

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

**Update prepared by
Climate Prediction Center / NCEP
September 18, 2006**

Outline

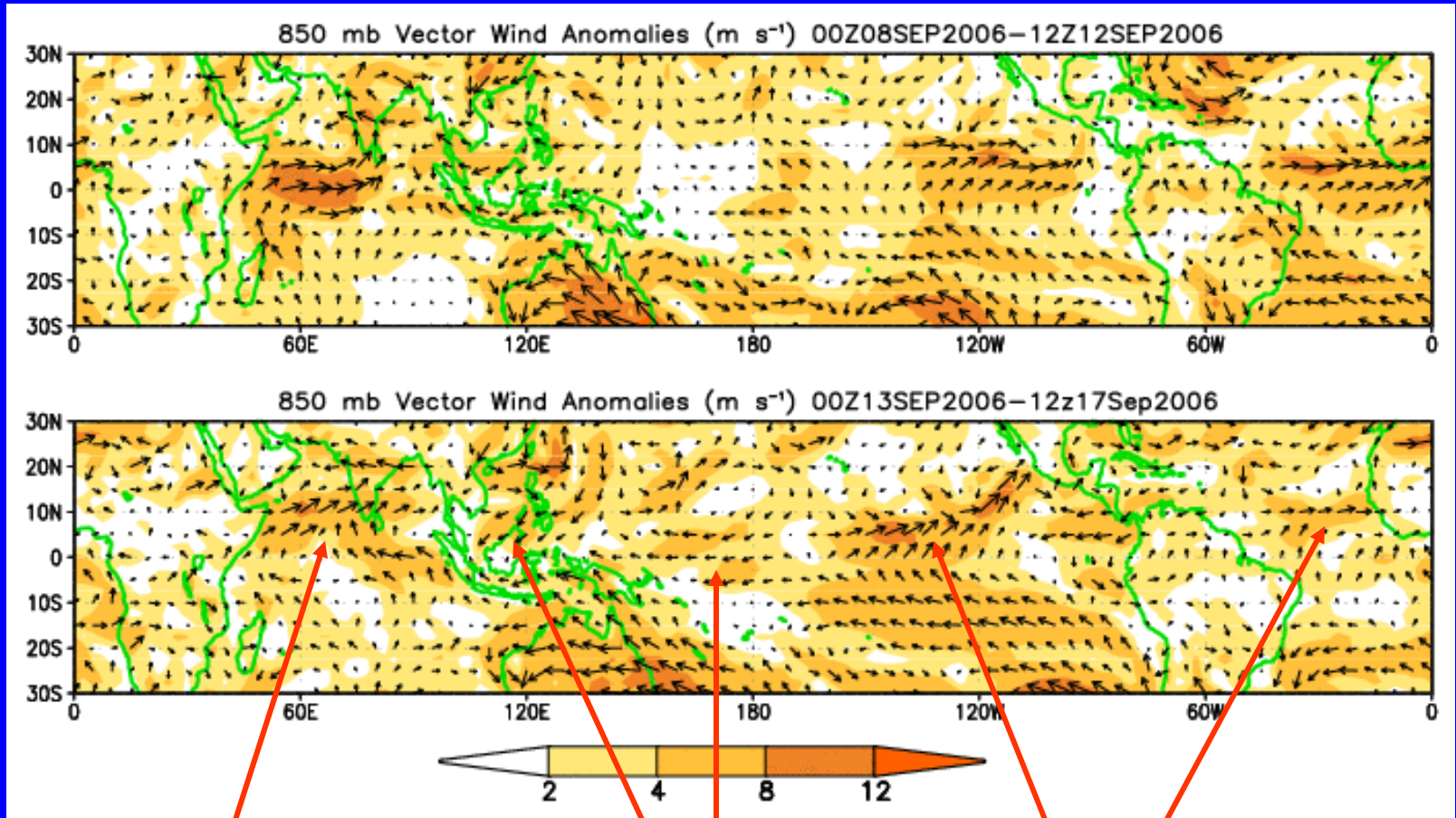
- **Overview**
- **Recent Evolution and Current Conditions**
- **Madden Julian Oscillation Forecast**
- **Summary**

Overview

- The MJO remains weak and the latest observations and forecasts indicate continued weak MJO activity during the next 1-2 weeks.
- Potential benefits/hazards during week 1 include an increased chance for above normal rainfall for India, Bay of Bengal, Southeast Asia, and sections of the western tropical Pacific Ocean. An increased chance of below normal rainfall exists in the east-central equatorial Indian Ocean. Tropical systems (Gordon and Helene) will impact sections of the Atlantic ocean. Favorable conditions for tropical cyclogenesis exist for the central Pacific Ocean, the deep tropical Atlantic Ocean, and for parts of the western Pacific, east of the Philippines and south of Japan. Tropical cyclone Yagi may influence Japan.
- The pattern of anomalous rainfall in the Indian Ocean and Maritime continent is expected to shift slightly eastward during week 2. Favorable conditions for tropical cyclogenesis will continue in the deep tropical Atlantic Ocean.

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

Note that shading denotes the magnitude of the anomalous wind vectors

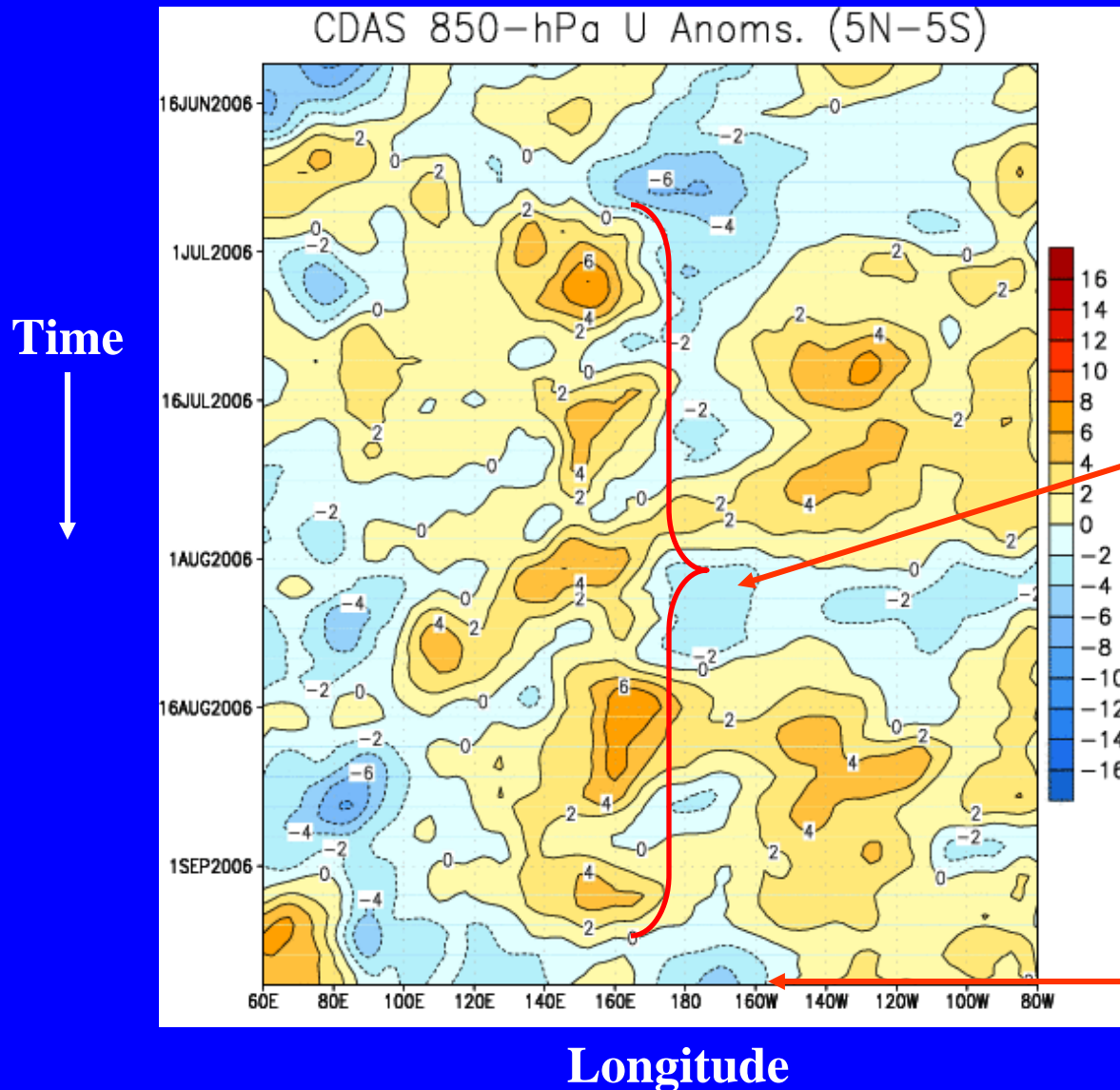


Westerly anomalies evident in the central Indian Ocean associated with enhanced convection.

Easterly anomalies are evident over the Maritime continent and near the Date line.

Westerly anomalies persist in both the eastern Pacific and Atlantic.

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



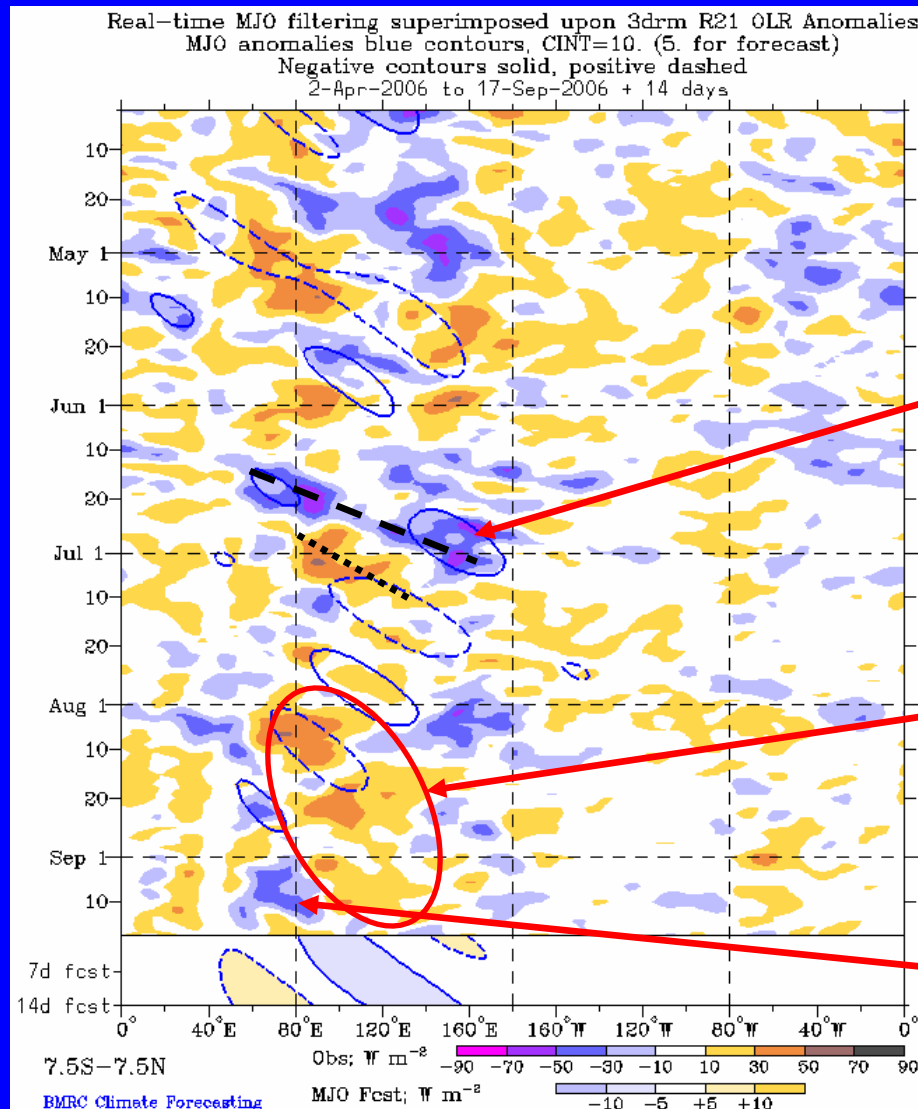
Weaker-than-average easterlies or westerlies (orange/red shading)

Stronger-than-average easterlies (blue shading)

Since early July, anomalous westerly wind “bursts” have been observed just west of the Date line. Also westerly anomalies have remained persistent in the eastern Pacific ocean.

Recently, easterly anomalies have expanded into the western Pacific and near the Date line.

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



Drier-than-average conditions (/red shading)

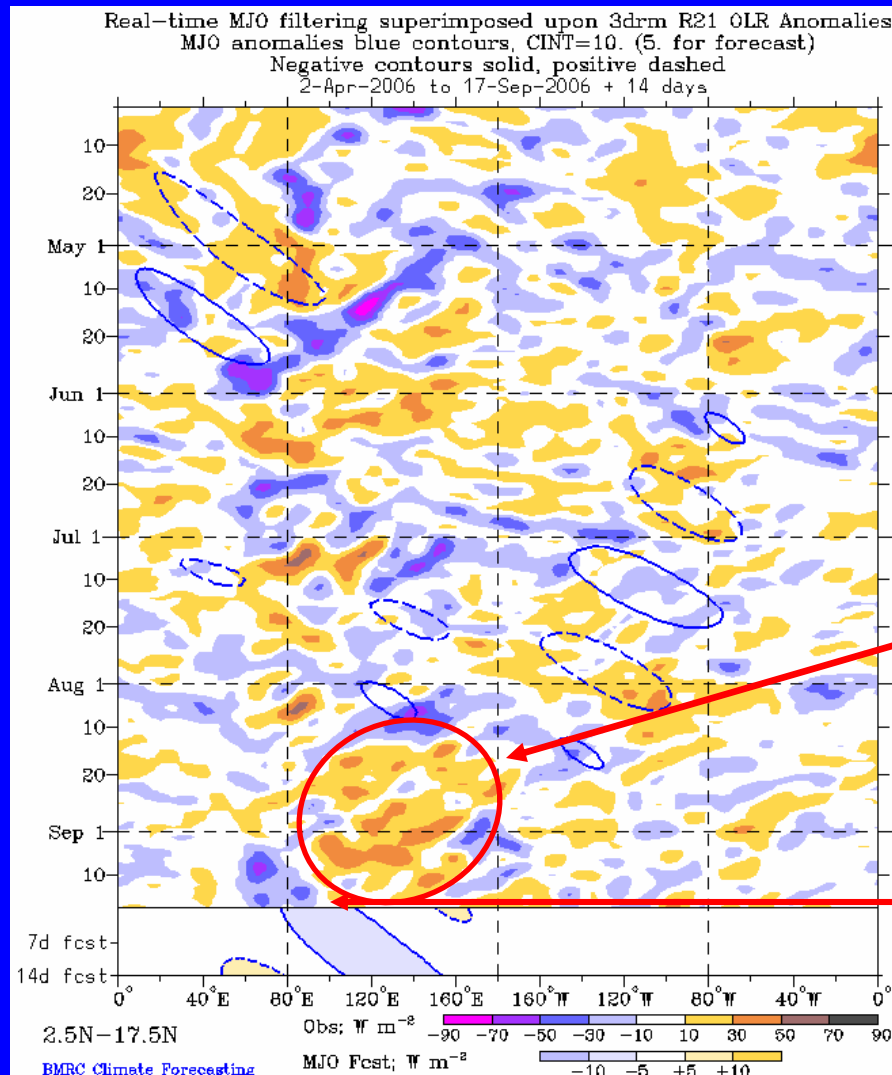
Wetter-than-average conditions (blue shading)

Coherent OLR anomalies moved across the Eastern Hemisphere in June.

Since early August, generally dry conditions have been observed for the eastern Indian Ocean and the Maritime Continent.

Since early September, wet conditions have emerged over the Indian Ocean.

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



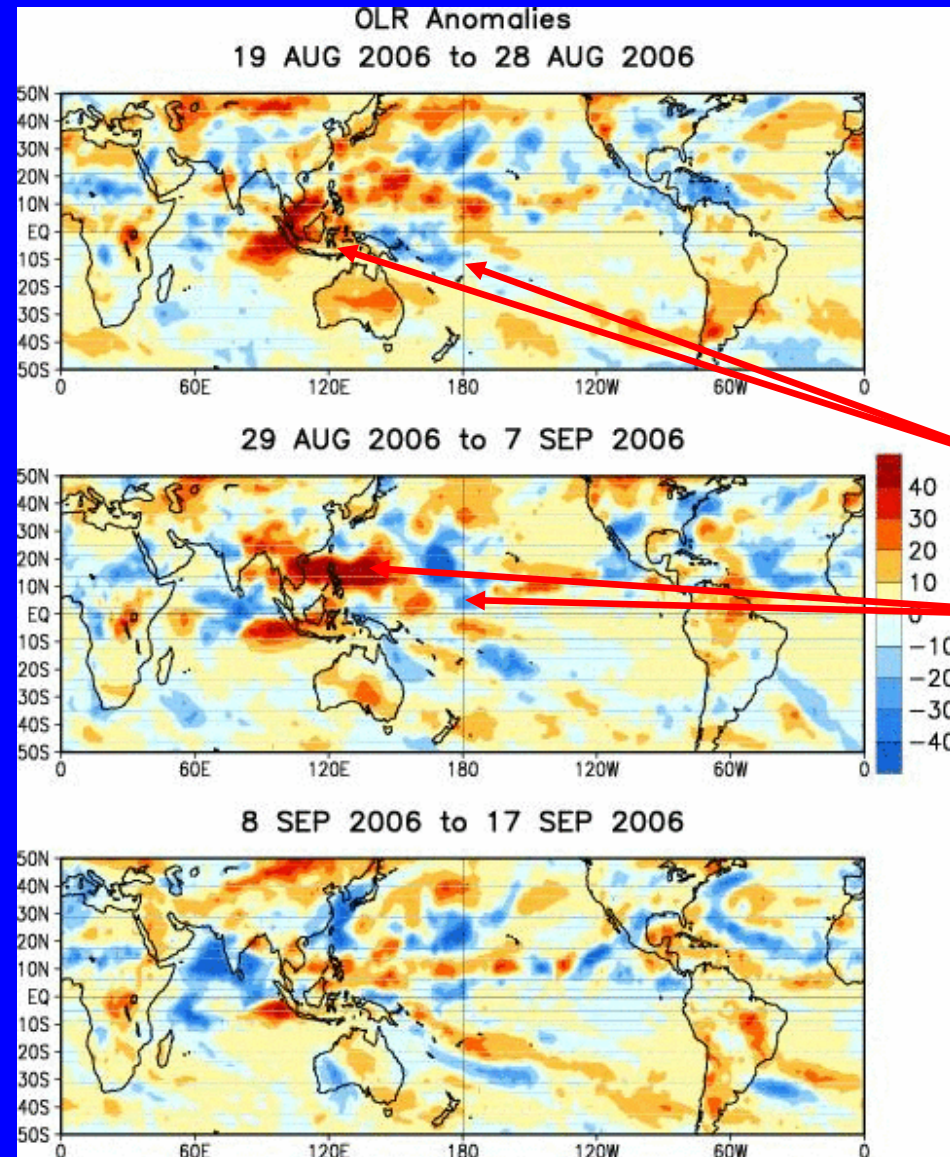
Drier-than-average conditions (/red shading)

Wetter-than-average conditions (blue shading)

Since mid-August, generally dry conditions have been evident north of the equator across Indonesia and the western Pacific.

Recently, however, wetter than average conditions have been observed in the Indian Ocean.

Anomalous OLR: Last 30 days



Drier-than-average conditions (red shading)

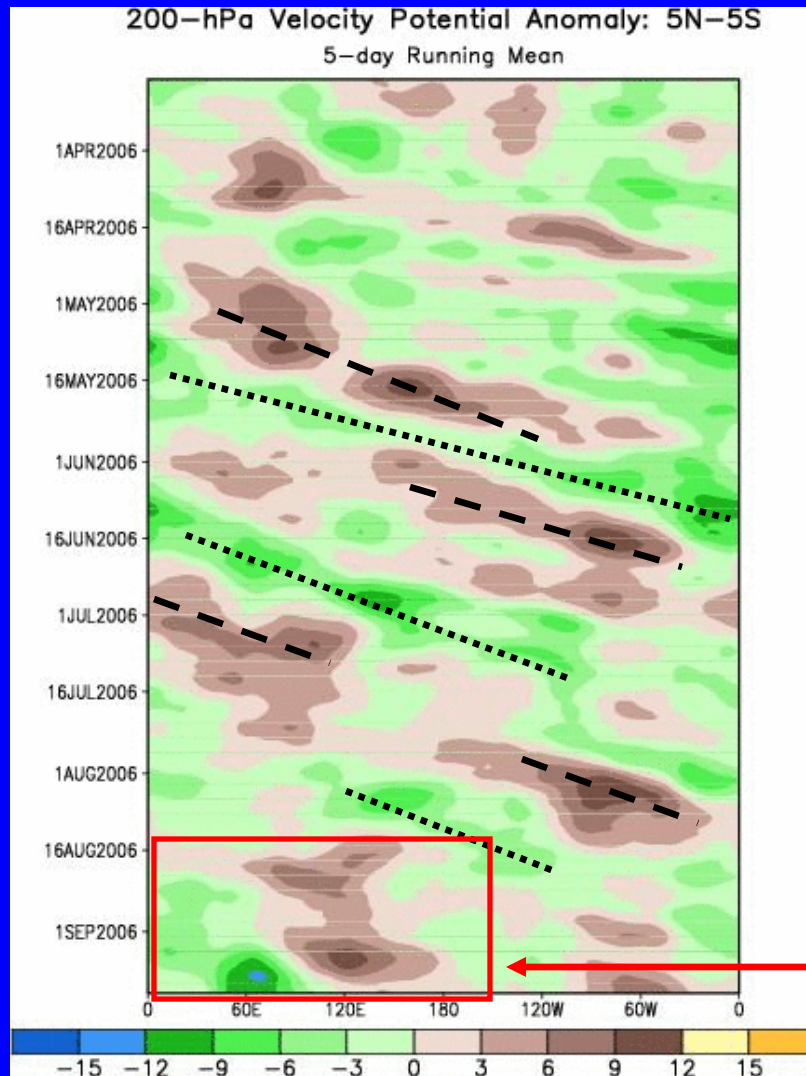
Wetter-than-average conditions (blue shading)

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

During the most recent ten days, dry conditions have been observed across sections of Southeast Asia and portions of the Maritime Continent with wetter conditions prevalent over the 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.



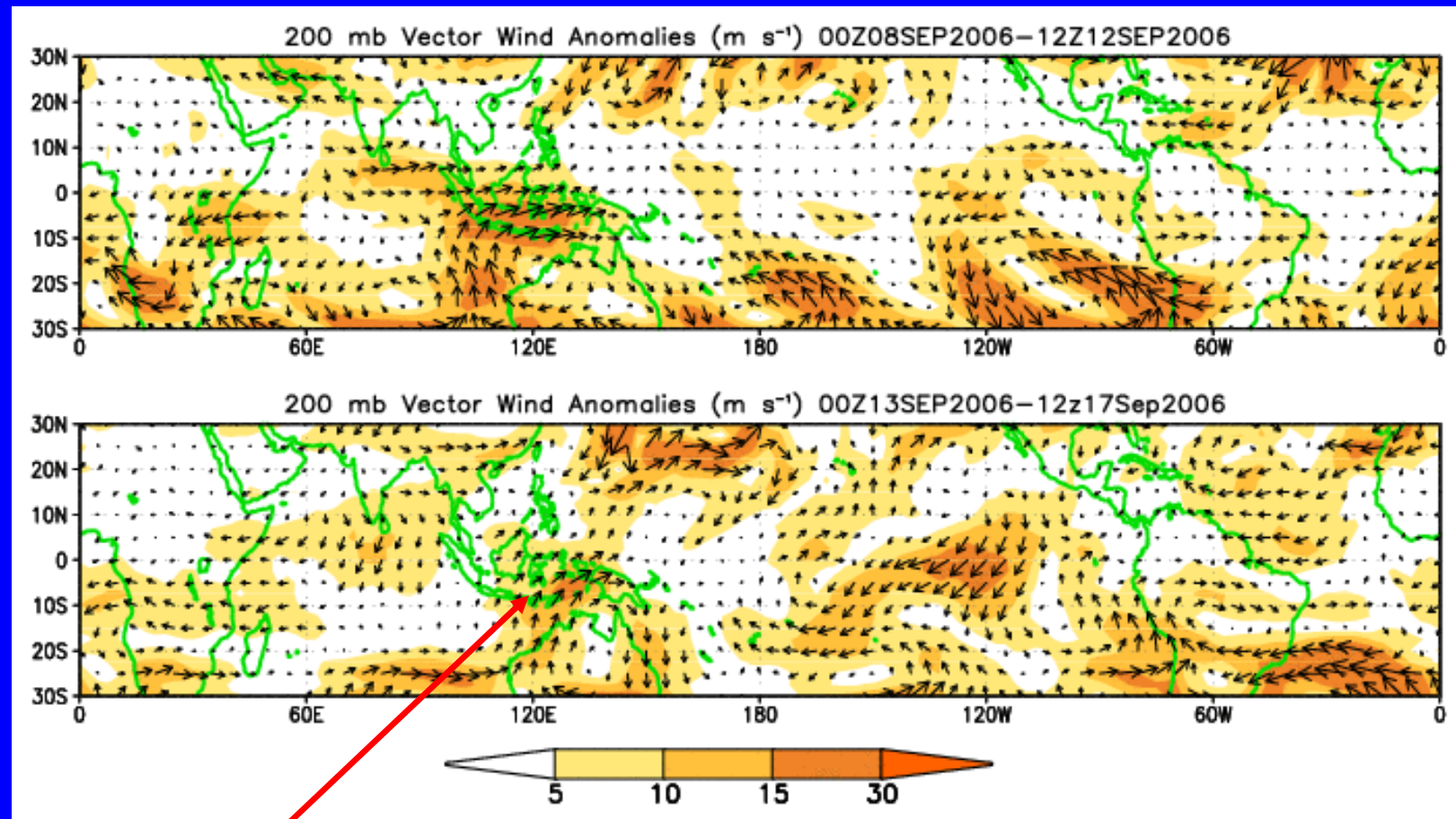
The MJO was incoherent during much of March and April.

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

Most recently, upper-level divergence (convergence) over Africa/Indian ocean (Maritime Continent/western Pacific) has shifted slightly eastward.

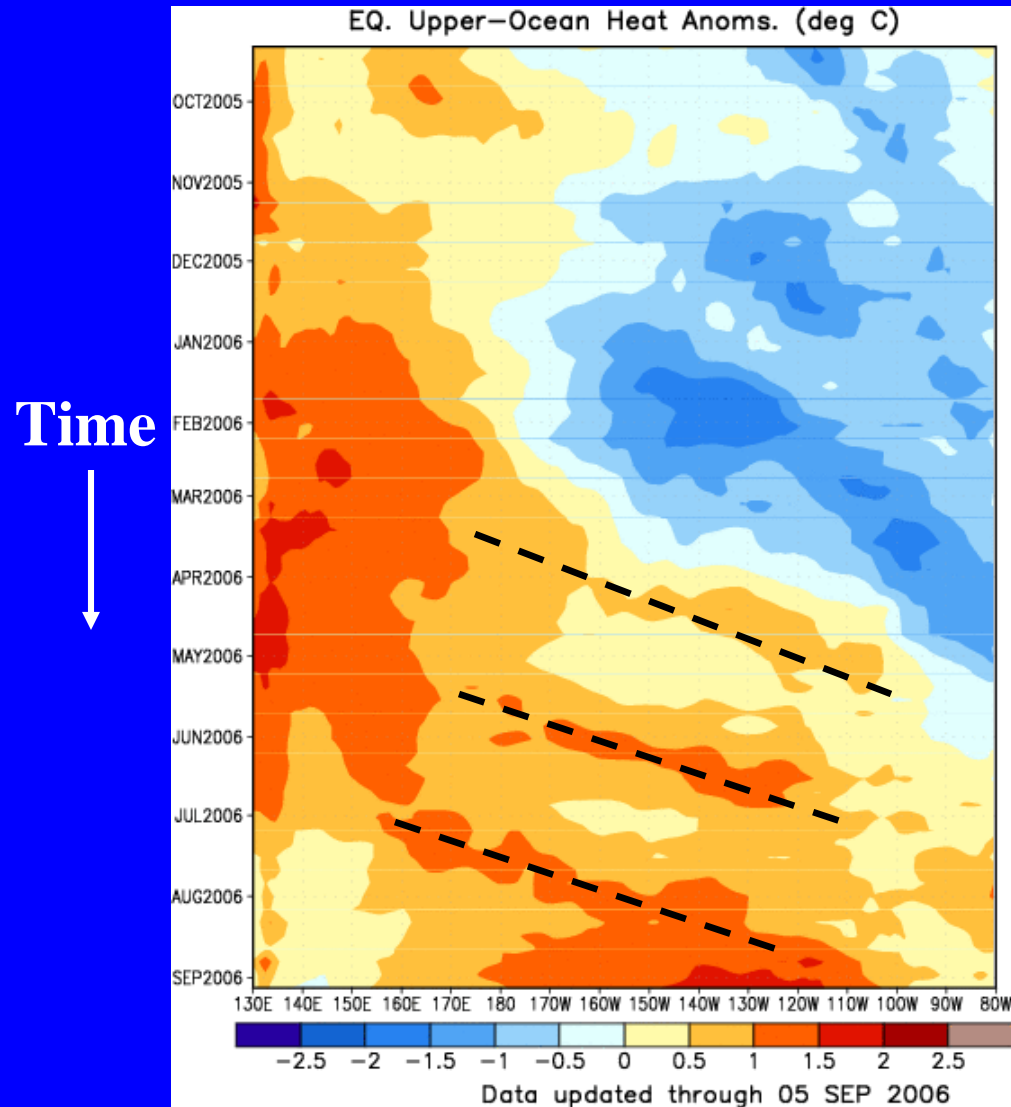
200-hPa Vector Winds and Anomalies (m s^{-1})

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



Westerly anomalies have weakened over the Indian Ocean and have shifted eastward over the Maritime Continent.

Heat Content Evolution in the Eq. Pacific

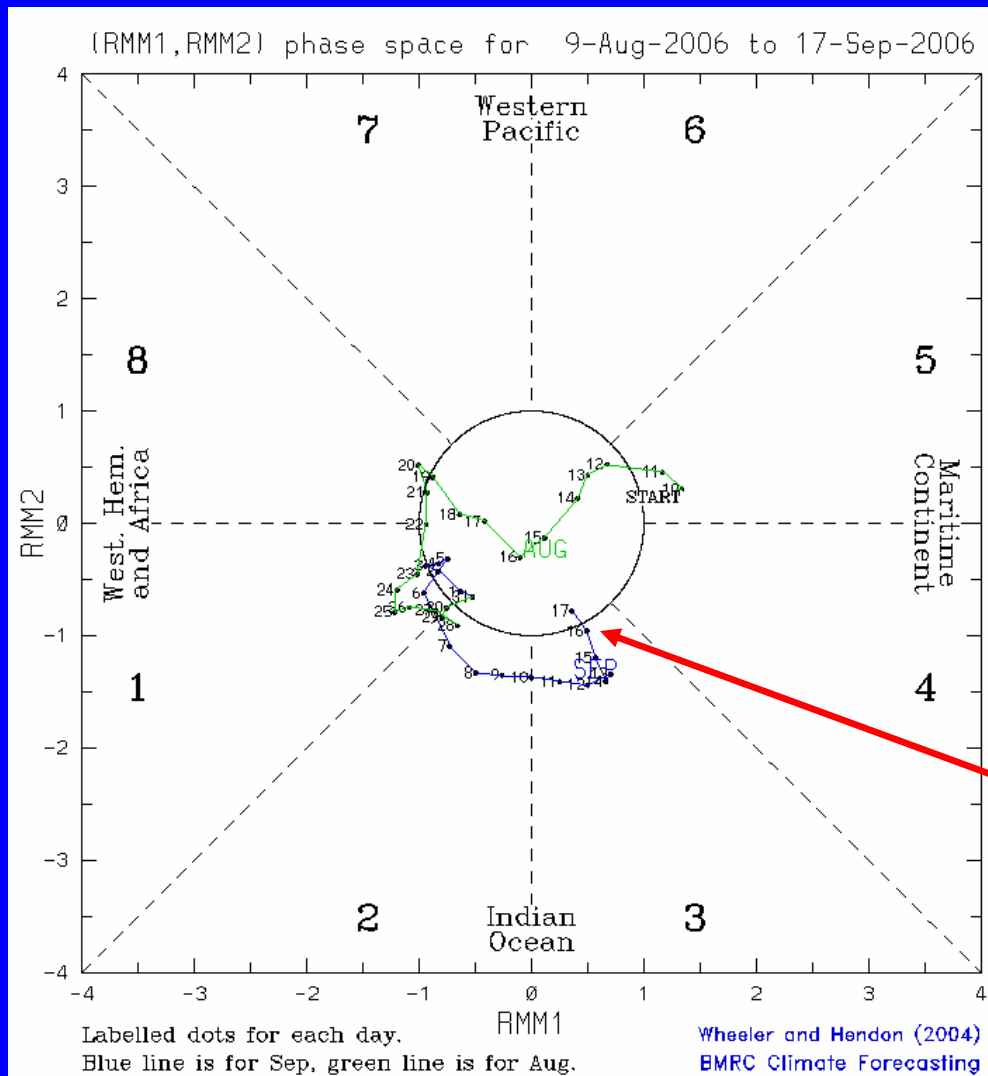


Starting in April, above normal upper oceanic water temperatures expanded from the western Pacific into the eastern Pacific in part due to Kelvin wave activity.

MJO Index (Magnitude and Phase)

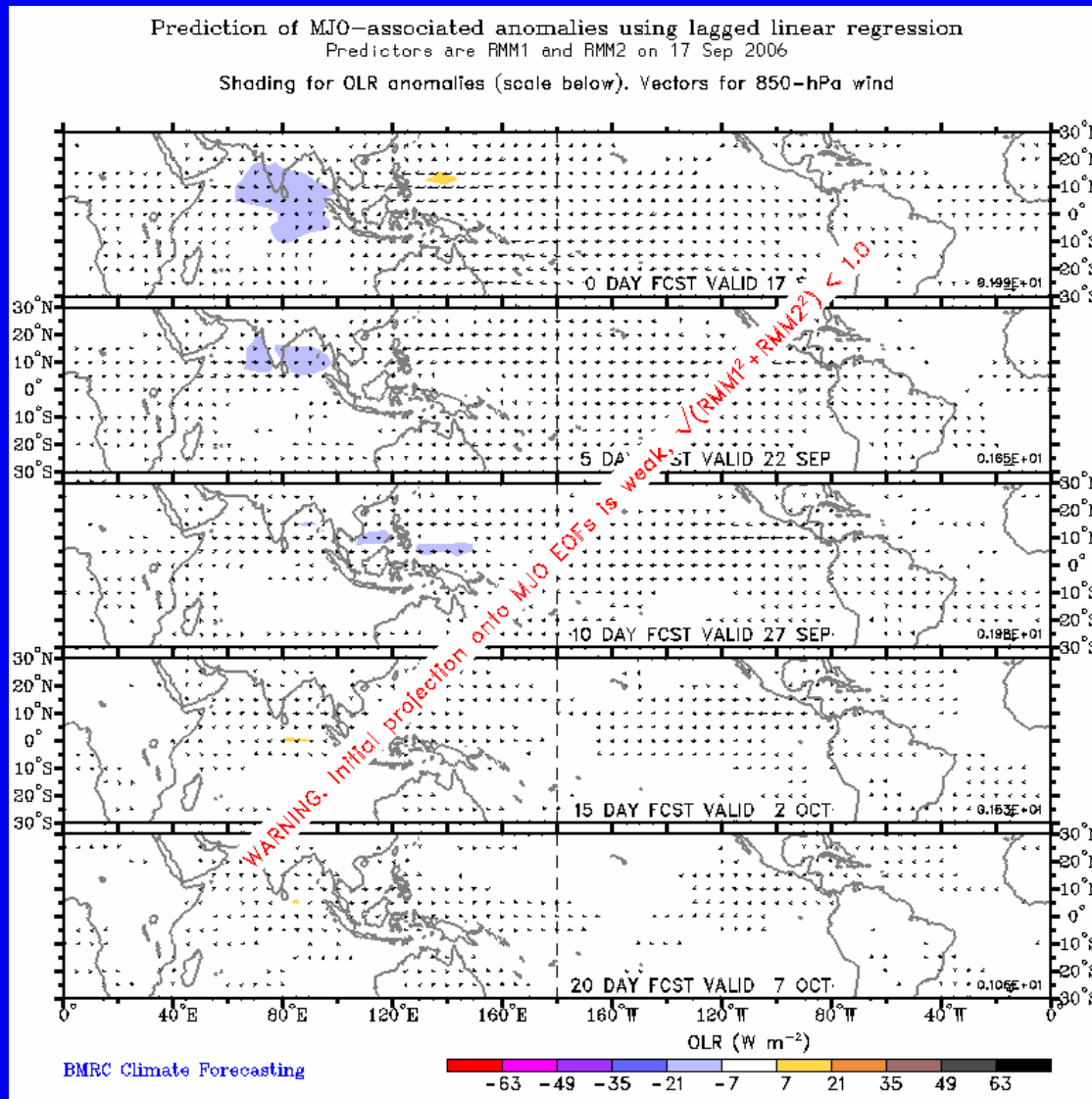
The current state of the MJO as determined by an index based on Empirical Orthogonal Function (EOF) analysis using combined fields of near-equatorially-averaged 850 hPa zonal wind, 200 hPa zonal wind, and satellite-observed outgoing longwave radiation (OLR) (Wheeler and Hendon, 2004).

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.



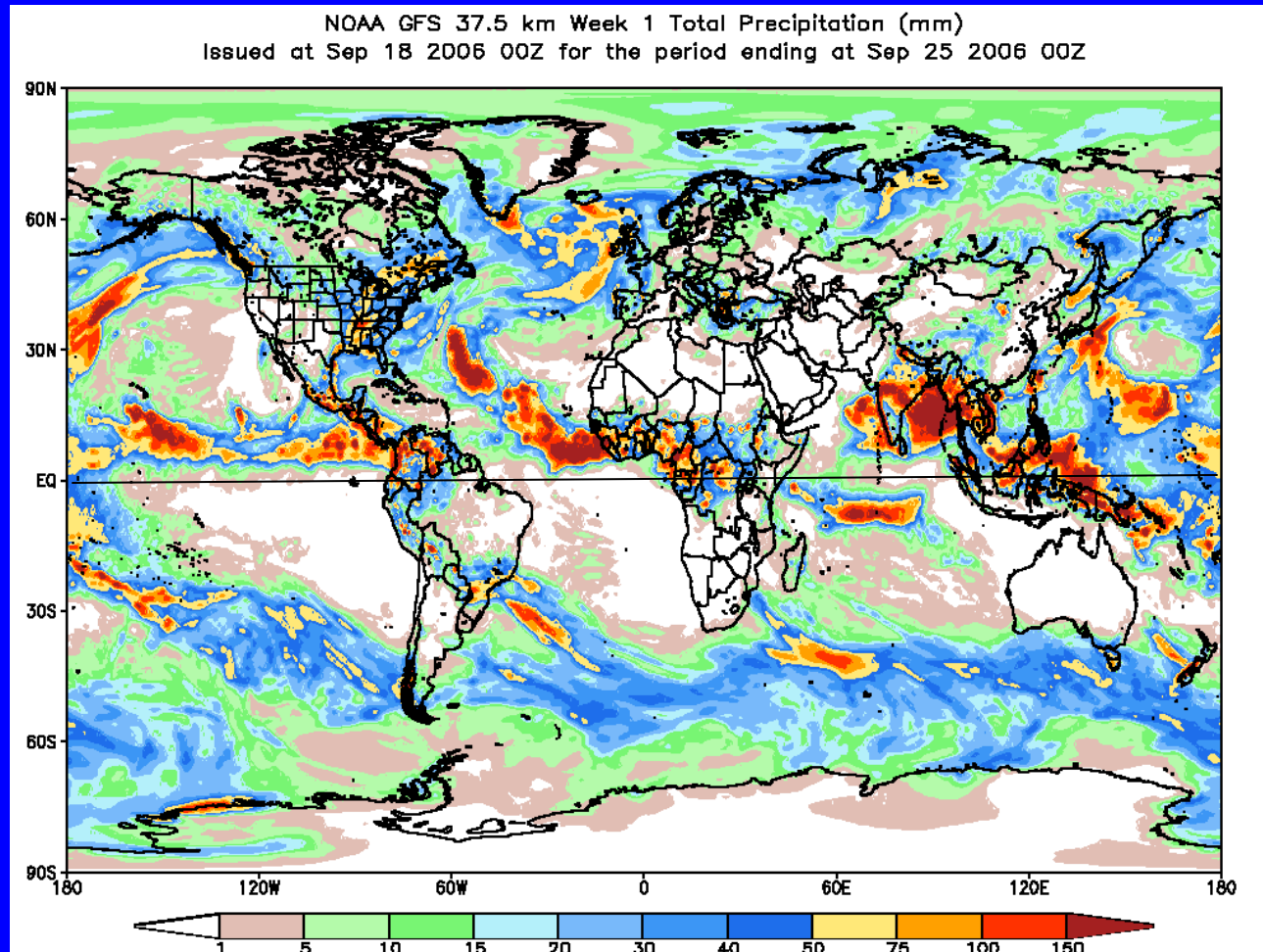
In recent days, the MJO signal has weakened.

Statistical OLR MJO Forecast

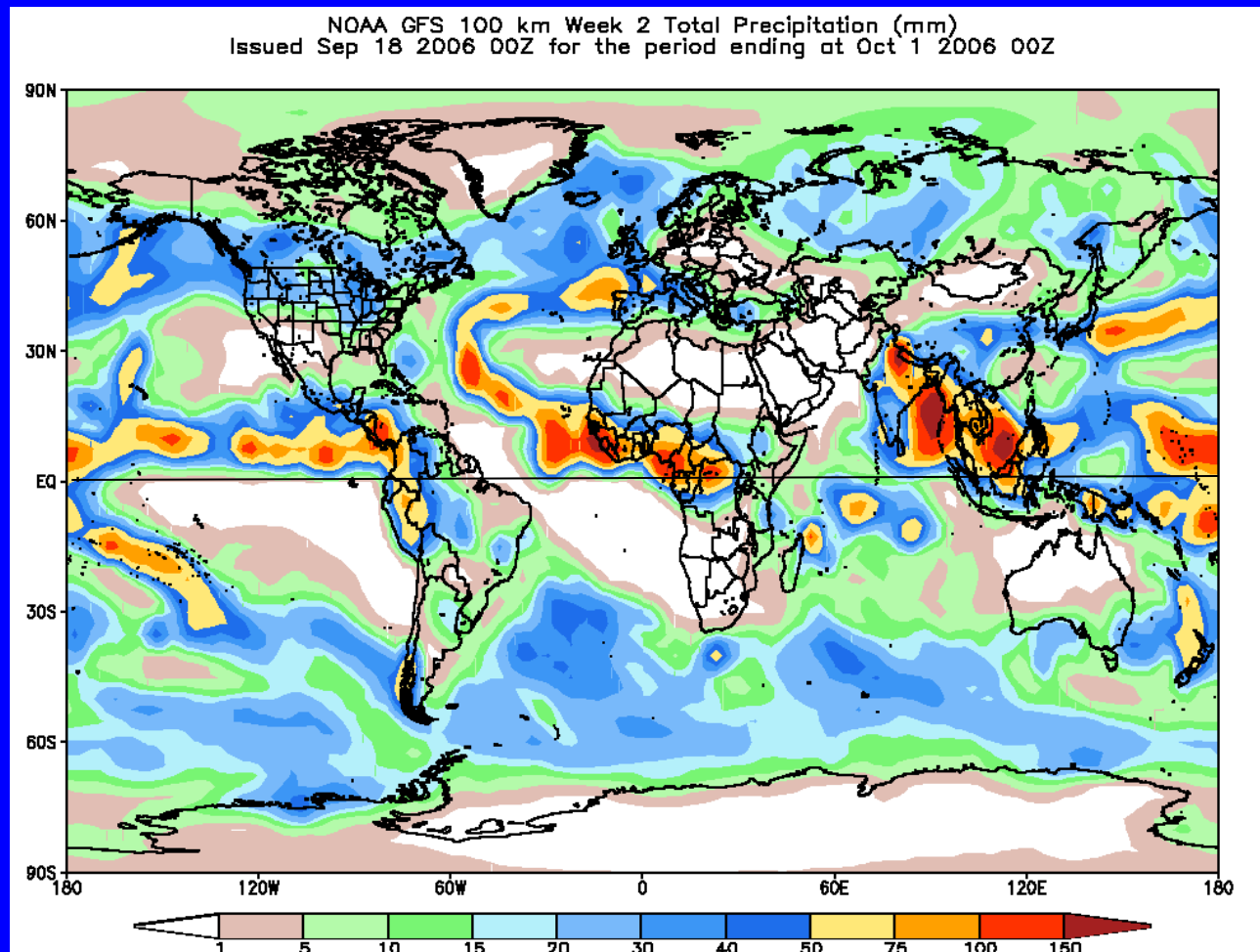


Little MJO activity is forecast during the next ten days.

Global Forecast System (GFS) Week 1 Precipitation Forecast

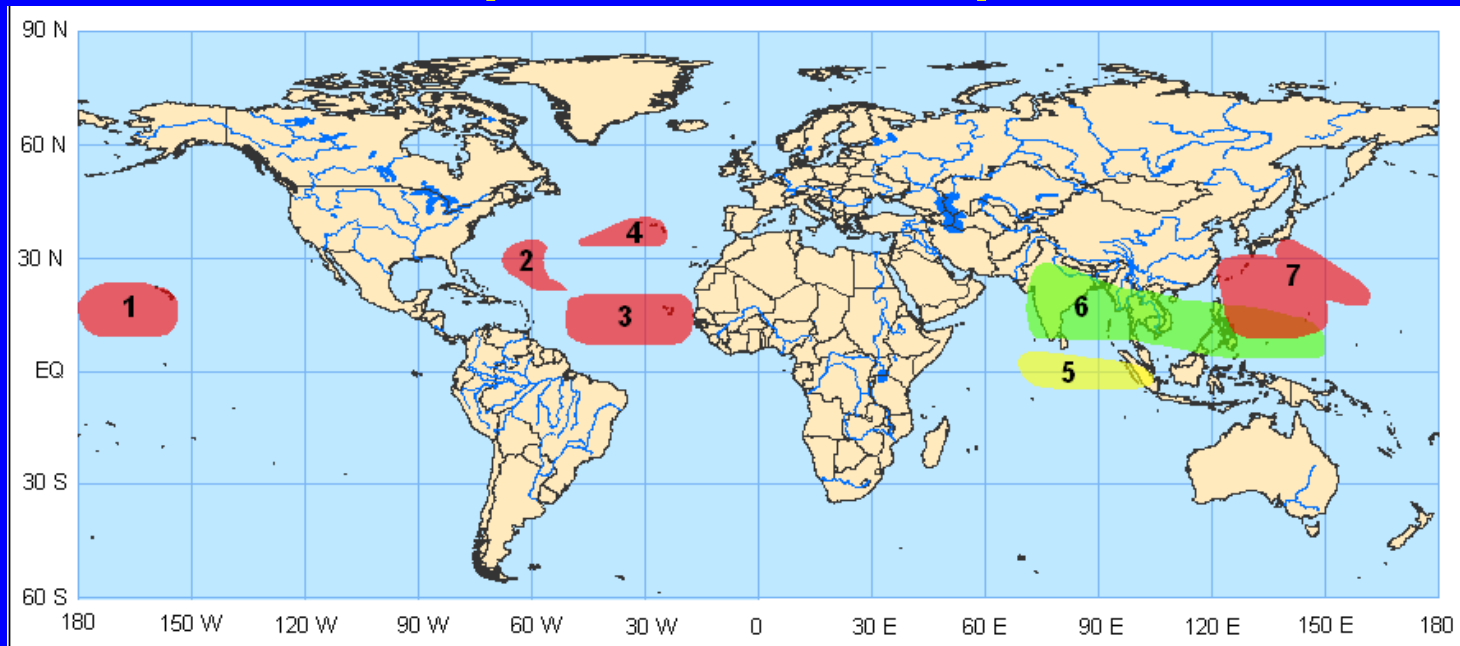


Global Forecast System (GFS) Week 2 Precipitation Forecast



Potential Benefits/Hazards – Week 1

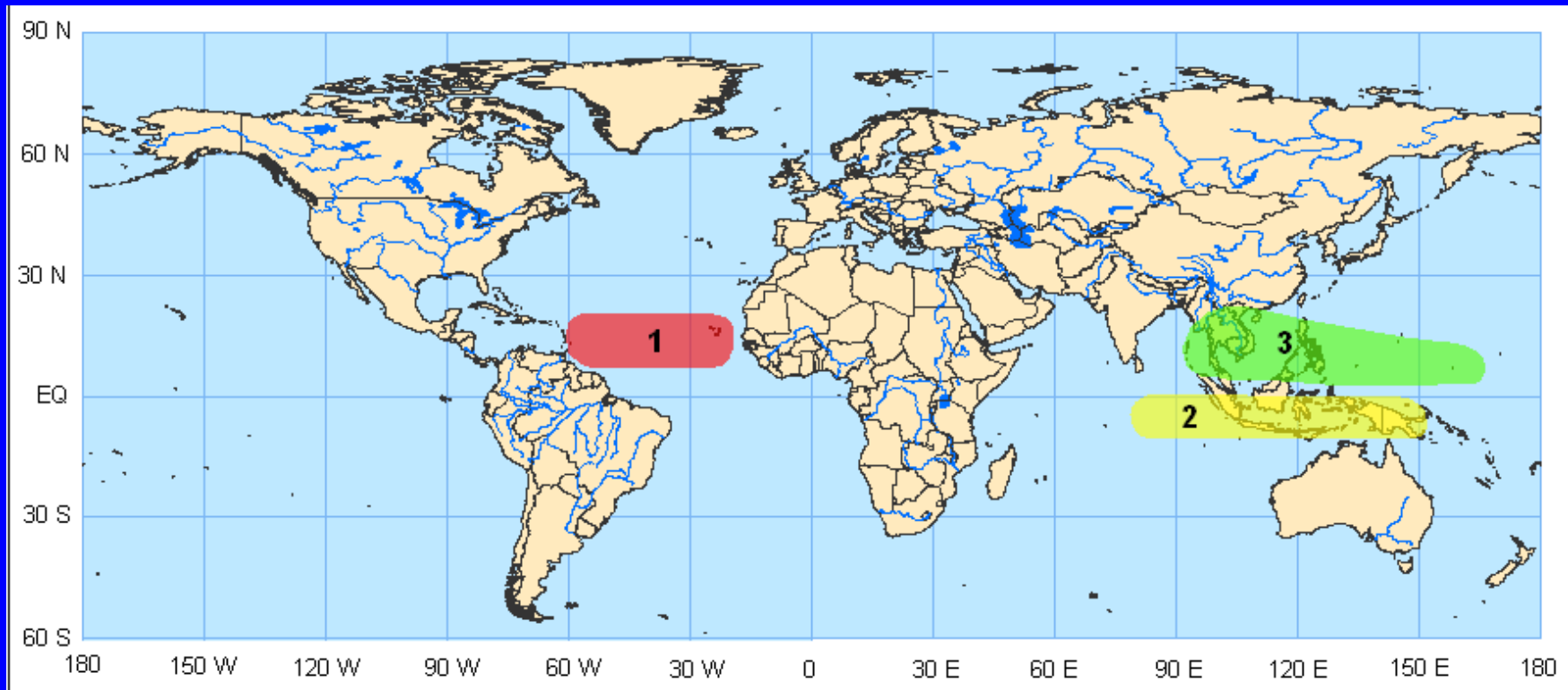
Valid September 19 – September 25, 2006



1. Favorable conditions exist for tropical cyclogenesis in the central Pacific Ocean.
2. Tropical cyclone Helene will impact the west-central Atlantic Ocean.
3. Favorable conditions exist for tropical cyclogenesis in the deep tropical Atlantic Ocean.
4. Tropical cyclone Gordon will impact the central Atlantic Ocean.
5. An increased chance of below normal rainfall for the east-central equatorial Indian Ocean.
6. An increased chance of above normal rainfall for India, Bay of Bengal, Southeast Asia, and sections of the western tropical Pacific Ocean.
7. Favorable conditions exist for tropical cyclogenesis east of the Philippines and south of Japan. Tropical cyclone Yagi may influence Japan.

Potential Benefits/Hazards – Week 2

Valid September 26 – October 2, 2006



1. Favorable conditions exist for tropical cyclogenesis in the deep tropical Atlantic Ocean.
2. An increased chance of below normal rainfall for southern parts of the Maritime Continent and the eastern Indian Ocean.
3. An increased chance of above normal rainfall for southeastern Asia, the Philippines, and parts of the western Pacific Ocean.

Summary

- The MJO remains weak and the latest observations and forecasts indicate continued weak MJO activity during the next 1-2 weeks.
- Potential benefits/hazards during week 1 include an increased chance for above normal rainfall for India, Bay of Bengal, Southeast Asia, and sections of the western tropical Pacific Ocean. An increased chance of below normal rainfall exists in the east-central equatorial Indian Ocean. Tropical systems (Gordon and Helene) will impact sections of the Atlantic ocean. Favorable conditions for tropical cyclogenesis exist for the central Pacific Ocean, the deep tropical Atlantic Ocean, and for parts of the western Pacific, east of the Philippines and south of Japan. Tropical cyclone Yagi may influence Japan.
- The pattern of anomalous rainfall in the Indian Ocean and Maritime continent is expected to shift slightly eastward during week 2. Favorable conditions for tropical cyclogenesis will continue in the deep tropical Atlantic Ocean.