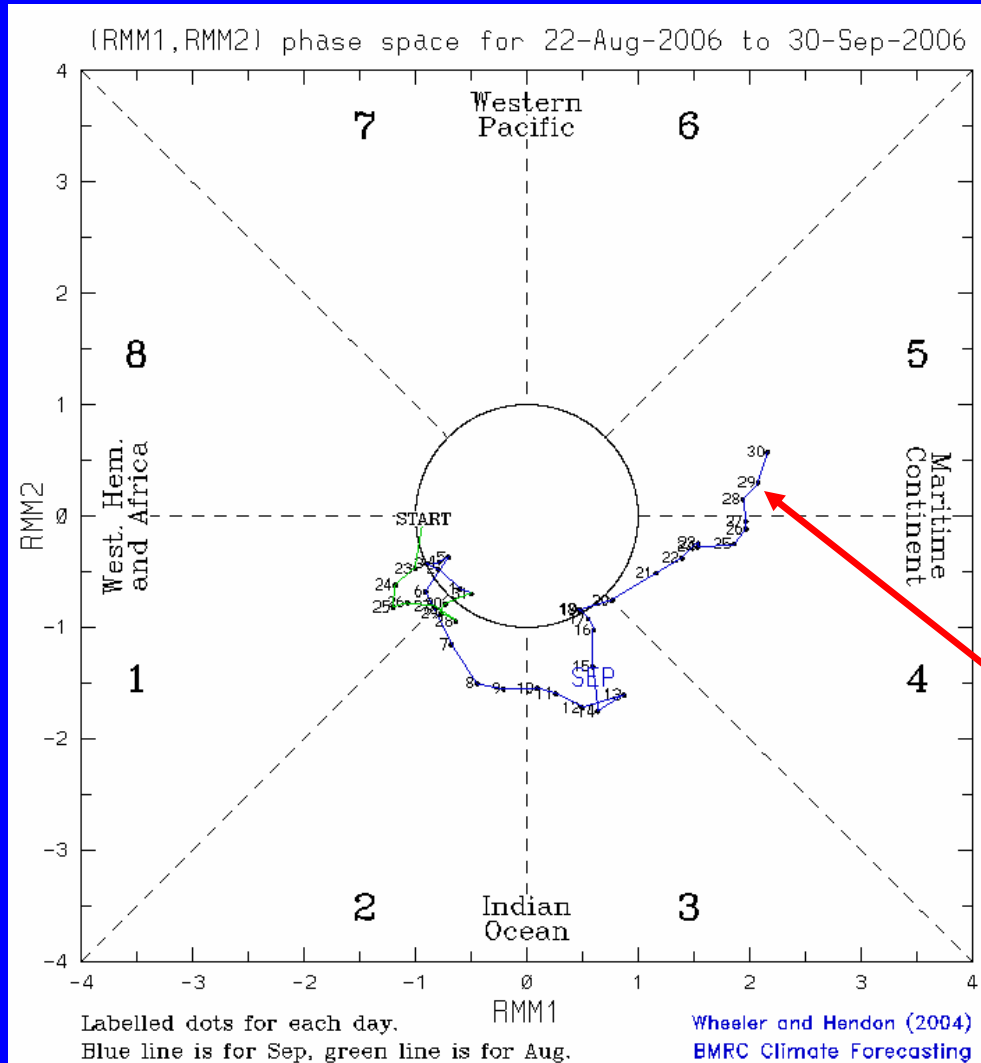


Starting in April, above normal upper oceanic water temperatures expanded from the western Pacific into the eastern Pacific in part due to Kelvin wave activity.

MJO Index (Magnitude and Phase)

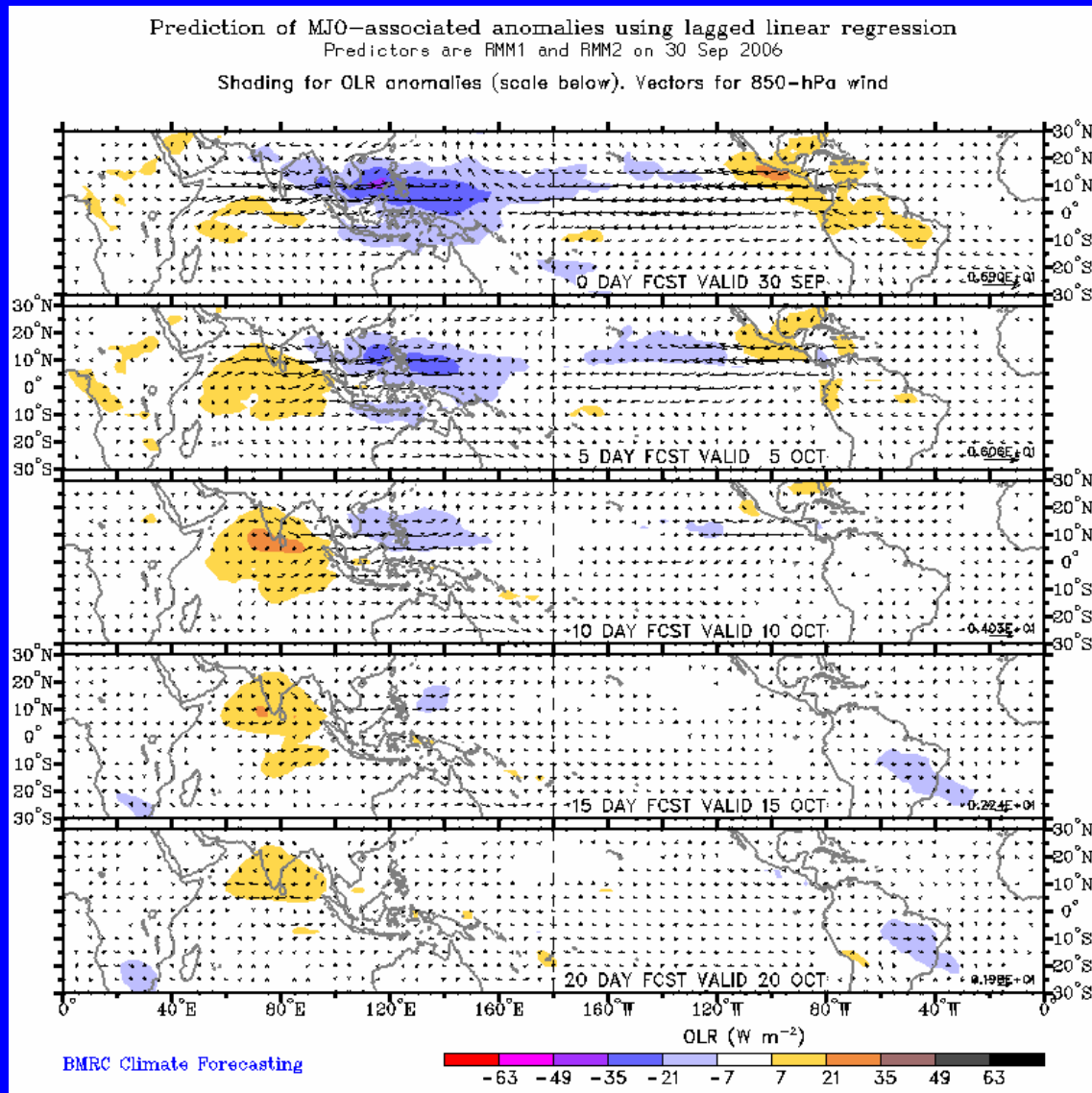
The current state of the MJO as determined by an index based on Empirical Orthogonal Function (EOF) analysis using combined fields of near-equatorially-averaged 850 hPa zonal wind, 200 hPa zonal wind, and satellite-observed outgoing longwave radiation (OLR) (Wheeler and Hendon, 2004).

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.



A moderate MJO has developed.

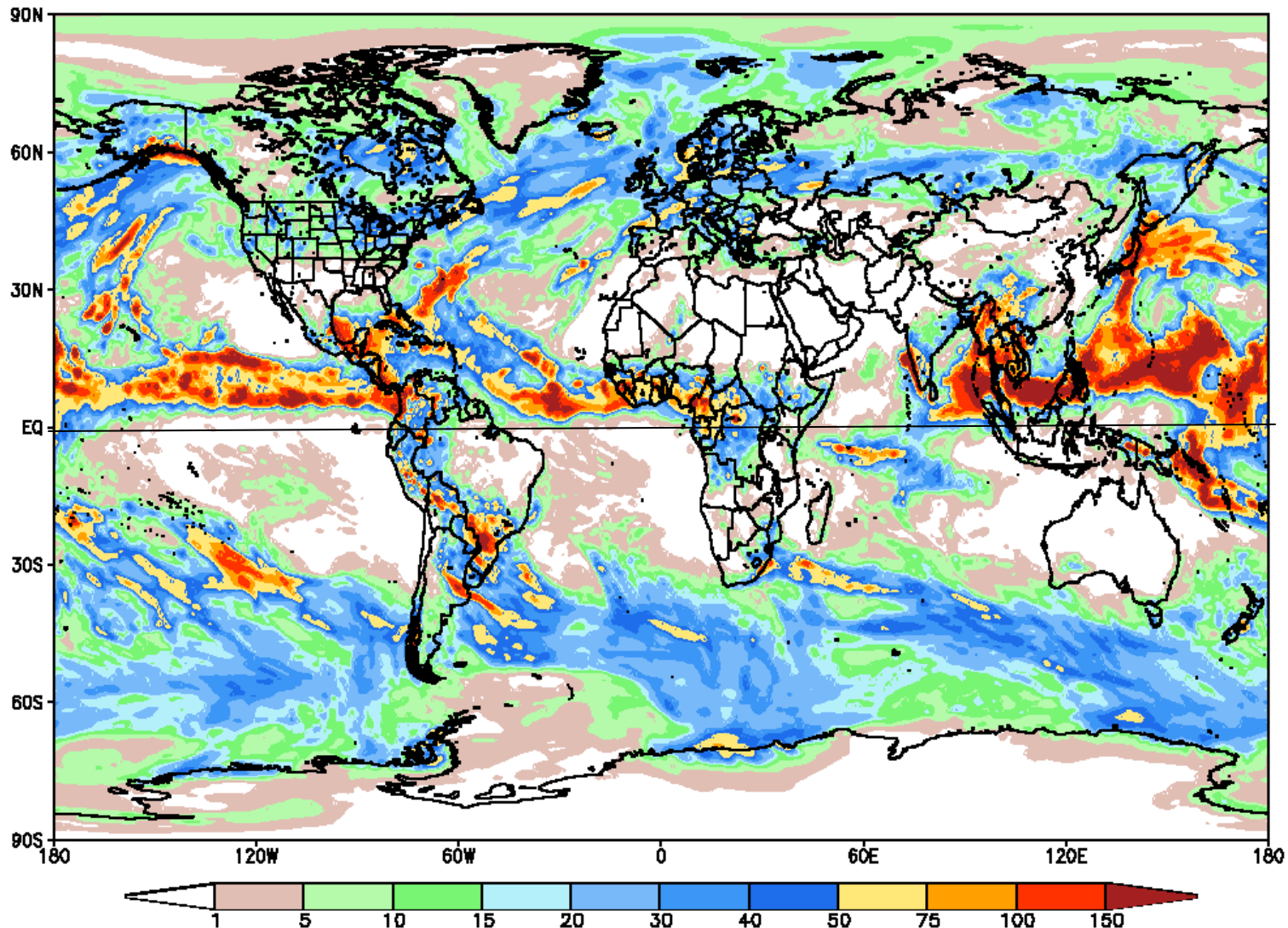
Statistical OLR MJO Forecast



Enhanced convection is forecast for the western and central Pacific Ocean with drier than normal conditions across the Indian Ocean.

Global Forecast System (GFS) Week 1 Precipitation Forecast

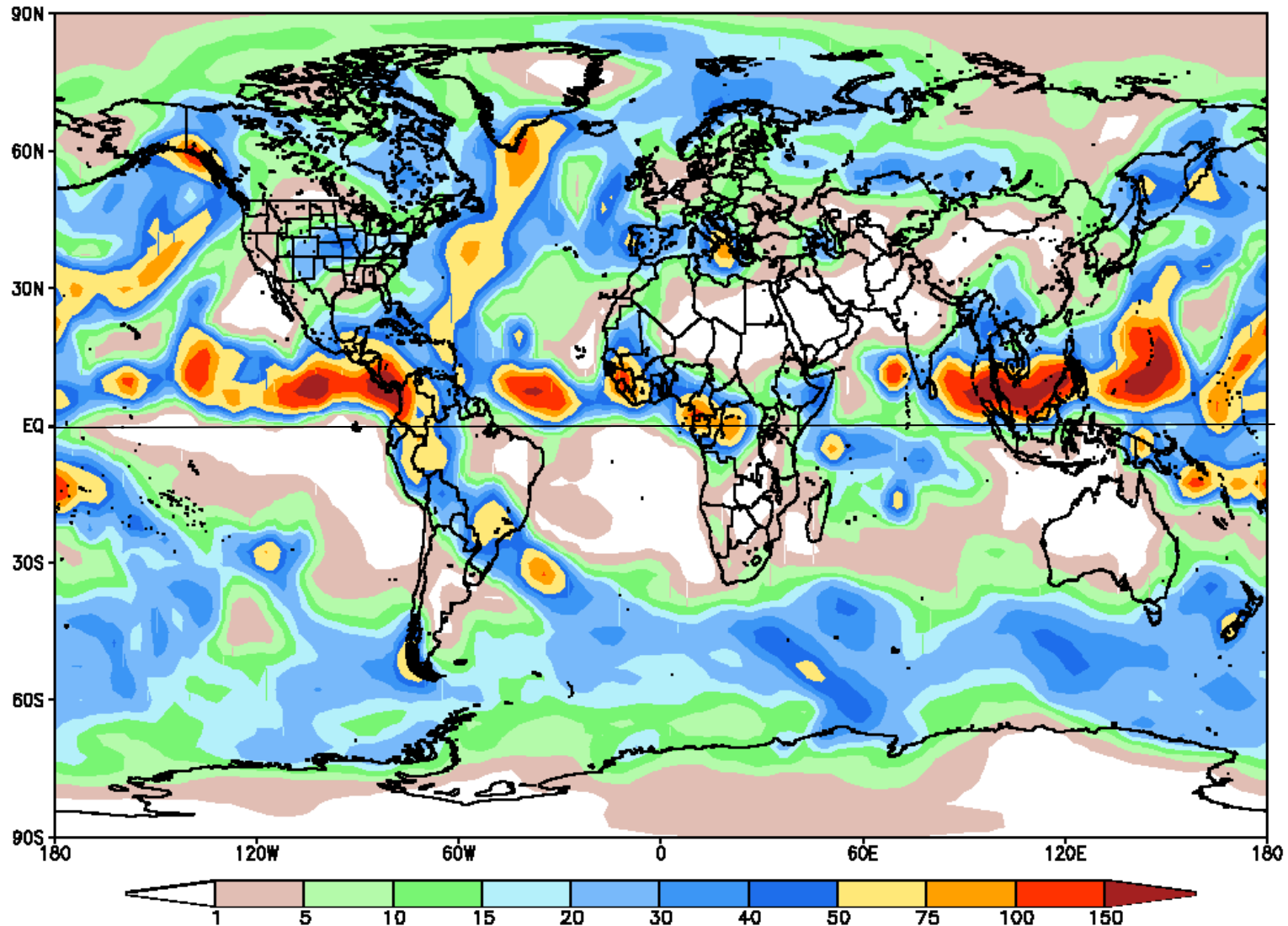
NOAA GFS 37.5 km Week 1 Total Precipitation (mm)
Issued at Oct 02 2006 00Z for the period ending at Oct 9 2006 00Z



Global Forecast System (GFS) Week 2

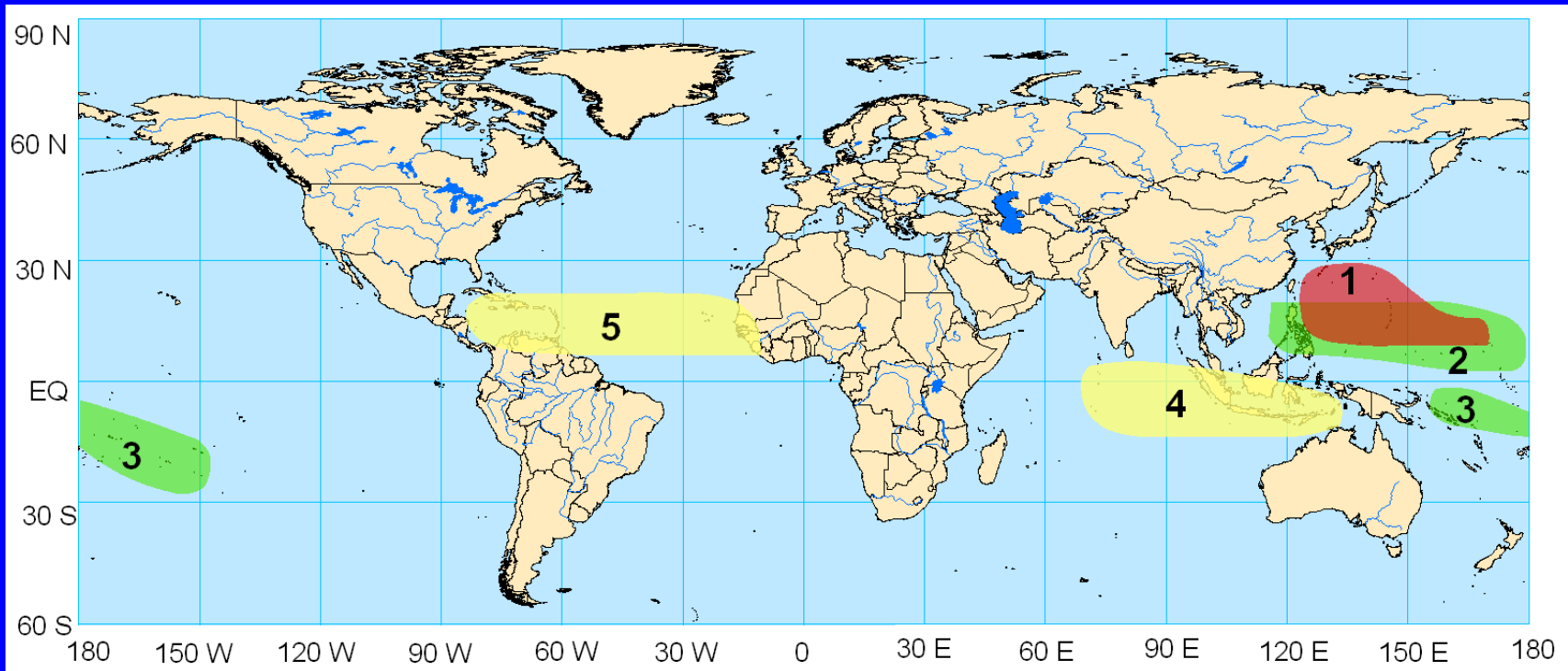
Precipitation Forecast

NOAA GFS 100 km Week 2 Total Precipitation (mm)
Issued Oct 2 2006 00Z for the period ending at Oct 15 2006 00Z



Potential Benefits/Hazards – Week 1

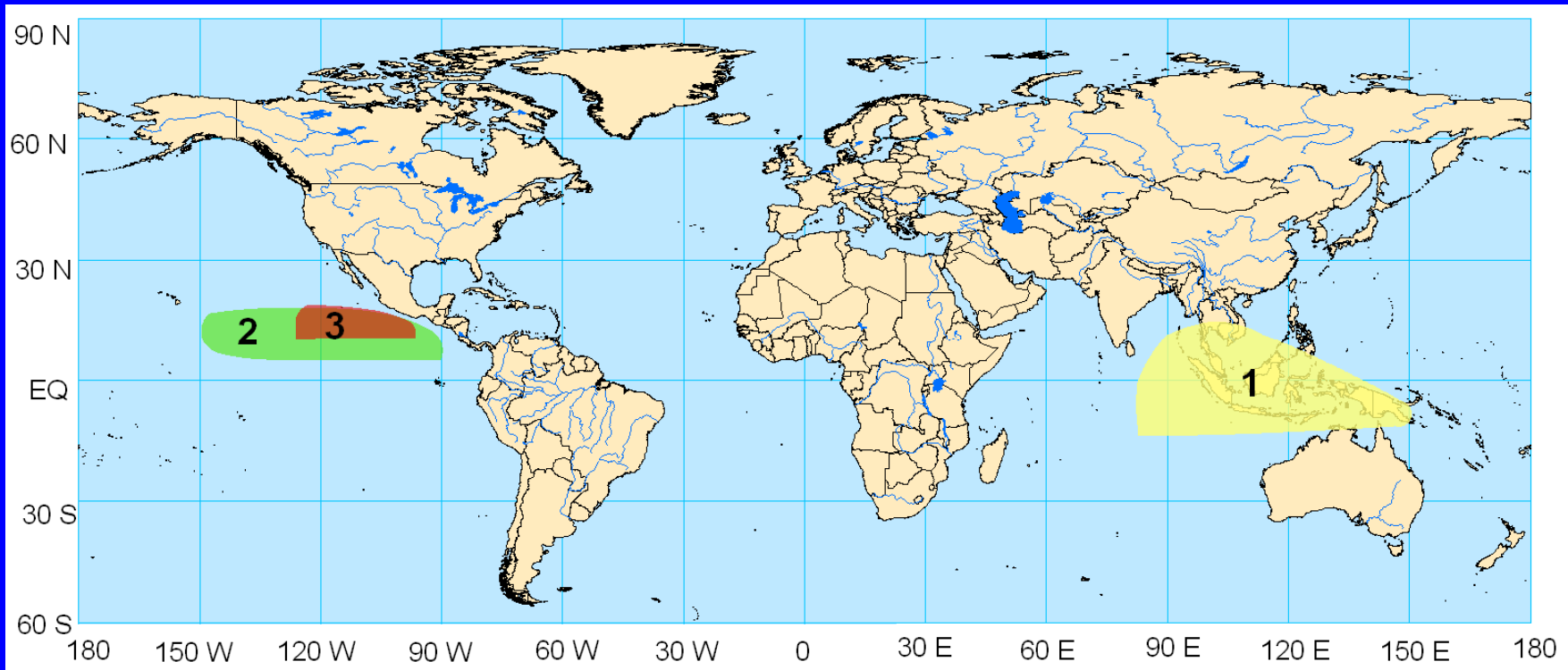
Valid October 3 - 9, 2006



1. Tropical Depression 19W is forecast to strengthen; favorable conditions exist for tropical cyclogenesis in the western Pacific.
2. An increased chance of above average rainfall across the western Pacific.
3. An increased chance of above average rainfall across the south Pacific surrounding the Date Line.
4. An increased chance of below average rainfall for the eastern Indian Ocean and Indonesia.
5. An increased chance of below average rainfall for the Caribbean Sea and tropical Atlantic.

Potential Benefits/Hazards – Week 2

Valid October 10 – 16, 2006



1. An increased chance of below average rainfall across the Maritime Continent.
2. An increased chance of above average rainfall across the eastern Pacific.
3. Favorable conditions for tropical cyclogenesis in the eastern Pacific.

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