

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

**Update prepared by
Climate Prediction Center / NCEP
November 27, 2006**

Outline

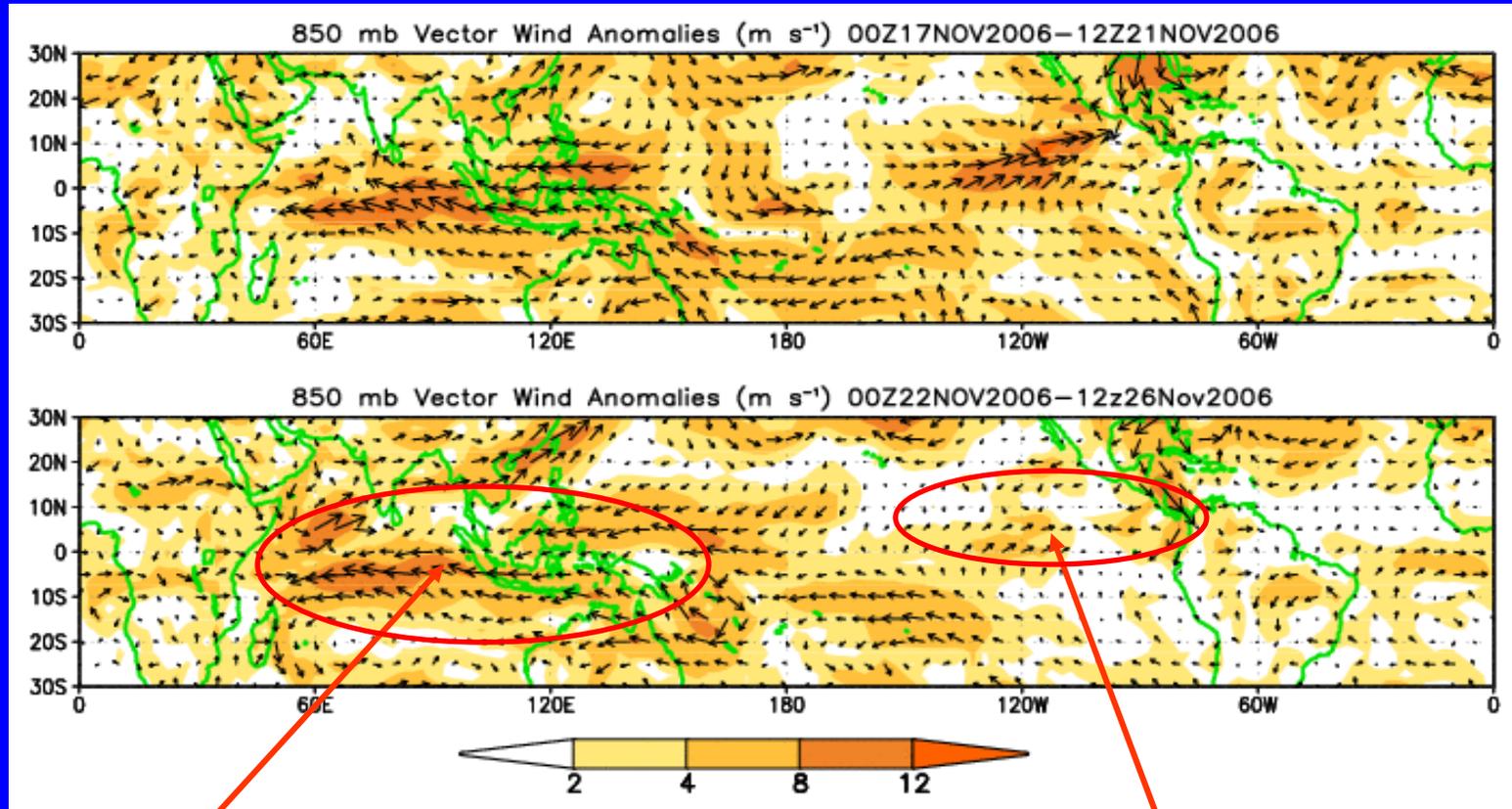
- **Overview**
- **Recent Evolution and Current Conditions**
- **Madden Julian Oscillation Forecast**
- **Summary**

Overview

- The latest observations indicate that the MJO is active but weak.
- During week 1, wetter than normal conditions are expected for sections of the central and western Indian Ocean, coastal East Africa, and sections of the tropical western Pacific. There is an increased chance for drier than normal conditions for the Maritime Continent and northern Australia. Tropical storm Durian is expected to strengthen and could potentially impact the Philippines.
- A similar pattern of anomalous rainfall is expected to persist during week 2 with the only change being a shift eastward of wet conditions in the Indian Ocean.
- Favorable conditions for tropical cyclogenesis are expected throughout the period in the western Pacific.
- Although confidence is somewhat lower, there does exist the threat of tropical cyclogenesis in the western Indian Ocean and the Mozambique Channel during week 1. In addition, an increased likelihood of above average rainfall exists for sections of the U.S. Mississippi Valley also during week 1.

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

Note that shading denotes the magnitude of the anomalous wind vectors

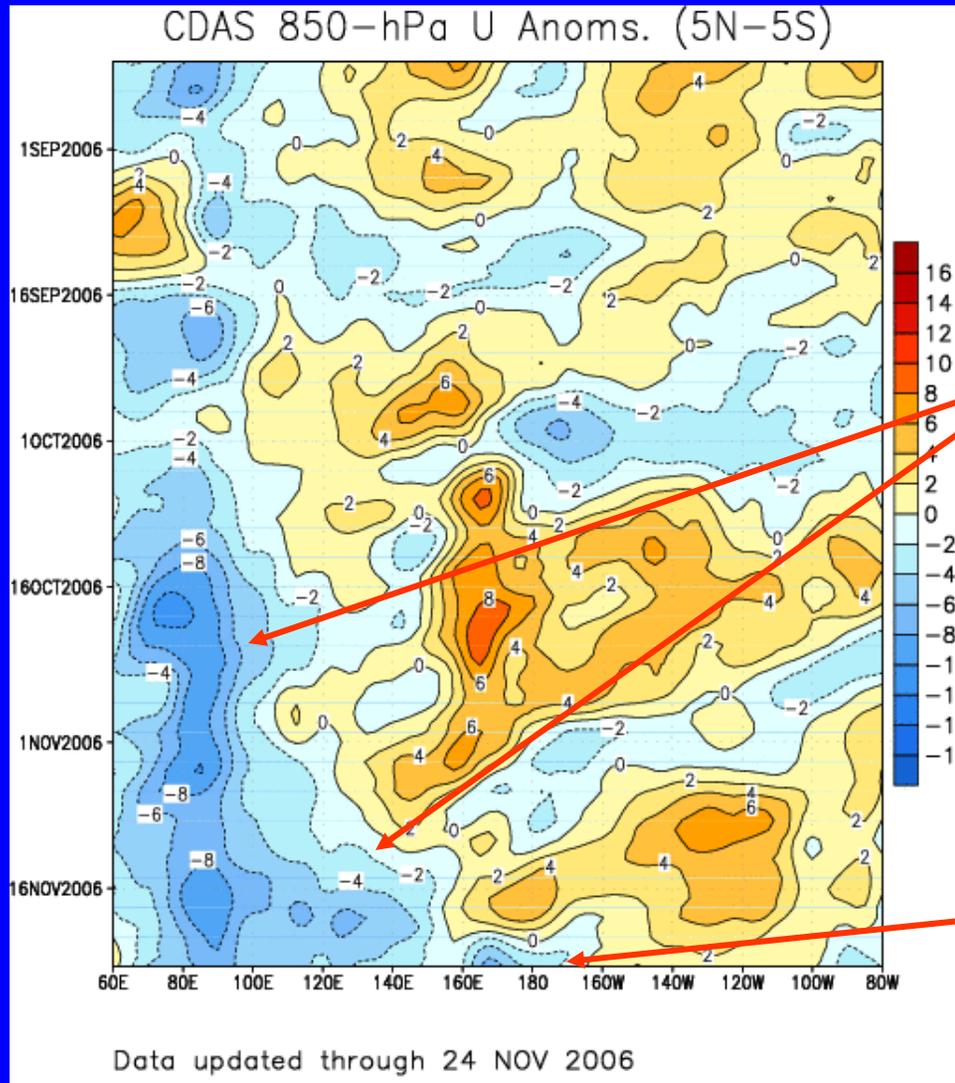


Easterly anomalies have persisted across the Indian Ocean and Maritime Continent.

Westerly anomalies in the eastern Pacific have weakened.

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

Time



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

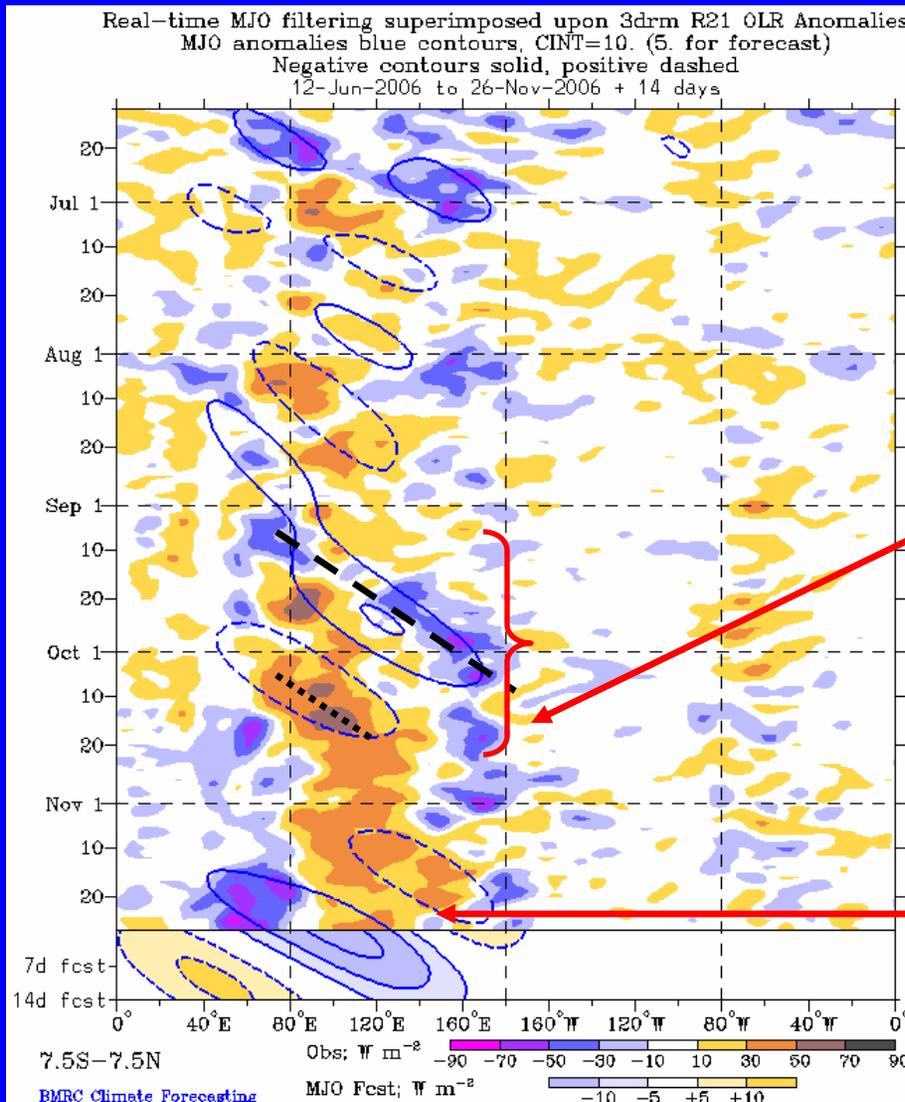
Stronger-than-average easterlies (blue shading)

Easterly anomalies in the Indian Ocean continued to persist and have expanded eastward.

Recently, westerly anomalies near the Date Line along the equator have been replaced by easterly anomalies.

Longitude

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



Time
 ↓

Longitude

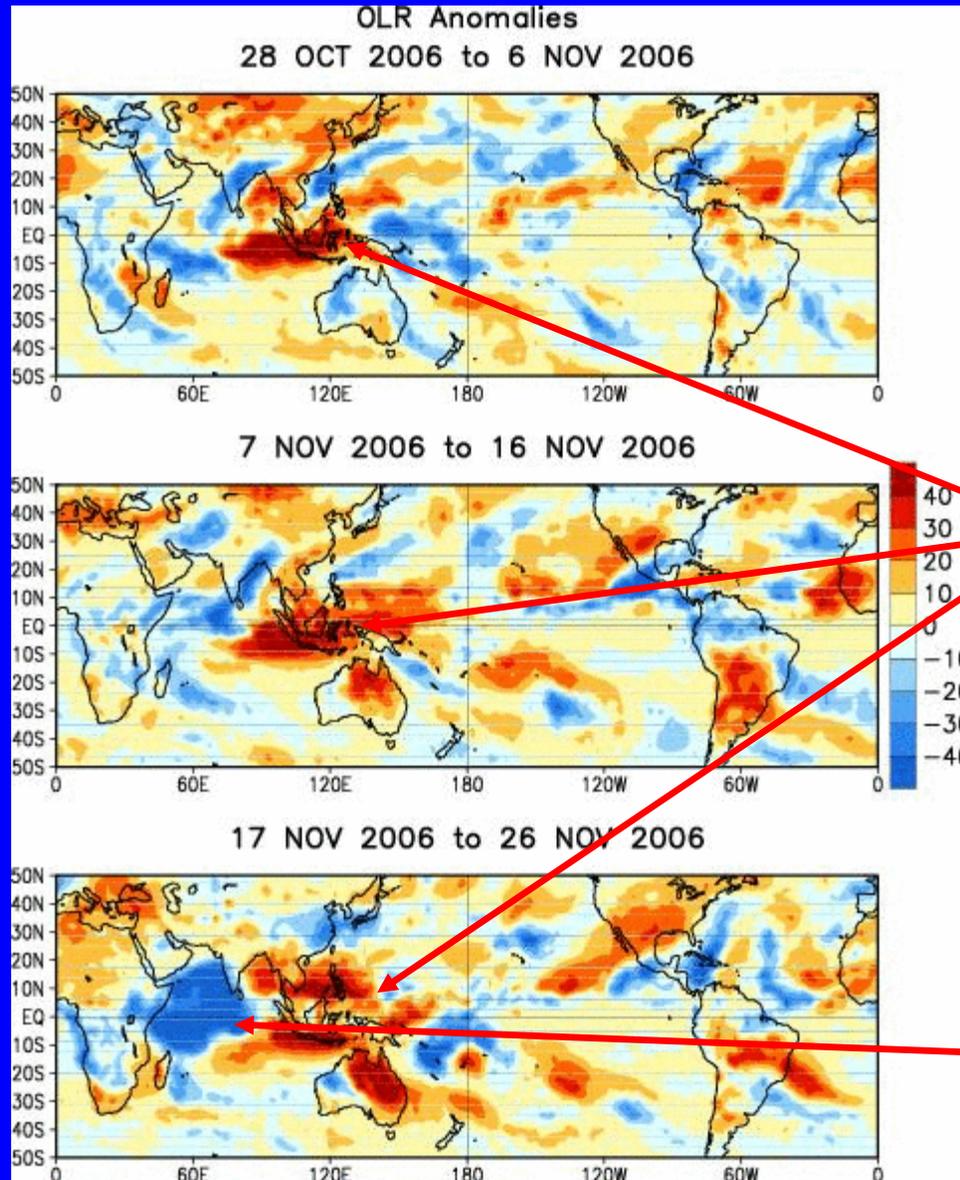
Drier-than-average conditions (/red shading)

Wetter-than-average conditions (blue shading)

OLR anomalies associated with the MJO developed in early-mid September over the eastern Indian Ocean and both negative and positive anomalies shifted east across the Maritime Continent.

Most recently, enhanced (suppressed) convection is located across the Indian Ocean (Maritime Continent).

Anomalous OLR: Last 30 days



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

Dry conditions have been very persistent across the Maritime Continent throughout the period.

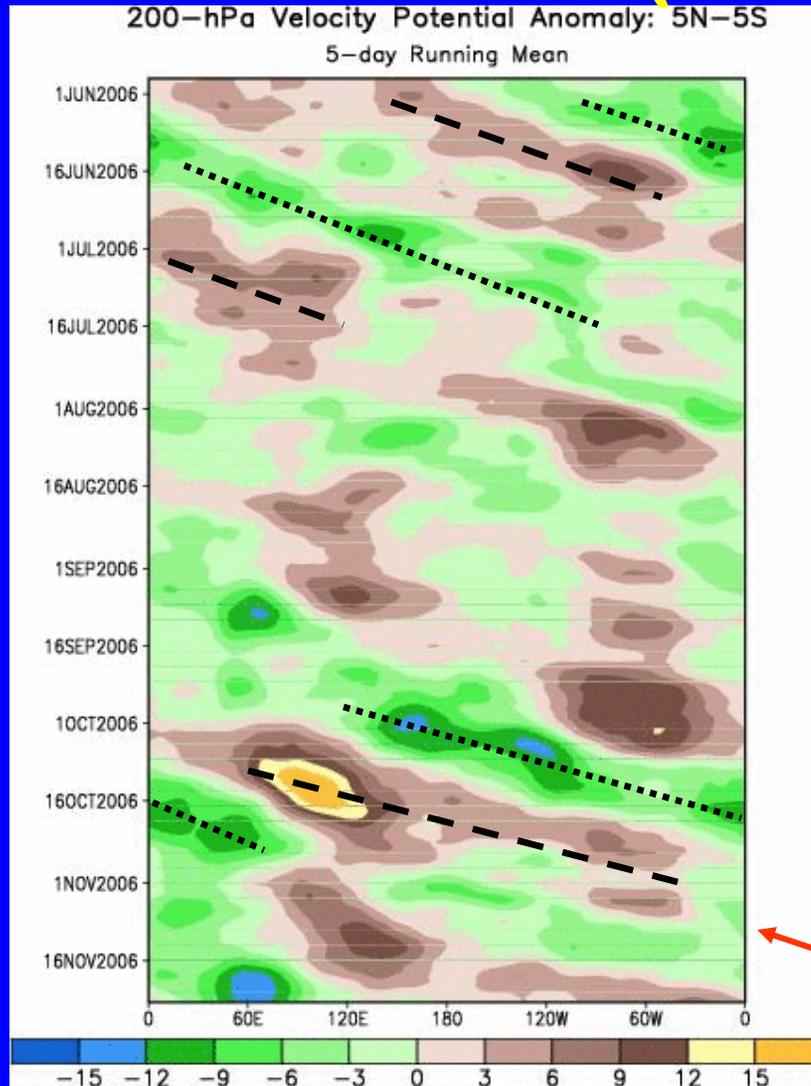
During the last ten days, convection has been enhanced across the central and western Indian Ocean.

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

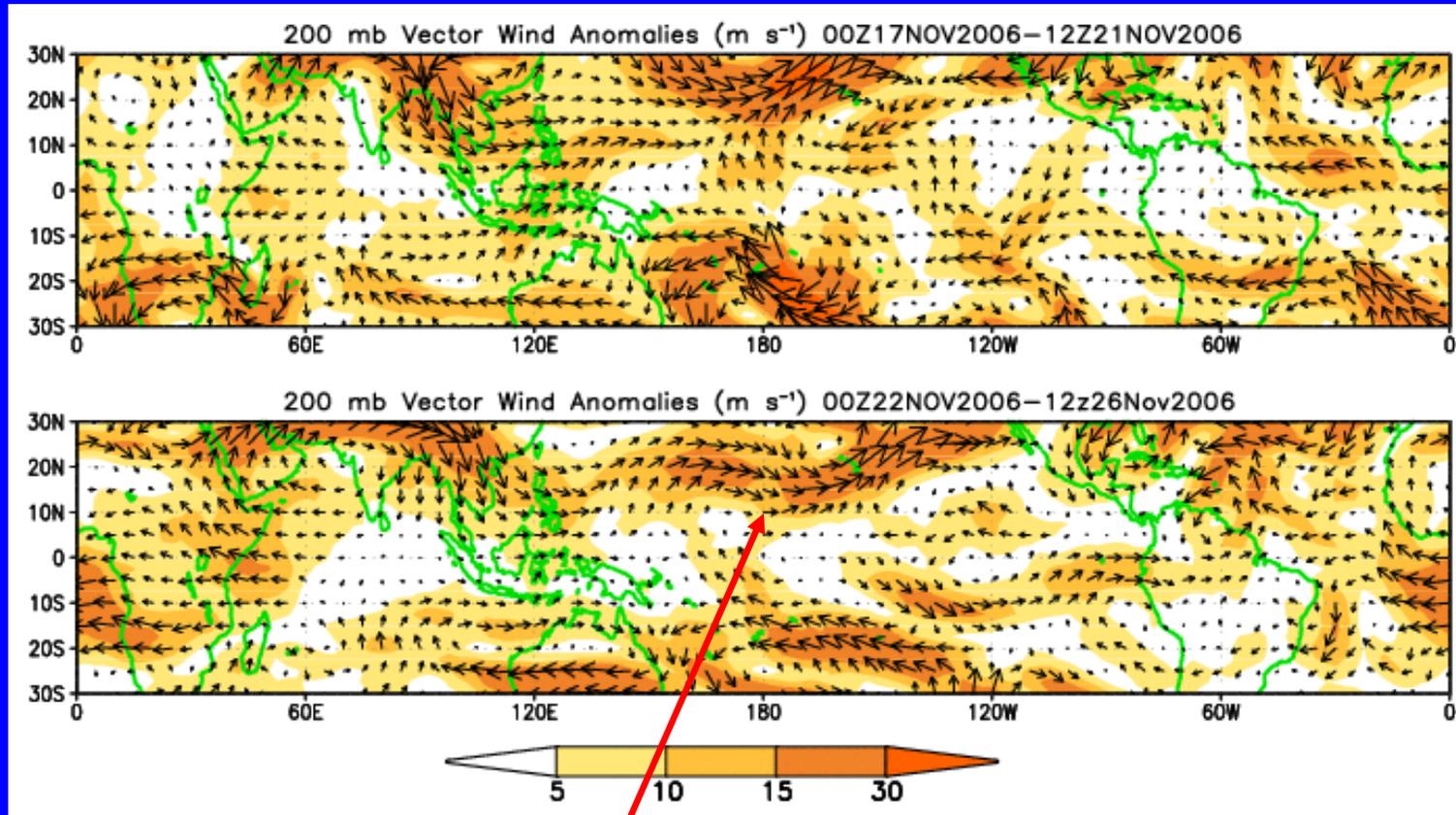
Only periods of weak MJO activity occurred during May through August.

Moderate to strong MJO activity was observed from late-September to mid-October.

The MJO weakened considerably during late October.

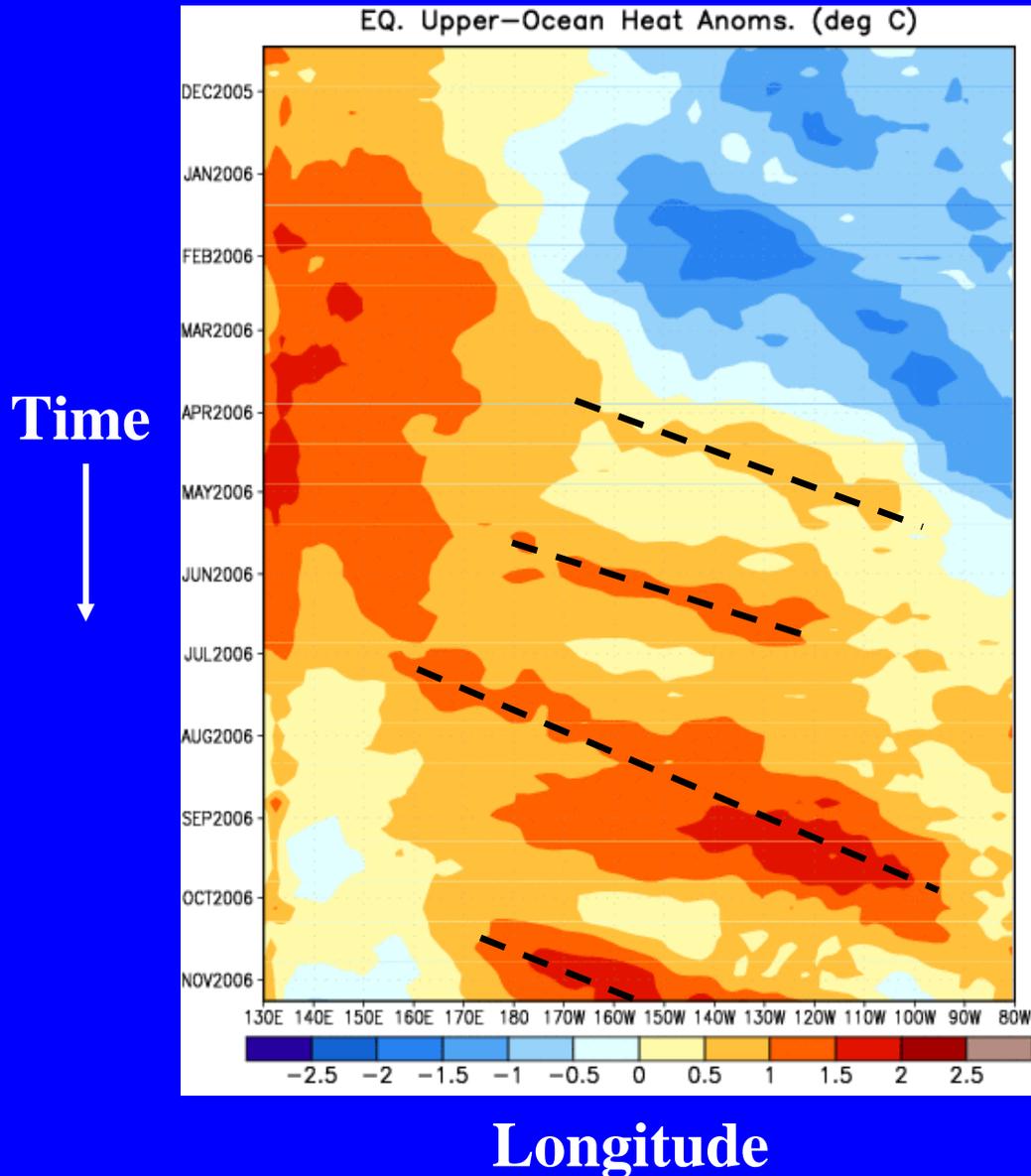
200-hPa Vector Winds and Anomalies (m s^{-1})

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



An upper level trough has persisted across the north central Pacific.

Heat Content Evolution in the Eq. Pacific

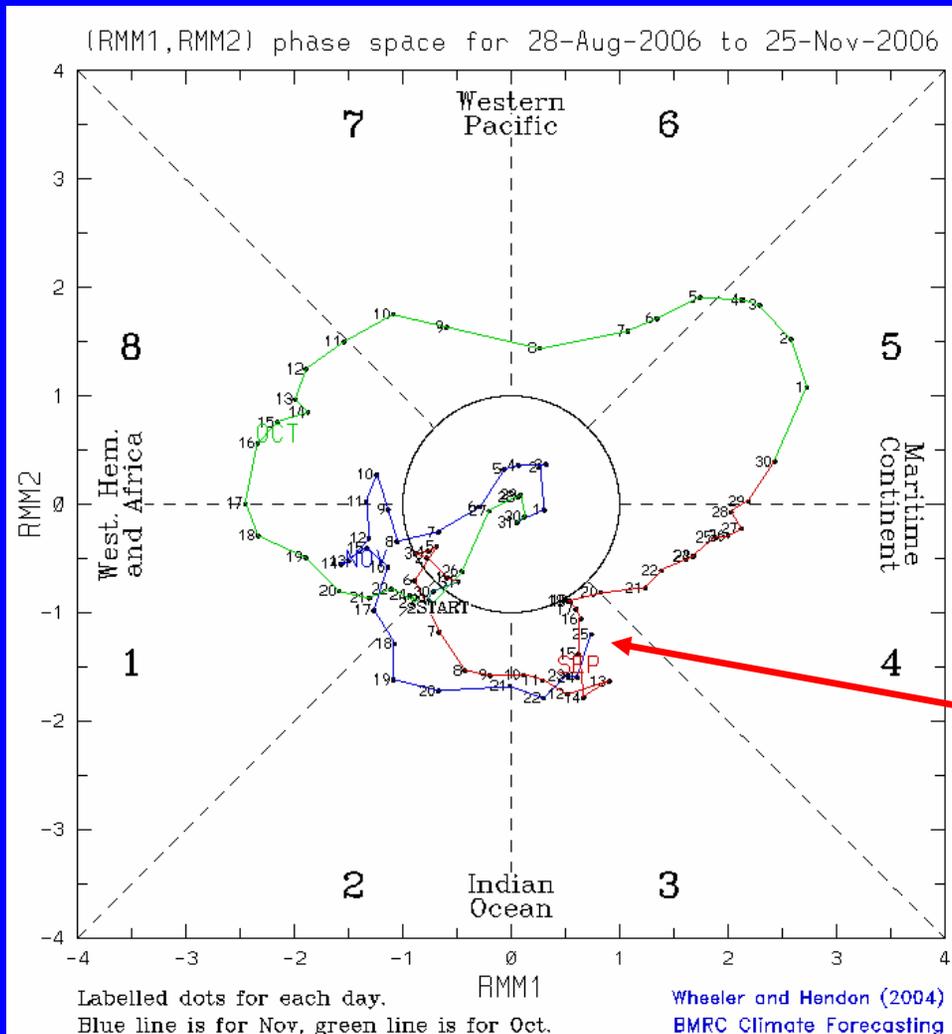


Starting in April, above normal upper oceanic water temperatures expanded from the western Pacific into the eastern Pacific in part due to Kelvin wave activity. The most recent downwelling Kelvin wave was initiated in early October.

MJO Index (Magnitude and Phase)

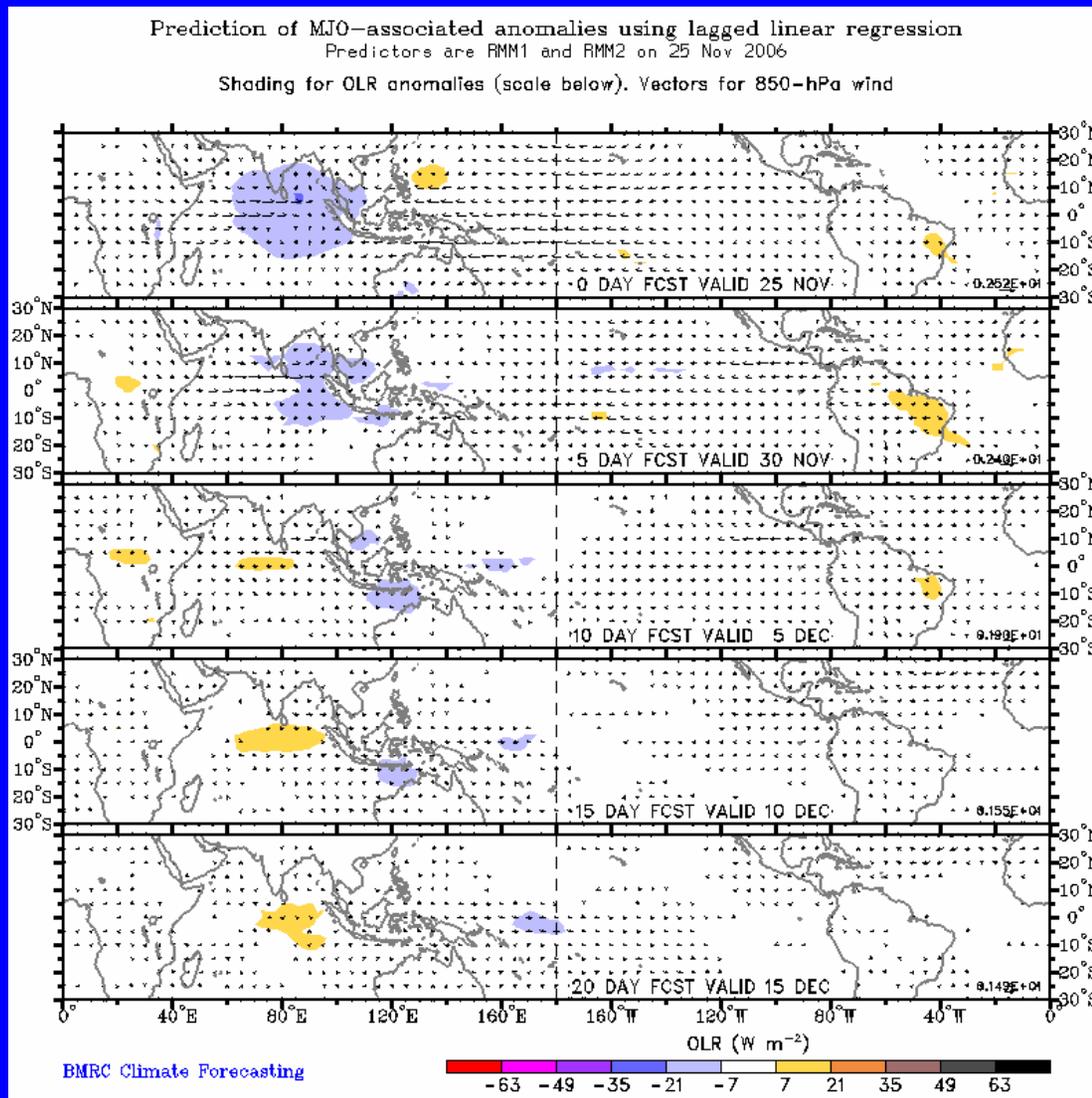
The current state of the MJO as determined by an index based on Empirical Orthogonal Function (EOF) analysis using combined fields of near-equatorially-averaged 850 hPa zonal wind, 200 hPa zonal wind, and satellite-observed outgoing longwave radiation (OLR) (Wheeler and Hendon, 2004).

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 remains active but has weakened.

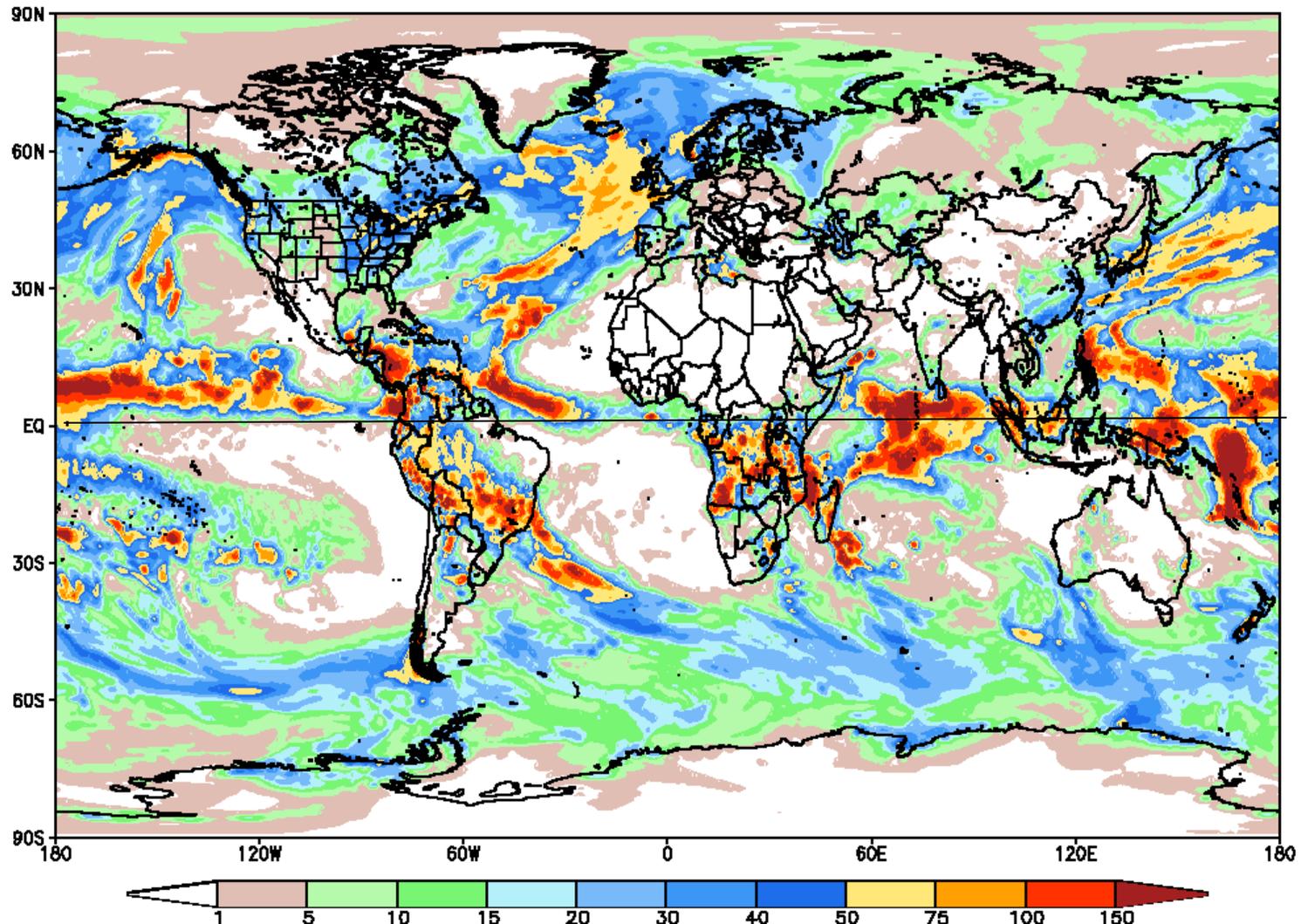
Statistical OLR MJO Forecast



The MJO forecast indicates wet conditions across the Indian Ocean during the next five days.

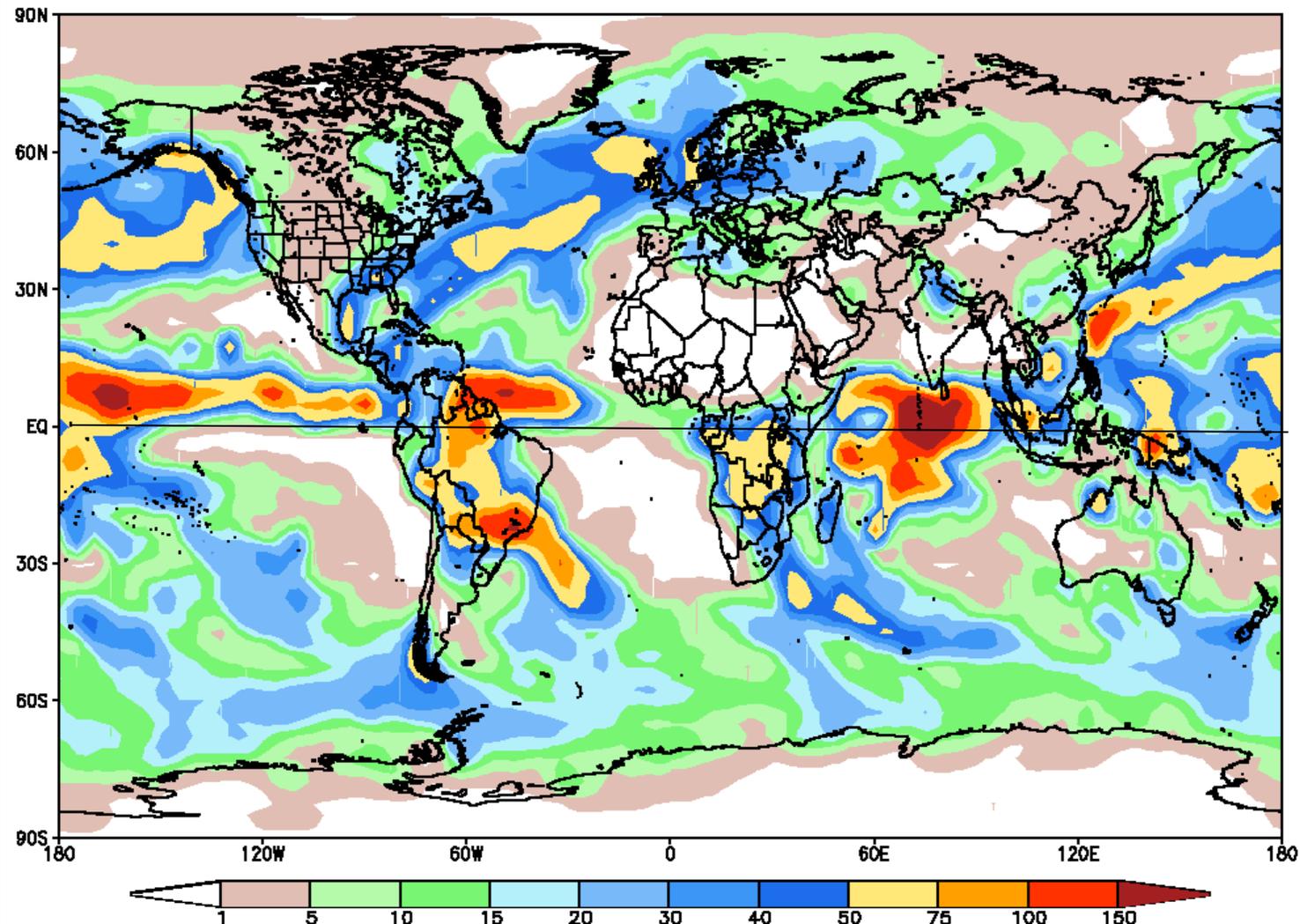
Global Forecast System (GFS) Week 1 Precipitation Forecast

NOAA GFS 37.5 km Week 1 Total Precipitation (mm)
Issued at Nov 27 2006 00Z for the period ending at Dec 4 2006 00Z



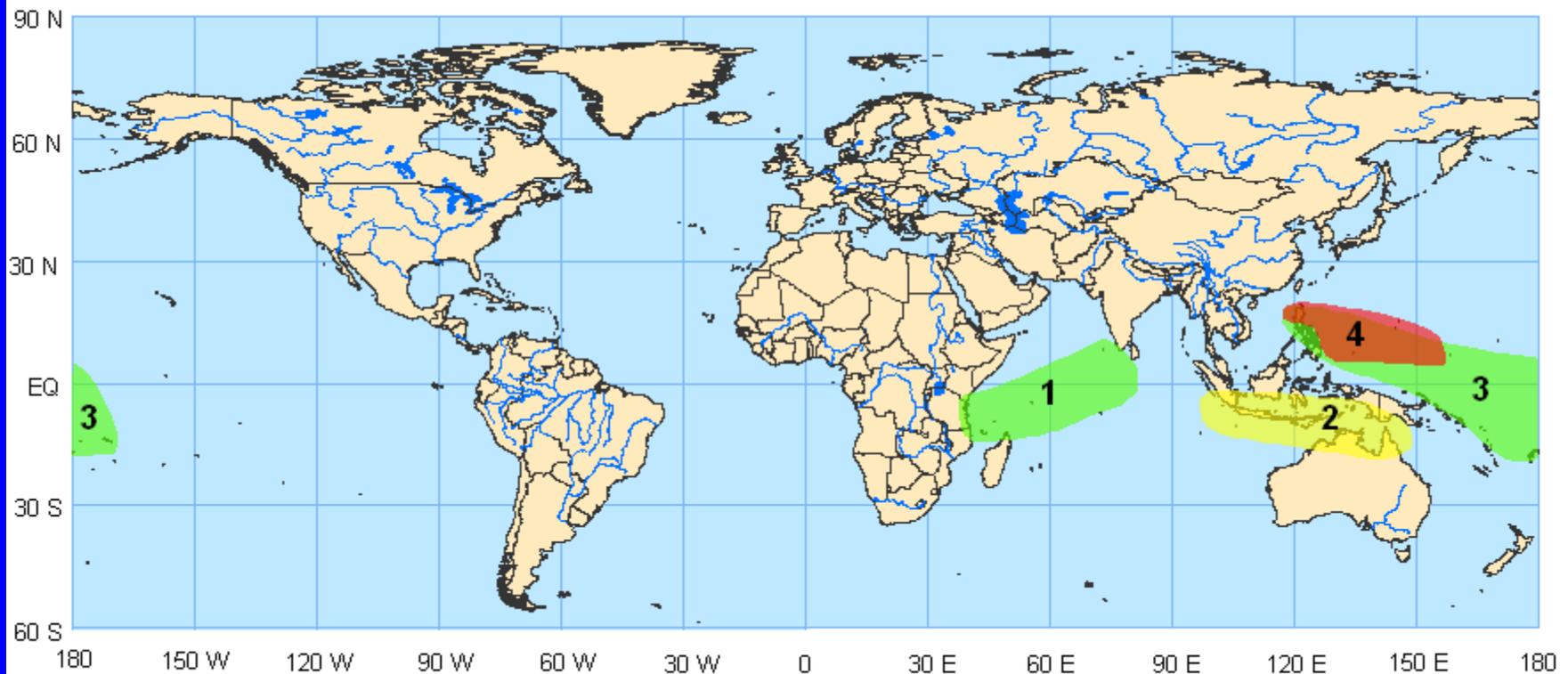
Global Forecast System (GFS) Week 2 Precipitation Forecast

NOAA GFS 100 km Week 2 Total Precipitation (mm)
Issued Nov 27 2006 00Z for the period ending at Dec 10 2006 00Z



Potential Benefits/Hazards – Week 1

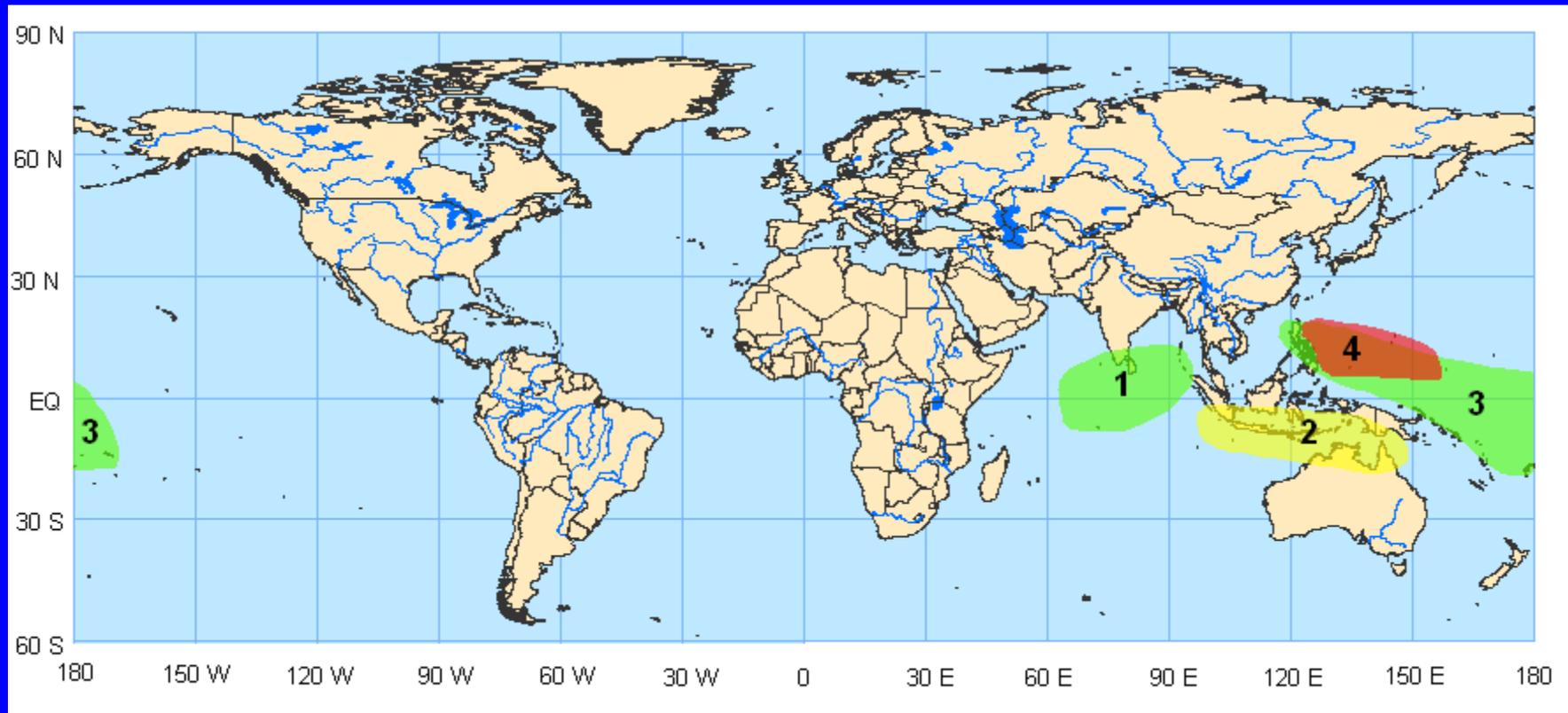
Valid November 28 – December 4, 2006



1. An increased chance for above normal rainfall for sections of the central and western Indian Ocean, as well as coastal East Africa.
2. An increased chance for below normal rainfall across the southern Maritime Continent and northern Australia.
3. An increased chance for above normal rainfall for sections of the western Pacific, including the Philippines.
4. Tropical storm Durian is expected to impact the western Pacific and potentially the Philippines. Favorable conditions for tropical cyclogenesis in the western Pacific are expected throughout the period.

Potential Benefits/Hazards – Week 2

Valid December 5 –11, 2006



1. An increased chance for above normal rainfall for sections of the Indian Ocean.
2. An increased chance for below normal rainfall across the southern Maritime Continent and northern Australia.
3. An increased chance for above normal rainfall for sections of the western Pacific, including the Philippines.
4. Favorable conditions for tropical cyclogenesis in the western Pacific are expected throughout the period.

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