

# Global Tropics Hazards And Benefits Outlook

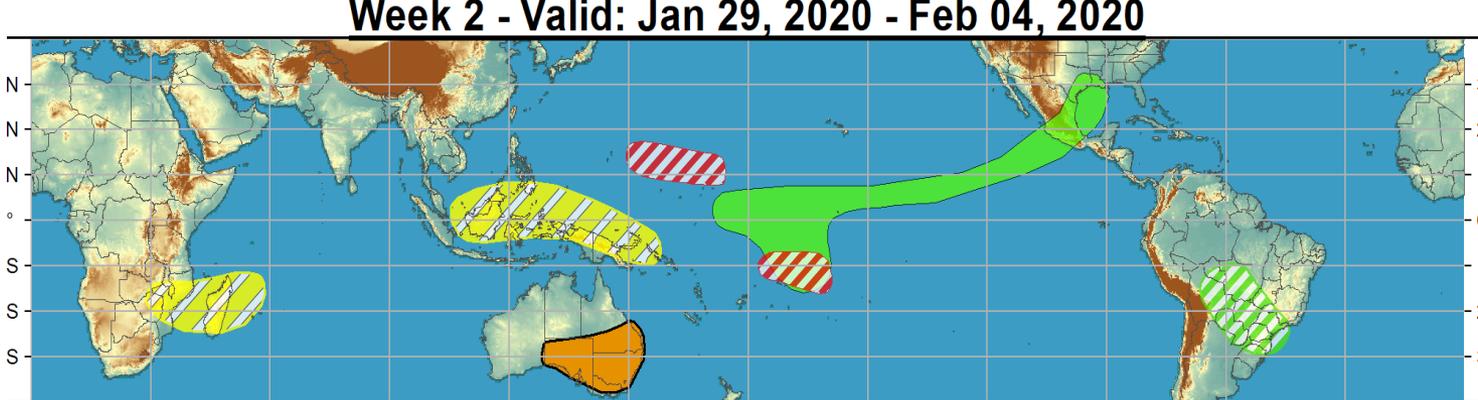
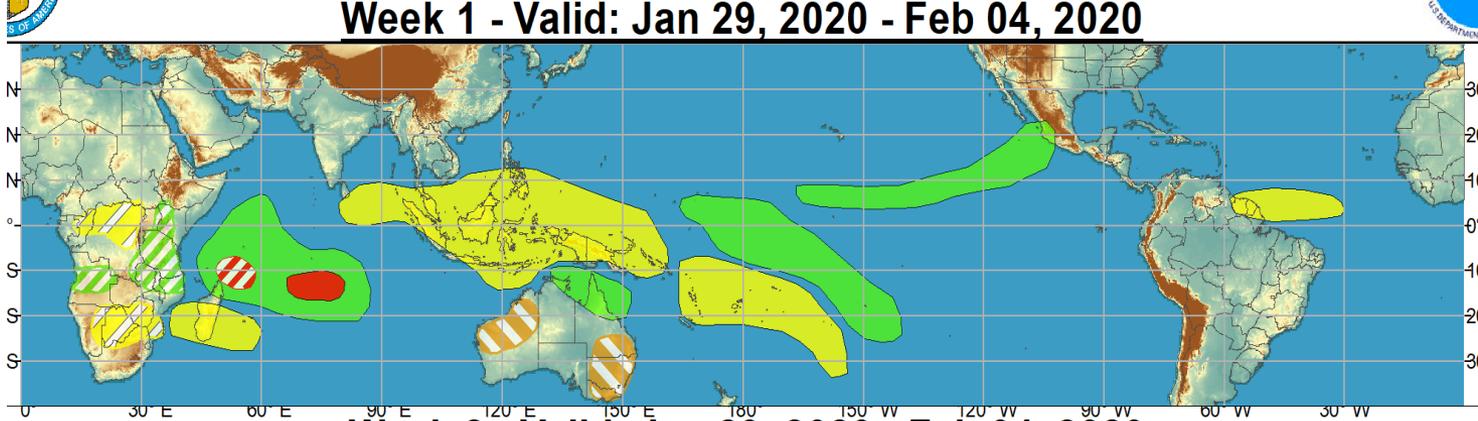
2/4/2020

Kyle MacRitchie

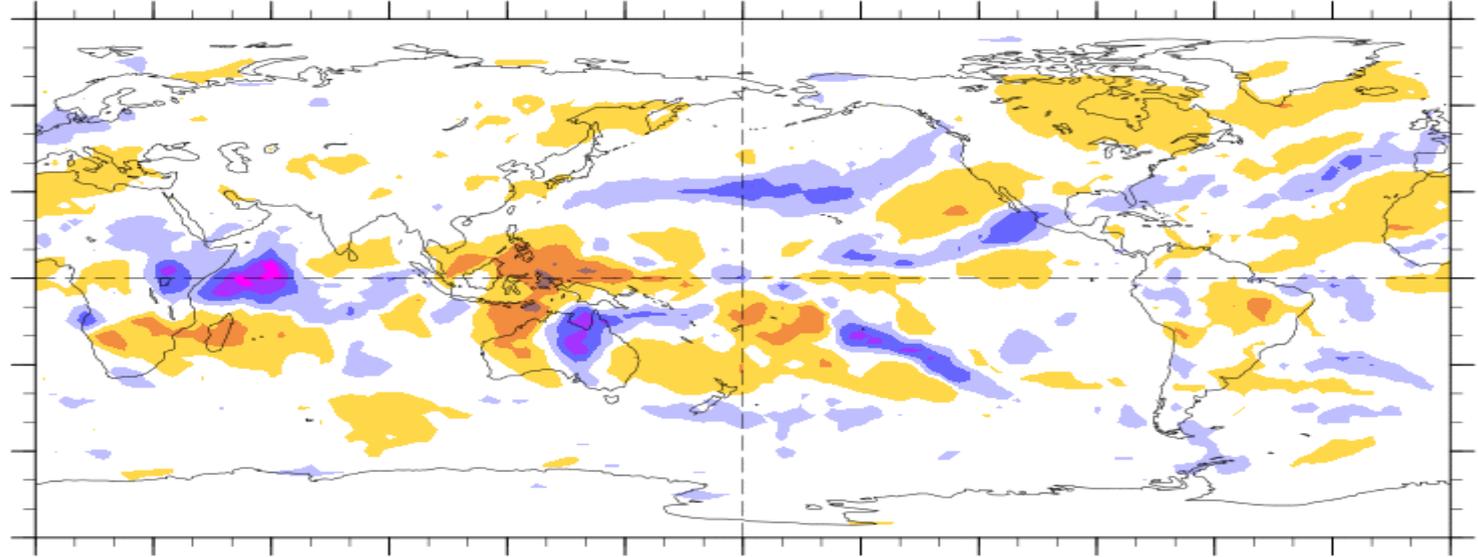
## Outline

1. Review of Recent Conditions
2. Synopsis of Climate Modes
3. GTH Outlook and Forecast Discussion
4. Connections to U.S. Impacts

# Outlook Review



7-Day Average OLR Anomaly 2020/01/27 - 2020/02/02



Cool shading  
More clouds/rain

Warm shading  
Less clouds/rain

# Synopsis of Climate Modes

## **ENSO: (January 9, 2020 Update)**

*next update on Feb. 13*

- ENSO Alert System Status: Not Active
- ENSO-neutral is favored through Northern Hemisphere spring 2020 (~60% chance), continuing through summer 2020 (~50% chance).

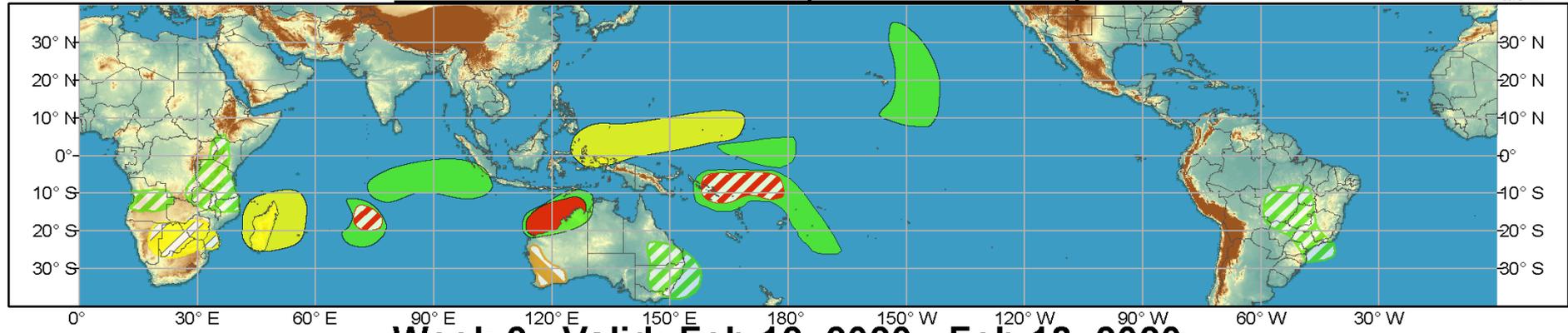
## **MJO and other subseasonal tropical variability:**

- The Indian Ocean Dipole remains near neutral. However there is a +IOD-esque pattern over the Indian Ocean.
- The MJO is weak and model agreement is poor regarding its future.
  - GEFS is the most bullish model: moderate Phase 5 during Week-1 and very strong Phase 6 during Week-2.
  - ECMWF forecasts a weak Phase 5 MJO instead. This seems more realistic than GEFS.

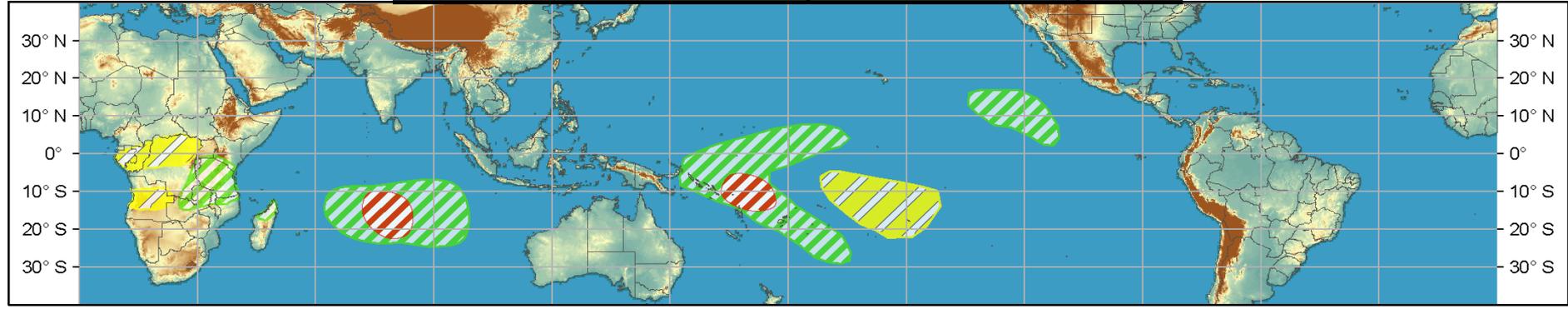


# Global Tropics Hazards and Benefits Outlook - Climate Prediction Center

## Week 1 - Valid: Feb 05, 2020 - Feb 11, 2020



## Week 2 - Valid: Feb 12, 2020 - Feb 18, 2020



### Confidence

High Moderate

- Tropical Cyclone Formation** Development of a tropical cyclone (tropical depression - TD, or greater strength).
- Above-average rainfall** Weekly total rainfall in the upper third of the historical range.
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- Above-normal temperatures** 7-day mean temperatures in the upper third of the historical range.
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Forecaster: MacRitchie

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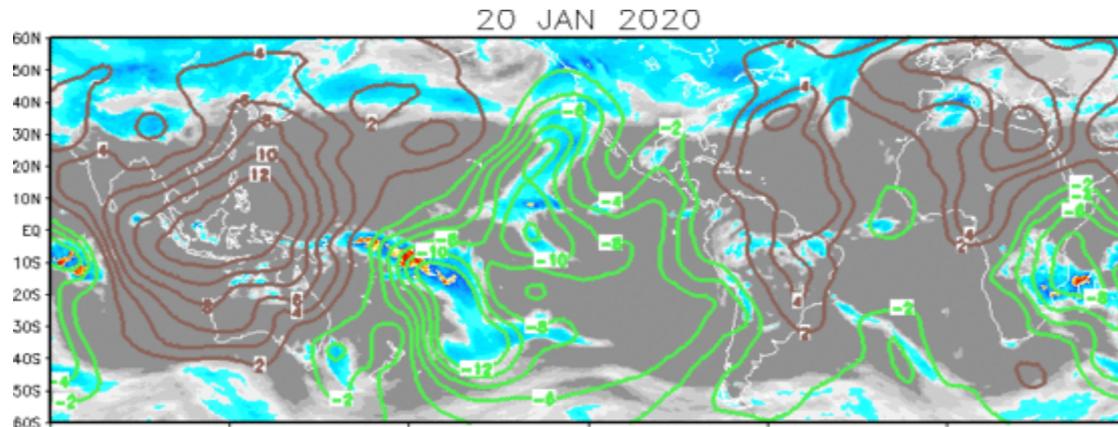


# IR Satellite & 200-hpa Velocity Potential Anomalies

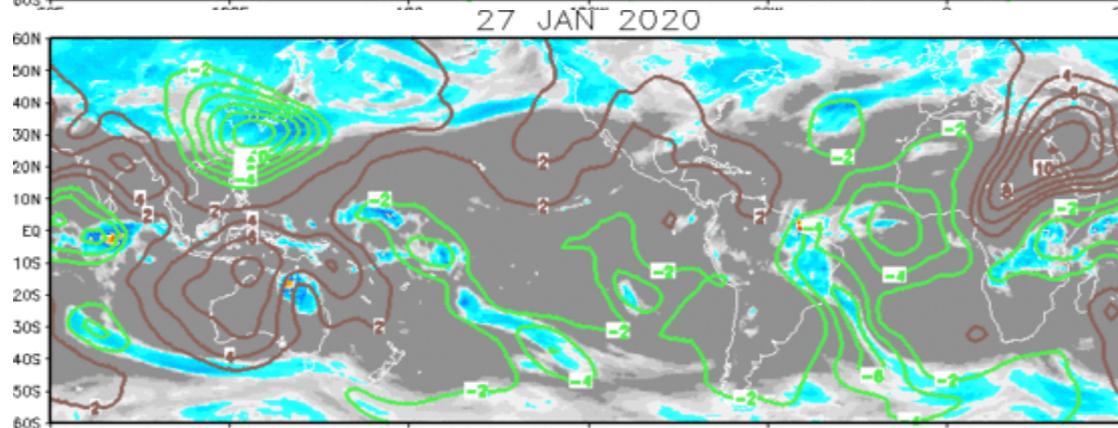
Green: Enhanced Divergence

Brown: Enhanced Convergence

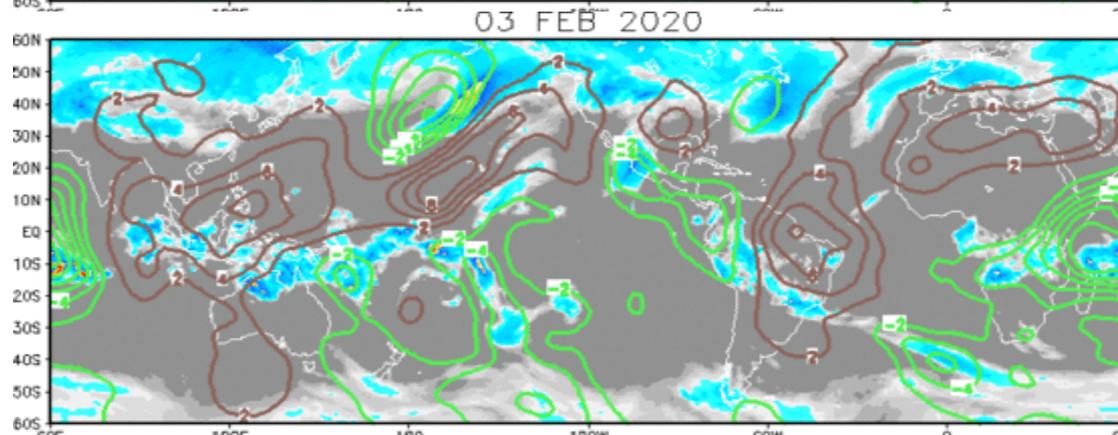
Wave-2 pattern throughout the globe. Enhanced convection over the eastern Indian Ocean.



Wave-2 pattern breaks down.

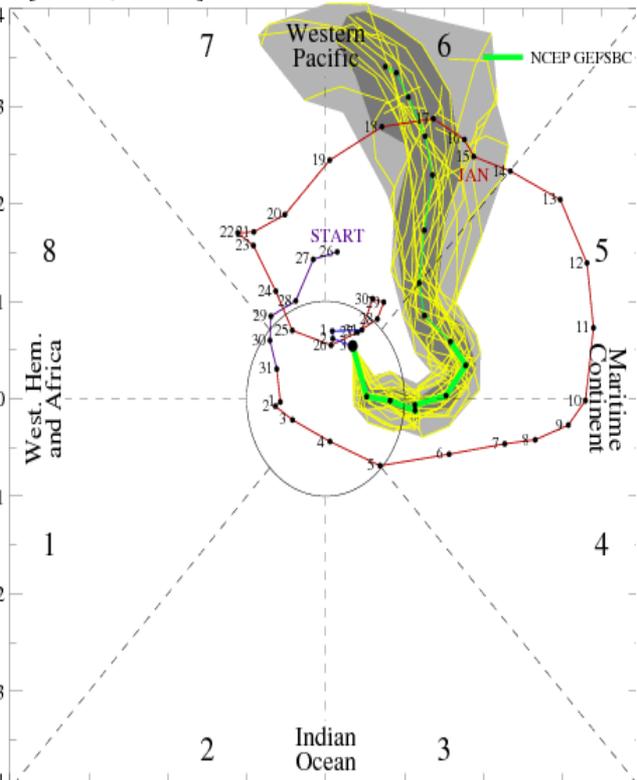


Strong dipole pattern over the Indian Ocean (probably related to Kelvin wave).



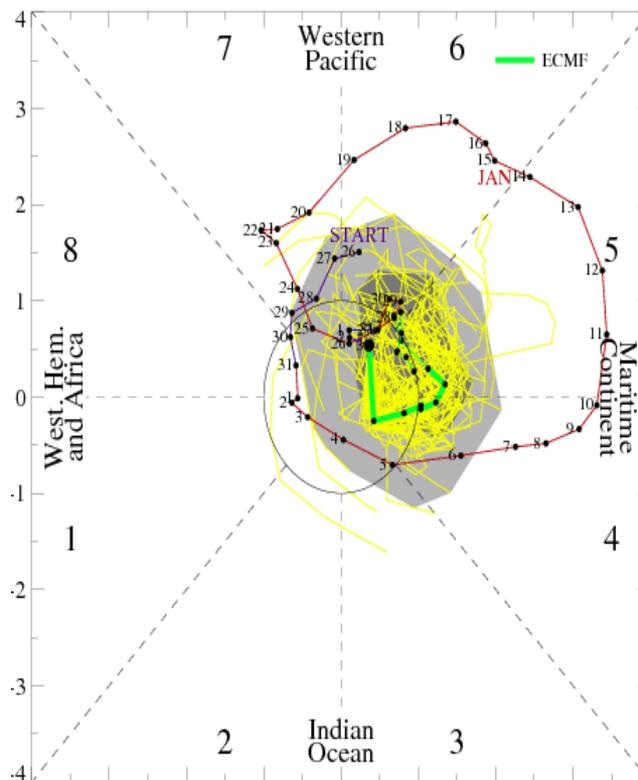
# MJO Observation/Forecast

[RMM1, RMM2] forecast for Feb-04-2020 to Feb-18-2020



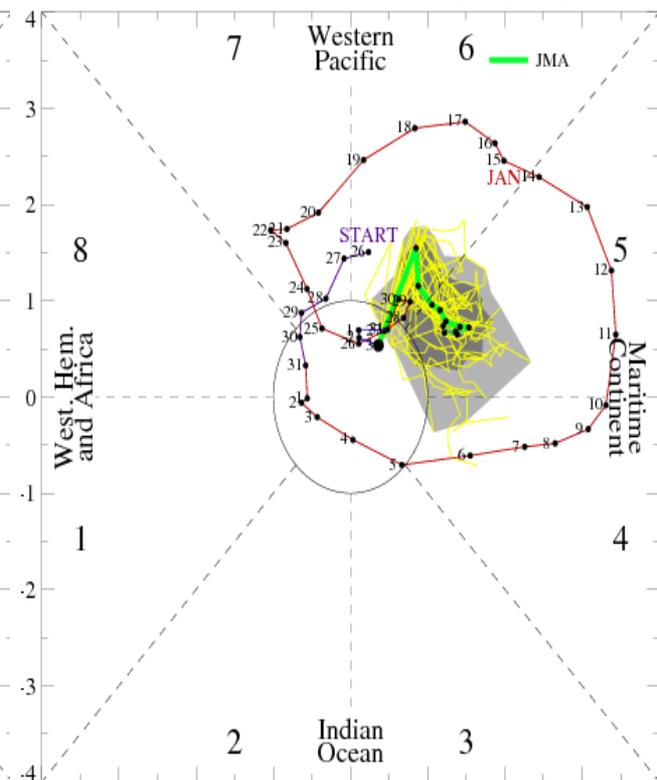
GEFS

MJO Index Forecast for 04Feb2020-18Feb2020



ECMWF

MJO Index Forecast for 04Feb2020-12Feb2020



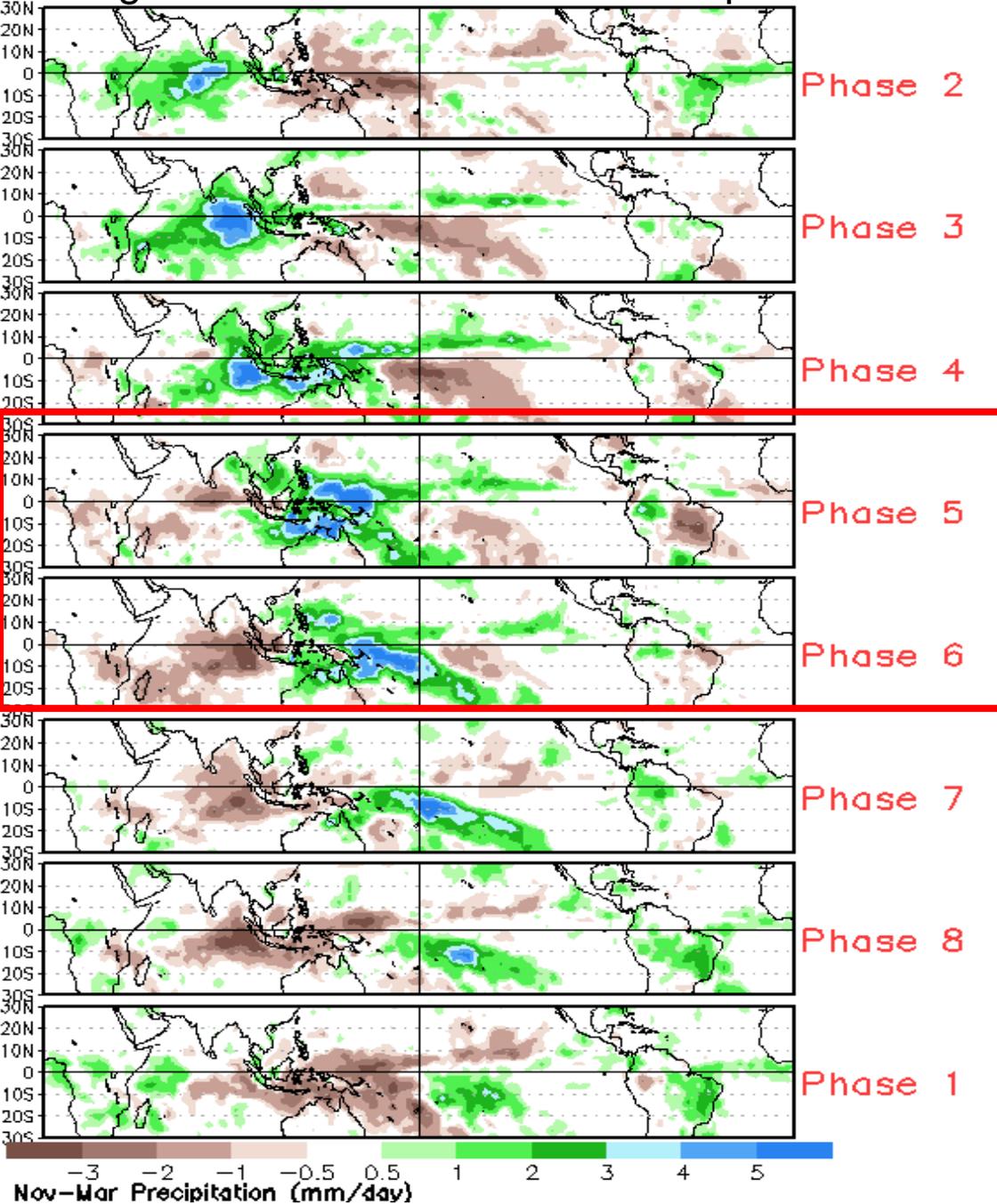
JMA

GEFS forecasts very strong MJO development during Weeks 1-2.

ECMWF and JMA forecast a more measured response.

Does the forecast discrepancy have something to do with mid-latitude/tropical interaction?

# Average Conditions when the MJO is present



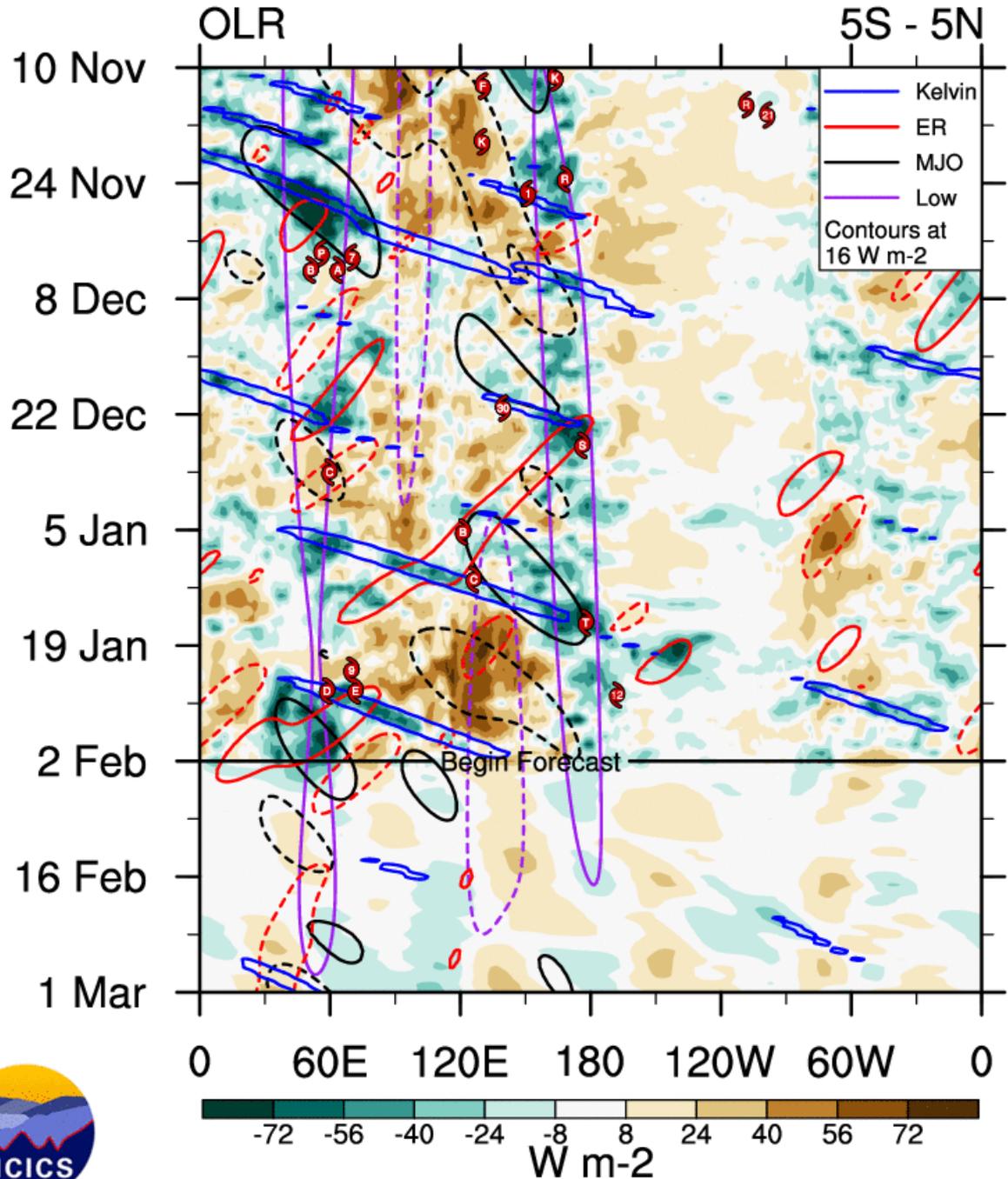
If GEFS is correct, this is what we might expect.

CAVEAT: These panels are representative of robust MJO events.

January's **MJO** signal is weak in OLR field but stronger in velocity potential.

**Rossby** and **Kelvin** wave activity over Indian Ocean.

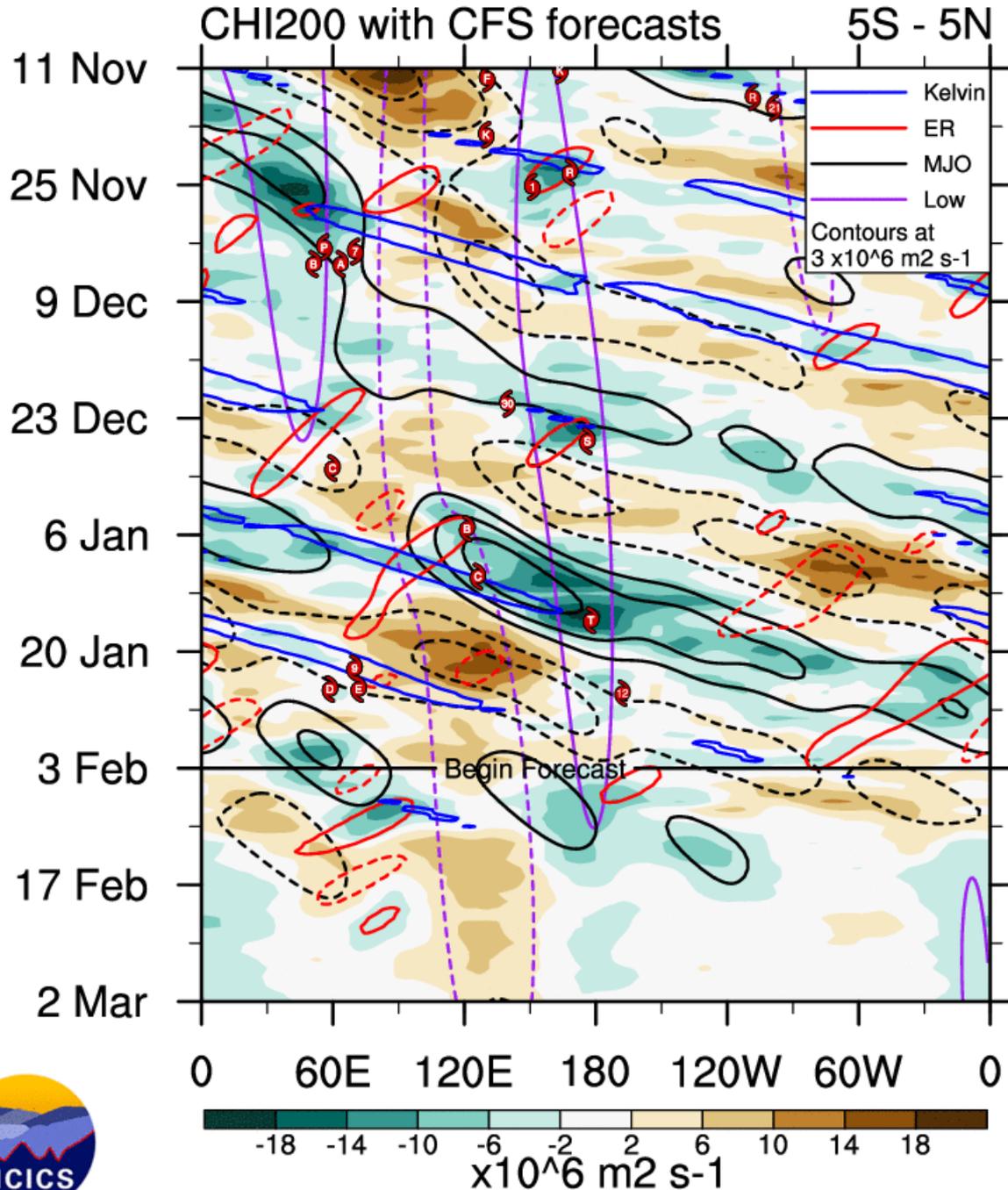
**Low frequency** contours from +IOD are very weak but still present in OLR field.

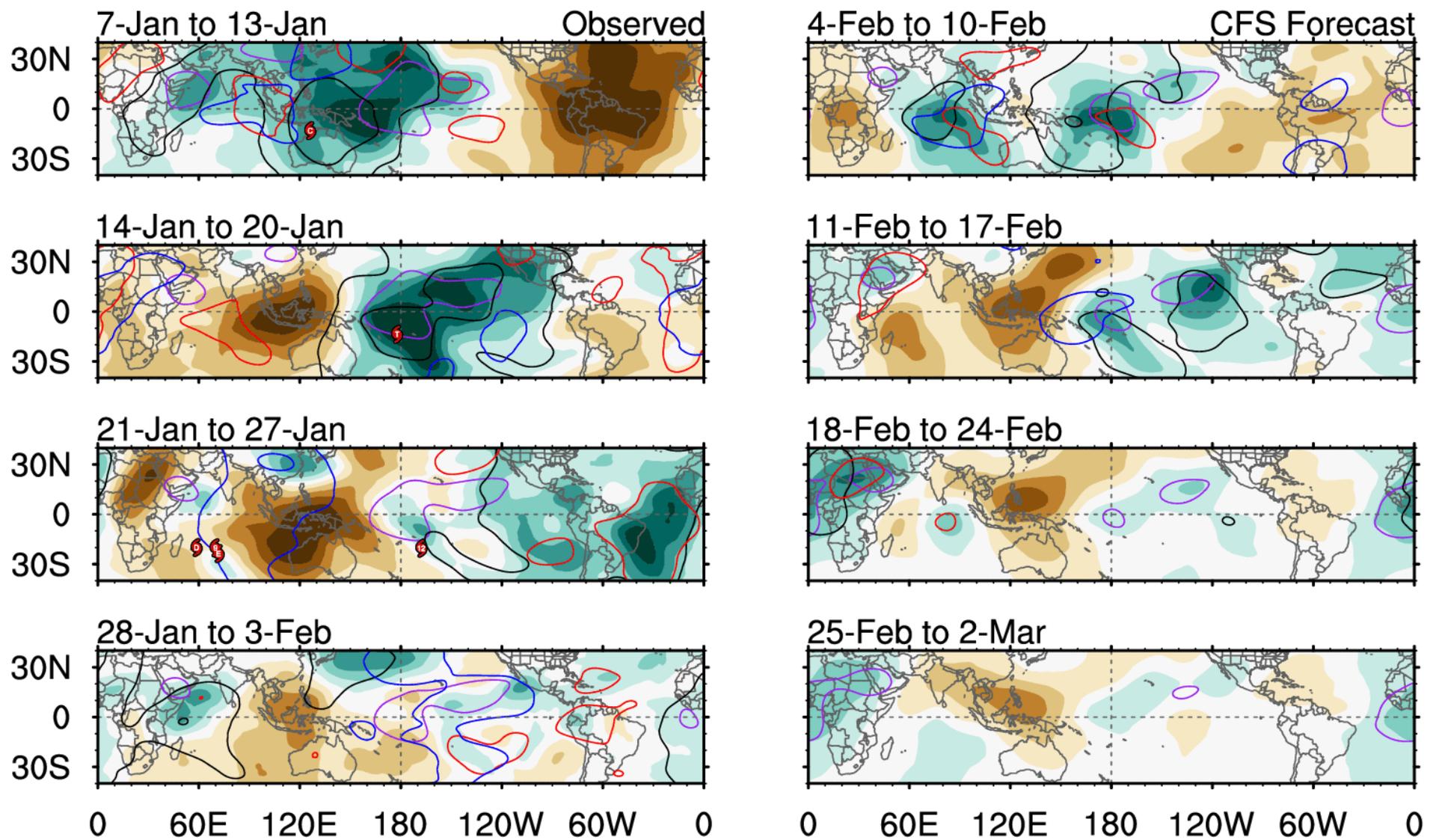


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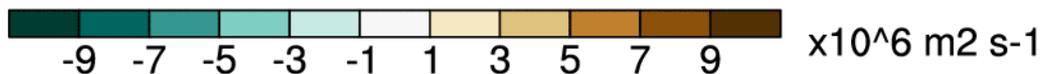
**Rossby** and **Kelvin** wave activity over Indian Ocean.

**Low frequency** contours from +IOD are very weak but still present in OLR field.





# 7-day CHI200 with CFS forecasts



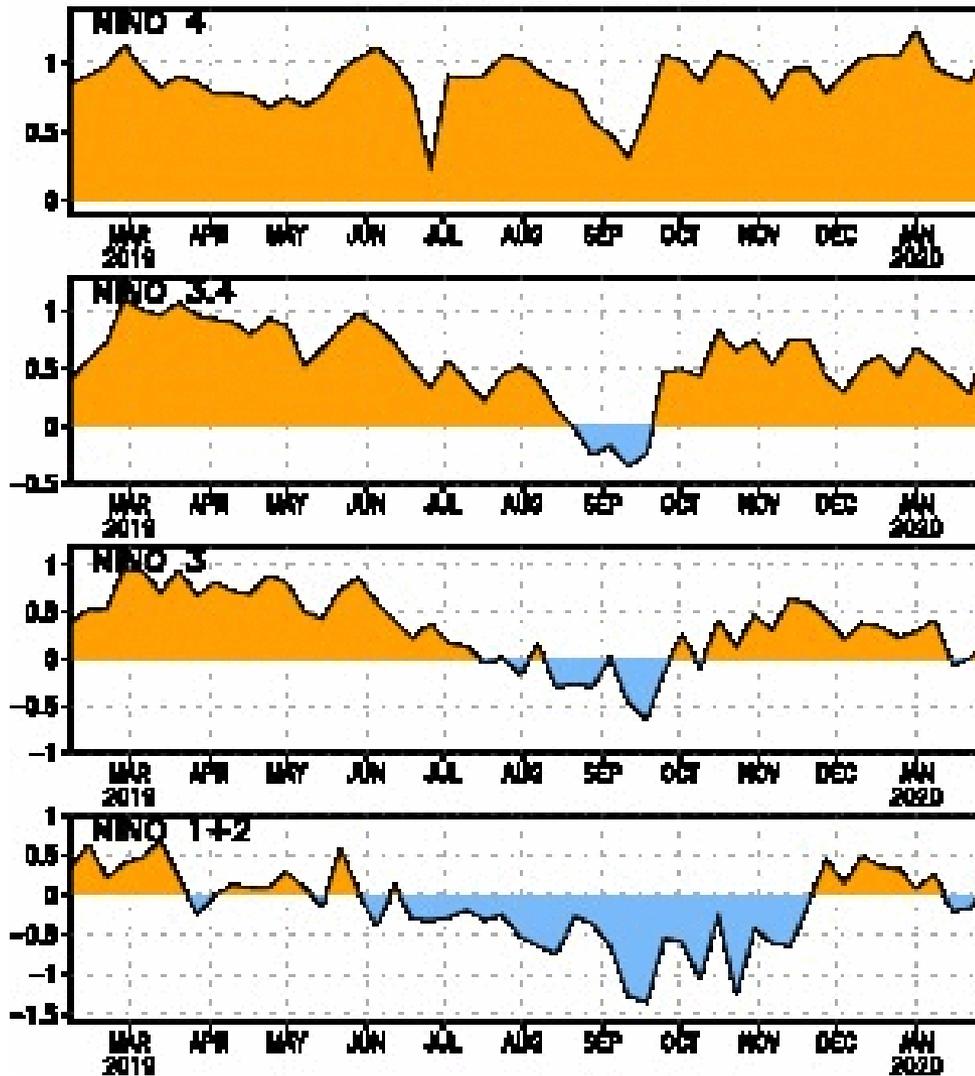
— MJO      — Kelvin x2  
 — Low      — ER

Contours at  $-2, -6 \times 10^6 \text{ m}^2 \text{ s}^{-1}$

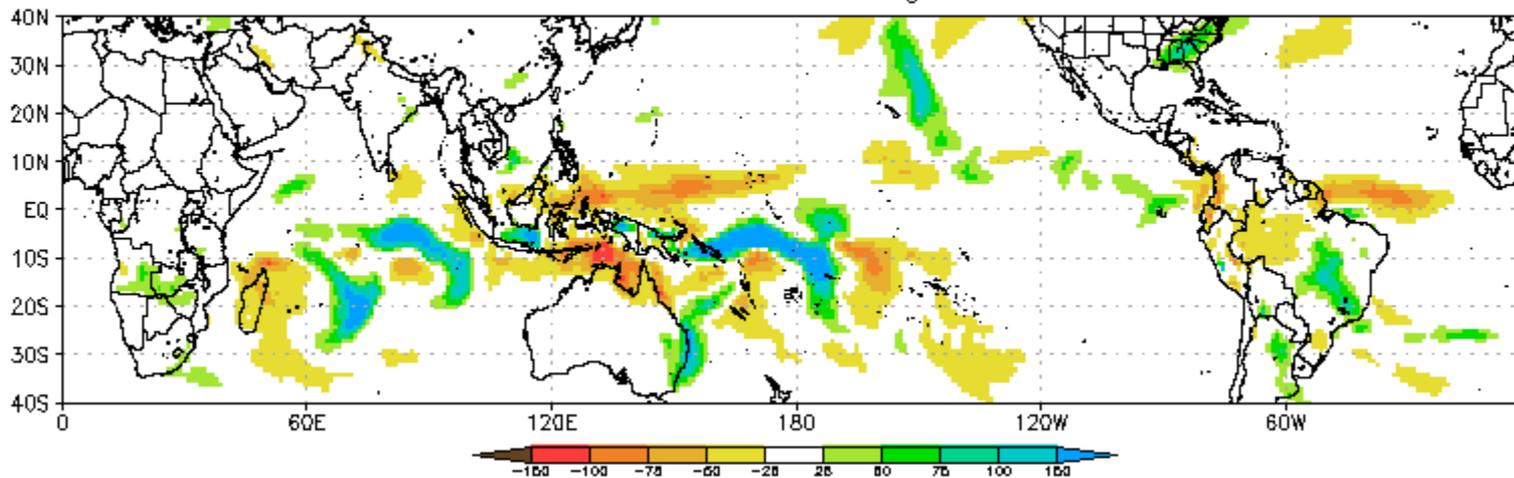
Carl Schreck

carl\_schreck@ncsu.edu

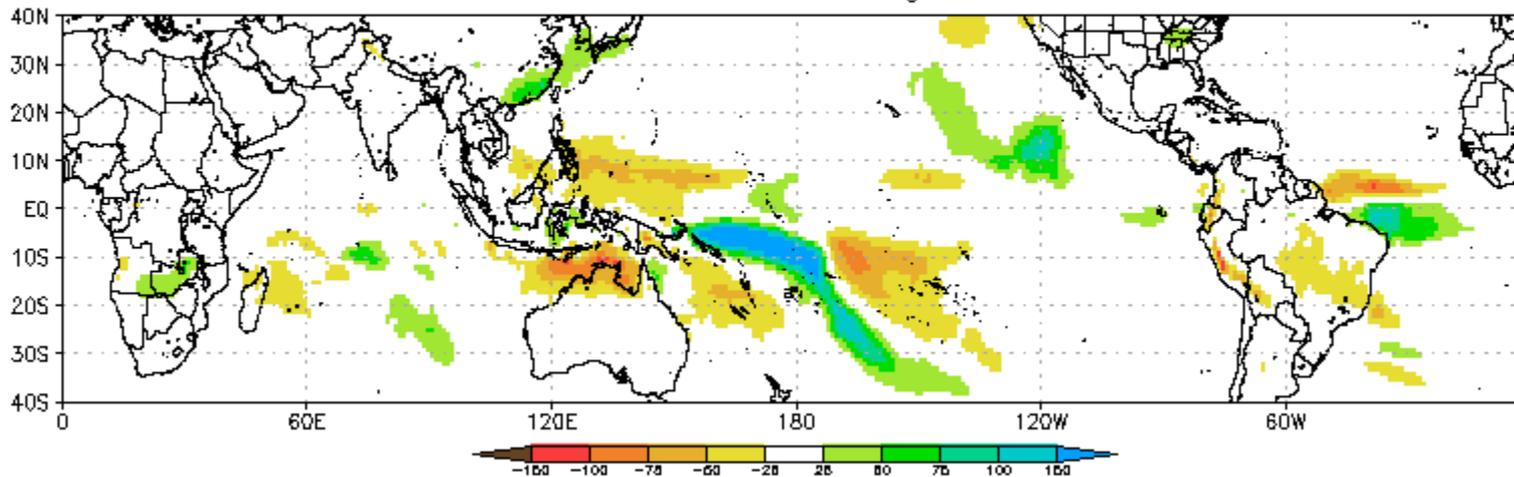
# SST Anomalies



CFS Precipitation Anomalies (mm) Issued 03Feb2020  
Week-1 Forecast Ending 11Feb2020

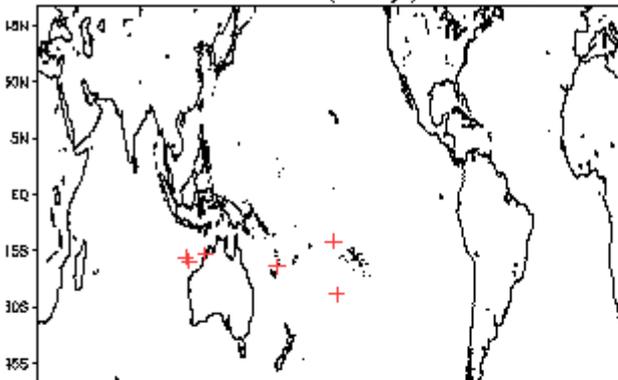


CFS Precipitation Anomalies (mm) Issued 03Feb2020  
Week-2 Forecast Ending 18Feb2020

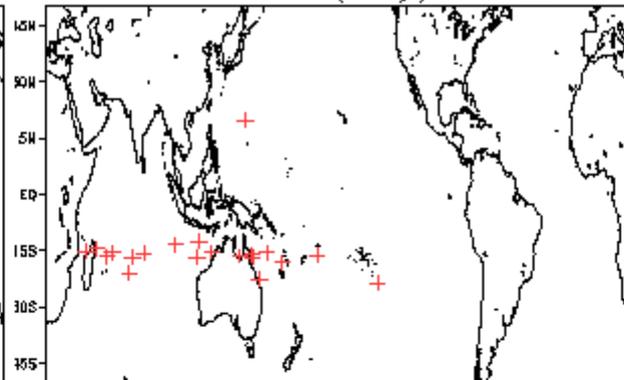


# February Tropical Storm Formation by MJO phase

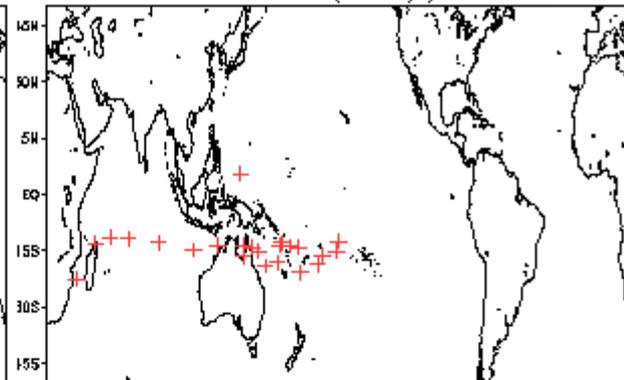
Phase 1 (41 days) 7 storms



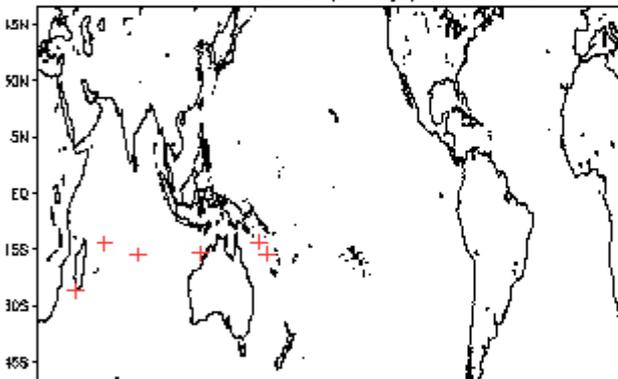
Phase 4 (92 days) 21 storms



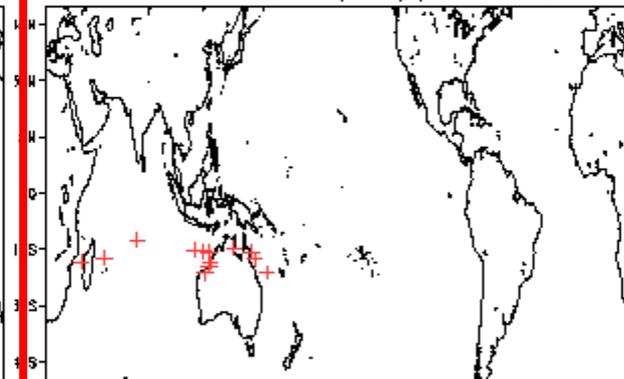
Phase 7 (125 days) 24 storms



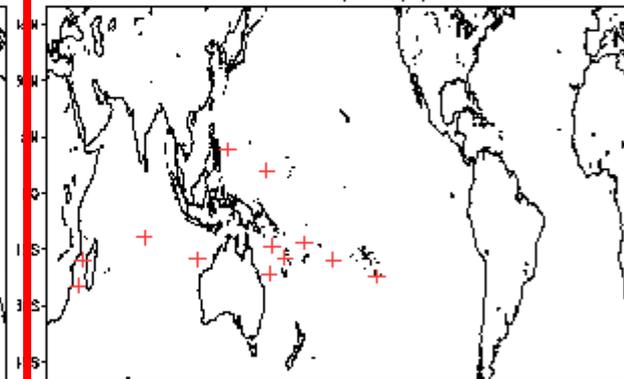
Phase 2 (51 days) 7 storms



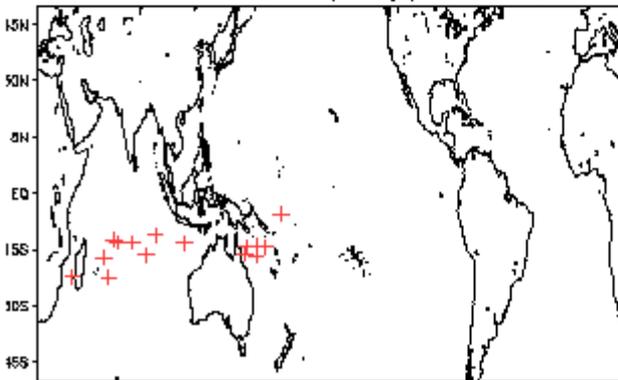
Phase 5 (70 days) 14 storms



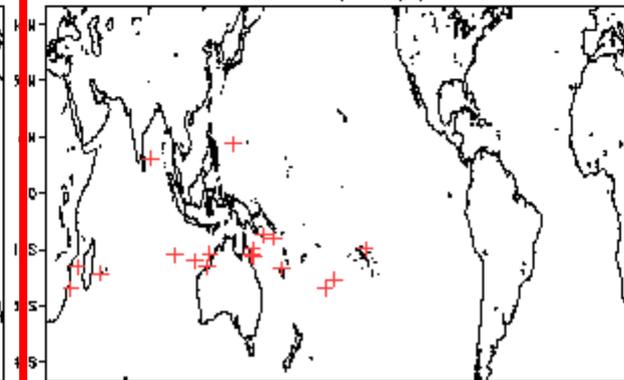
Phase 8 (84 days) 13 storms



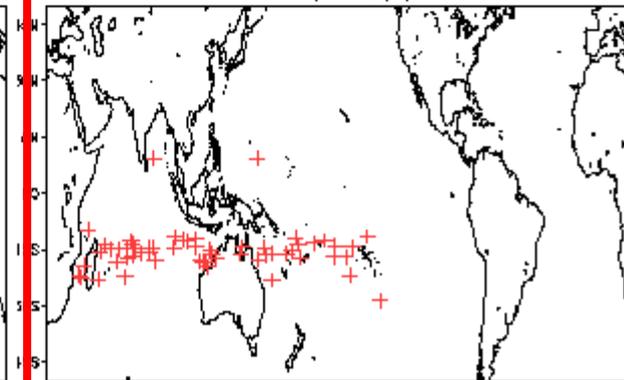
Phase 3 (89 days) 16 storms

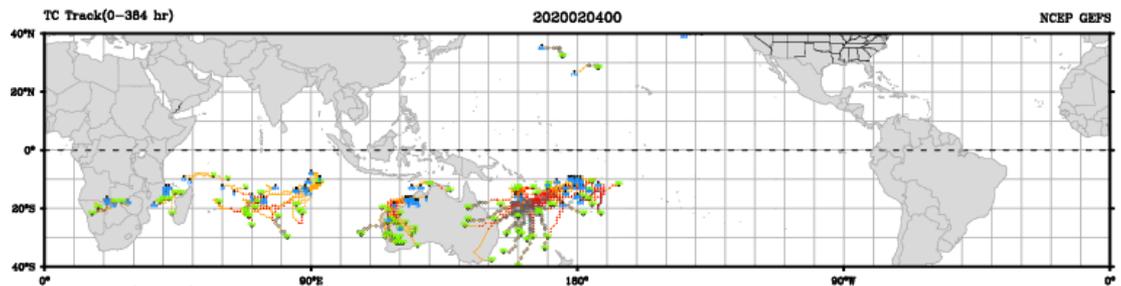


Phase 6 (92 days) 19 storms

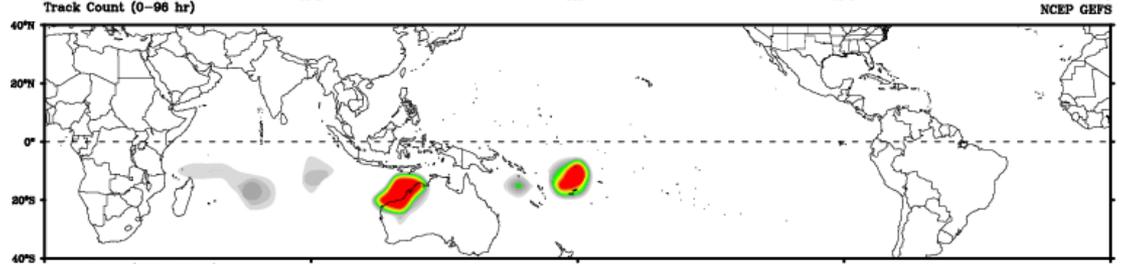


Null (308 days) 60 storms

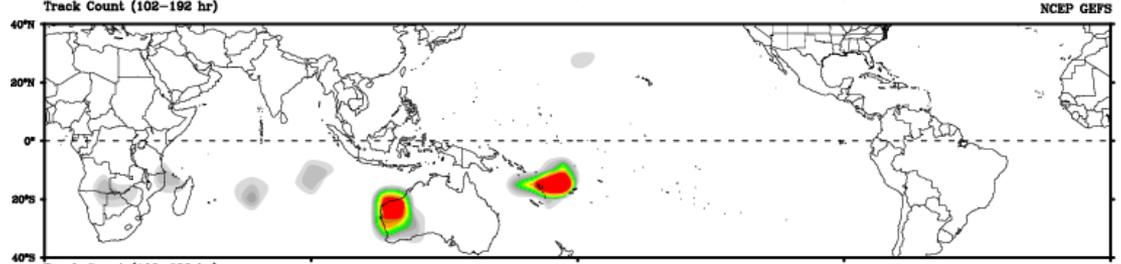




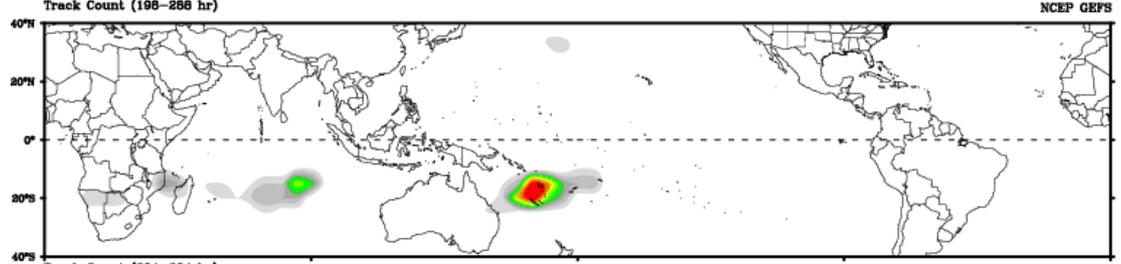
Days 1-4



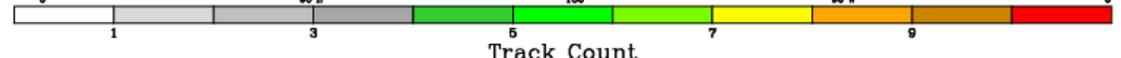
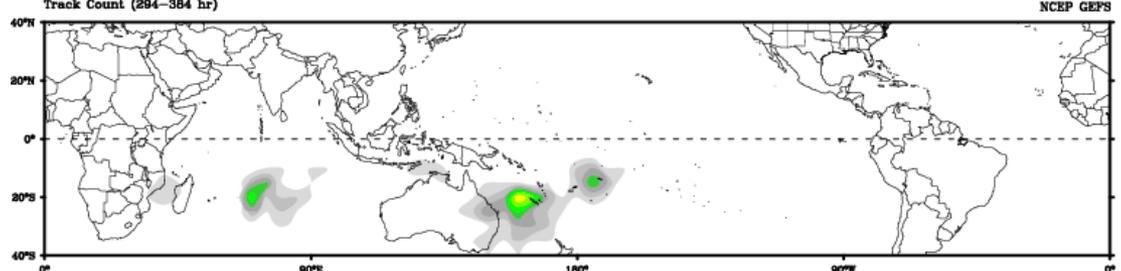
Day 5-8



Day 9-12

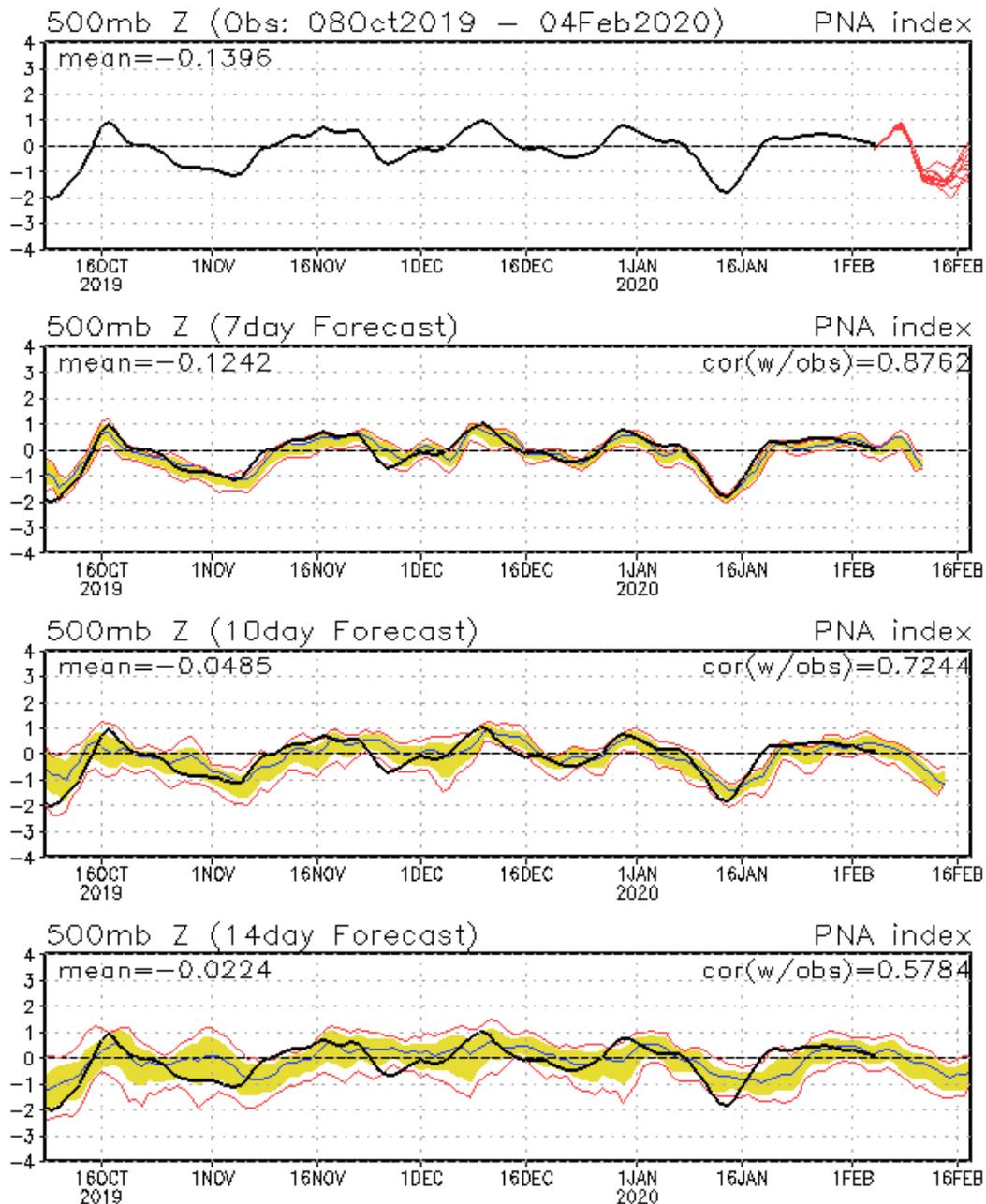


Day 13-15

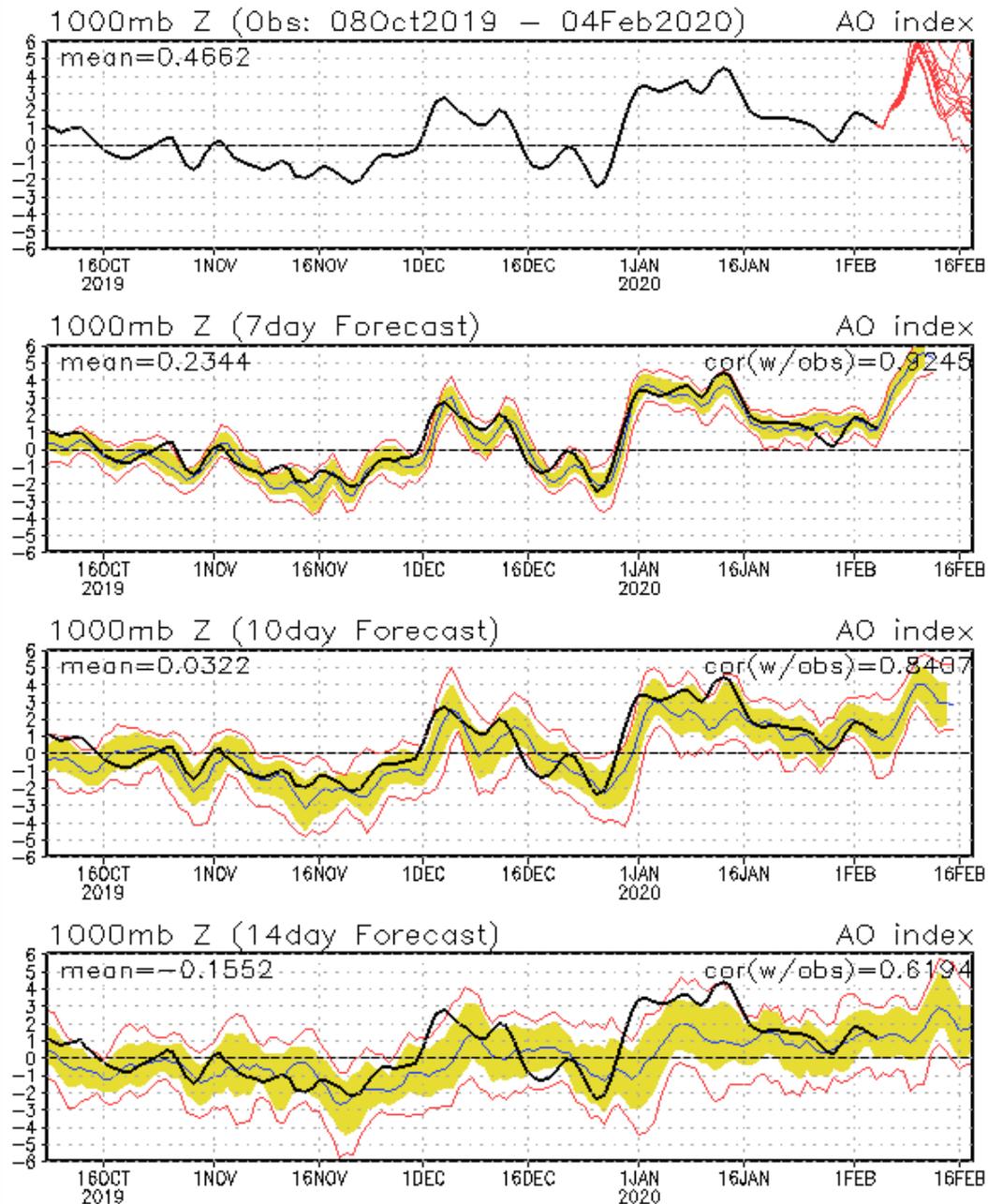


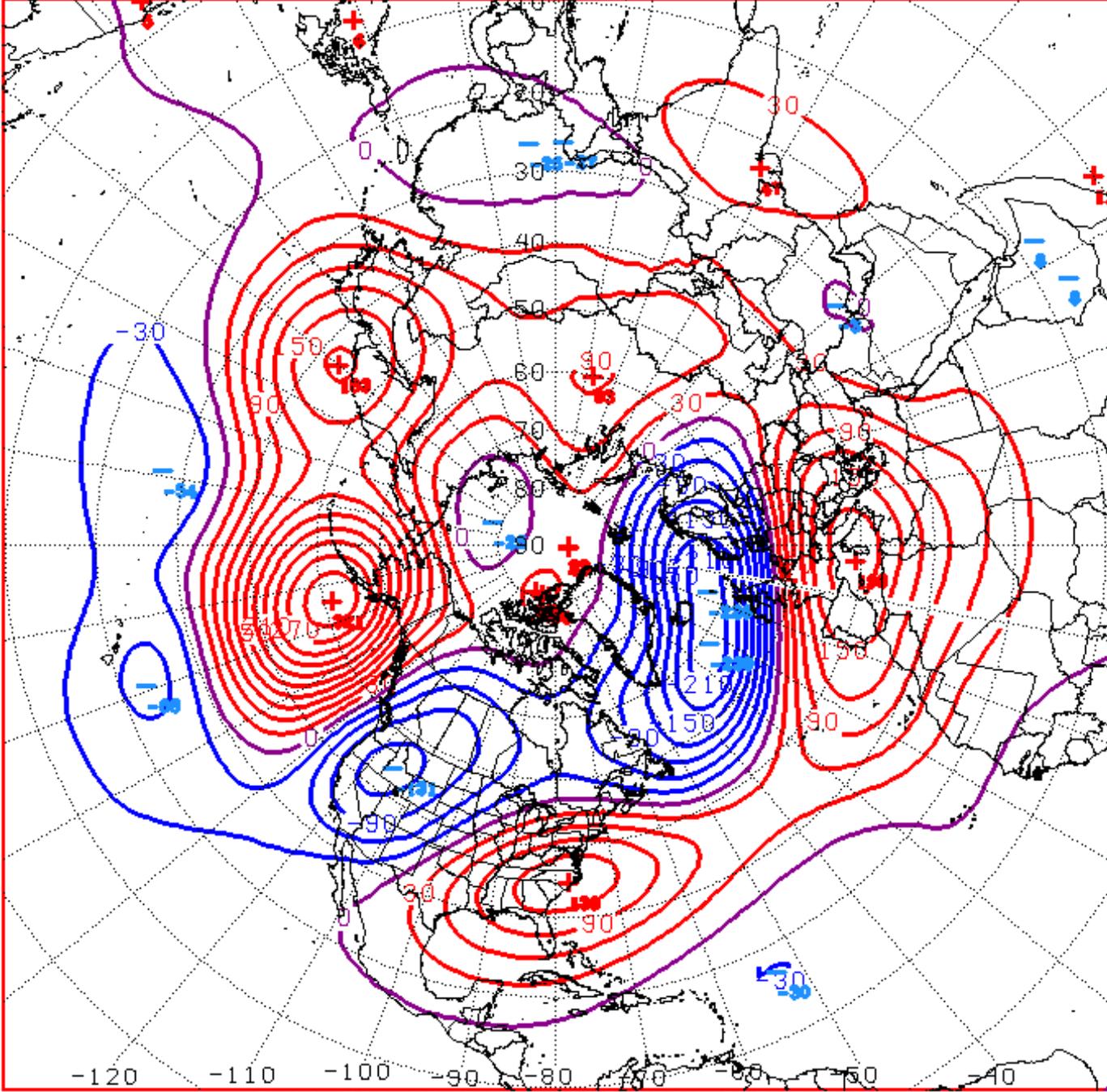
# Connections to U.S. Impacts

## PNA: Observed & ENSM forecasts



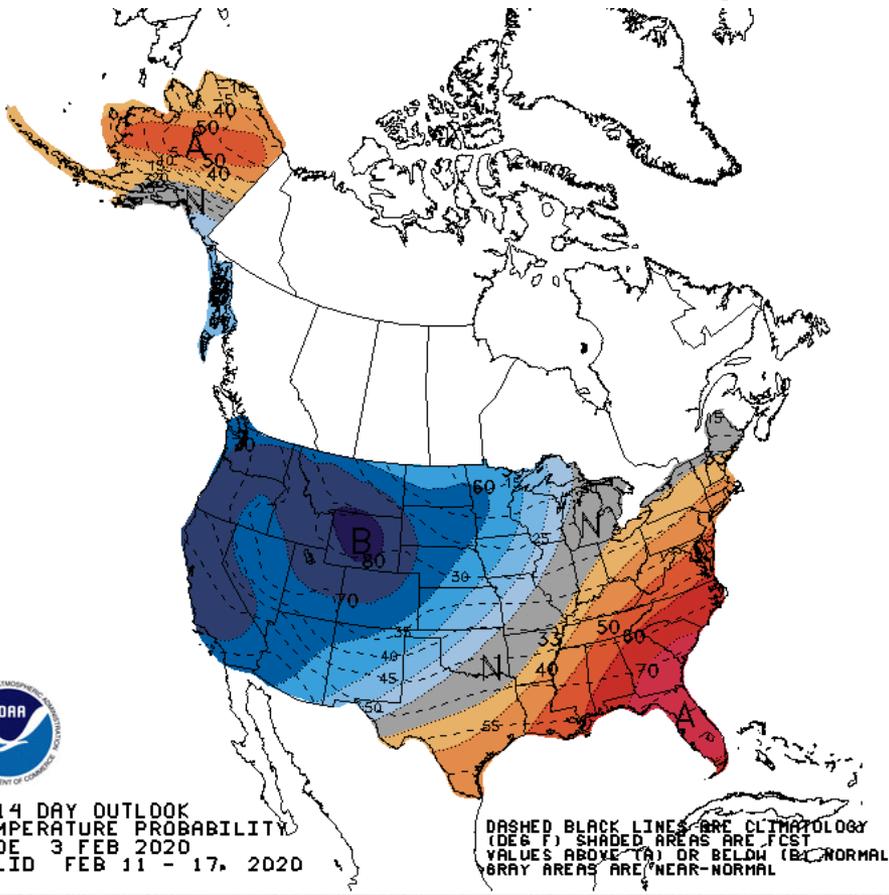
# AO: Observed & ENSM forecasts





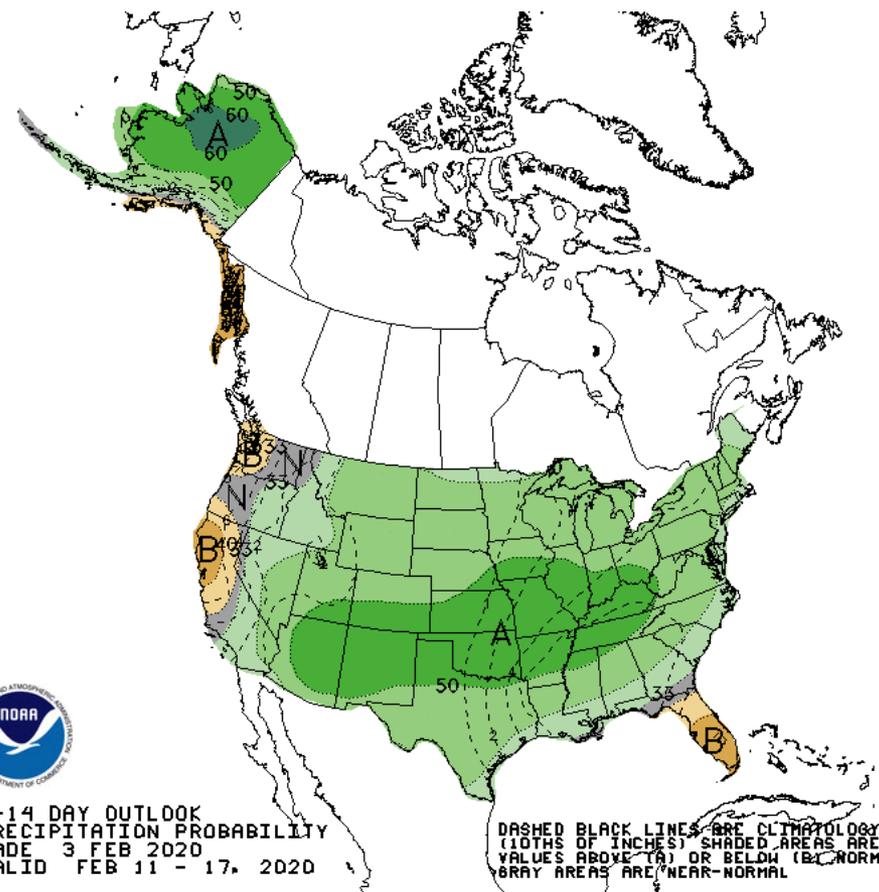
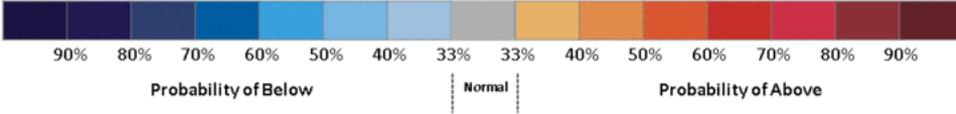
D+11 500 MB ANOMALIES FROM ALZ ENSM  
 CPC MAP MADE FEB 04 2020 1328 UTC CNTD FEB 15 2020

# Week 2 – Temperature and Precipitation



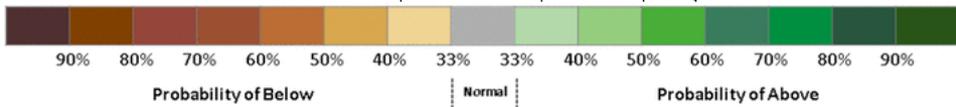
8-14 DAY OUTLOOK  
TEMPERATURE PROBABILITY  
MADE 3 FEB 2020  
VALID FEB 11 - 17, 2020

DASHED BLACK LINES ARE CLIMATOLOGY (DEG F). SHADED AREAS ARE FCST VALUES ABOVE (A) OR BELOW (B) NORMAL. GRAY AREAS ARE NEAR-NORMAL.



8-14 DAY OUTLOOK  
PRECIPITATION PROBABILITY  
MADE 3 FEB 2020  
VALID FEB 11 - 17, 2020

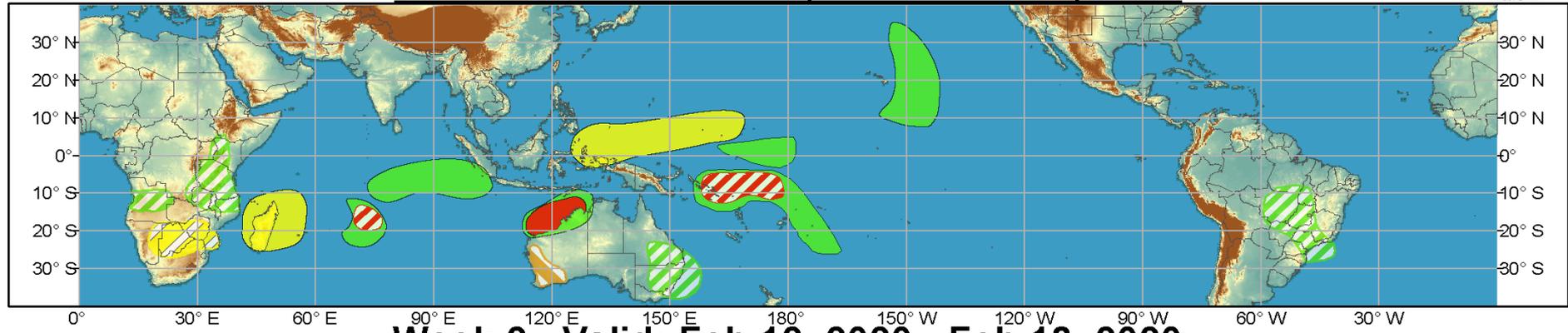
DASHED BLACK LINES ARE CLIMATOLOGY (TENTHS OF INCHES). SHADED AREAS ARE FCST VALUES ABOVE (A) OR BELOW (B) NORMAL. GRAY AREAS ARE NEAR-NORMAL.





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