

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

**Update prepared by
Climate Prediction Center / NCEP
March 5, 2007**

Outline

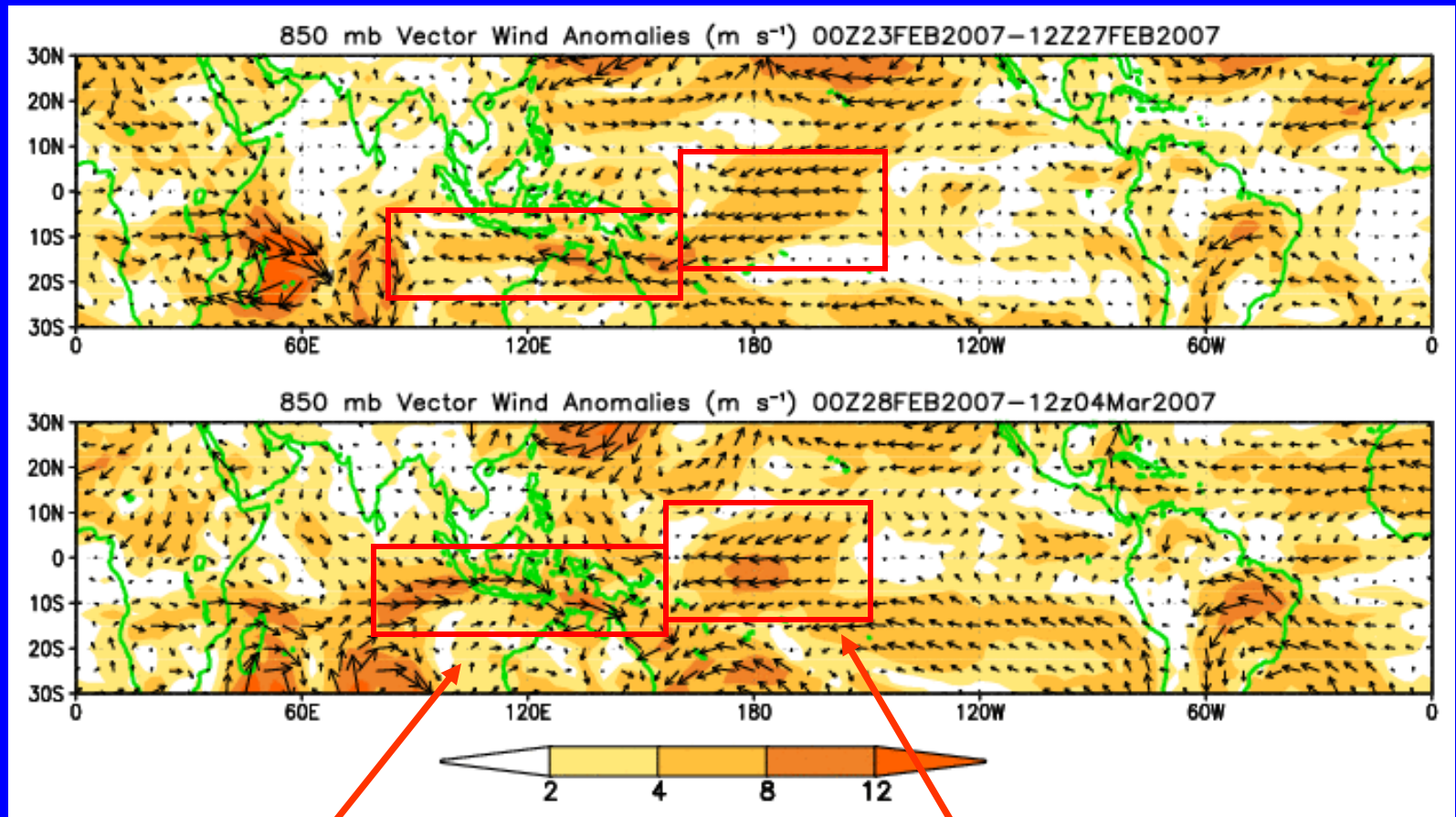
- **Overview**
- **Recent Evolution and Current Conditions**
- **Madden Julian Oscillation Forecast**
- **Summary**

Overview

- **The MJO index indicates a weak-moderate MJO. However, not all relevant fields show characteristics of a well-developed MJO.**
- **During both weeks 1 and 2, there exists an increased chance for above average rainfall for the Maritime continent and northern Australia. Also, conditions are expected to remain favorable for tropical cyclogenesis for the eastern Indian Ocean throughout the period.**
- **For week 1 only, there is an increased chance for below normal rainfall for sections of Brazil and south-central Africa and for wetter than normal conditions for parts of the western Pacific Ocean south of the equator.**

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

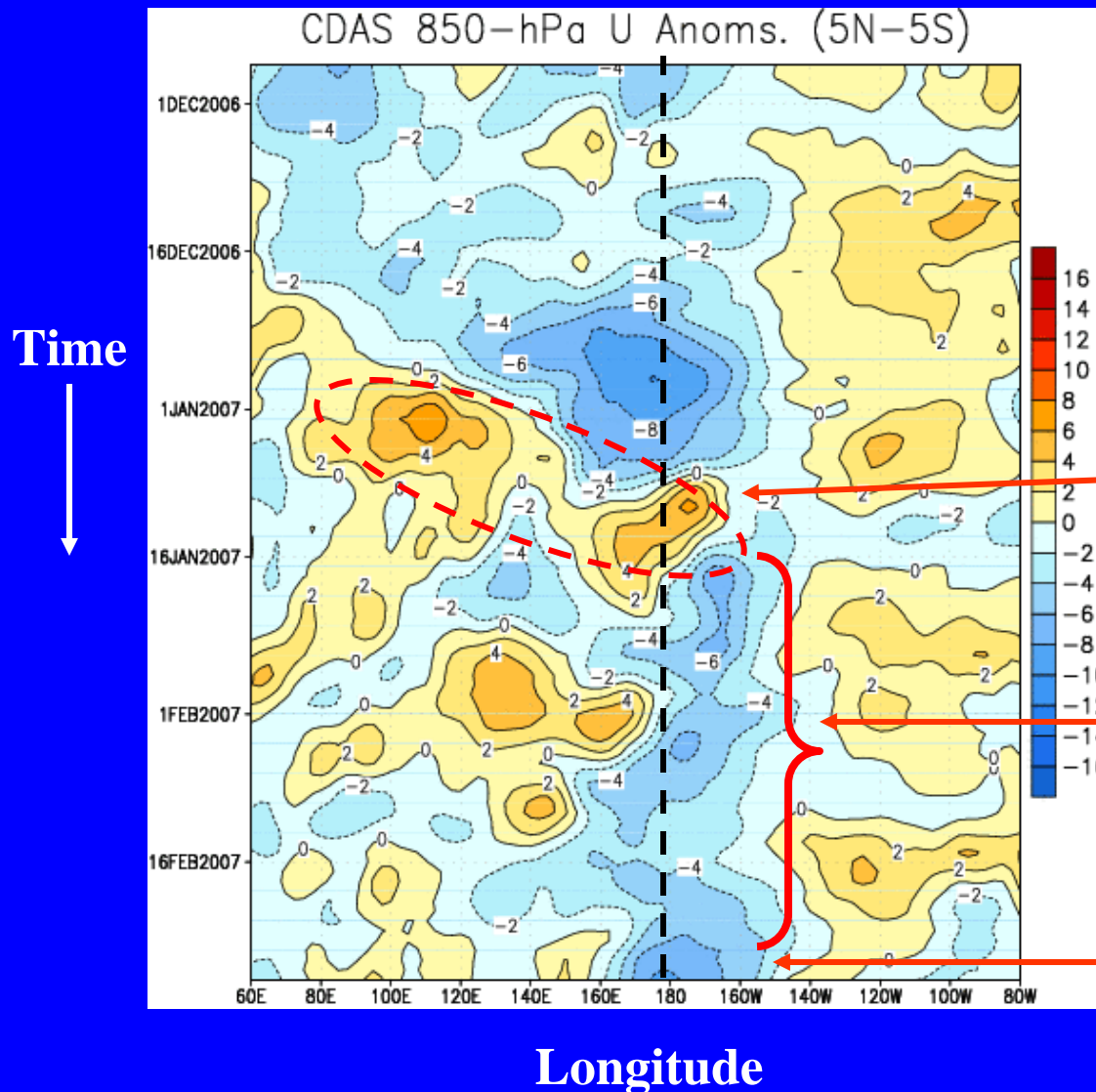
Note that shading denotes the magnitude of the anomalous wind vectors



Strong anomalous easterlies across the southern Maritime continent and Australia have been replaced with westerly anomalies during the past 5 days.

Anomalous easterlies along the equator in the western Pacific continue.

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



Westerly anomalies (orange/red shading) represent anomalous west-to-east flow.

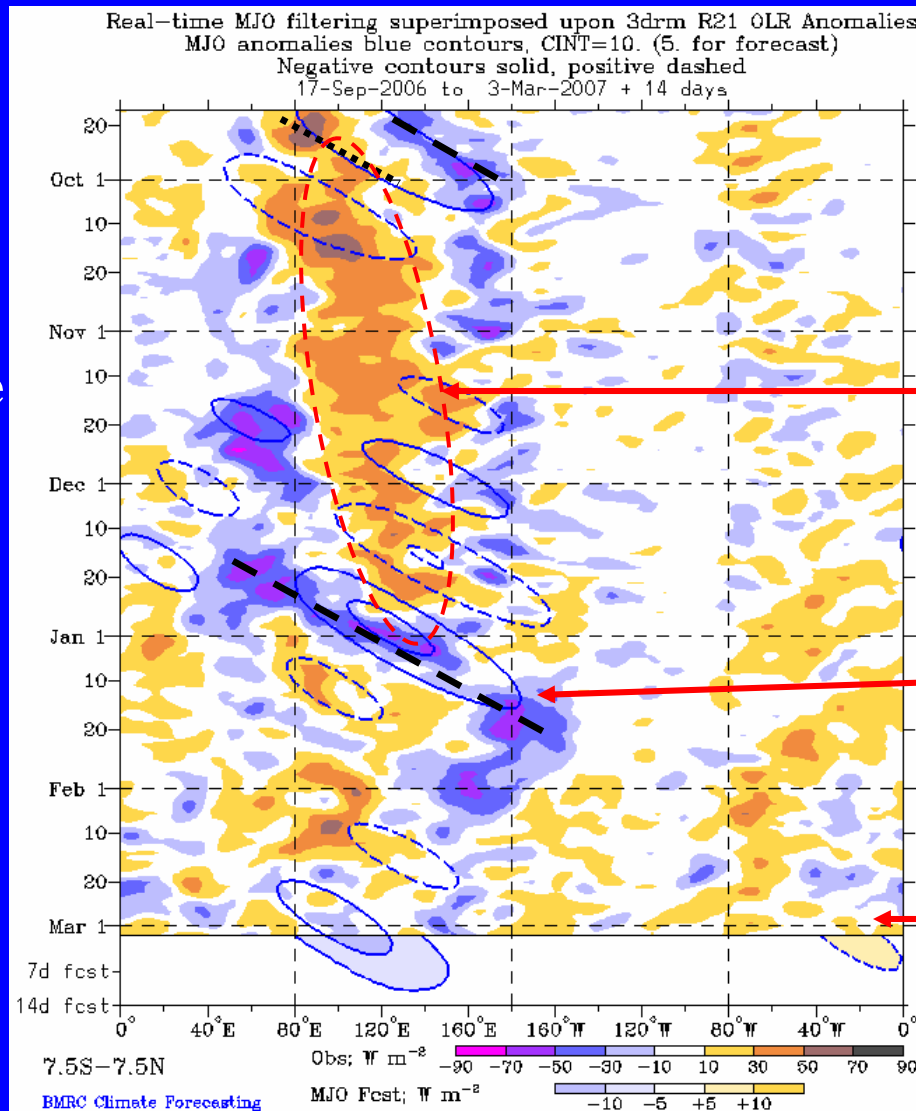
Easterly anomalies (blue shading) represent anomalous east-to-west flow.

Westerly anomalies associated with the MJO shifted from the equatorial Indian Ocean to the central equatorial Pacific during early January 2007.

In general, easterly anomalies have persisted near the Date Line since mid-January.

Recently, easterly anomalies have strengthened near the Date Line.

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



Drier-than-average conditions, positive OLR anomalies (/red shading)

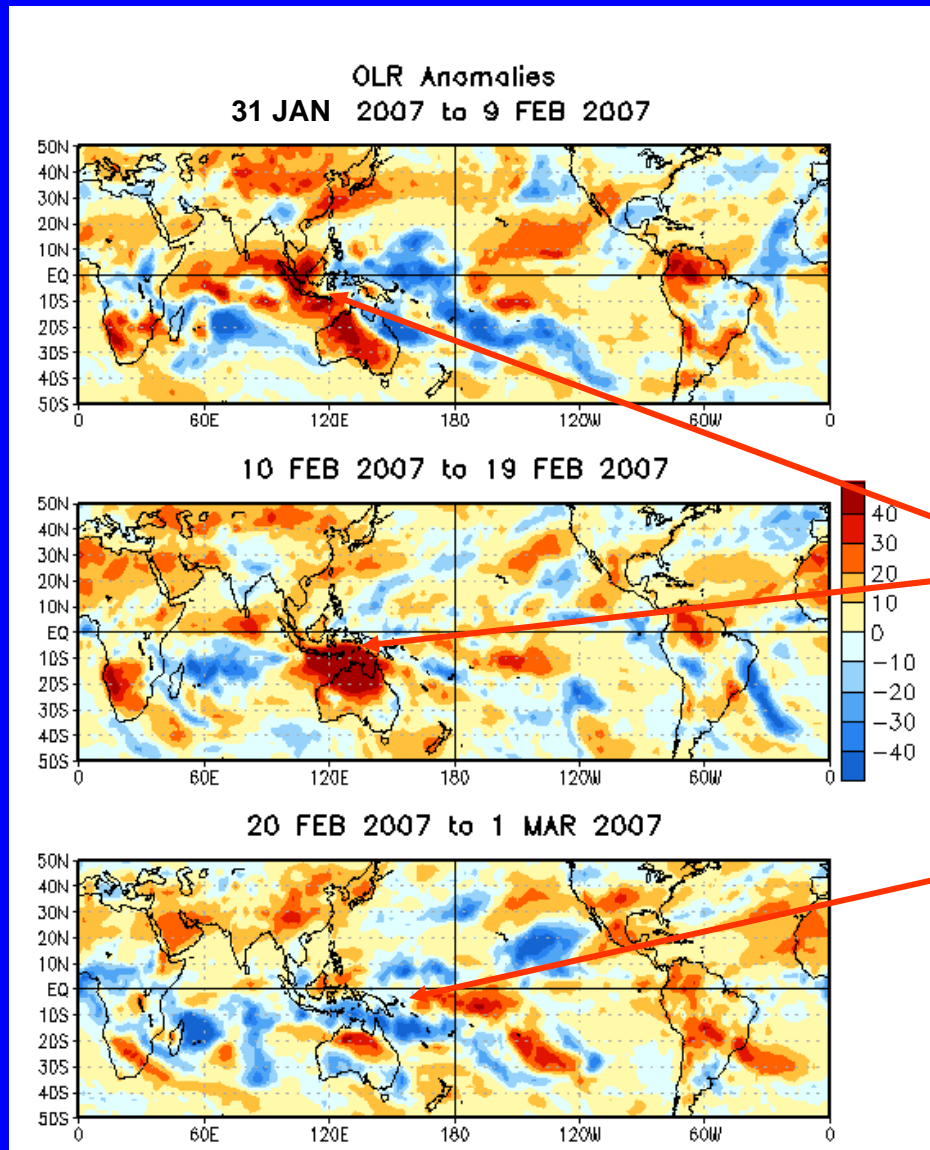
Wetter-than-average conditions, negative OLR anomalies (blue shading)

Strong suppressed convection was evident across the Maritime Continent (100E-150E) from late September to mid-December.

Enhanced convection, associated with the MJO in late December and January, shifted eastward from the Indian Ocean across the Maritime Continent and western Pacific.

Currently, OLR anomalies along the equator remain small. Weak enhanced convection is evident near 150E.

Anomalous OLR: Last 30 days



Drier-than-average conditions, positive OLR anomalies (red shading)

Wetter-than-average conditions, negative OLR anomalies (blue shading)

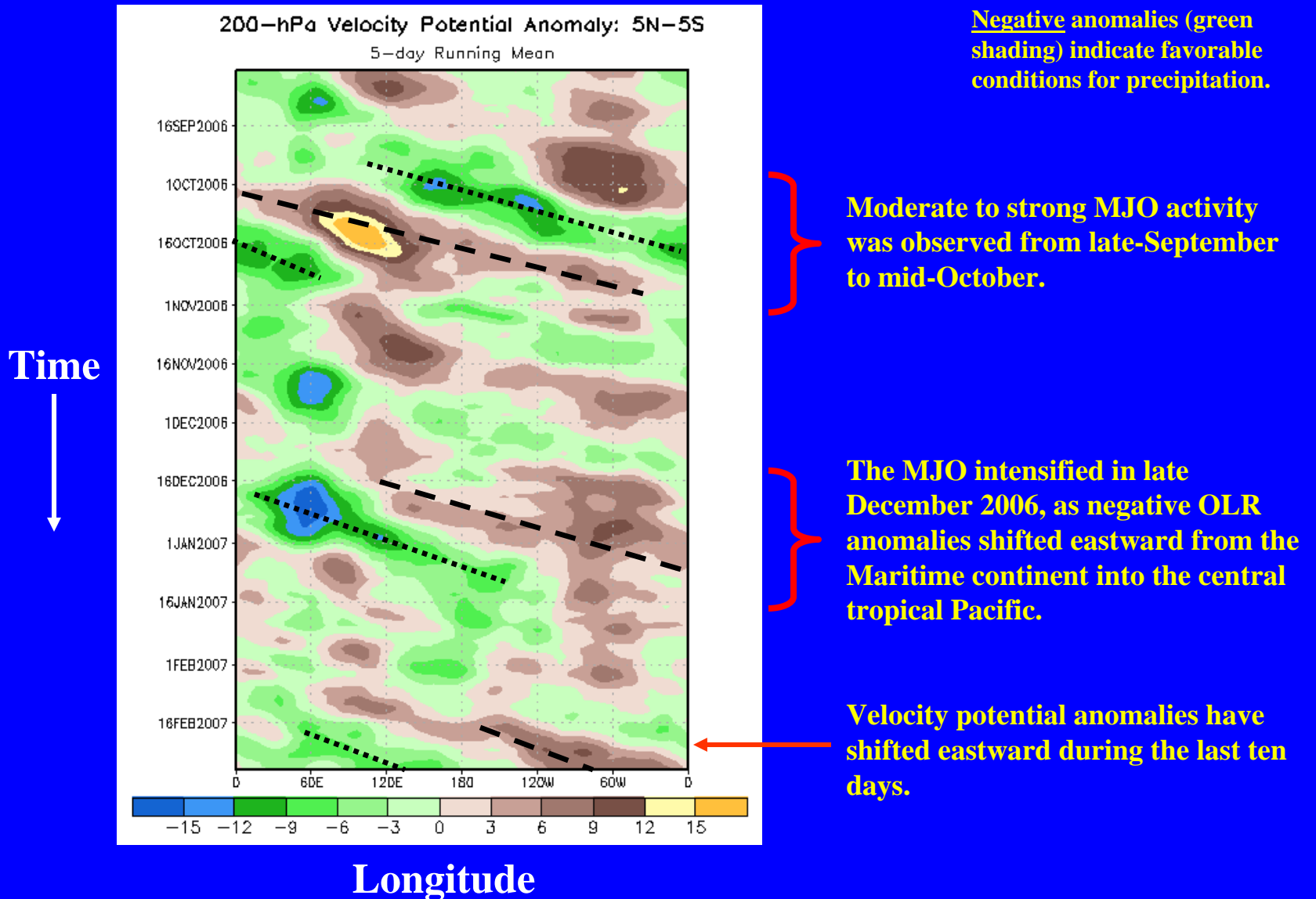
During early-mid February, dry conditions prevailed across sections of the eastern Indian Ocean, Maritime Continent, and Australia.

During the most recent 10 days, enhanced convection has developed across northern Australia and the southern Maritime Continent and adjacent waters.

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

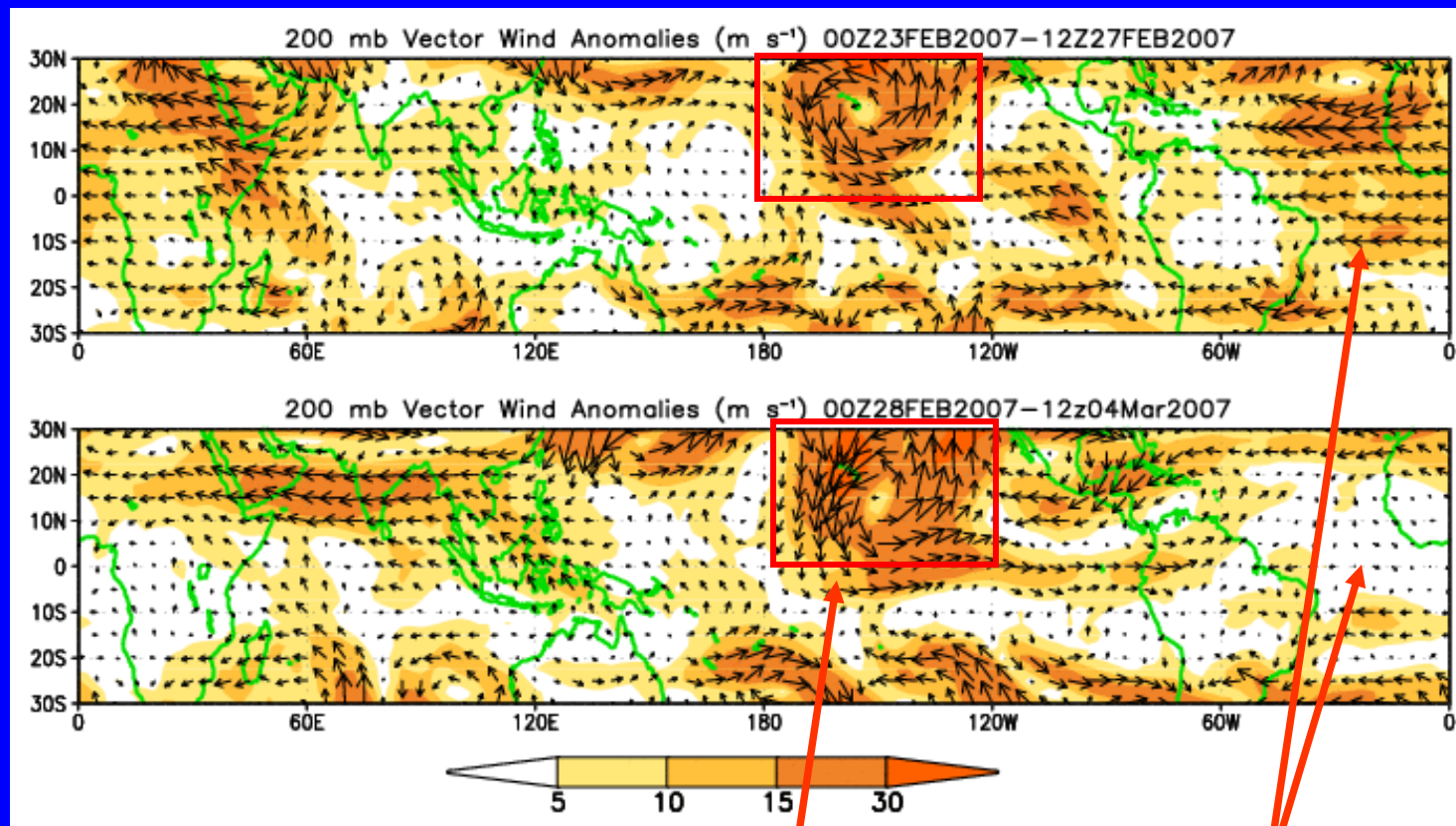
Positive anomalies (brown shading) indicate unfavorable conditions for precipitation.

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



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

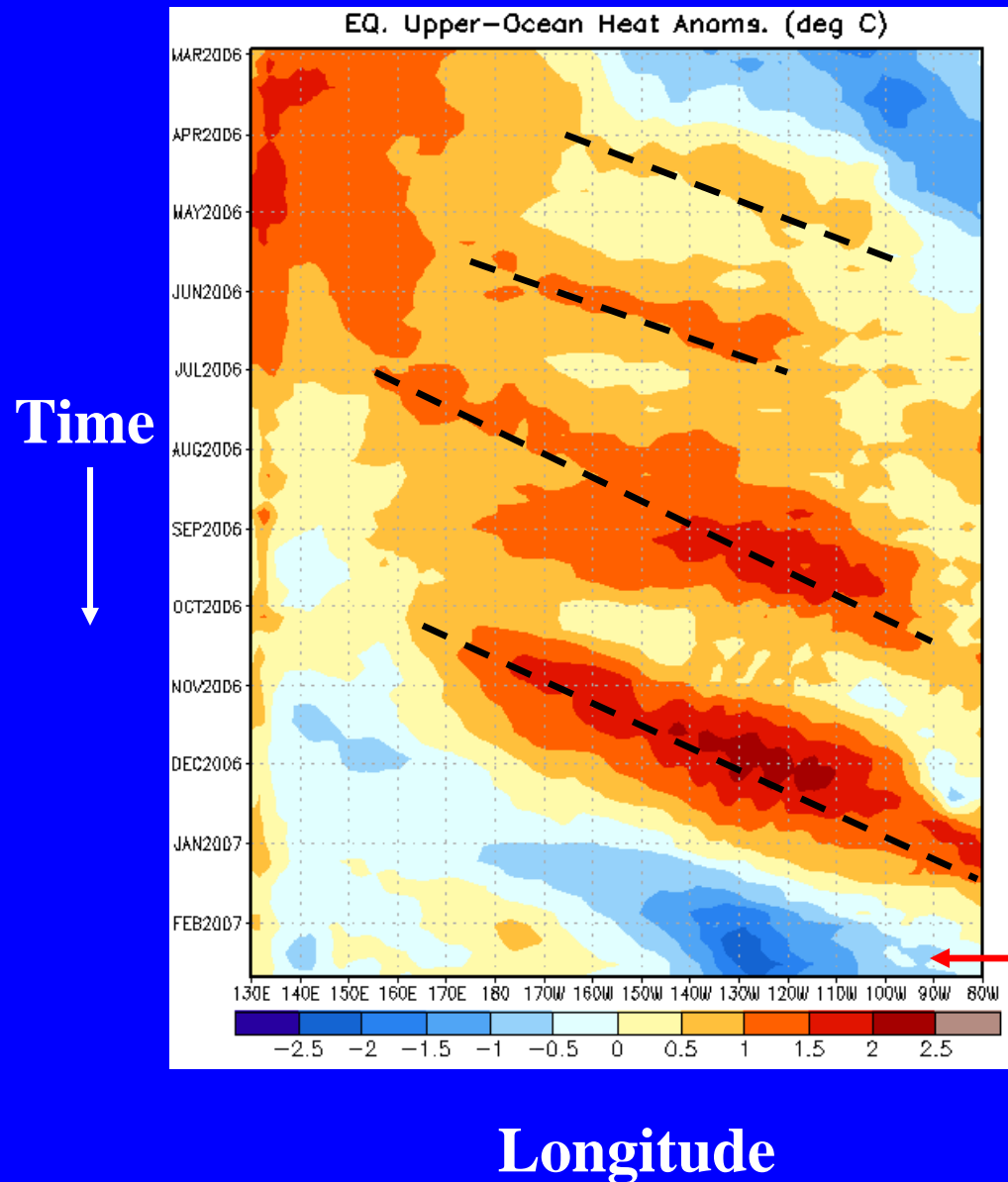
Note that shading denotes the magnitude of the anomalous wind vectors.



Anomalous upper-level cyclonic circulation centered near Hawaii persists.

Anomalous upper-level easterlies have weakened across the Atlantic Ocean and sections of Africa.

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.

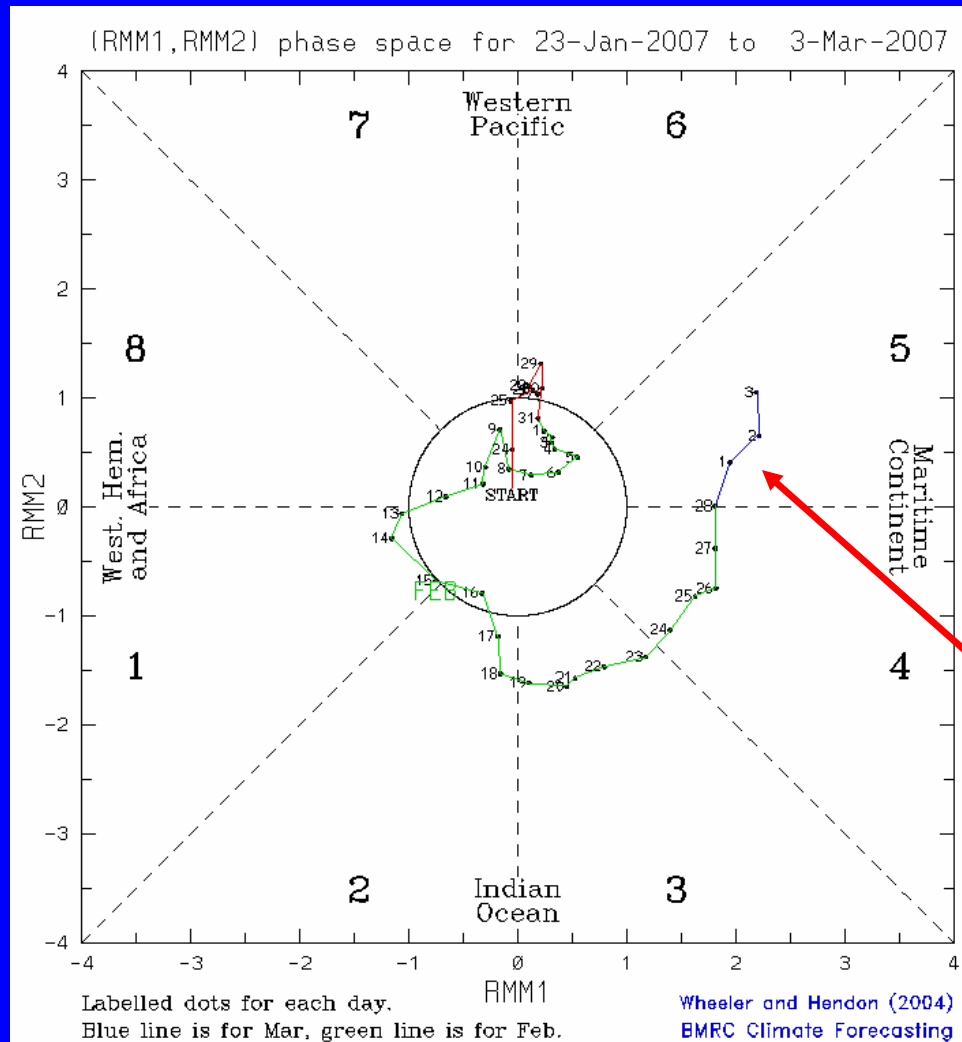
During this period eastward-propagating Kelvin waves (warm phases indicated by dashed lines) have caused considerable month-to-month variability in the upper-ocean heat content.

Recently, negative heat content anomalies are evident across the eastern equatorial Pacific.

MJO Index (Magnitude and Phase)

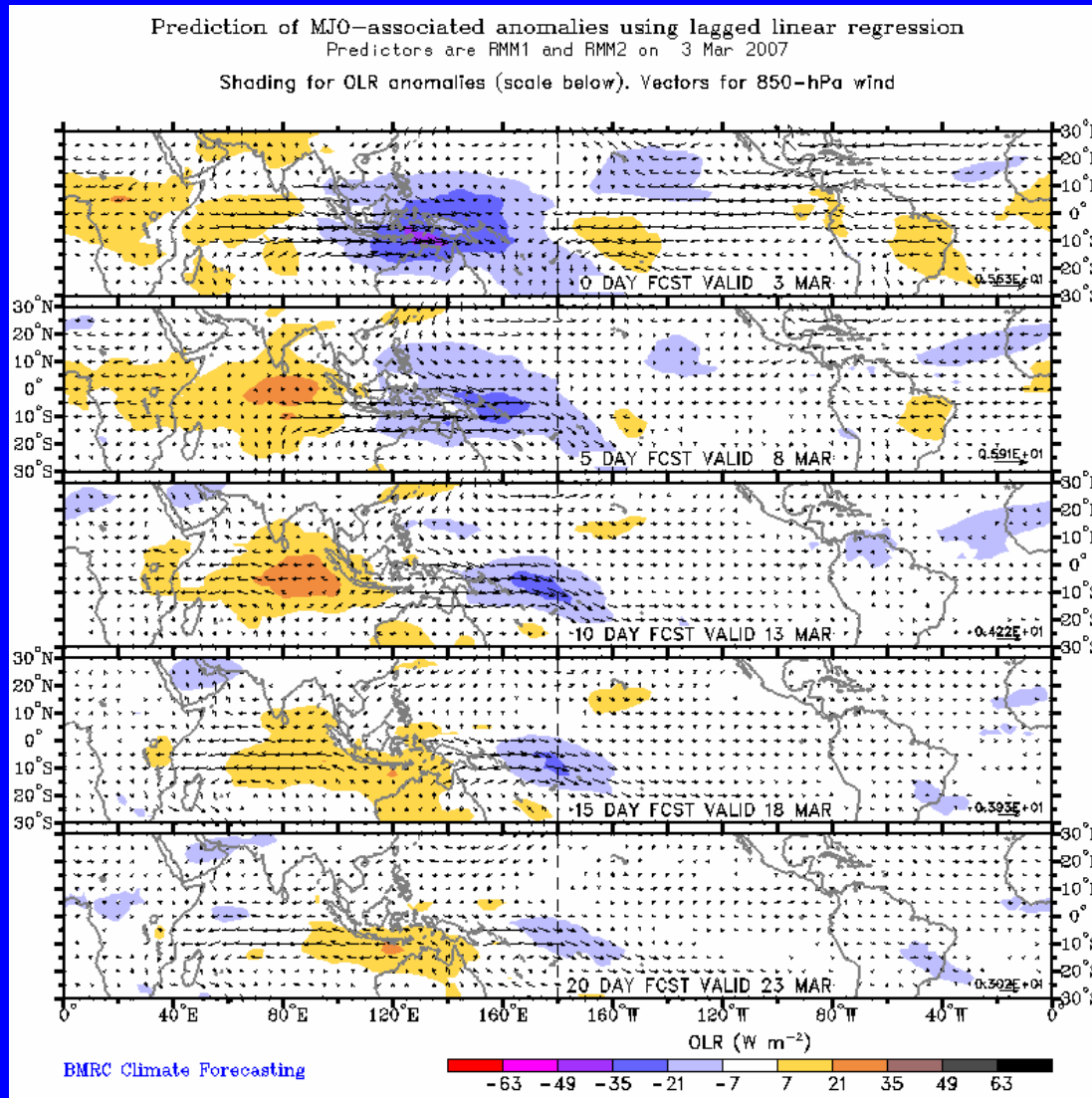
The current state of the MJO as determined by an index based on Empirical Orthogonal Function (EOF) analysis using combined fields of near-equatorially-averaged 850-hPa zonal wind, 200- hPa zonal wind, and satellite-observed outgoing longwave radiation (OLR) (Wheeler and Hendon, 2004).

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 index indicates weak to moderate MJO activity.

Statistical OLR MJO Forecast

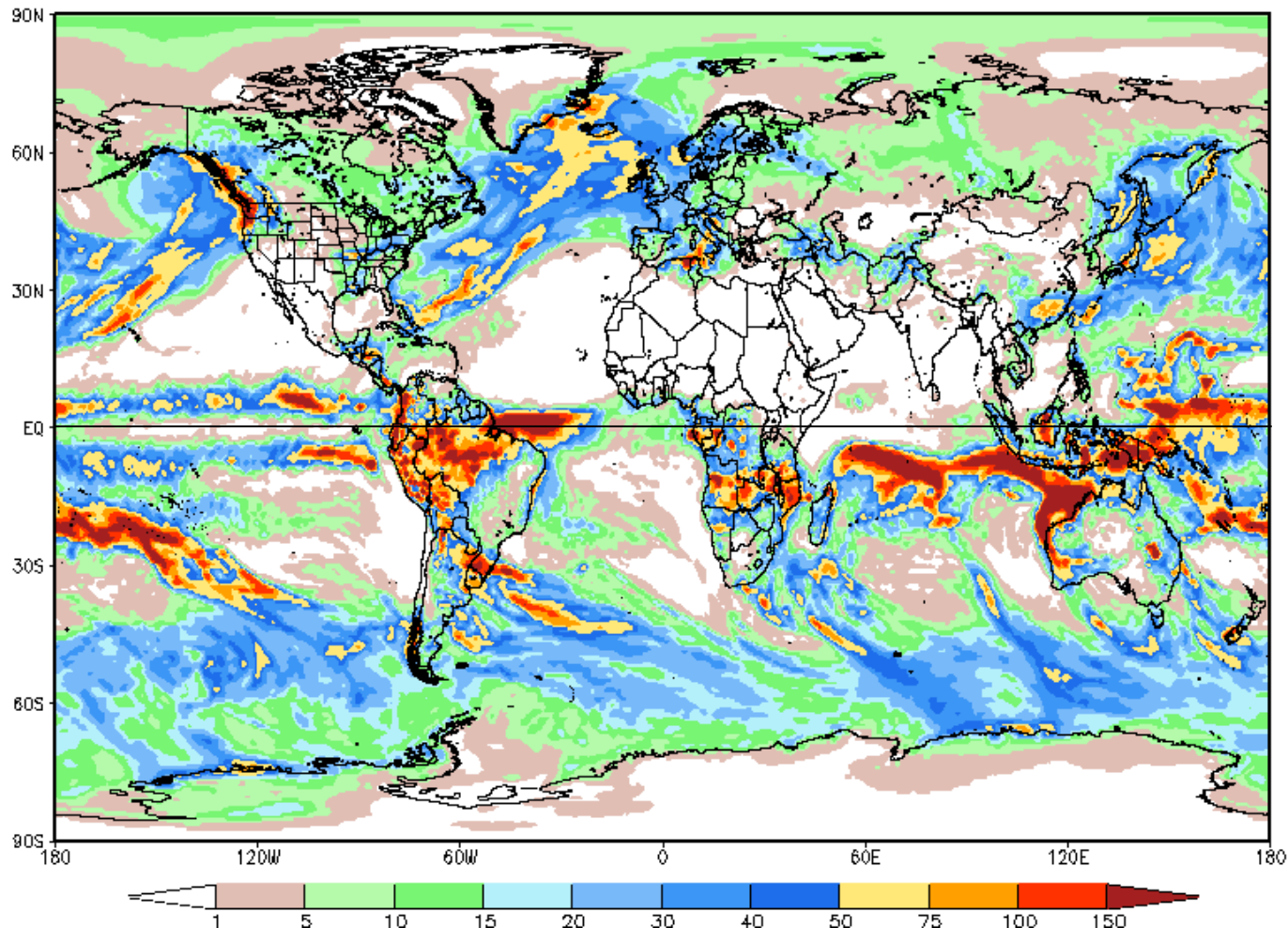


The forecast indicates enhanced convection for the Maritime continent and western Pacific Ocean during the next 5-10 days with drier than normal conditions for Africa and the Indian Ocean.

Global Forecast System (GFS) Week 1

Precipitation Forecast

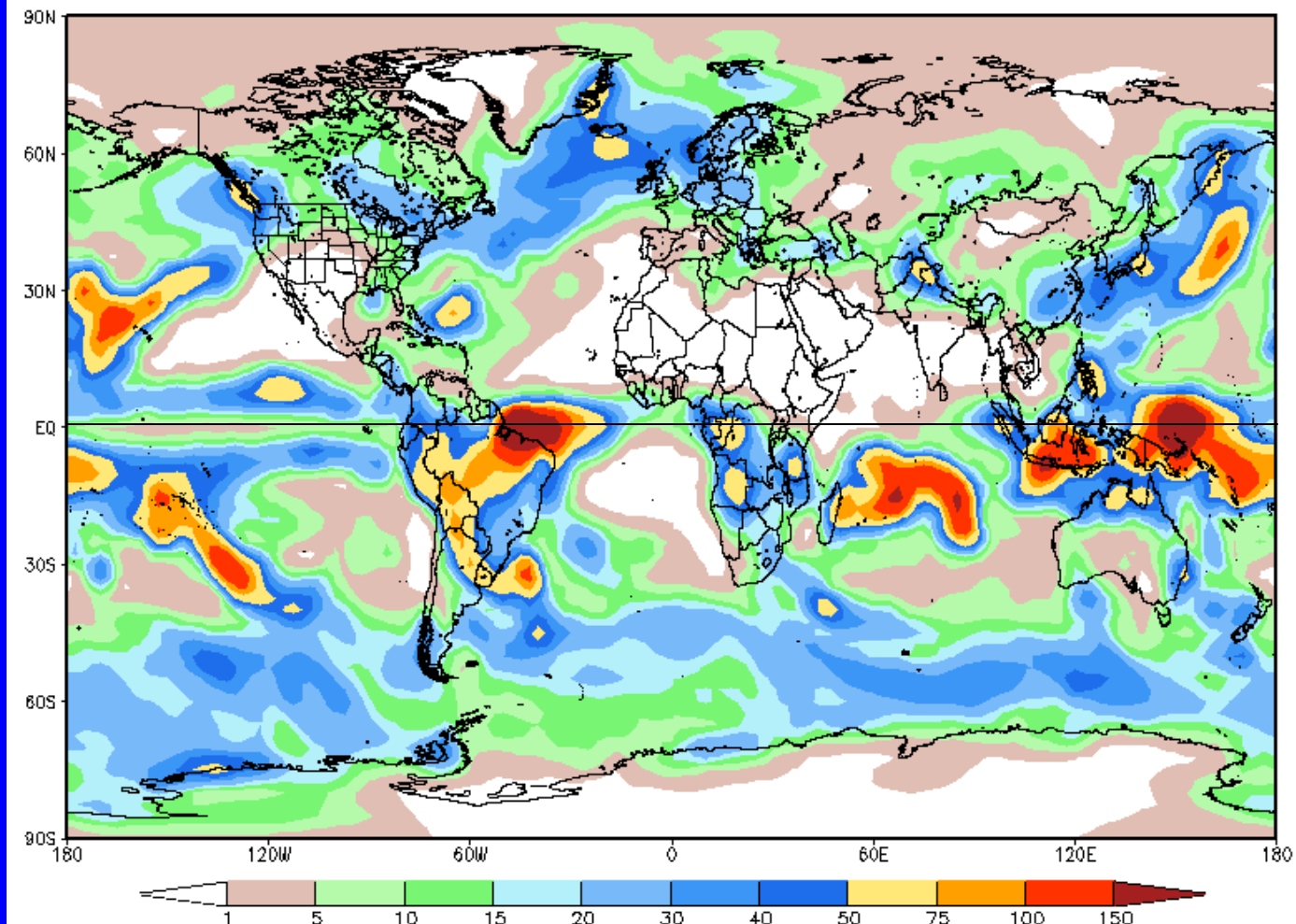
NOAA GFS 37.5 km Week 1 Total Precipitation (mm)
Issued at Mar 05 2007 00Z for the period ending at Mar 12 2007 00Z



Global Forecast System (GFS) Week 2

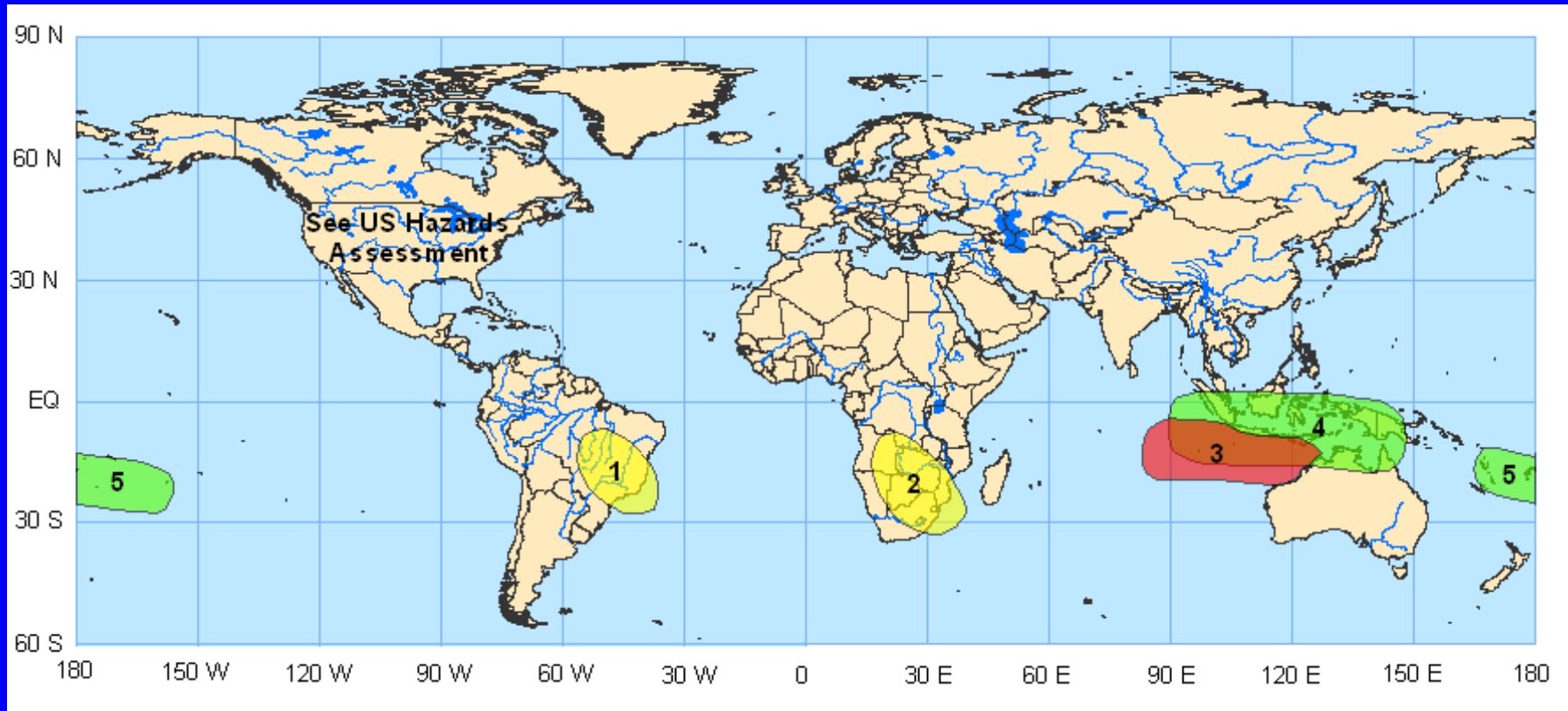
Precipitation Forecast

NOAA GFS 100 km Week 2 Total Precipitation (mm)
Issued Mar 5 2007 00Z for the period ending at Mar 18 2007 00Z



Potential Benefits/Hazards – Week 1

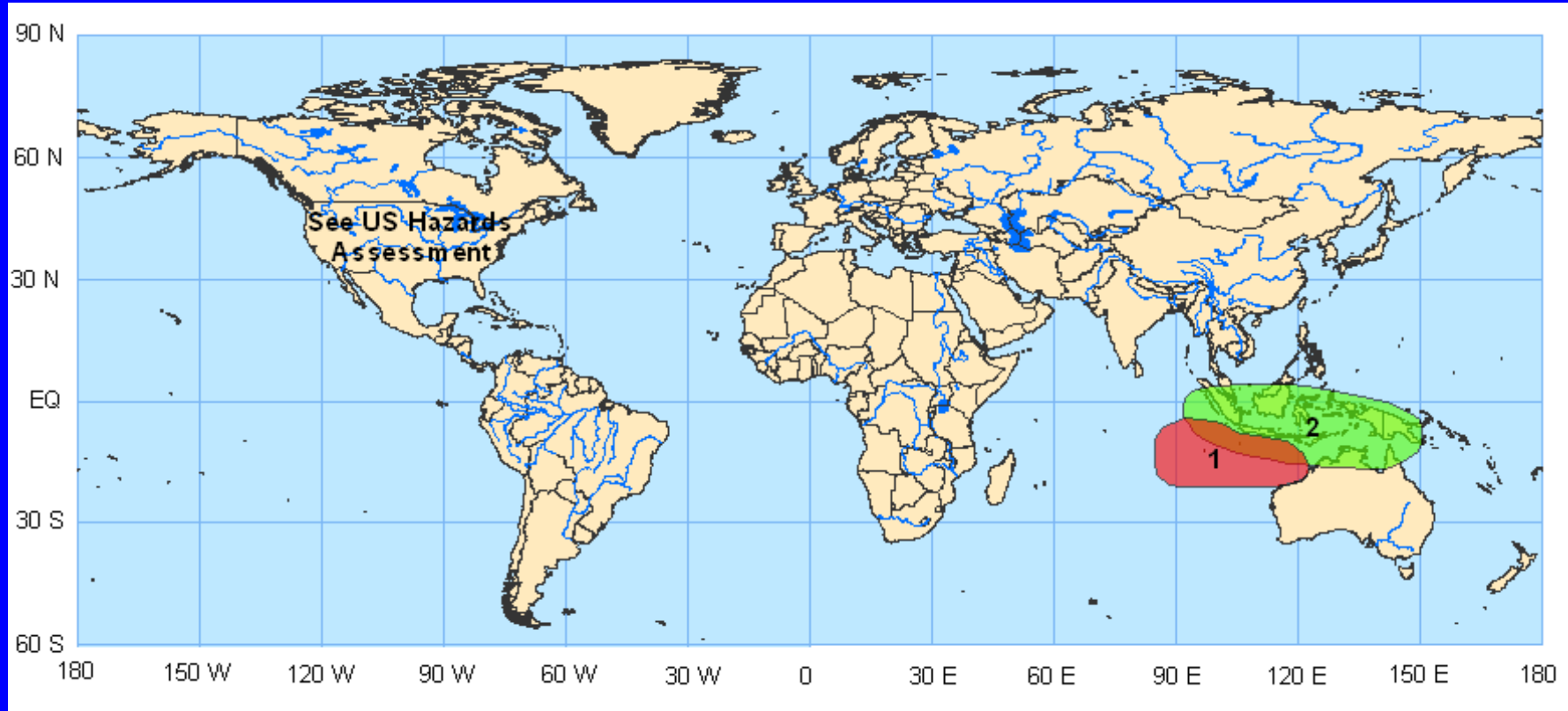
Valid: 6-12 March 2007



1. An increased chance for below normal rainfall for sections of Brazil.
2. An increased chance for below normal rainfall for south-central Africa.
3. Conditions are expected to be favorable for tropical cyclogenesis for the eastern Indian Ocean.
4. An increased chance for above normal rainfall for the Maritime continent and northern Australia.
5. An increased chance for above normal rainfall for sections of the western Pacific Ocean south of the equator.

Potential Benefits/Hazards – Week 2

Valid: 13-19 March 2007



1. Conditions are expected to be favorable for tropical cyclogenesis for the eastern Indian Ocean.
2. An increased chance for above normal rainfall for the Maritime continent and northern Australia.

Summary

- **The MJO index indicates a weak-moderate MJO. However, not all relevant fields show characteristics of a well-developed MJO.**
- **During both weeks 1 and 2, there exists an increased chance for above average rainfall for the Maritime continent and northern Australia. Also, conditions are expected to remain favorable for tropical cyclogenesis for the eastern Indian Ocean throughout the period.**
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