

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

Update prepared by
Climate Prediction Center / NCEP
November 6, 2006

Outline

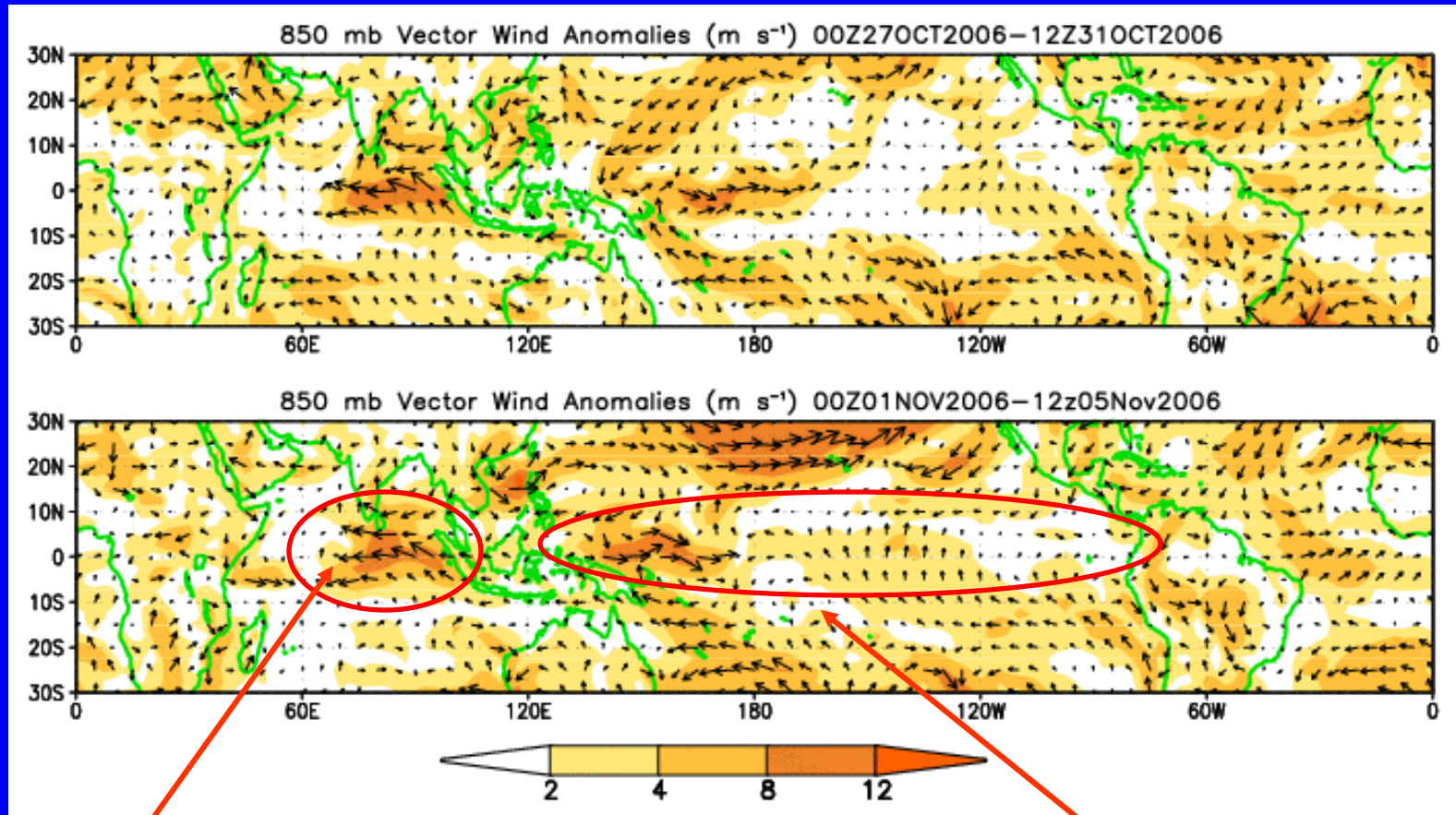
- **Overview**
- **Recent Evolution and Current Conditions**
- **Madden Julian Oscillation Forecast**
- **Summary**

Overview

- The latest observations indicate that the MJO remains weak.
- Patterns of anomalous rainfall are expected to be in large part associated with the larger scale El Nino signal.
- Wetter than normal conditions are expected for sections of the western Pacific Ocean and western Indian Ocean south of the equator with an increased chance for drier than normal conditions across the Maritime Continent and surrounding waters.
- During week 2, this pattern of anomalous rainfall is expected to persist. However, the area of enhanced rainfall in the western Pacific Ocean is anticipated to be more centered near the Date Line.
- At times, a tropical connection from the Pacific Ocean to western North America is expected during both weeks 1 and 2 impacting sections of the US Pacific northwest, western Canada, and the Alaska Panhandle with periods of heavy rainfall, strong winds, and heavy surf.

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

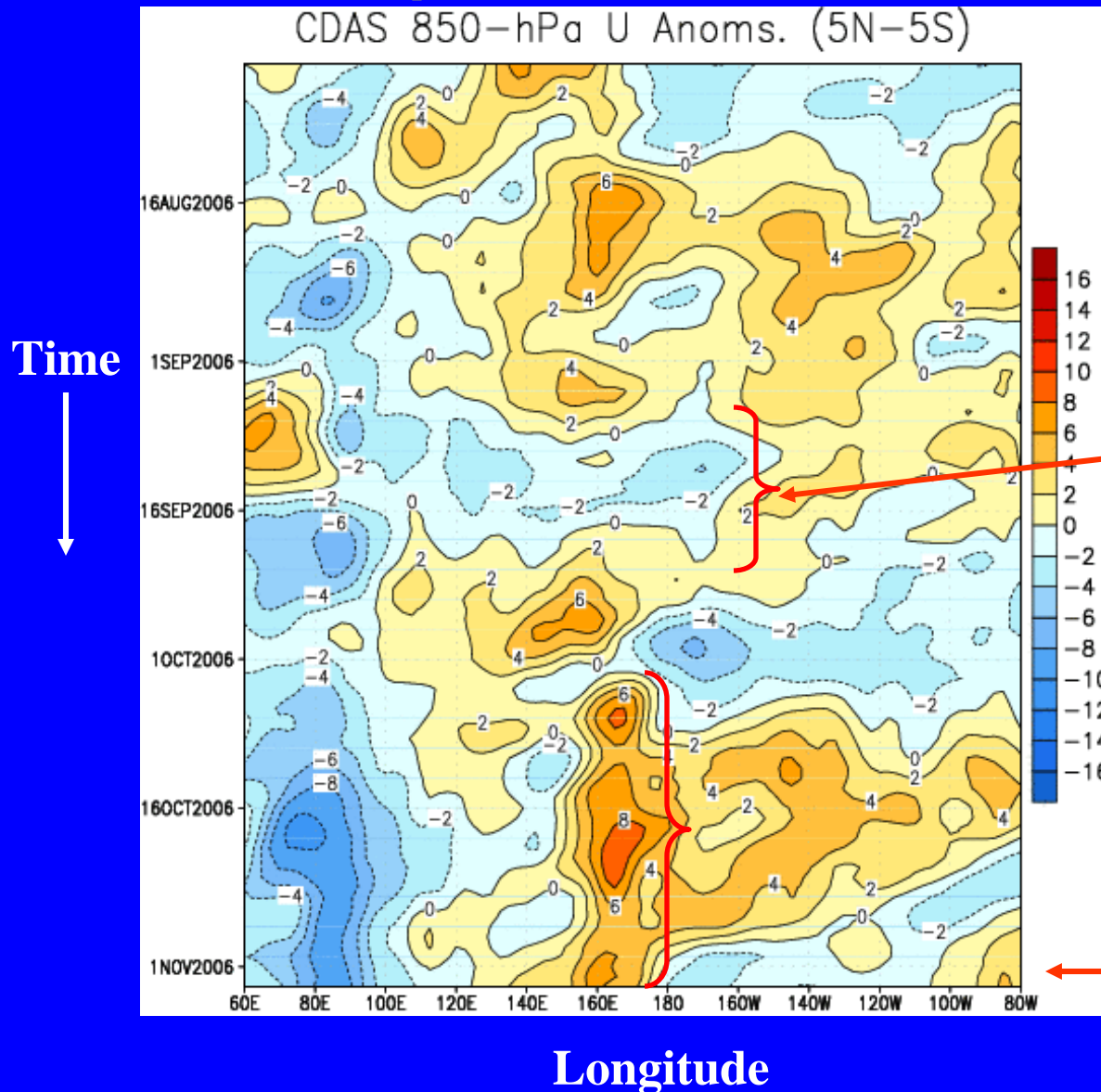
Note that shading denotes the magnitude of the anomalous wind vectors



Easterly anomalies in the Indian ocean continue during the past five days.

Westerly anomalies continue in the western Pacific while low-level winds in the central and eastern equatorial Pacific have become closer to normal.

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



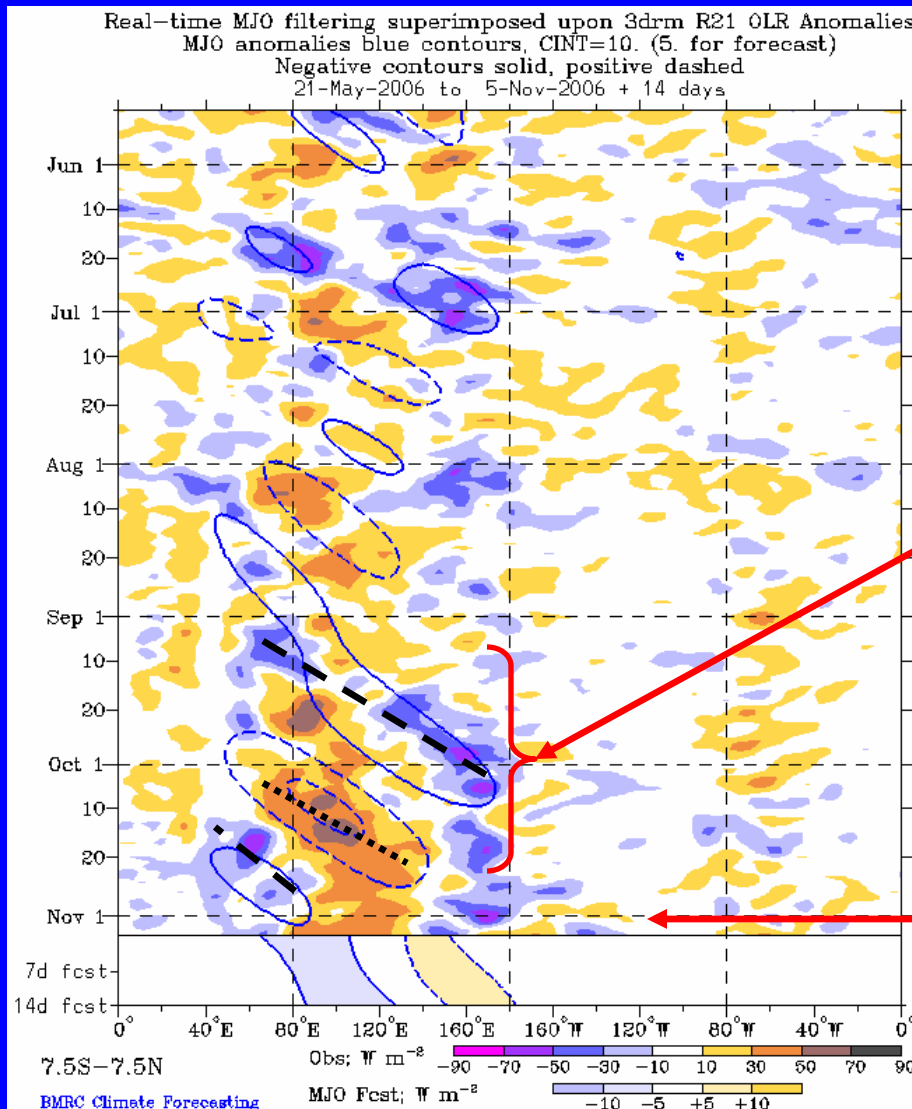
Weaker-than-average easterlies or westerlies (orange/red shading)

Stronger-than-average easterlies (blue shading)

Frequent periods of westerly anomalies near the Date Line during August relaxed for a period in mid-September.

Westerly anomalies continue near and west of the Date Line while weak easterlies are evident across much of the remainder of the Pacific Ocean.

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



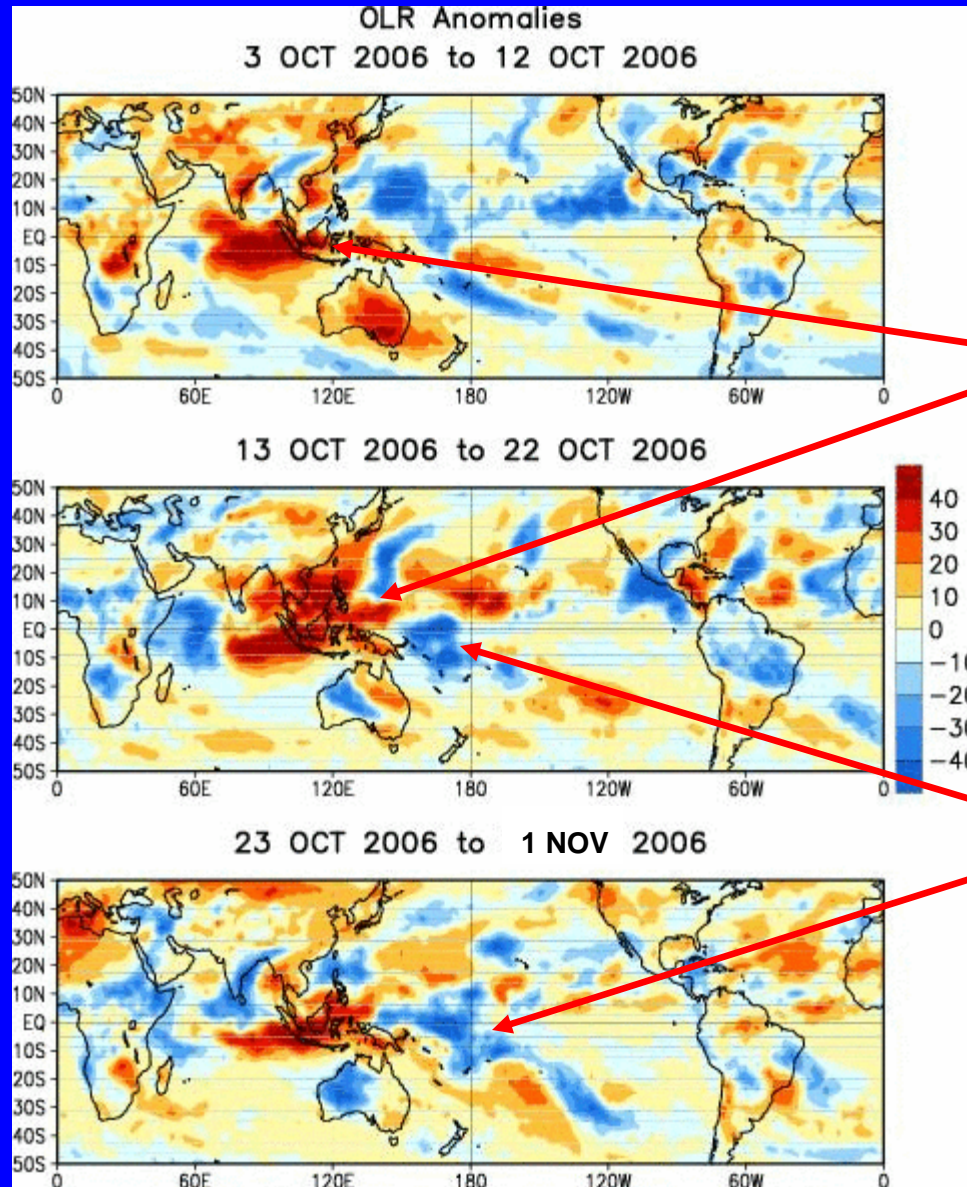
Drier-than-average conditions (/red shading)

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.

With a rapid weakening of the MJO, areas of enhanced (suppressed) convection have become more stationary just west of the Date Line (Maritime Continent).

Anomalous OLR: Last 30 days



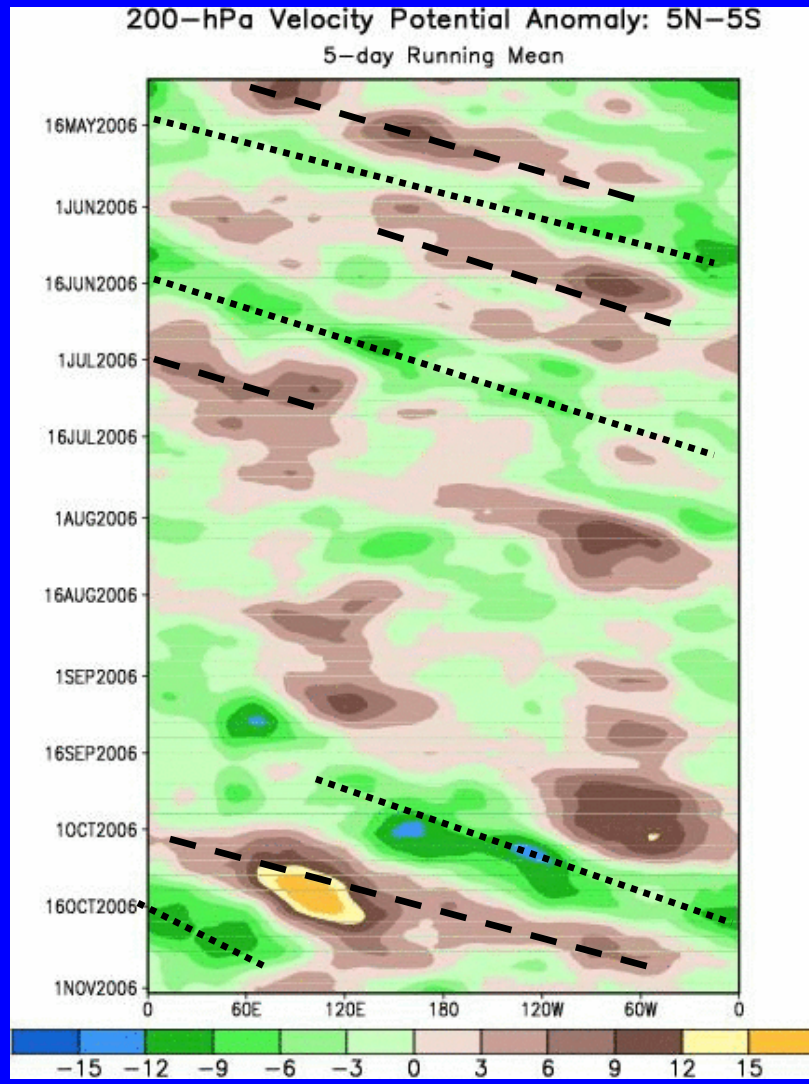
Drier-than-average conditions (red shading)

Wetter-than-average conditions (blue shading)

In large part associated with the MJO, dry conditions in the Indian Ocean shifted east across sections of the Maritime Continent and Southeast Asia during the first half of October.

During the last 20 days, enhanced convection has become more persistent just west of the Date line near and just south of the equator.

200-hPa Velocity Potential Anomalies (5°S-5°N)



Time



Positive anomalies (brown shading) indicate unfavorable conditions for precipitation.

Negative anomalies (green shading) indicate favorable conditions for precipitation.

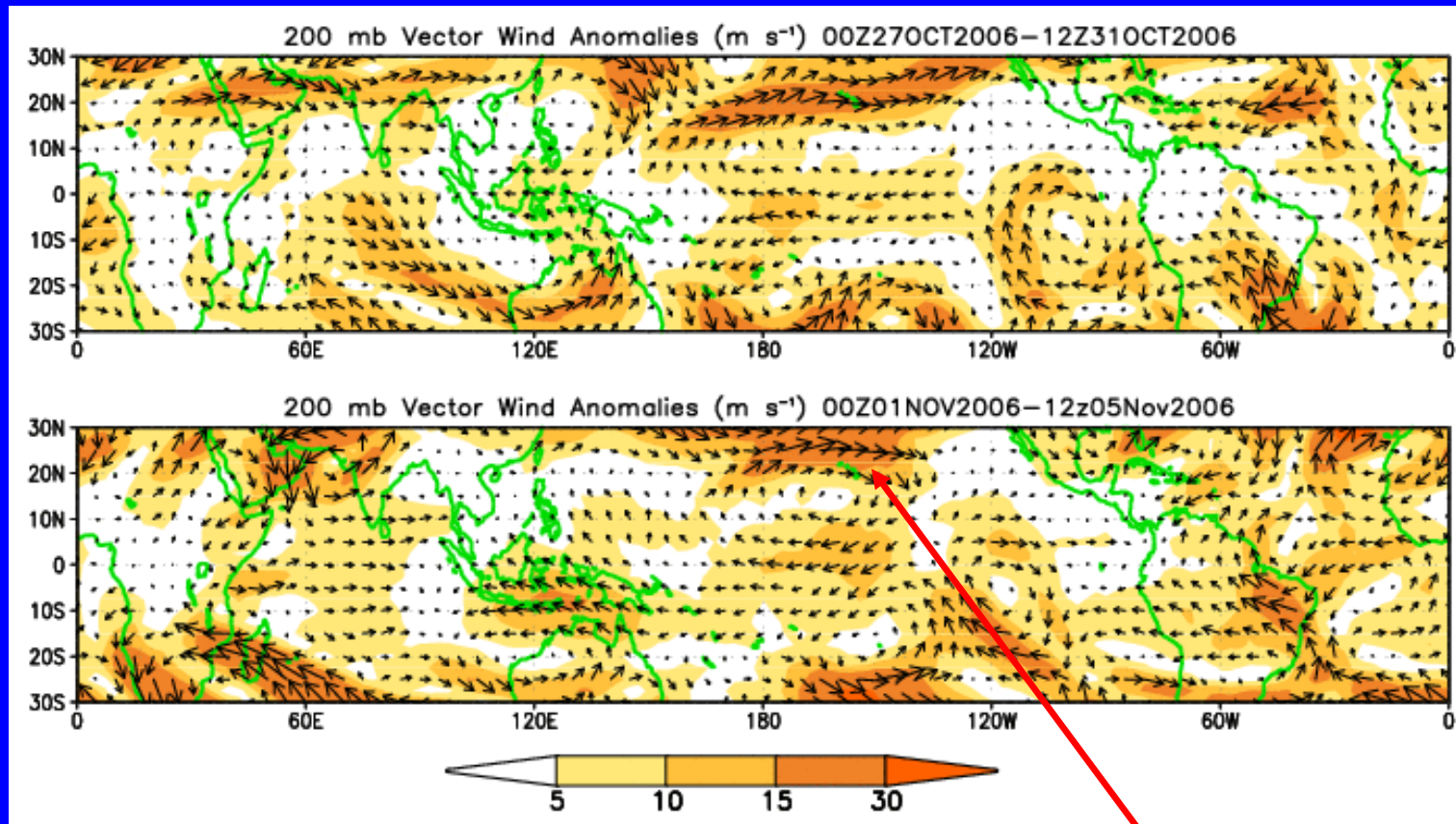
Only periods of weak MJO activity occurred some during May through August.

Moderate to strong MJO activity was observed from late-September to mid-October. Recently, the MJO has weakened.

Longitude

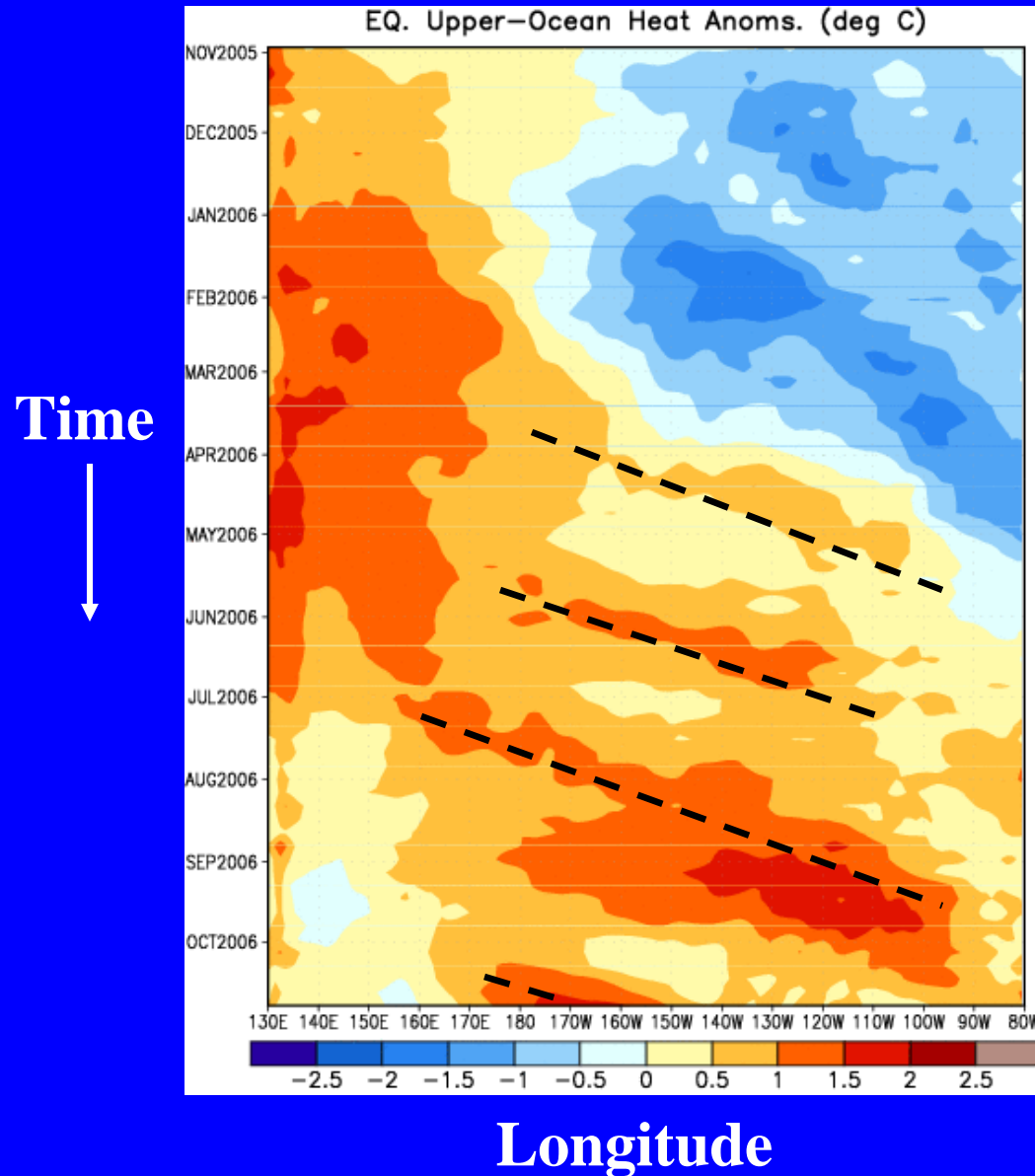
200-hPa Vector Winds and Anomalies (m s^{-1})

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



Strong subtropical jet is evident across much of the Pacific Ocean in the Northern Hemisphere.

Heat Content Evolution in the Eq. Pacific

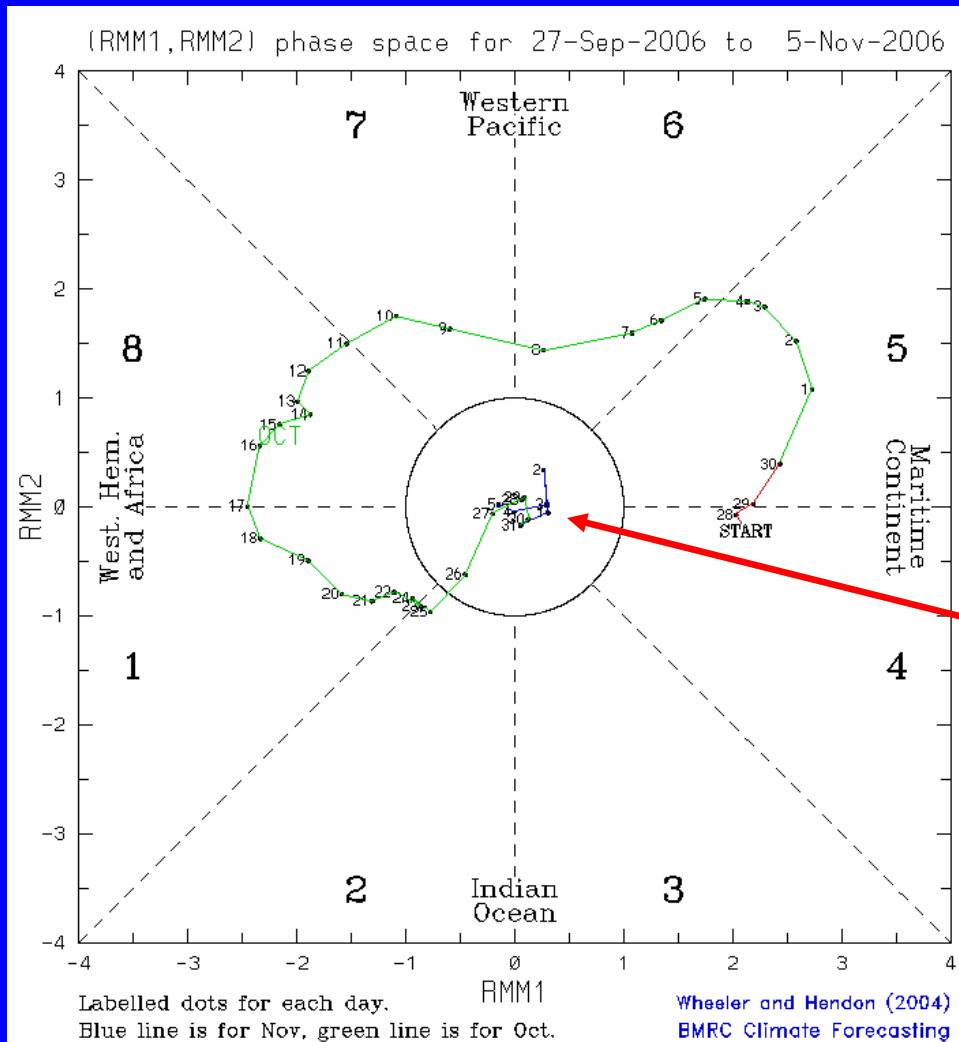


Starting in April, above normal upper oceanic water temperatures expanded from the western Pacific into the eastern Pacific in part due to Kelvin wave activity. The most recent downwelling Kelvin wave was initiated in early October.

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).

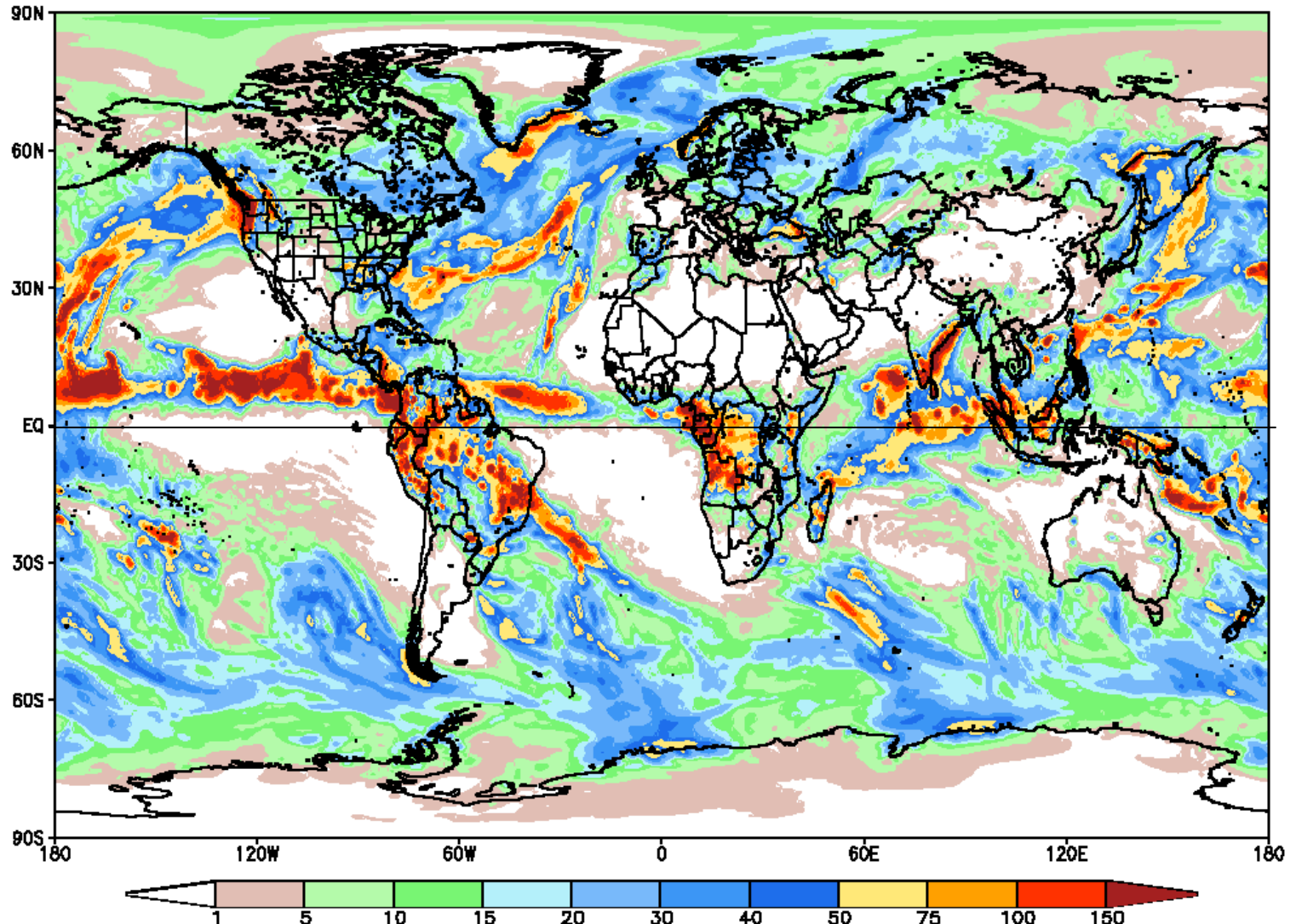
The axes represent the time series of the two leading modes of variability and are used to measure the amplitude while the triangular areas indicate the phase or location of the enhanced phase of the MJO. The farther away from the center of the circle the stronger the MJO. Different color lines indicate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



The MJO signal is currently very weak.

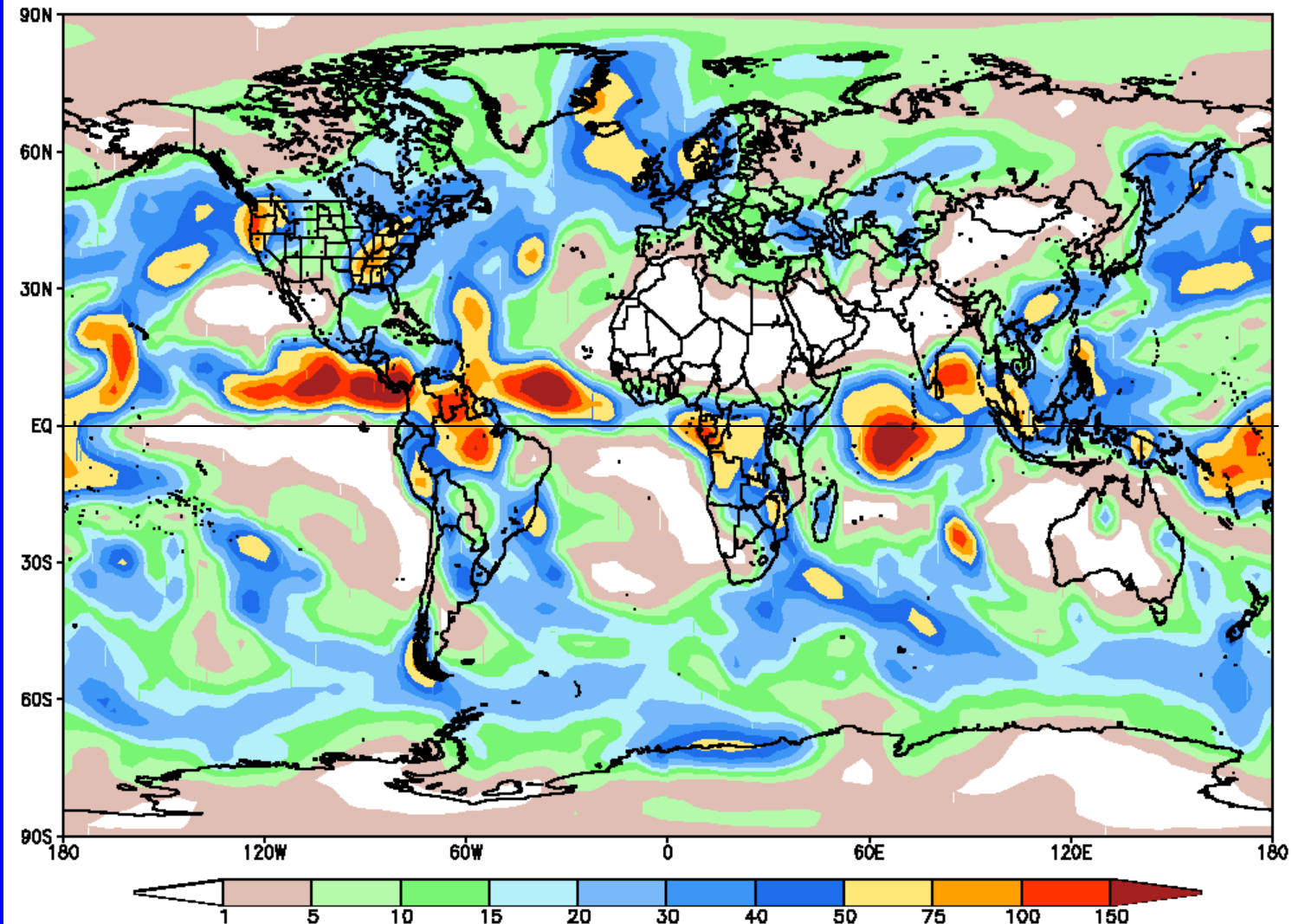
Global Forecast System (GFS) Week 1 Precipitation Forecast

NOAA GFS 37.5 km Week 1 Total Precipitation (mm)
Issued at Nov 06 2006 00Z for the period ending at Nov 13 2006 00Z



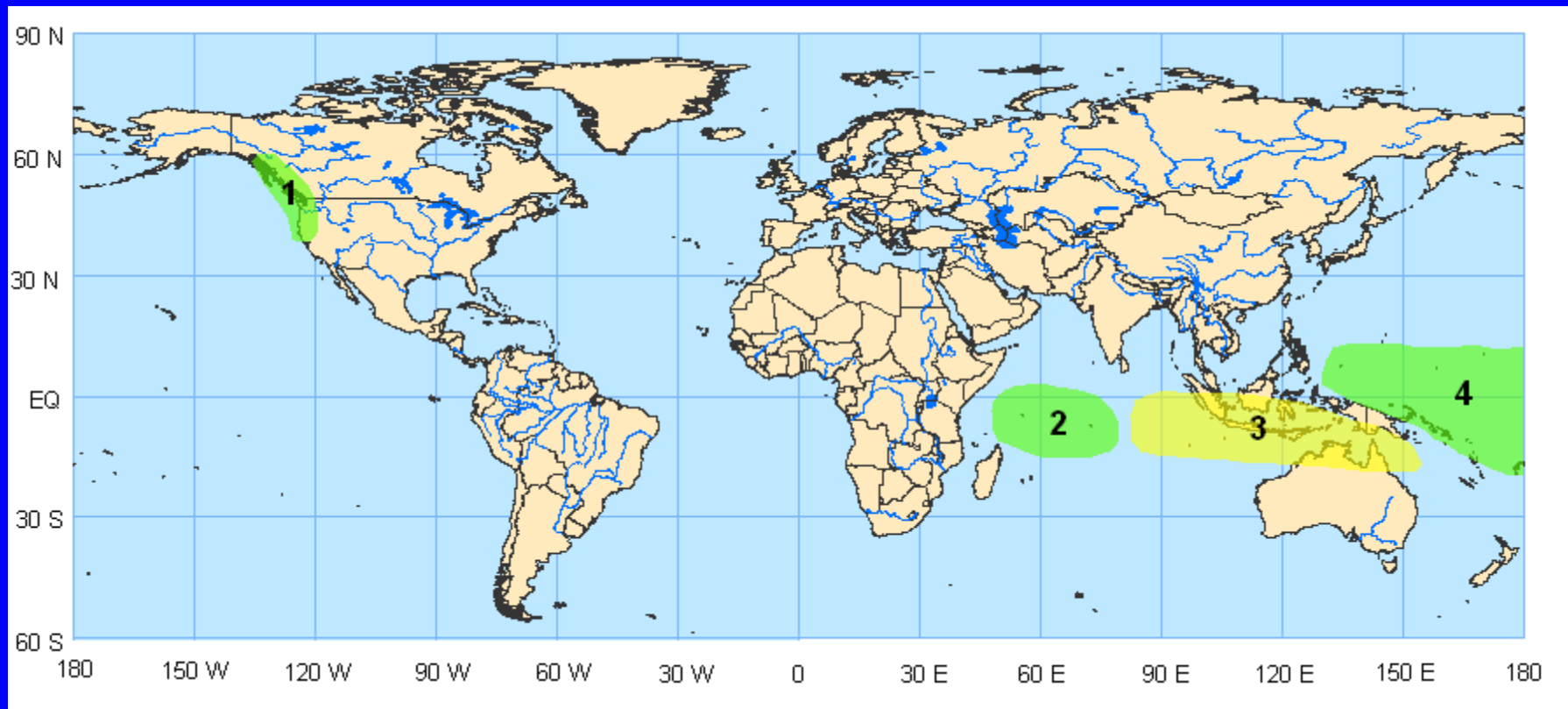
Global Forecast System (GFS) Week 2 Precipitation Forecast

NOAA GFS 100 km Week 2 Total Precipitation (mm)
Issued Nov 6 2006 00Z for the period ending at Nov 19 2006 00Z



Potential Benefits/Hazards – Week 1

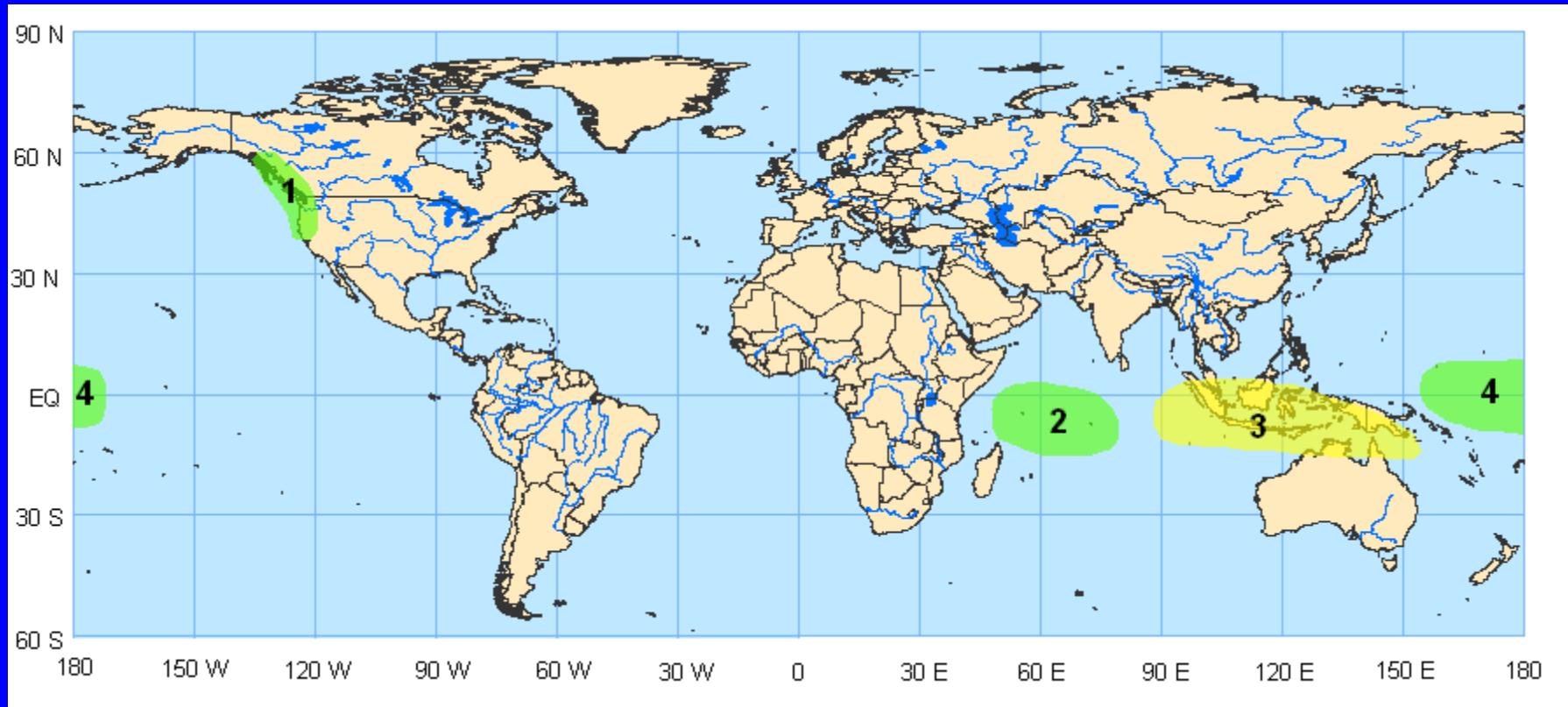
Valid November 7 – November 13, 2006



1. Periods of heavy rainfall, strong winds and heavy surf for areas of the Pacific Northwest of the US, western Canada, and the Panhandle of Alaska
2. An increased chance for above normal rainfall for sections of the western Indian Ocean south of the equator
3. An increased chance for below normal rainfall across the southern Maritime Continent and adjacent waters
4. An increased chance for above normal rainfall for sections of the western Pacific Ocean

Potential Benefits/Hazards – Week 2

Valid November 14 - 20, 2006



1. Periods of heavy rainfall, strong winds and heavy surf for areas of the Pacific Northwest of the US, western Canada, and the Panhandle of Alaska
2. An increased chance for above normal rainfall for sections of the western Indian Ocean south of the equator
3. An increased chance for below normal rainfall across the southern Maritime Continent and adjacent waters
4. An increased chance for above normal rainfall for sections of the western Pacific Ocean

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