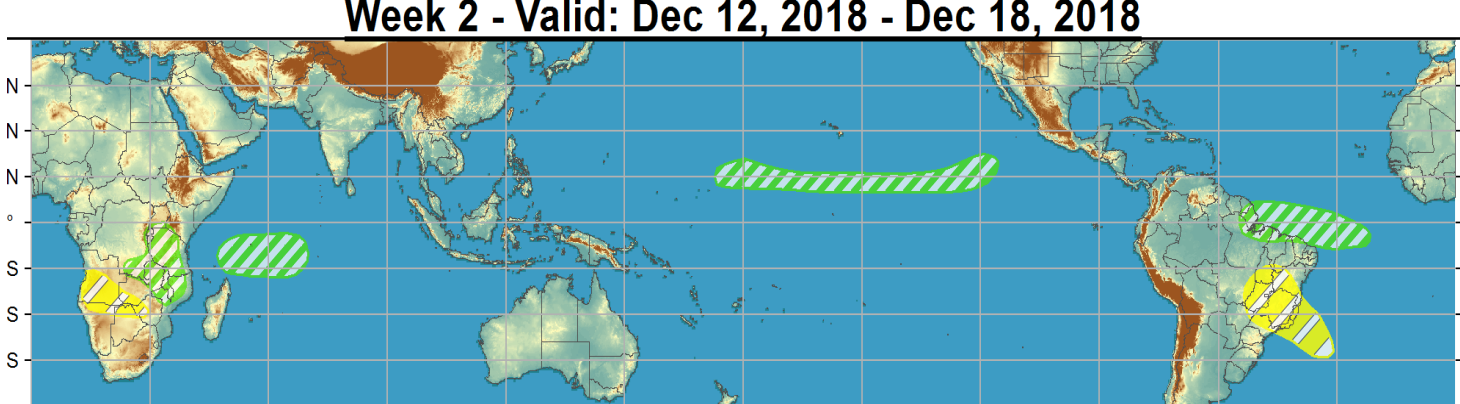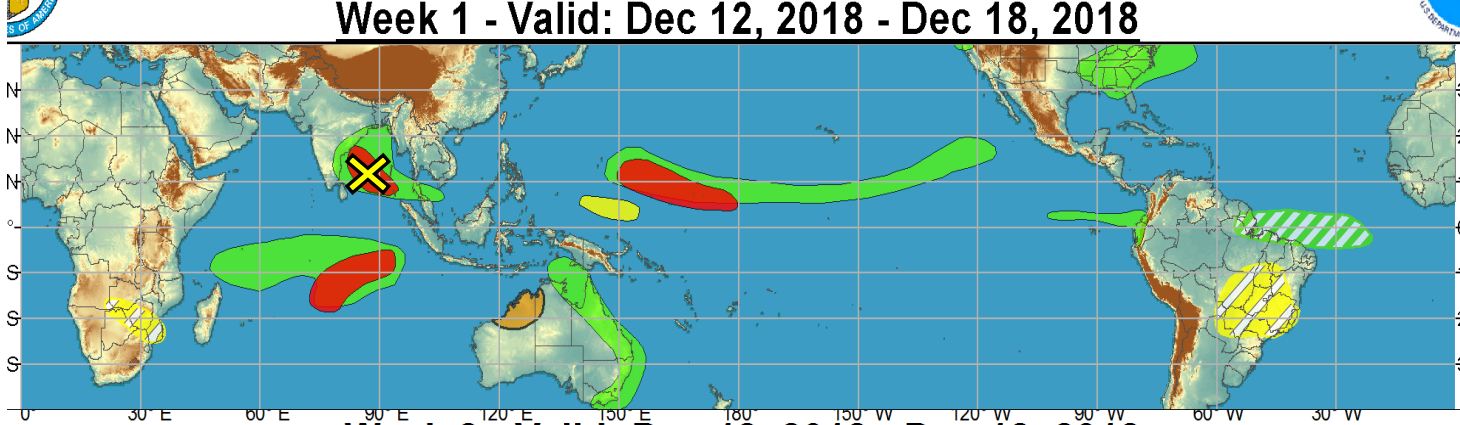# Global Tropics Hazards And Benefits Outlook
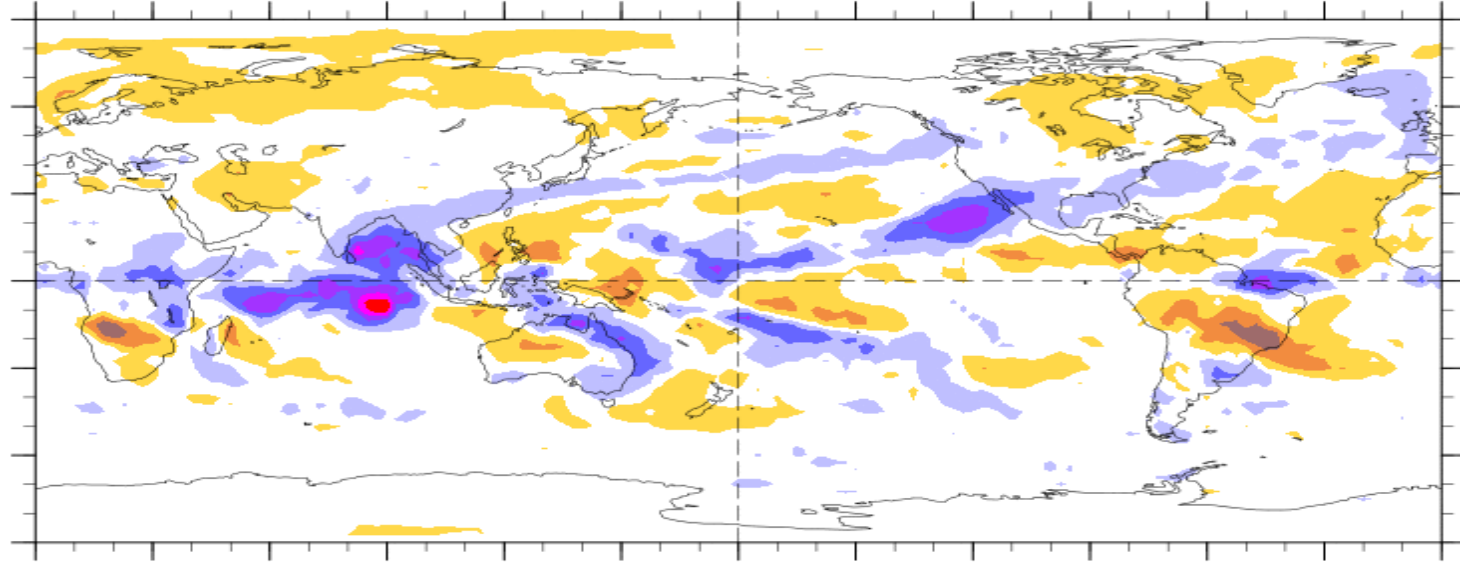## 12/18/2018

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

Week 1 - Valid: Dec 12, 2018 - Dec 18, 2018

Week 2 - Valid: Dec 12, 2018 - Dec 18, 2018

7-Day Average OLR Anomaly   2018/12/10 - 2018/12/16

Cool shading
More clouds/rain

Warm shading
Less clouds/rain

Synopsis of Climate Modes

ENSO: (December 13, 2018 Update)
- ENSO Alert System Status: <u>El Niño Watch</u>

- El Nino is expected to form and continue through the Northern Hemisphere winter 2018-2019 (~90% chance) and through Spring (~60% chance).

MJO and other subseasonal tropical variability:
• MJO remained active and is currently in RMM Phase 4.

• Dynamical models struggle to propagate the MJO fully around the circle.
   •Most models forecast the MJO to stall where it is now for the next few days.
   •Most models forecast the MJO to weaken considerably (to roughly the edge of the circle) as it moves into Phase 5.

Extratropics:
•Forecast pattern during Week-2 over North America is consistent with MJO Phase 5.
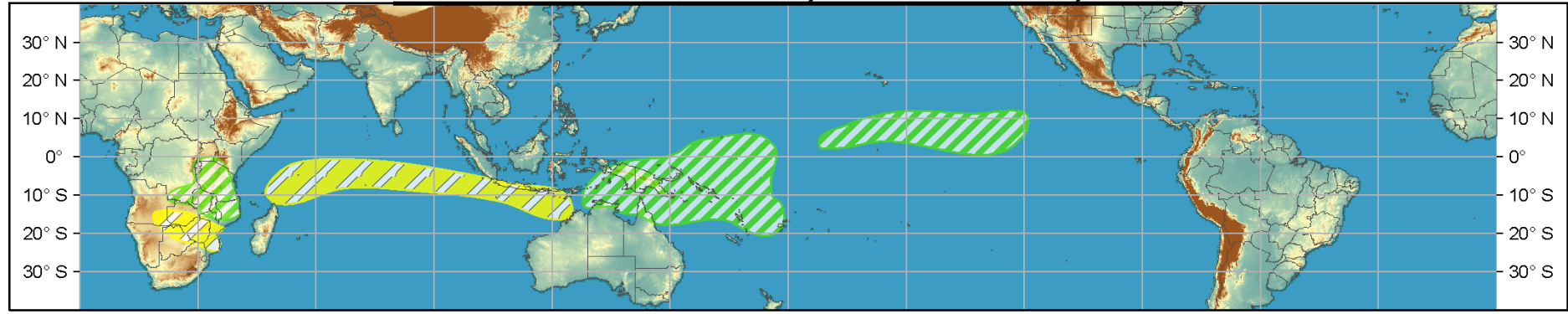•No clear atmospheric coupling to the warm waters/developing El Nino yet.

Global Tropics Hazards and Benefits Outlook - Climate Prediction Center

Week 1 - Valid: Dec 19, 2018 - Dec 25, 2018

Week 2 - Valid: Dec 26, 2018 - Jan 01, 2019

Produced: 12/18/2018
Forecaster: MacRitchie
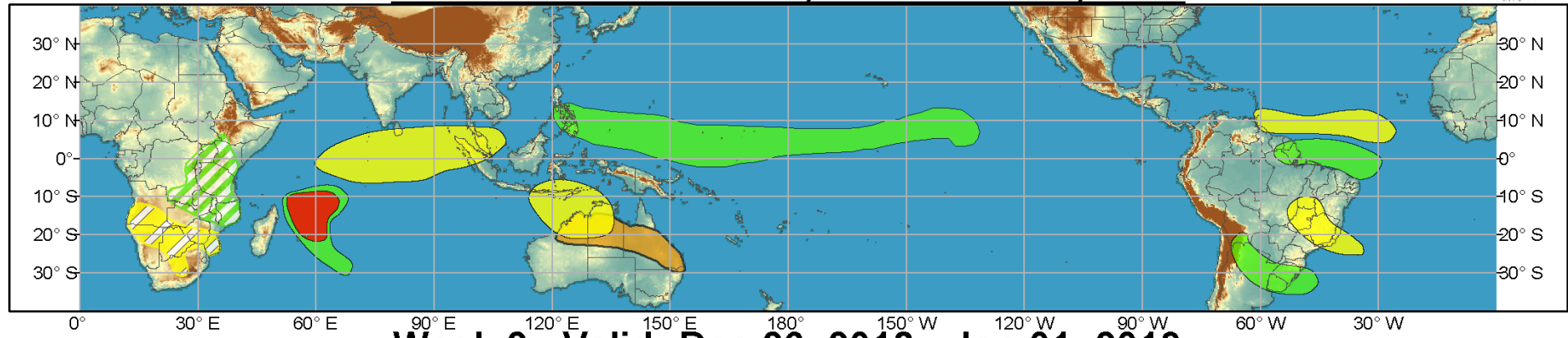
Confidence

	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.
Below-average rainfall			Weekly total rainfall in the lower third of the historical range.
Above-normal temperatures			7-day mean temperatures in the upper third of the historical range.
Below-normal temperatures			7-day mean temperatures in the lower third of the historical range.

Product is updated once per week, except from 6/1 - 11/30 for the region from 120E to 0, 0 to 40N. The product targets broad scale conditions integrated over a 7-day period for US interests only. Consult your local responsible forecast agency.

IR Satellite & 200-hpa Velocity Potential Anomalies
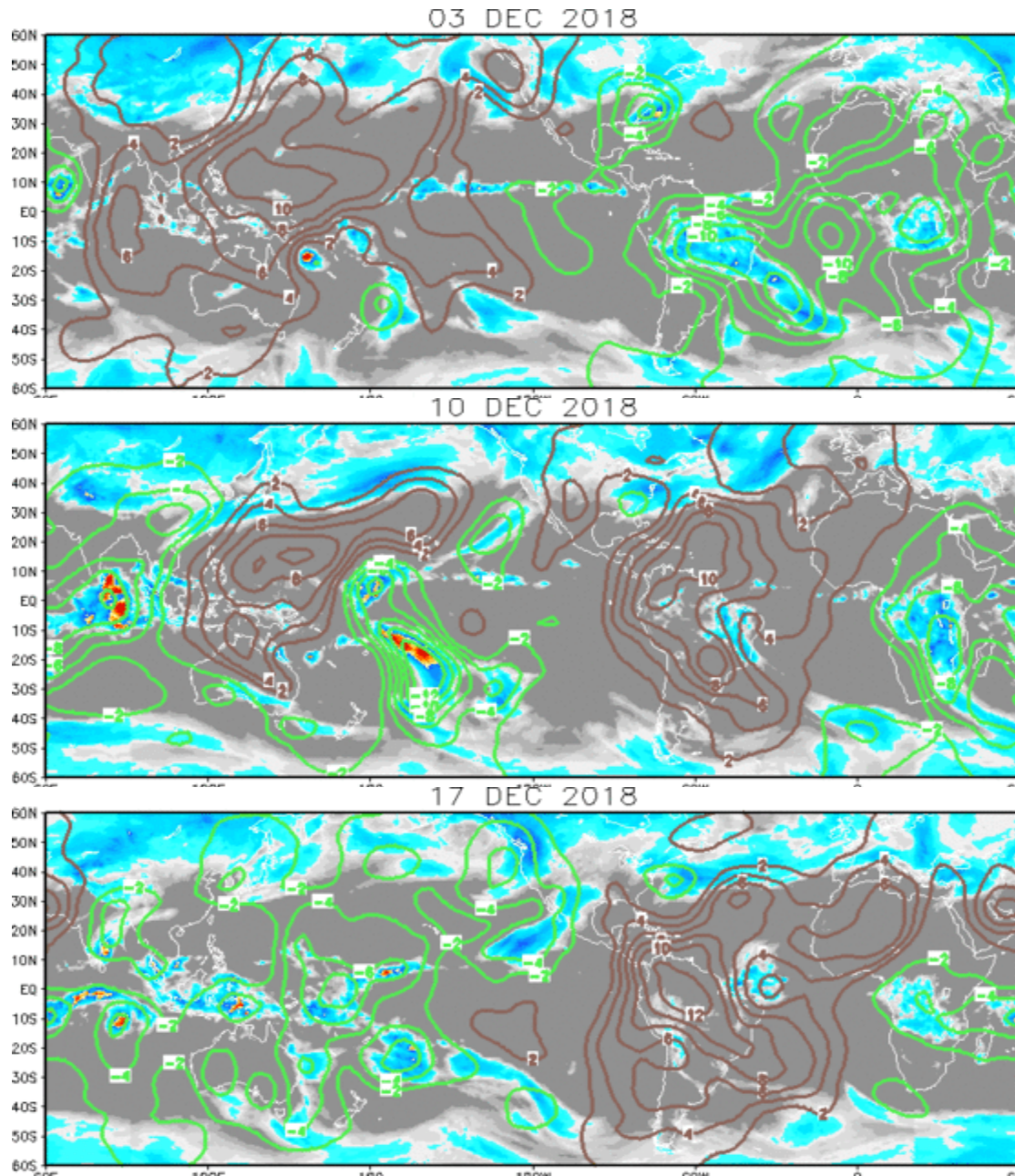
Green: Enhanced Divergence   Brown: Enhanced Convergence

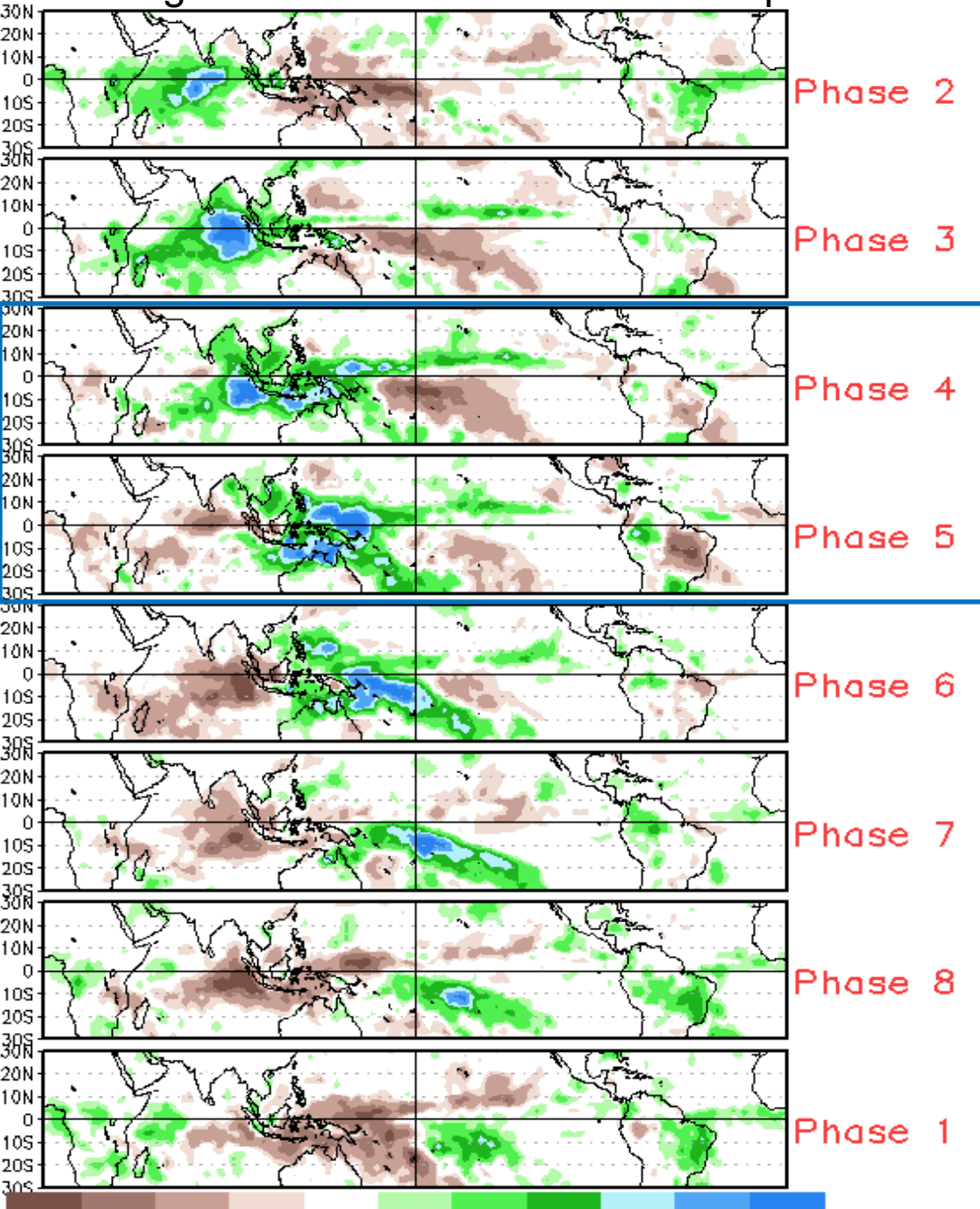Wave-1 pattern consistent with the MJO in its early phases.

The Wave-1 pattern breaks down a bit as tropical waves and extratropical flow enhances convection.

Back to a Wave-1 pattern associated with a strong MJO.

MJO Observation/Forecast

GEFS

ECMWF

CFS

- The MJO will probably continue through Phases 5-6 over the next two weeks but models have trouble propagating it past the Maritime Continent.

- Models are probably having difficulty resolving the MJO properly because of strong interference from other tropical waves.

Average Conditions when the MJO is present

Phase 2
Phase 3
Phase 4
Phase 5
Phase 6
Phase 7
Phase 8
Phase 1

Weeks 1-2: Phases 4/5 and maybe 6

CAVEAT: These panels are representative of robust MJO events.
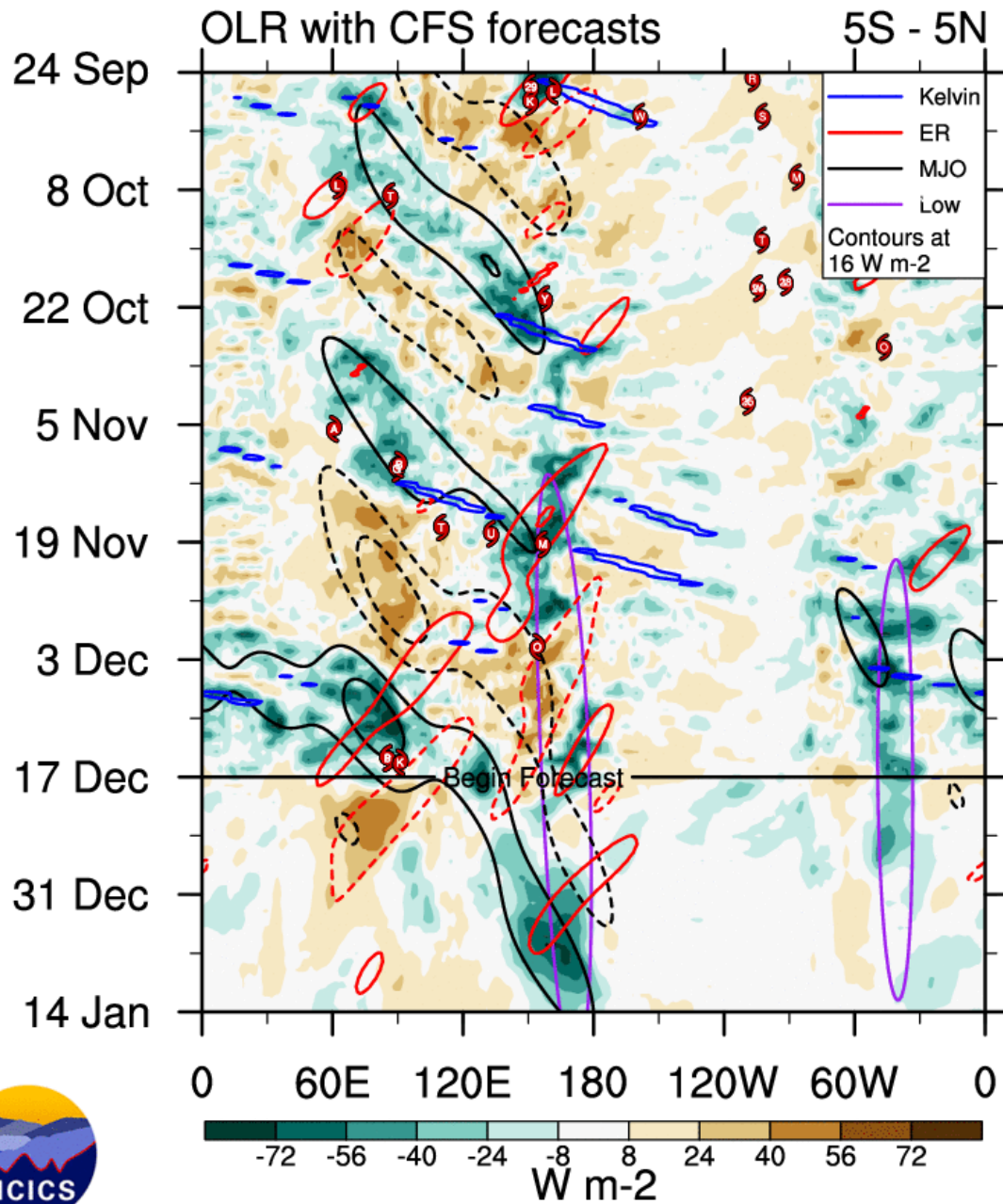
The CFS forecasts the **MJO** to weaken and couple with convection, resulting in it slowing down considerably as it approaches the Date Line.
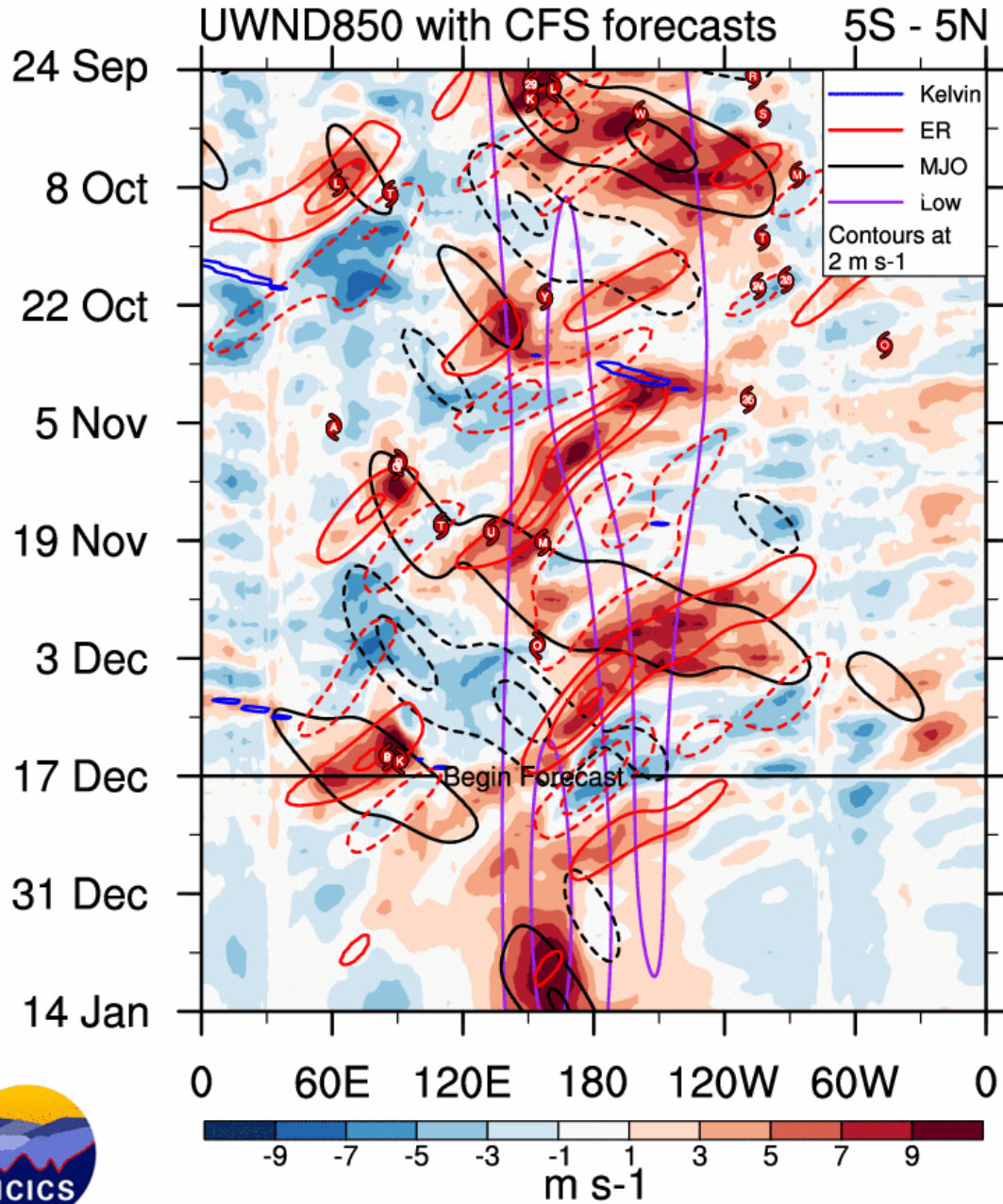
Equatorial Rossby waves strongly interefere with the pattern over the Pacific, which may impact the models' ability to properly resolve the **MJO**.

20-Nov to 26-Nov — Observed
18-Dec to 24-Dec — CFS Forecast
27-Nov to 3-Dec
25-Dec to 31-Dec
4-Dec to 10-Dec
1-Jan to 7-Jan
11-Dec to 17-Dec
8-Jan to 14-Jan
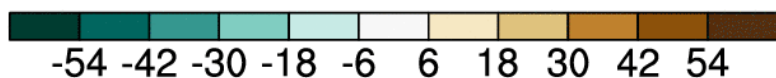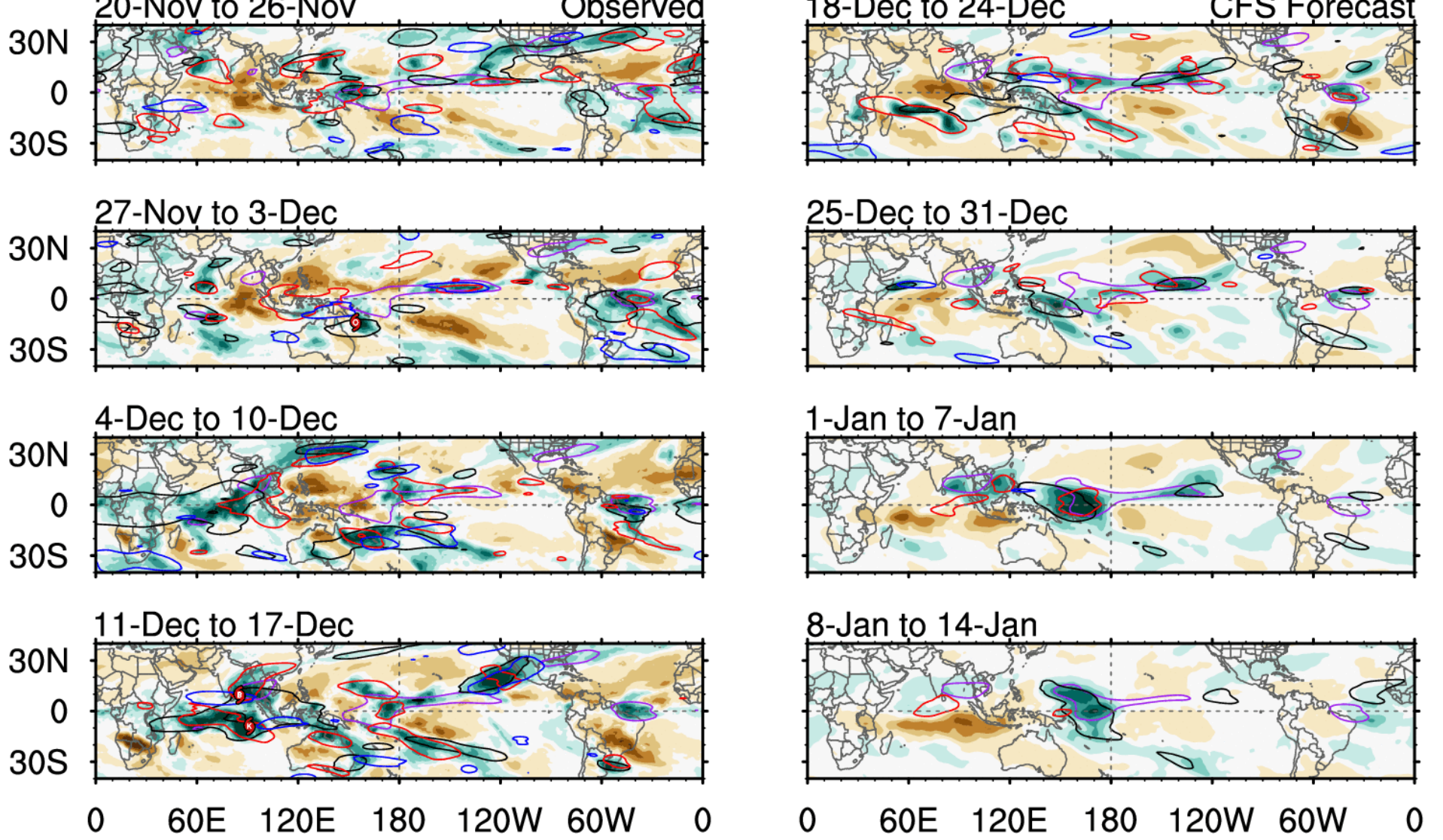
W m-2

MJO   Kelvin x2
Low   ER

Contours at -12, -36 W m-2

-54 -42 -30 -18 -6 6 18 30 42 54

7-day OLR with CFS forecasts

NCICS

ncics.org/mjo

Tue 2018-12-18 1640 UTC

Carl Schreck (cjschrec@ncsu.edu)

CFS Precipitation Anomalies (mm) Issued 17Dec2018
Week-1 Forecast Ending 25Dec2018
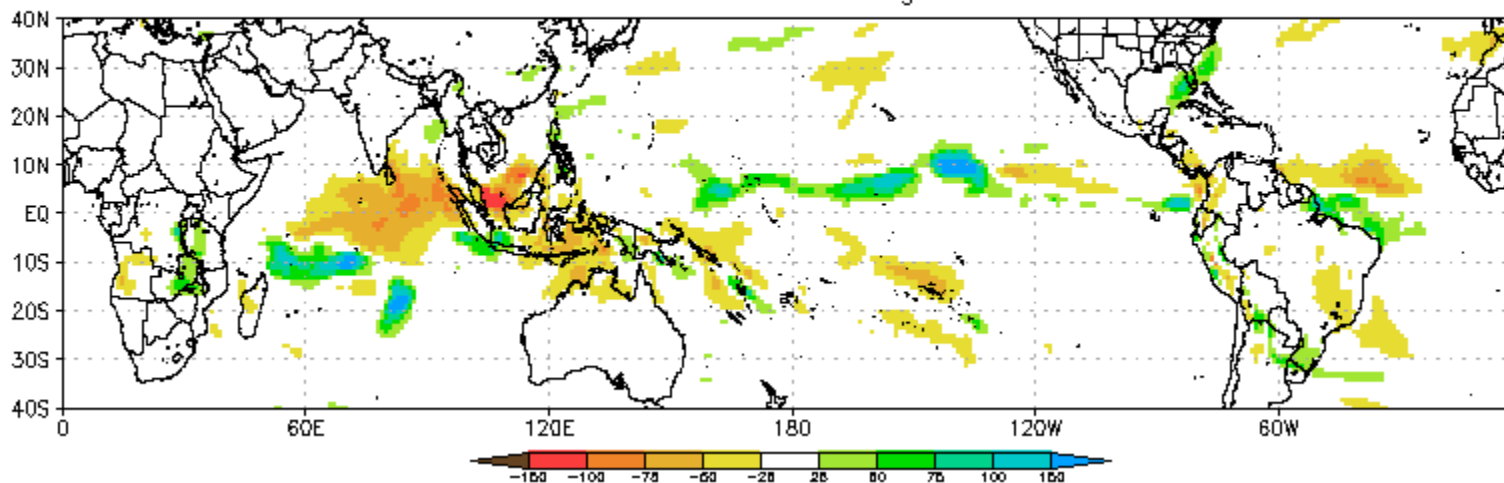
CFS Precipitation Anomalies (mm) Issued 17Dec2018
Week-2 Forecast Ending 01Jan2019
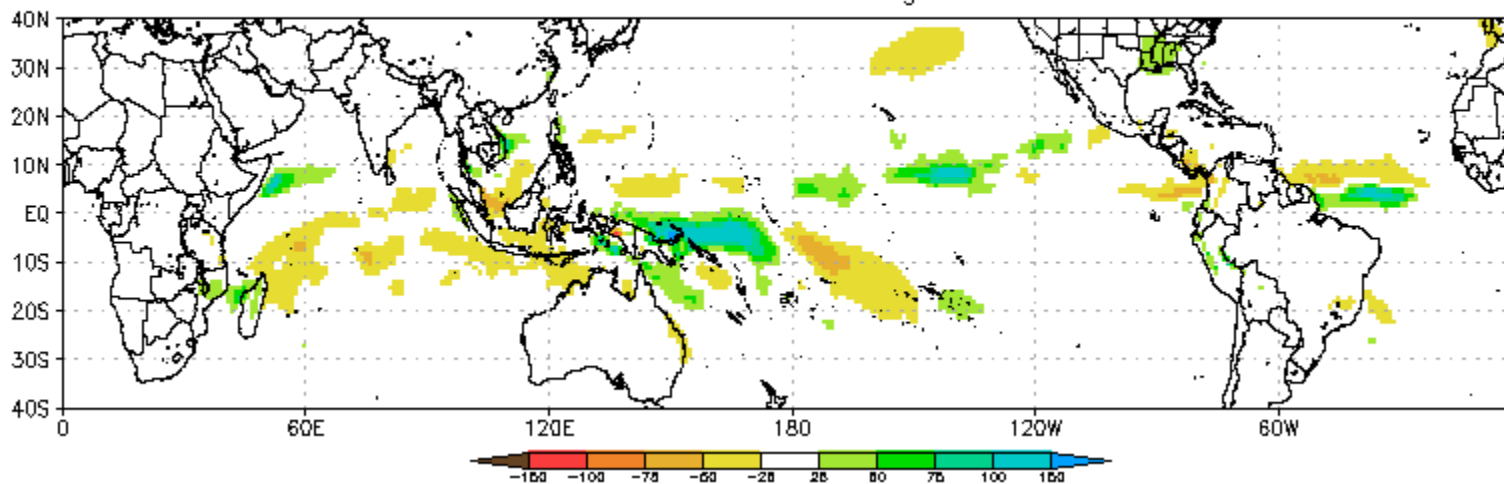
December Tropical Storm Formation by MJO phase
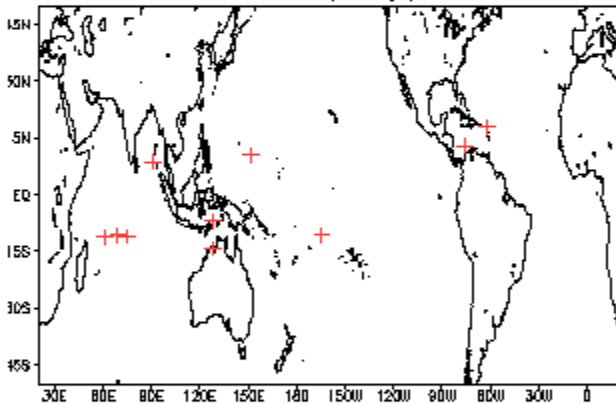

Phase 1 (46 days) 7 storms
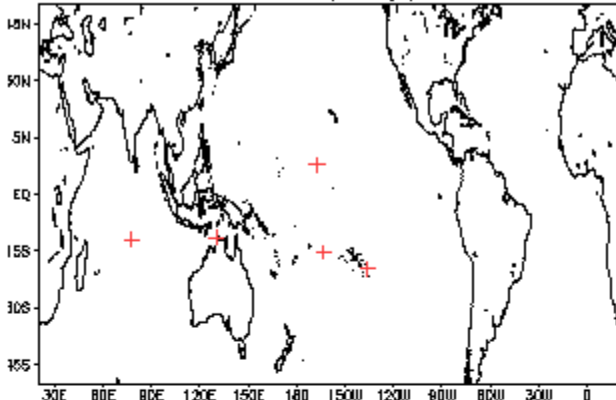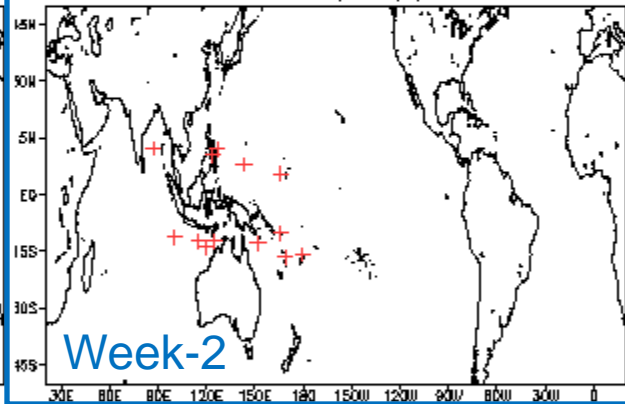
Phase 4 (72 days) 13 storms
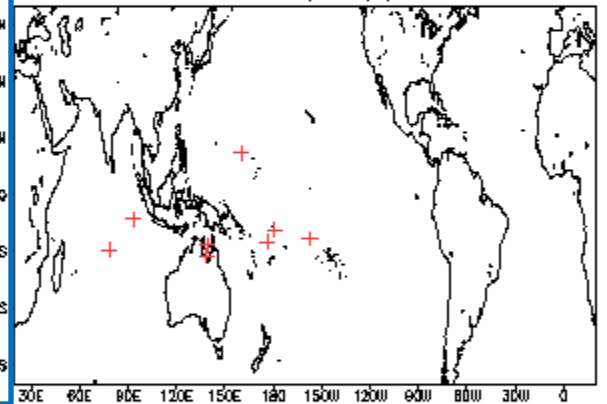
Week-1
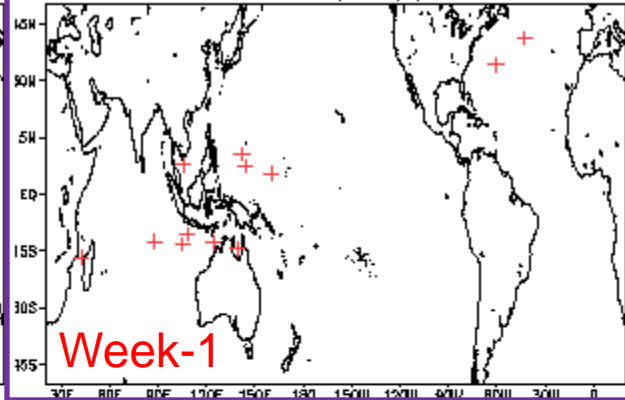
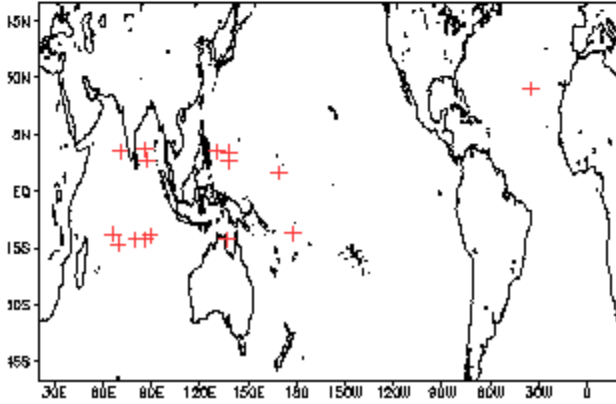Phase 7 (103 days) 19 storms
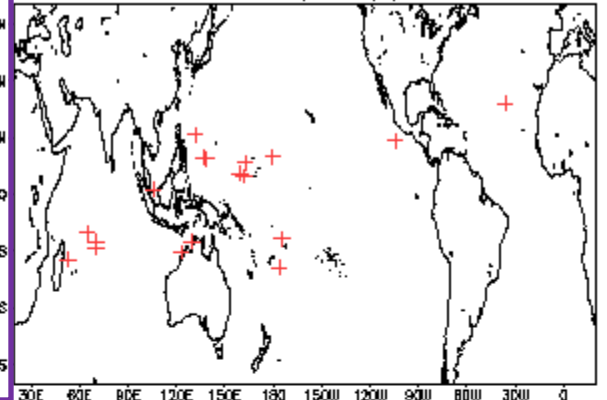
Phase 2 (67 days) 11 storms

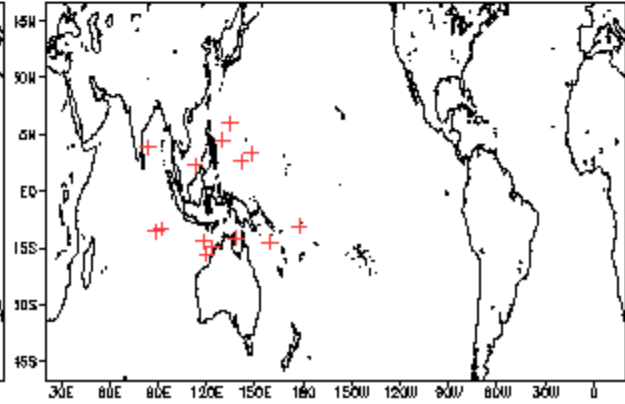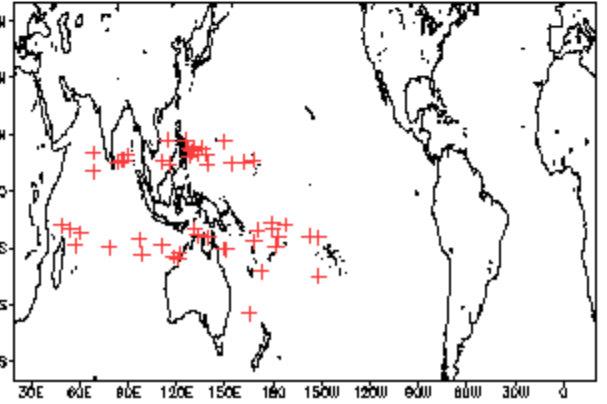Phase 5 (73 days) 14 storms
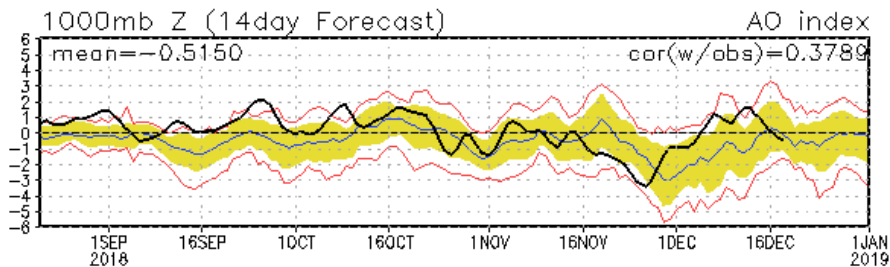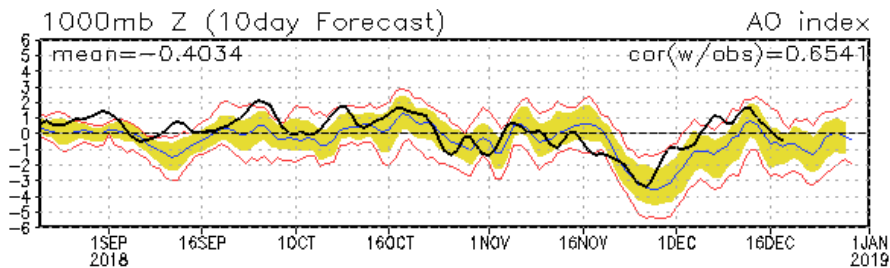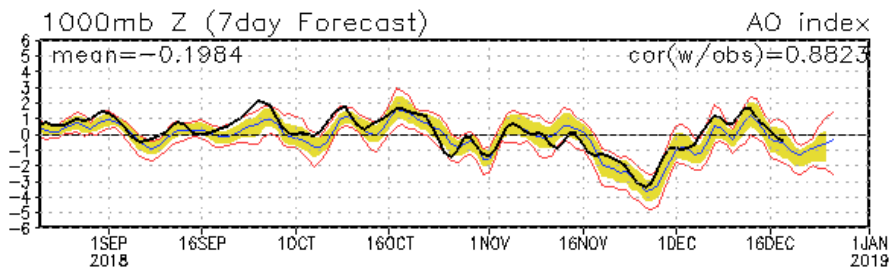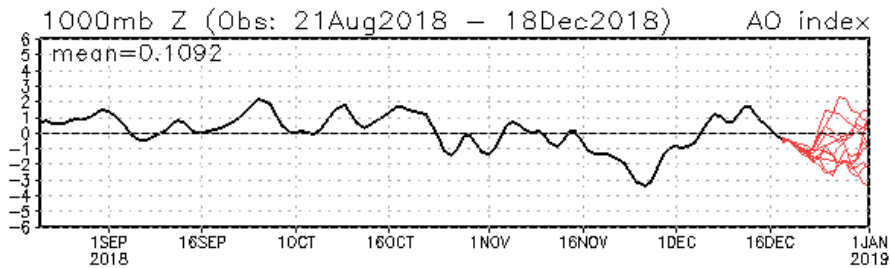
Week-2

Phase 8 (76 days) 9 storms

Phase 3 (101 days) 16 storms

Phase 6 (69 days) 15 storms

Null (416 days) 52 storms

Connections to U.S. Impacts

AO: Observed & ENSM forecasts

1000mb Z (Obs: 21Aug2018 – 18Dec2018)   AO index
mean=0.1092

1000mb Z (7day Forecast)   AO index
mean=-0.1984   cor(w/obs)=0.8823

1000mb Z (10day Forecast)   AO index
mean=-0.4034   cor(w/obs)=0.6541

1000mb Z (14day Forecast)   AO index
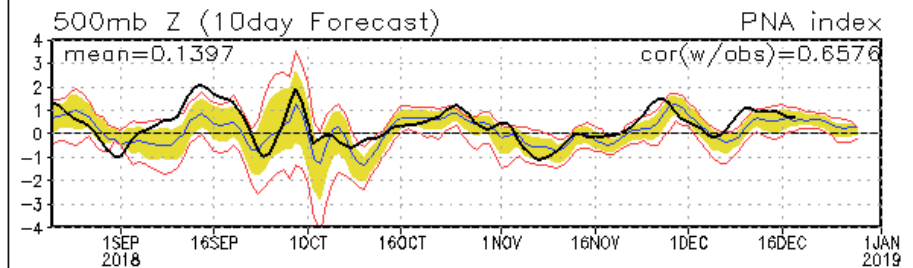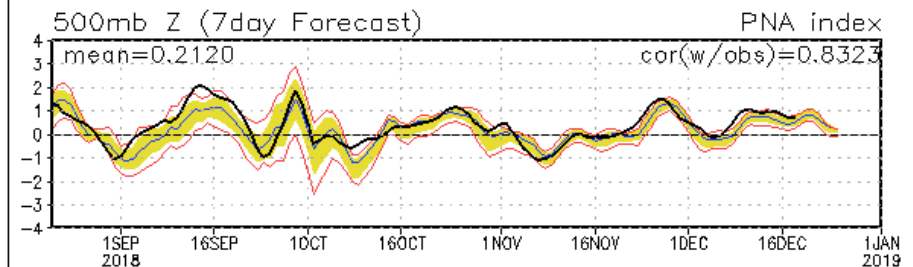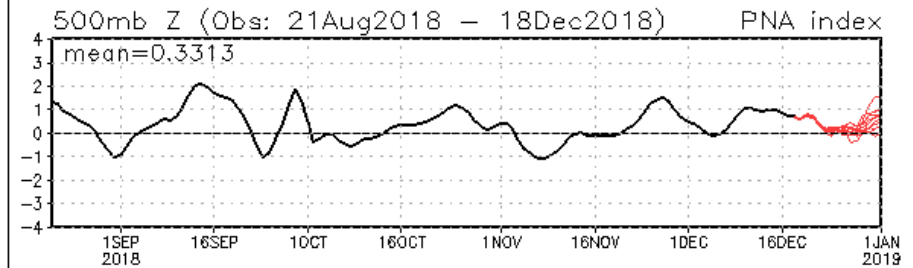mean=-0.5150   cor(w/obs)=0.3789

PNA: Observed & ENSM forecasts

500mb Z (Obs: 21Aug2018 – 18Dec2018)   PNA index
mean=0.3313

500mb Z (7day Forecast)   PNA index
mean=0.2120   cor(w/obs)=0.8323

500mb Z (10day Forecast)   PNA index
mean=0.1397   cor(w/obs)=0.6576

500mb Z (14day Forecast)   PNA index
mean=0.0046   cor(w/obs)=0.4936

D+11 500 MB ANOMALIES FROM ALZ ENSM
CPC MAP MADE DEC 18 2018 1305 UTC CNTD DEC 29 2018
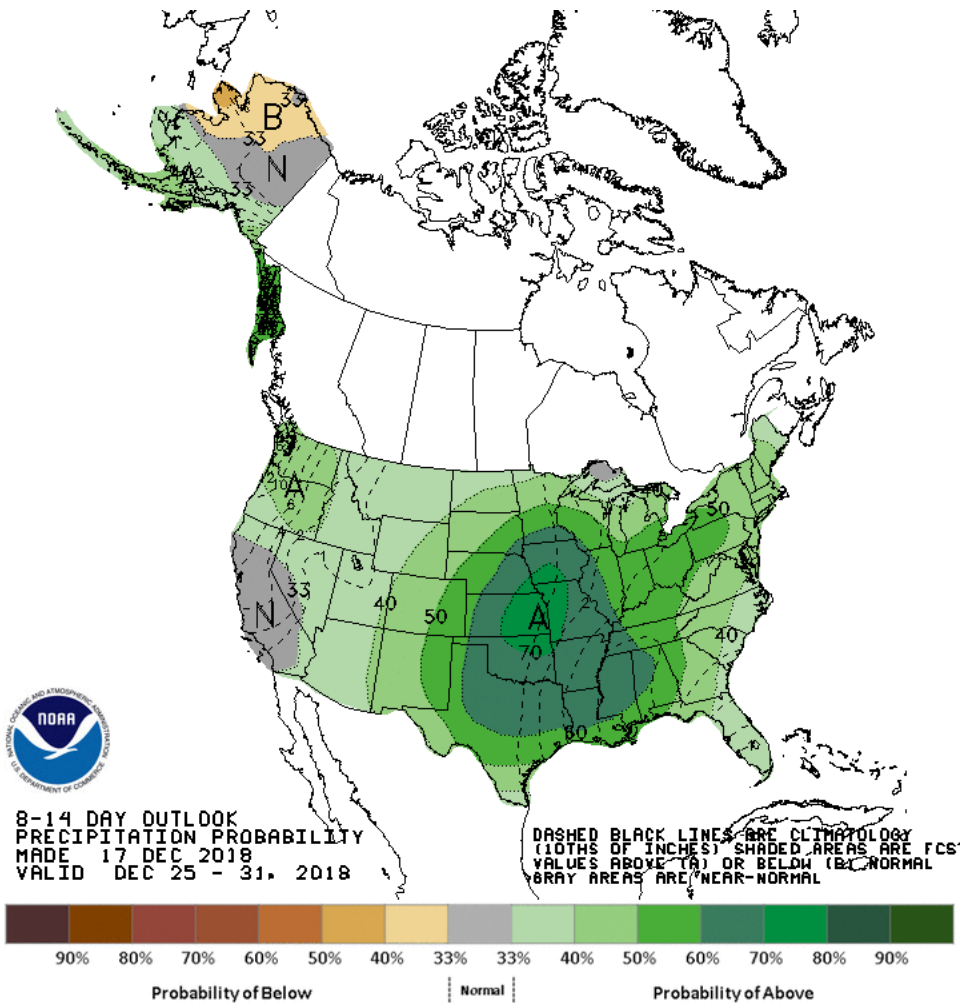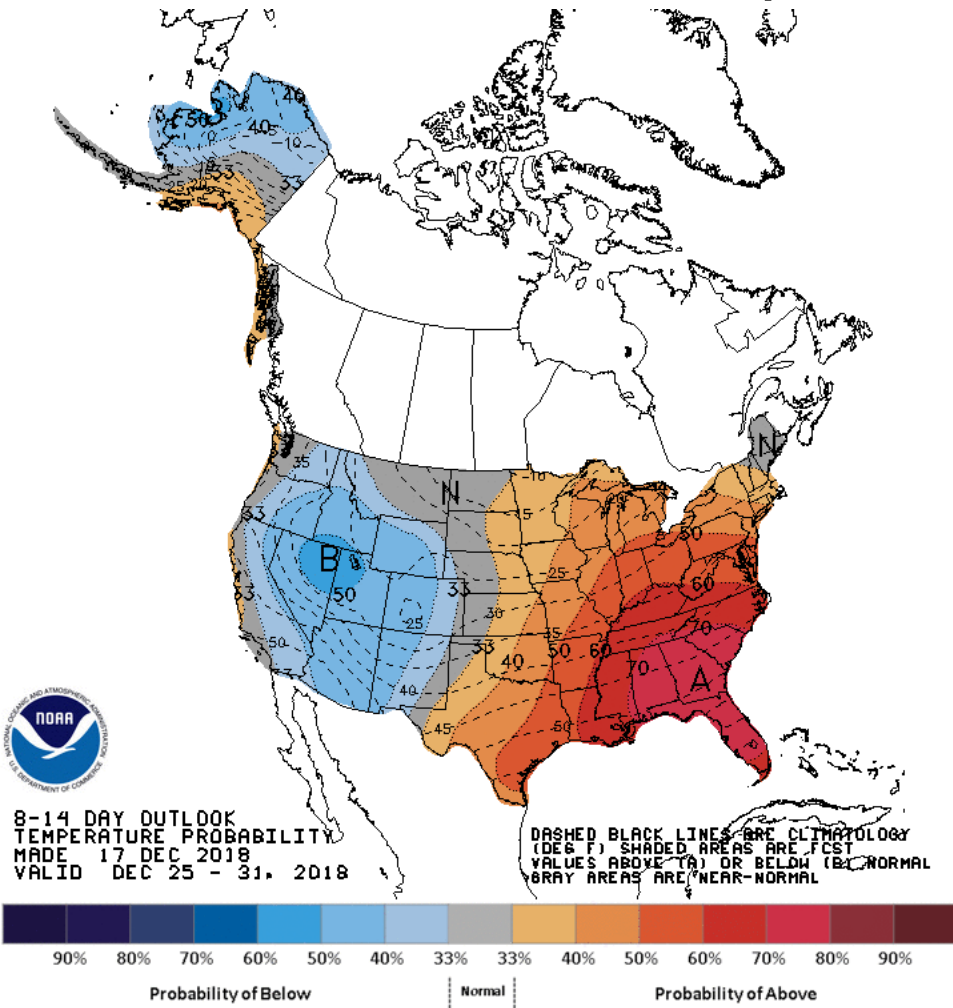
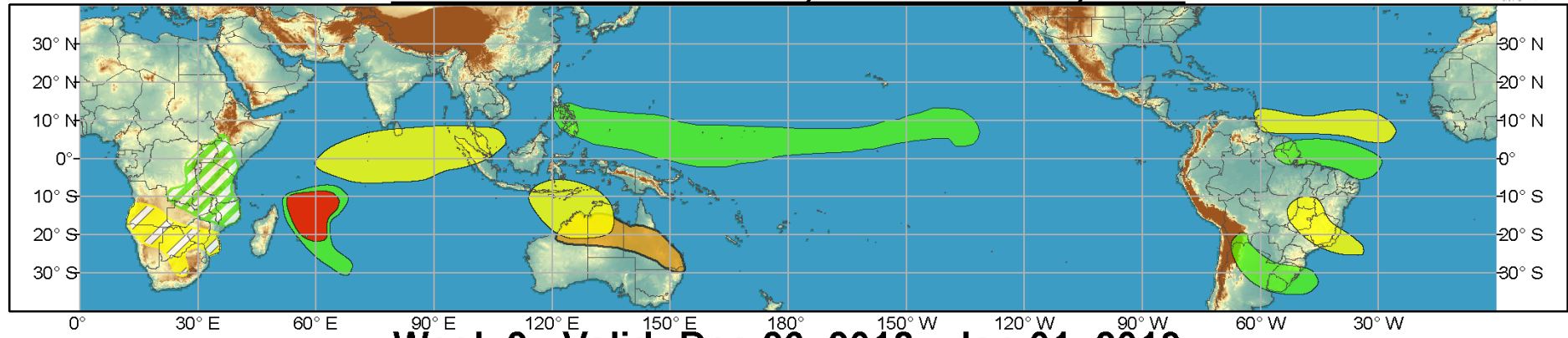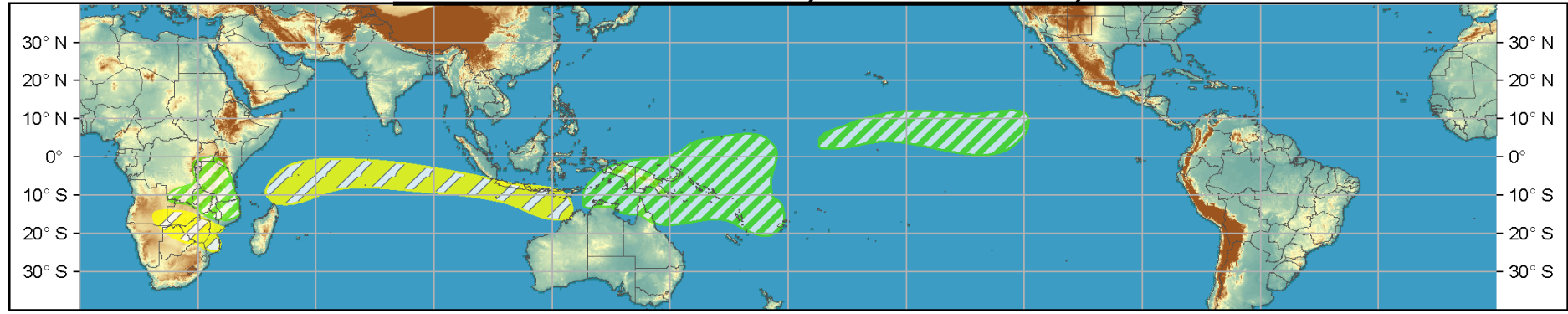# Week 2 – Temperature and Precipitation

Global Tropics Hazards and Benefits Outlook - Climate Prediction Center

Week 1 - Valid: Dec 19, 2018 - Dec 25, 2018

Week 2 - Valid: Dec 26, 2018 - Jan 01, 2019

Produced: 12/18/2018
Forecaster: MacRitchie

Confidence
High   Moderate

Tropical Cyclone Formation	red	red hatched	Development of a tropical cyclone (tropical depression - TD, or greater strength).
Above-average rainfall	green	green hatched	Weekly total rainfall in the upper third of the historical range.
Below-average rainfall	yellow	yellow hatched	Weekly total rainfall in the lower third of the historical range.
Above-normal temperatures	orange	orange hatched	7-day mean temperatures in the upper third of the historical range.
Below-normal temperatures	blue	blue hatched	7-day mean temperatures in the lower third of the historical range.

Product is updated once per week, except from 6/1 - 11/30 for the region from 120E to 0, 0 to 40N. The product targets broad scale conditions integrated over a 7-day period for US interests only. Consult your local responsible forecast agency.