Please Note: Many additional NCEP model forecast graphics (in addition to what is included here) are available at the DYNAMO data catalog and span from hourly to Week-2.

Work supported by NOAA’s Climate Program Office
Review of Conditions During the Past Week
The MJO remained active during the past week with the enhanced convective phase shifting across the western Pacific and now impacting the Western Hemisphere. Atmospheric Kelvin wave (KW) activity continues to be superimposed on the slower MJO variability. The suppressed phase of an equatorial Rossby wave (ERW) is also evident across the western Pacific. During the past week, enhanced convection was observed from the South China Sea into the western Pacific and also across parts of the western and central Indian Ocean (IO) just west of the DYNAMO array. Suppressed convection was observed across India, the Bay of Bengal and parts of the Indian Ocean. Positive SST anomalies remain across most of the equatorial Indian Ocean with below-normal SST anomalies along the southern Sumatra coast becoming less negative.

The WH MJO index showed continued eastward propagation during the past week as the enhanced convective phase shifted across the western Pacific and now entering Phase 8. The observed evolution of the MJO index was well forecast by most of the models from both one and two weeks ago. The DYNAMO outlook from last week verified well for the suppressed convection that included India, the Bay of Bengal and the eastern Indian Ocean as well as the more regional enhanced rainfall over the equatorial west-central Indian Ocean. Although drier conditions appear to be developing along the equatorial MC in recent days, convection over the past week was near average across many areas and weakly enhanced in western sections.
OLR Time Longitude – Tropical Modes

Ovals are projections of leading modes: MJO (blue), KW (green), ER-1 (black)

Courtesy: Carl Schreck CICS-NC

OLR anomalies: 7.5°S - 7.5°N
22-May-2011 to 9-Oct-2011 + 21-day Fourier Projection

OLR anomalies: 2.5°N - 17.5°N
22-May-2011 to 9-Oct-2011 + 21-day Fourier Projection

Obs: W/m²
Sum of Waves: W/m²
MJO (blue, CINT=10); ER (black, CINT=10); Kelvin (green, CINT=15)
Weekly Spatial OLR

Total field

Anomalies
Zonal wind shaded, direction by vector
Westerly total/anomalies (red shades)
Easterly total/anomalies (blue shades)

Pentad averages for last 5 days
(bottom) and 5 days previous (top)
Zonal wind shaded, direction by vector
Westerly total/anomalies (red shades)
Easterly total/anomalies (blue shades)

Pentad averages for last 5 days
(bottom) and 5 days previous (top)
Equatorial Cross Section

Pressure Longitude Cross-section -- 5N - 5S
Mean U-W (streamlines), Specific Humidity (shaded) (g/kg)
OCT 03 2011 -- OCT 09 2011

Pressure Longitude Cross-section -- 5N - 5S
Anomalous U-W (streamlines), Specific Humidity (shaded) (g/kg)
OCT 03 2011 -- OCT 09 2011
MJO Index
IOD - Dipole Mode Index

Indian Ocean Dipole Mode Indices

SETIO [90–110E, 10S–0]

WTIO [50–70E, 10S–10N]

DM1 = WTIO - SETIO
Velocity Potential

10 OCT 2011
Verification


Observed 7-day mean OLR anom from day 20111003

X ➔ Denotes TC development location
Forecast Graphics
Outlook and Forecast Rationale

The MJO is forecast to remain active with MJO index model forecasts indicating continued eastward propagation well into Phase 1 by the end of the two week period. Interestingly most models, however, indicate a decrease in eastward propagation by the end of Week-2 indicating potential persistence of large scale enhanced convection over the Americas and Africa. The MJO index forecast from the ECMWF seasonal prediction system indicates continued eastward propagation of a moderate strength MJO signal across the Indian Ocean by the end of Week-3. An ERW likely will constructively interfere for suppressed convection over the eastern MC and western Pacific during Week-1 while a second KW increases the chances for enhanced convection for east Africa and the western Indian Ocean.

For Week-1, suppressed convection is favored from the Bay of Bengal across the MC into the western Pacific associated with the suppressed phases of the MJO, a KW and an ERW. Enhanced convection is forecast for east Africa and portions of the western Indian Ocean associated with KW activity and the enhanced phase of the MJO later in the period. Model forecast guidance is generally consistent with these regions, although model forecasts still indicate some enhanced rainfall over the equatorial MC. During Week-2, the area of suppressed convection is forecast to continue across the MC and western Pacific with a slight shift eastward from Week-1 while enhanced convection is favored from eastern Africa across much of the western and central equatorial Indian Ocean stretching into southern India. The MJO enhanced convective phase is expected to begin to impact the DYNAMO area as there is often a quick increase in convection across the IO when entering WH phase 1 (composites) especially if KWs precede the main MJO activity. Both statistical and dynamical tools favor enhanced convection during this period.

Probability of at least moderate strength MJO (Outside WH unit circle with eastward propagation): Week-1: 90%, Week-2: 90%, Week-3: 60%
MJO Index Forecasts


MJO Index Forecasts

ECMWF Seasonal Prediction System
MJO Composites

Courtesy: ESRL

MJO Outgoing Longwave Radiation Composites centered Oct 5

Courtesy: CAWCR
OLR/u850 Spatial Forecast Maps – Tropical Modes

Courtesy: Paul Roundy - SUNY

Daily snapshots
OLR Spatial Forecast Maps – Tropical Modes

Courtesy: Carl Schreck CICS-NC

Madden-Julian Oscillation in OLR

Kelvin Waves in OLR
OLR Spatial Forecast Maps – Tropical Modes

Equatorial Rossby Waves in OLR

Sum of MJO, Kelvin, ER

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GFS / CFS Forecasts – Week-1

16 Member Ensemble Mean Forecast from 10Oct2011
Week 1 Anomalies (mm/day) 11Oct2011–17Oct2011

GFS fcst Precip for week 1 from: 20111010all

GFS - CMORPH fcst Precip for week 1 from: 20111010all

REVH vs. A-Wind for week 1 from: 20111010all (850hPa)

NOAA – Climate Prediction Center
Ensemble GFS Forecasts – Week-1

GEFS precip for week 1 from: 20111011

GEFS aprecip for week 1 from: 20111011

NOAA – Climate Prediction Center
Ensemble GFS Forecasts – Week-2

GEFS precip for week 2 from: 20111018

GEFS aprecip for week 2 from: 20111018

NOAA – Climate Prediction Center
Operational GFS Precipitable Water and 10 m Anomalous Wind

NOAA - Climate Prediction Center
Comments, Suggestion and Questions?