

# Global Tropics Hazards And Benefits Outlook

12/14/2021

Thomas Collow

## Outline

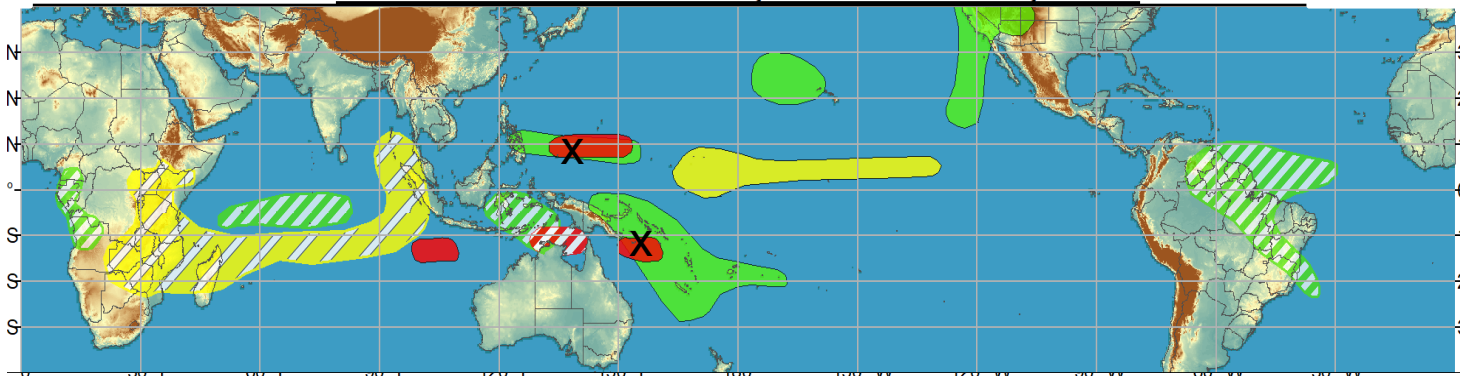
1. Review of Recent Conditions
2. Synopsis of Climate Modes
3. GTH Outlook and Forecast Discussion
4. Connections to U.S. Impacts

# Outlook Review

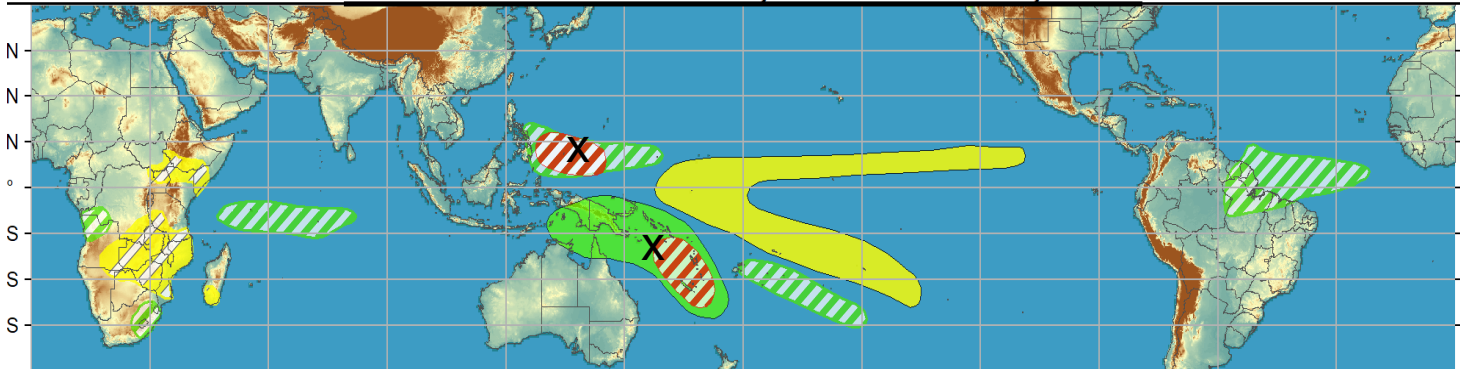
X = Cyclone Ruby  
Coral Sea, 12/12

X = Tropical Storm Rai  
W. Pacific, 12/13

**Week 1 - Valid: Dec 08, 2021 - Dec 14, 2021**

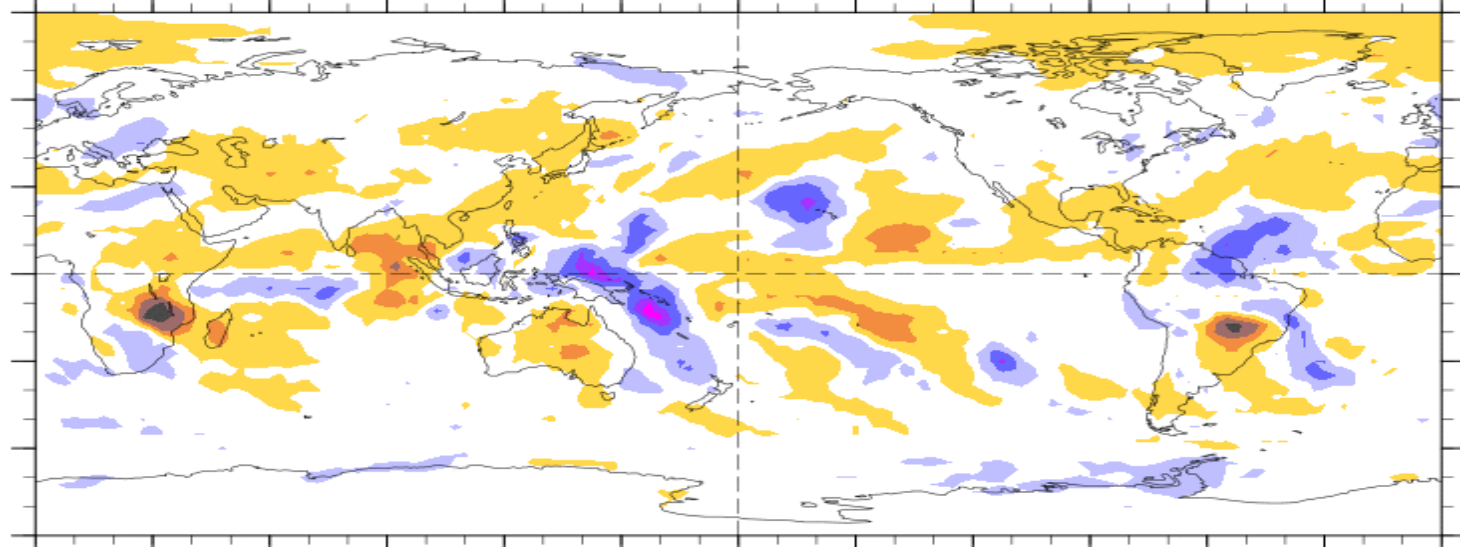


**Week 2 - Valid: Dec 08, 2021 - Dec 14, 2021**



7-Day Average OLR Anomaly

2021/12/06 - 2021/12/12



Cool shading  
More clouds/rain

Warm shading  
Less clouds/rain

# Synopsis of Climate Modes

## **ENSO: (December 9, 2021 Update)**

*next update on 13<sup>th</sup> of Jan.!*

- ENSO Alert System Status: [La Niña Advisory](#)
- La Niña is favored to continue through the Northern Hemisphere winter 2021-22 (~95% chance) and transition to ENSO-neutral during the spring 2022 (~60% chance during April-June).

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

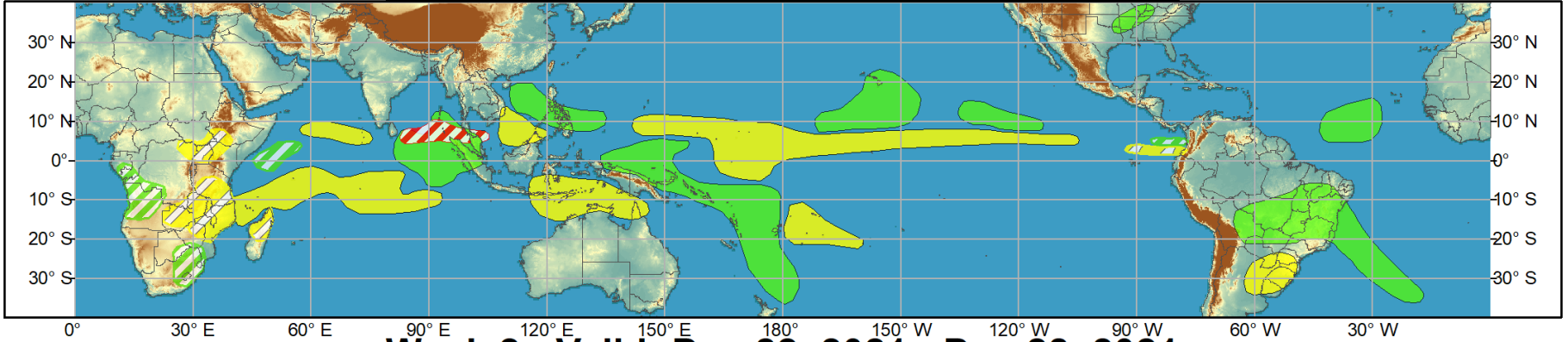
- The MJO remains active, and is located over the Western Pacific (RMM phase 7)
- The MJO is forecast to destructively interfere with the established La Niña base state, which may result in some weakening and retrogression of the signal in the short term. However, dynamical models indicate some renewed eastward propagation during week-2.
- Although uncertainty continues on how much if any the MJO affects the mid-latitude circulation pattern over North America, week-2 model solutions are beginning to depict blocking at the highest latitudes of the Northern Hemisphere. This could lead to a colder pattern for the north-central CONUS by the end of December.



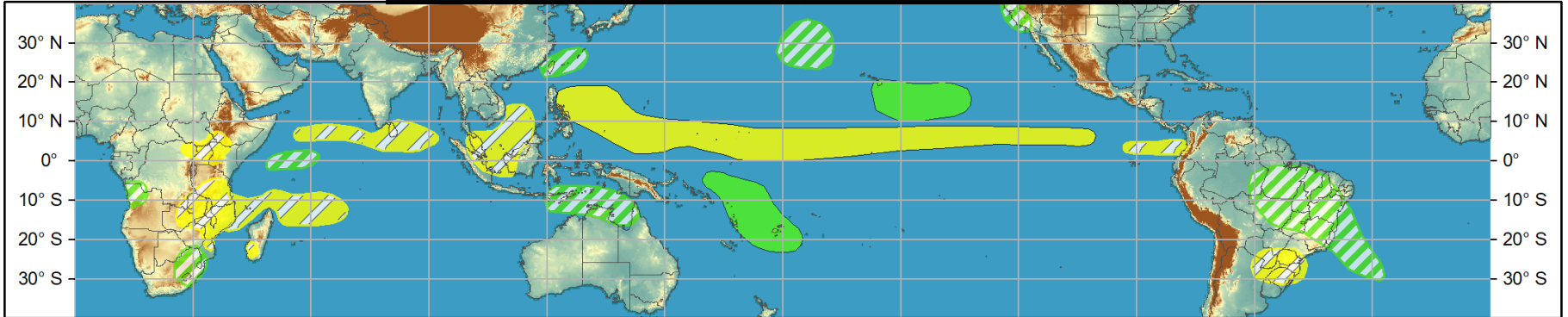
# Global Tropics Hazards and Benefits Outlook - Climate Prediction Center



## Week 1 - Valid: Dec 15, 2021 - Dec 21, 2021



## Week 2 - Valid: Dec 22, 2021 - Dec 28, 2021



### 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.

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Forecaster: Collow

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# IR Satellite & 200-hpa Velocity Potential Anomalies

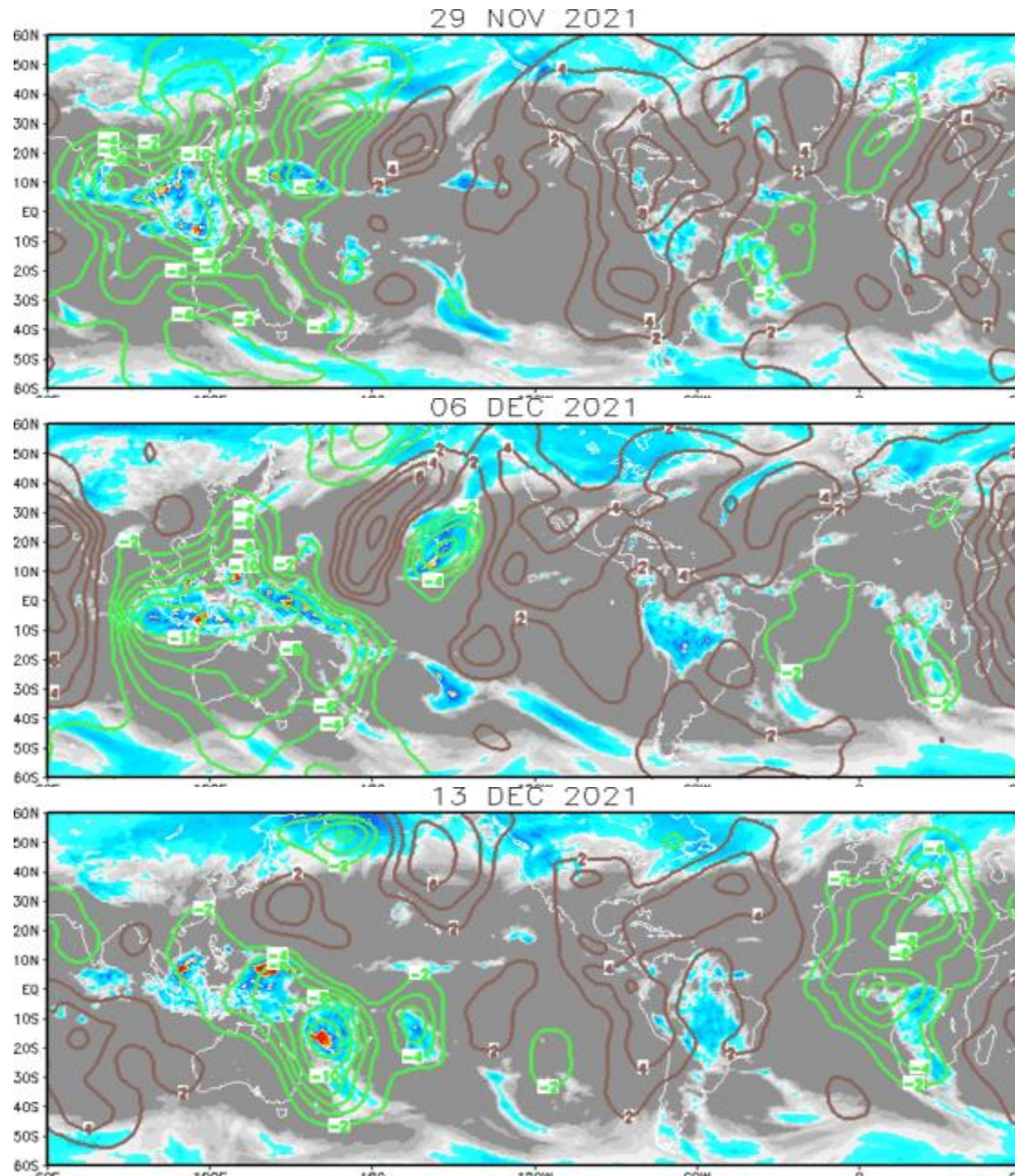
Green: Enhanced Divergence

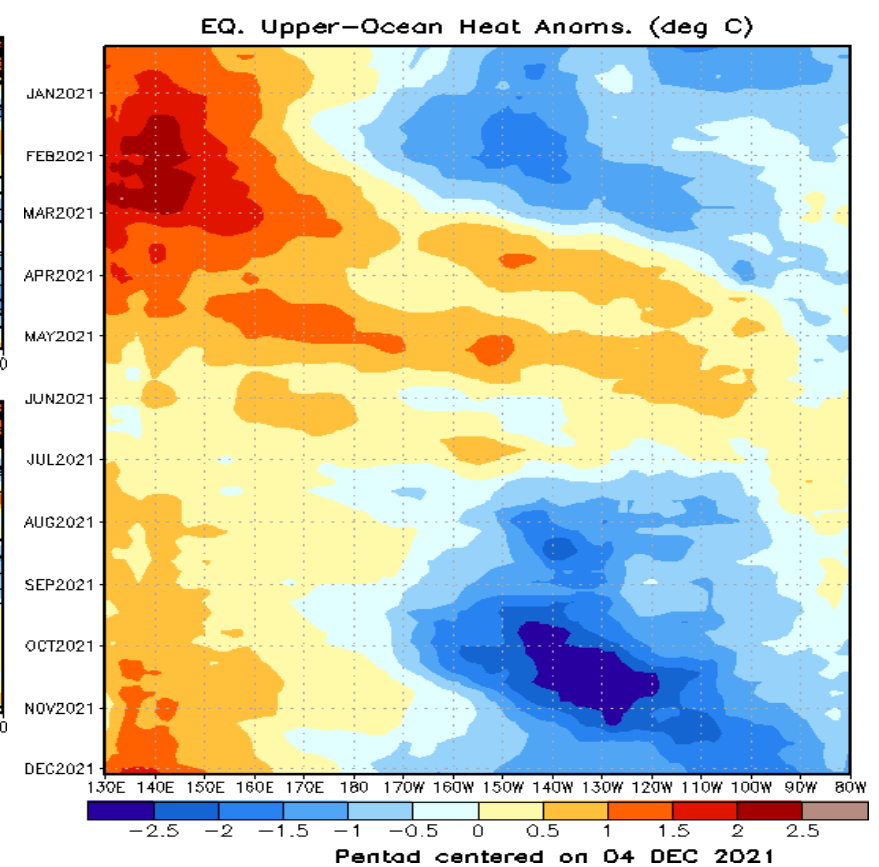
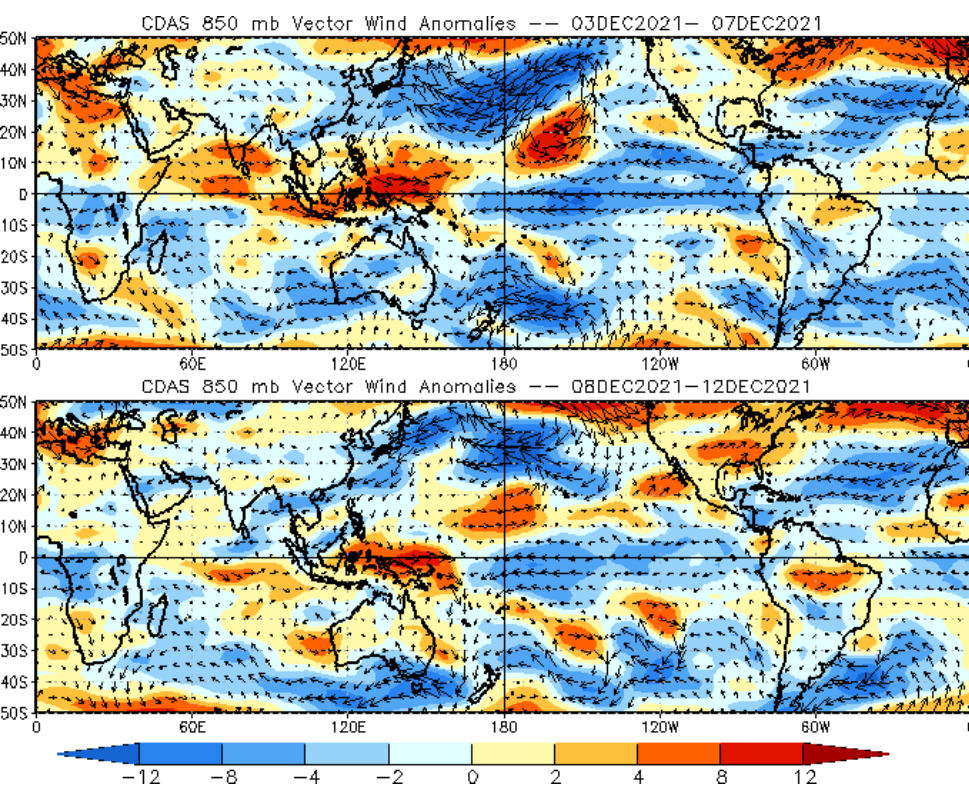
Brown: Enhanced Convergence

Enhanced convection over the eastern Indian Ocean, Maritime Continent, and West Pacific; suppressed convection over much of the Western Hemisphere.

Enhanced convection expands across the Maritime Continent and West Pacific including over the South Pacific Convergence Zone.

Wave-2 pattern emerges with continued enhanced convection over the southwest Pacific, with enhanced convection also expanding over Africa in the wake of the MJO and increased upper level divergence.



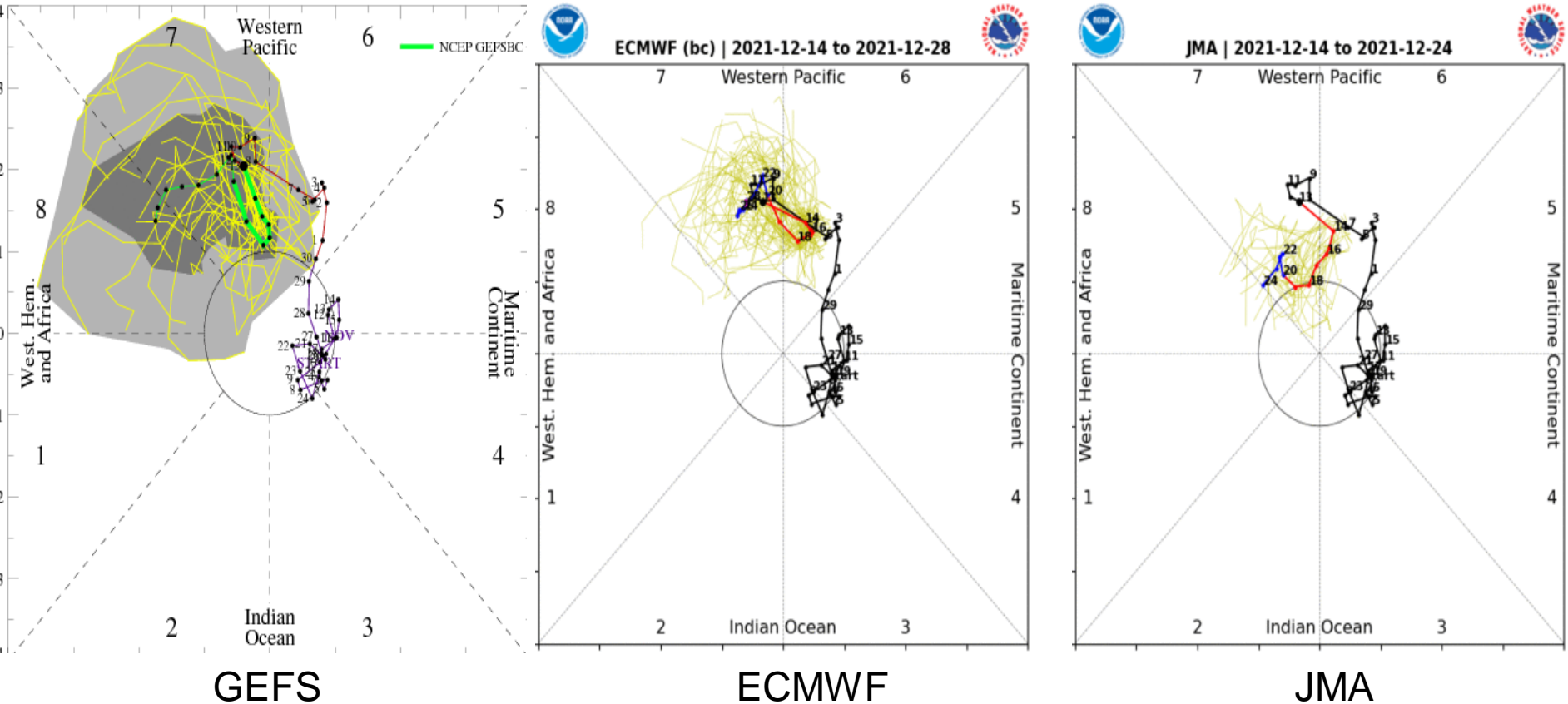


Low level westerly wind burst observed in the far west Pacific, consistent with eastward propagating MJO event.

Advection of positive subsurface temperature anomalies eastward has the potential to decrease the amplitude of the negative sea surface temperature anomalies in the Niño regions.

# MJO Observation/Forecast

[RMM1, RMM2] forecast for Dec-14-2021 to Dec-28-2021

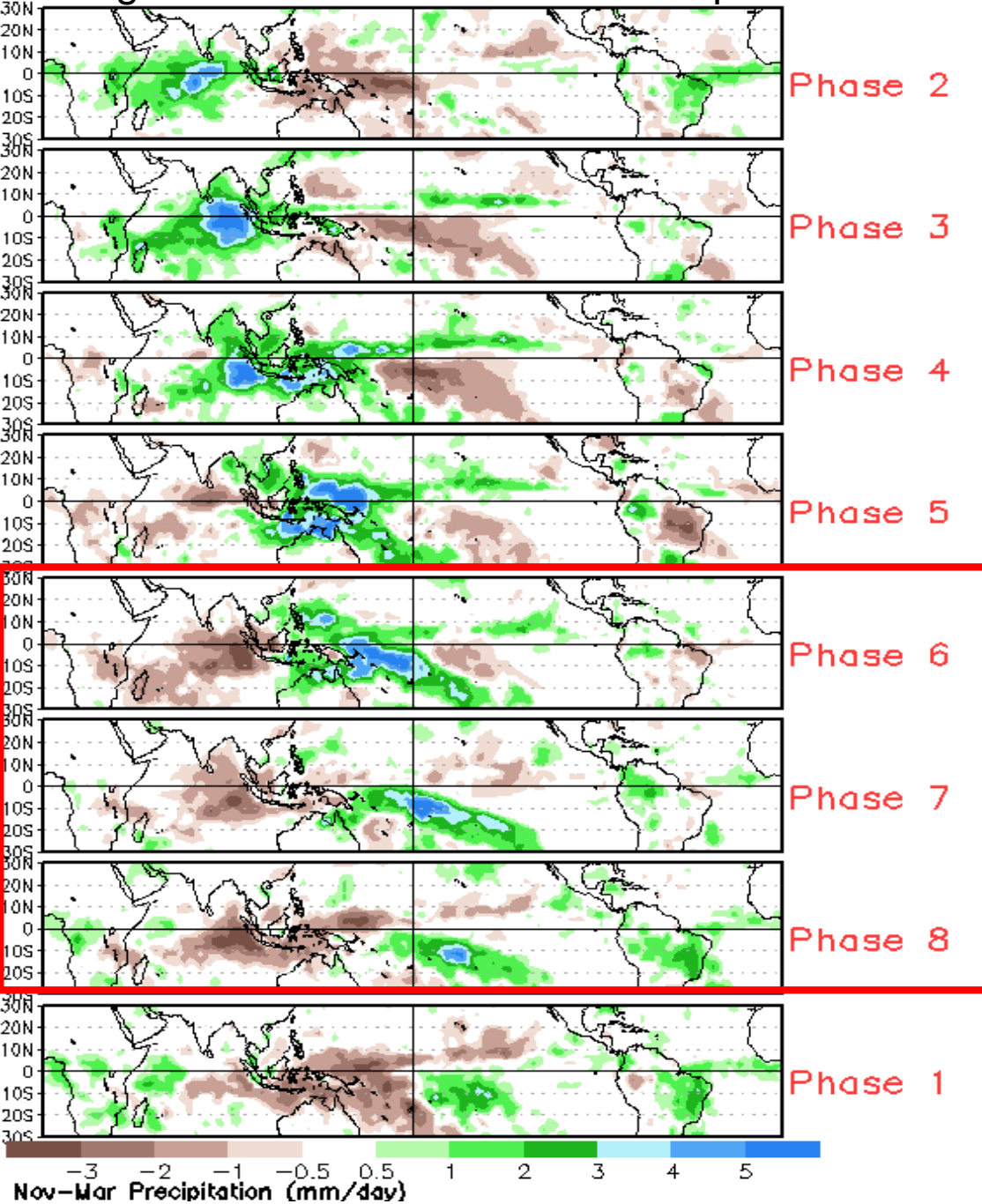


GEFS and ECMWF stall or retrograde the MJO in the near term, but both models indicate some renewed eastward propagation by week-2.

JMA is similar, but with greater weakening of the intraseasonal signal during week-1.

Uncertainty is high due to large ensemble spread.

# Average Conditions when the MJO is present



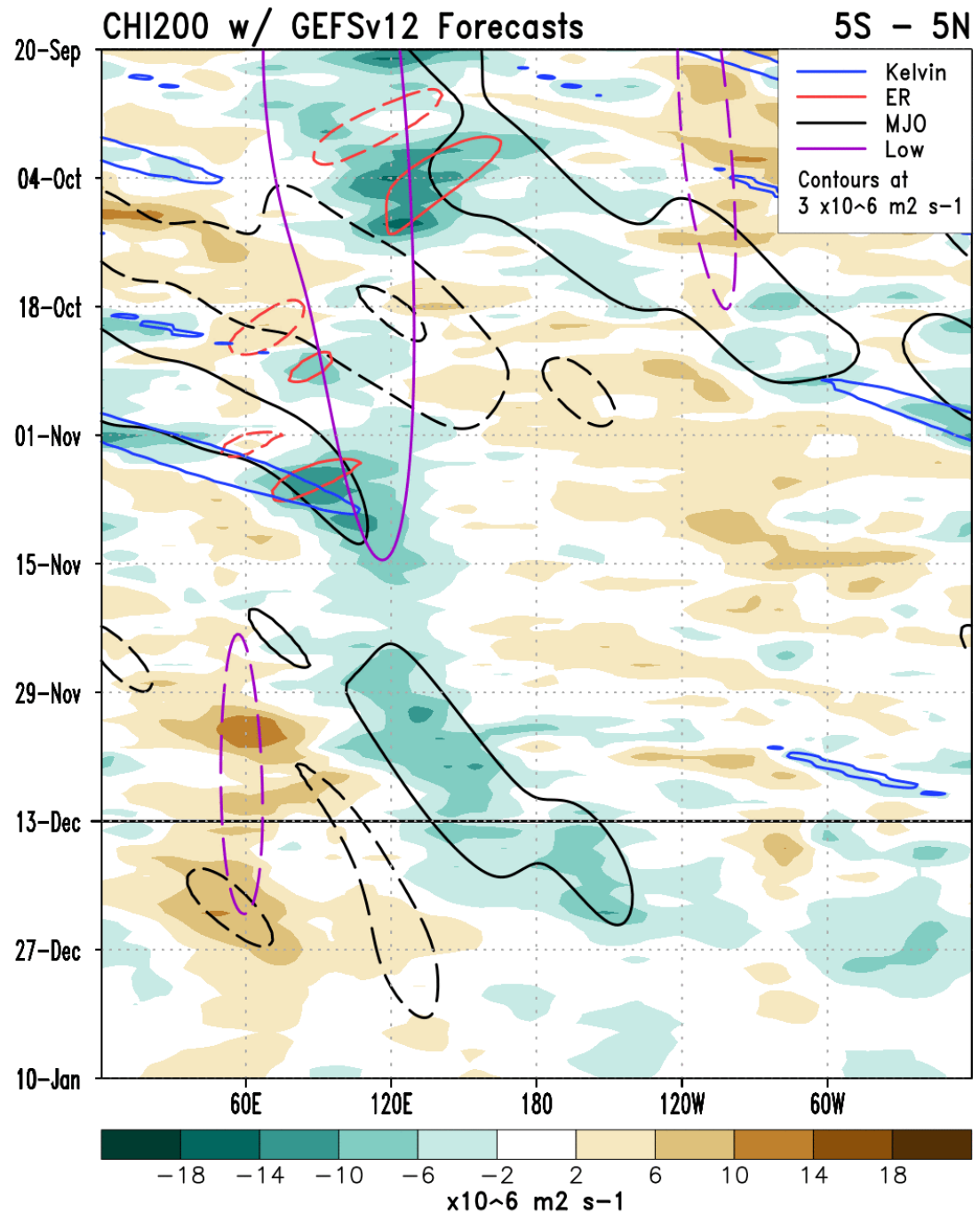
CAVEAT: These panels are representative of robust MJO events.



**MJO** activity is coming through the filtering over the West Pacific in the velocity potential field.

**Low frequency** contours over the West Pacific have disappeared as of late November as the intraseasonal signal became more dominant.

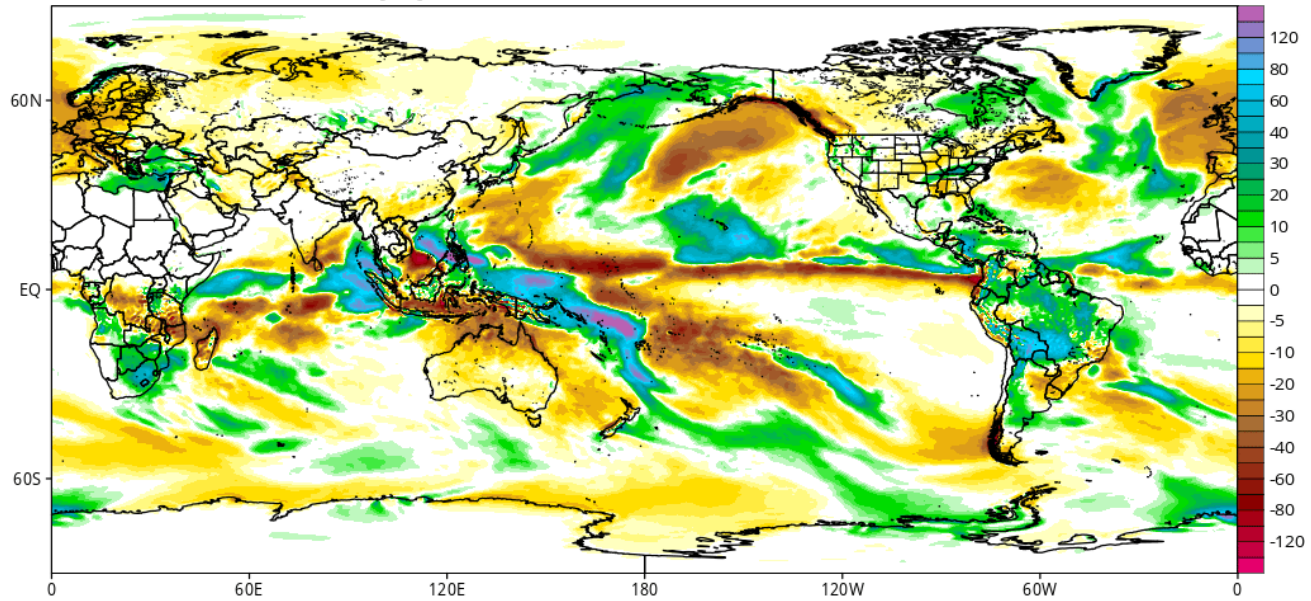
The **MJO** is forecast to continue its eastward propagation in the GEFS.



GEFS Accumulated Precip. Anomaly (mm) from 00z15Dec2021 to 00z22Dec2021 (Days 2-8)

Init: 00z Dec 14 2021 Forecast Hour: [192] valid at 00z Wed, Dec 22 2021

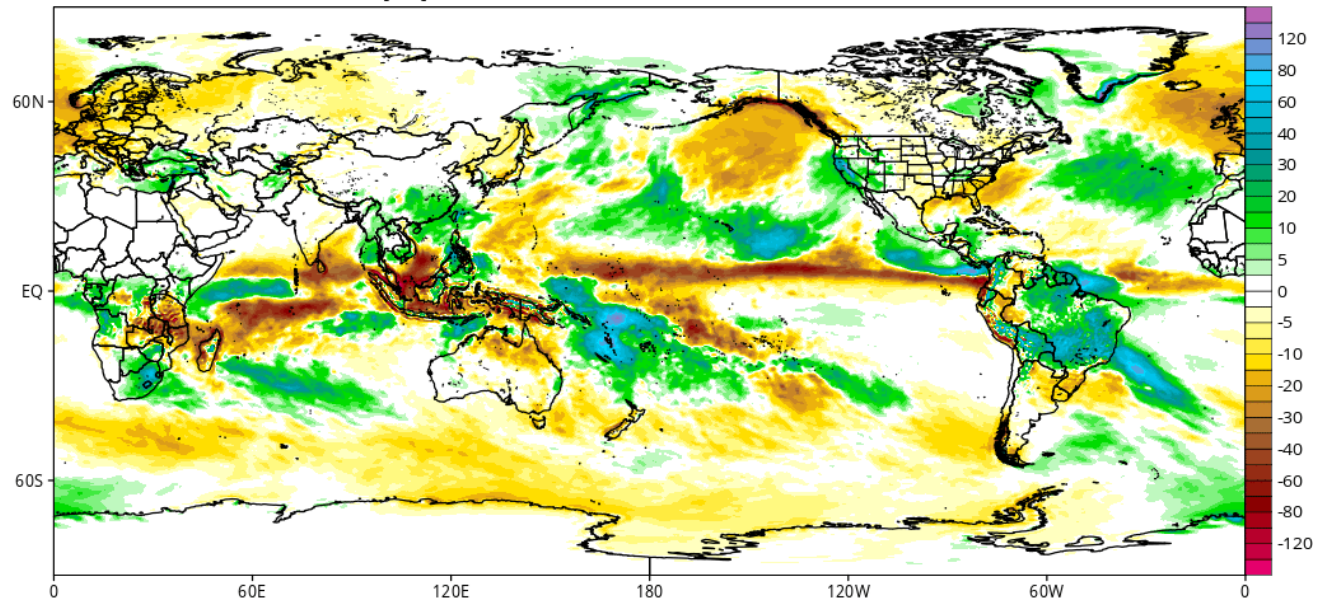
TROPICALTIDBITS.COM



GEFS Accumulated Precip. Anomaly (mm) from 00z22Dec2021 to 00z29Dec2021 (Days 9-15)

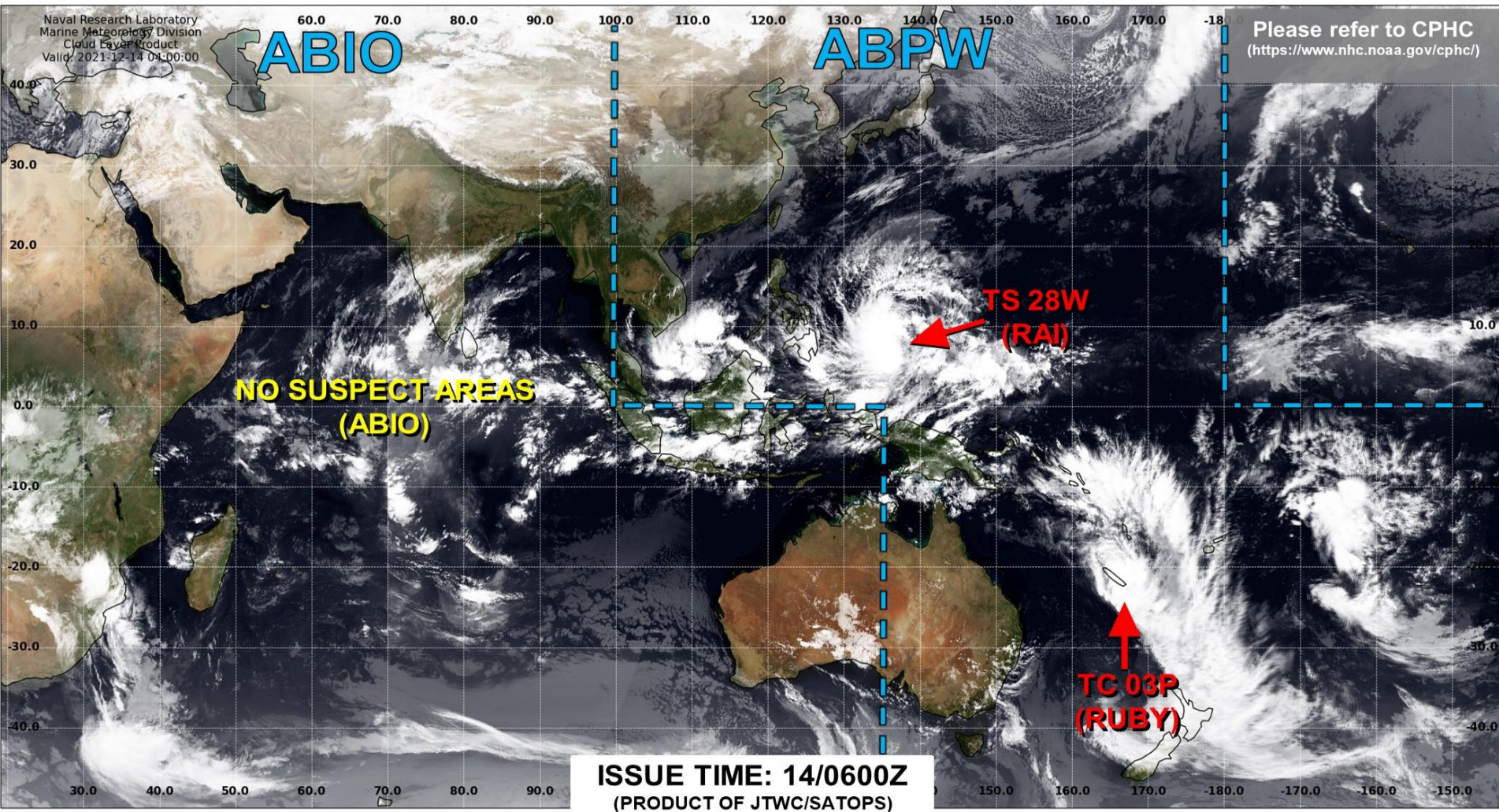
Init: 00z Dec 14 2021 Forecast Hour: [360] valid at 00z Wed, Dec 29 2021

TROPICALTIDBITS.COM





# JOINT TYPHOON WARNING CENTER



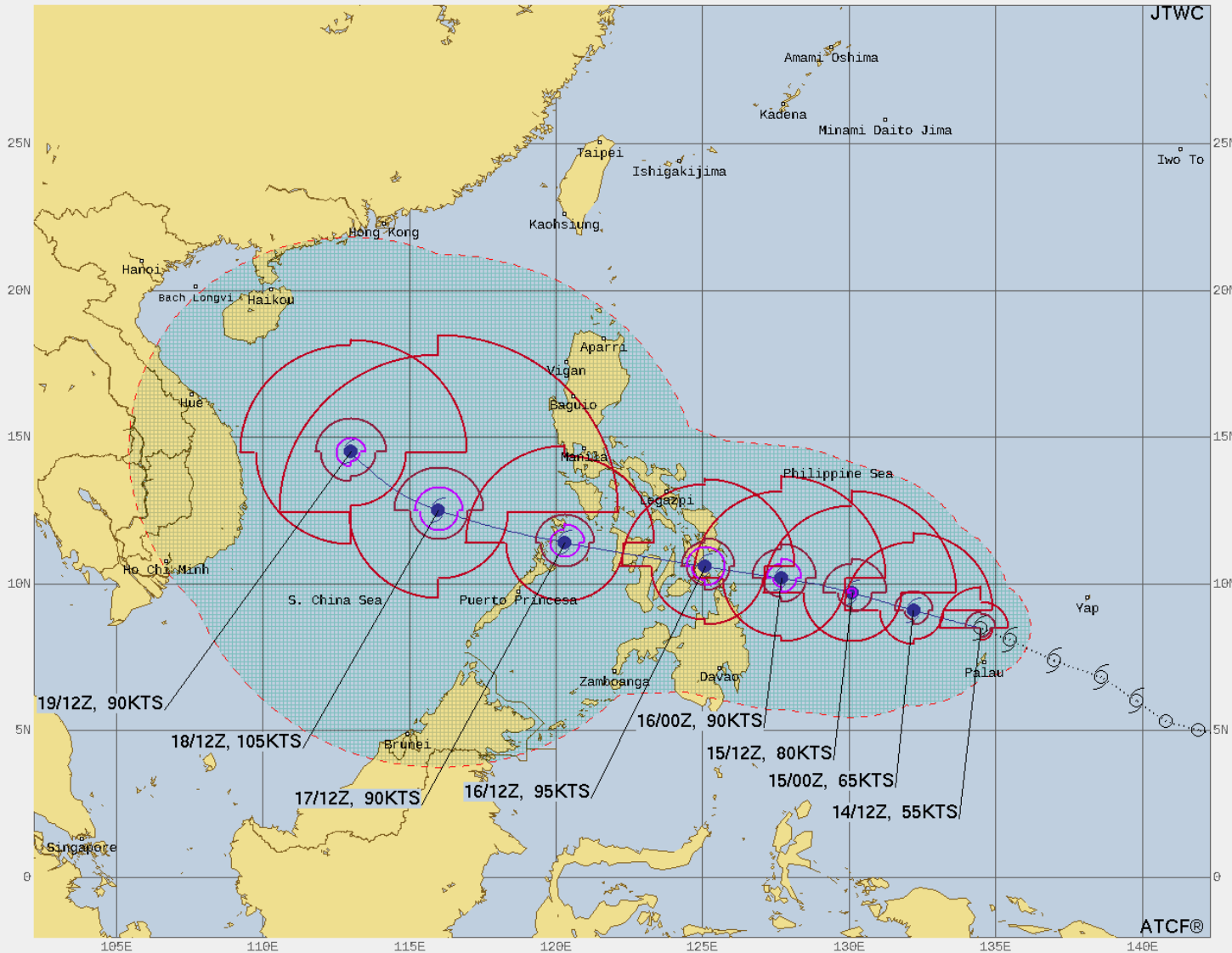
**LOW** TC development unlikely within 24 hours

**MEDIUM** TC development likely, but expected to occur beyond 24 hours

**HIGH** TC development likely within 24 hours (Reference TCFA)

**SUB TROPICAL** Monitoring for potential transition to TC. Invest label color denotes tropical transition probability





**TROPICAL STORM 28W (RAI) WARNING #7**  
 WTPN31 PGTW 141500  
 141200Z POSIT: NEAR 8.5N 134.5E  
 MOVING 290 DEGREES TRUE AT 11 KNOTS  
 MAXIMUM SIGNIFICANT WAVE HEIGHT: 15 FEET

14/12Z, WINDS 055 KTS, GUSTS TO 070 KTS
15/00Z, WINDS 065 KTS, GUSTS TO 080 KTS
15/12Z, WINDS 080 KTS, GUSTS TO 100 KTS
16/00Z, WINDS 090 KTS, GUSTS TO 110 KTS
16/12Z, WINDS 095 KTS, GUSTS TO 115 KTS
17/12Z, WINDS 090 KTS, GUSTS TO 110 KTS
18/12Z, WINDS 105 KTS, GUSTS TO 130 KTS
19/12Z, WINDS 090 KTS, GUSTS TO 110 KTS

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CPA TO:	NM	DTG
SONSOROL	222	12/14/20Z
TOBI	370	12/14/22Z
DAVAO	203	12/16/07Z
ZAMBOANGA	247	12/16/23Z
MANILA	196	12/17/12Z
CLARK_AB	227	12/17/15Z
SUBIC_BAY	198	12/17/16Z
PUERTO_PRINCESA	119	12/17/18Z
DA_NANG	287	12/19/12Z

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BEARING AND DISTANCE	DIR	DIST (NM)	TAU (HRS)
ANGAUR	011	98	0
FAIS	258	364	0
KAYANGEL	334	27	0
KORUR	005	72	0
NGULU	274	178	0
SONSOROL	035	236	0
SOROL	273	351	0
TOBI	031	384	0
ULITHI	255	314	0
YAP	255	222	0

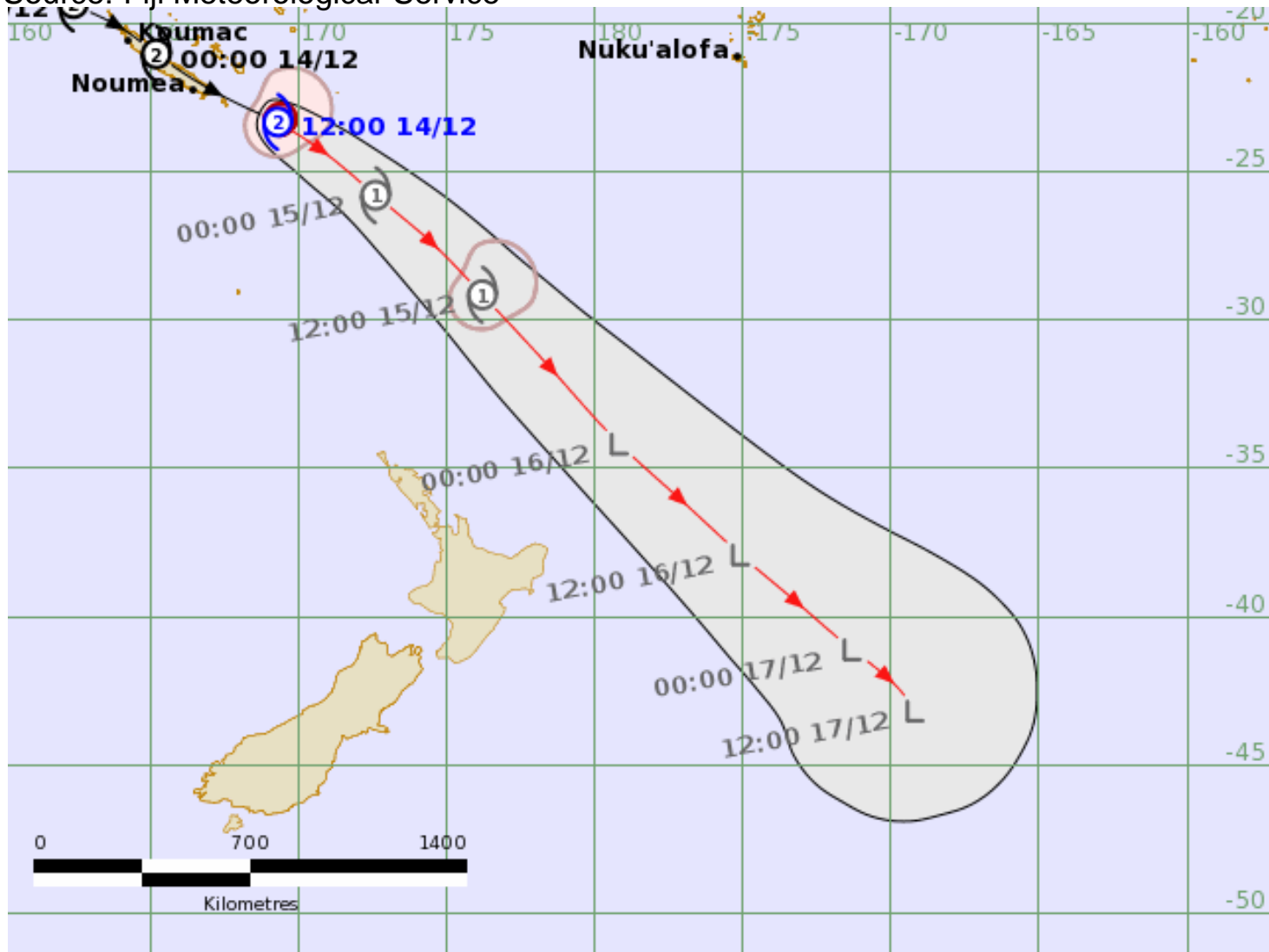
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**LEGEND:**

- ○ ○ ○ ○ LESS THAN 34 KNOTS
- ○ ○ ○ 34-63 KNOTS
- ● ● ● MORE THAN 63 KNOTS
- FORECAST CYCLONE TRACK
- PAST CYCLONE TRACK
- DENOTES 34 KNOT WIND DANGER AREA/USN SHIP AVOIDANCE AREA
- ○ ○ ○ ○ FORECAST 34/50/64 KNOT WIND RADII (WINDS VALID OVER OPEN OCEAN ONLY)

Tropical Storm Rai is forecast to impact the Philippines at typhoon strength, and then re-emerge over the South China Sea, possibly tracking near southeast China.

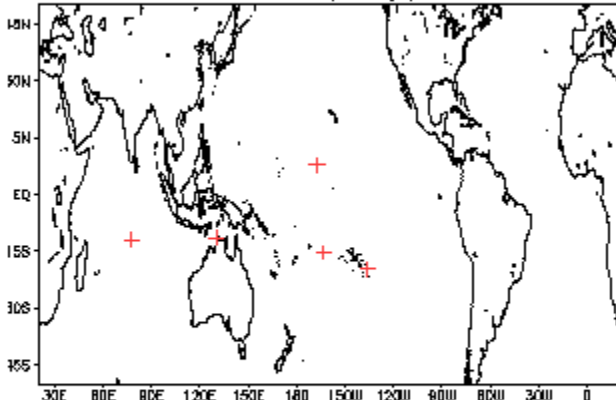
Source: Fiji Meteorological Service



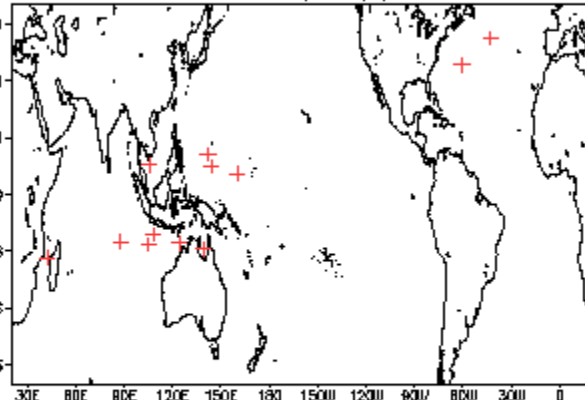
Cyclone Ruby impacted New Caledonia as a 60-knot system, and is forecast to continue to track southeastward and weaken, remaining east of New Zealand.

# December Tropical Storm Formation by MJO phase

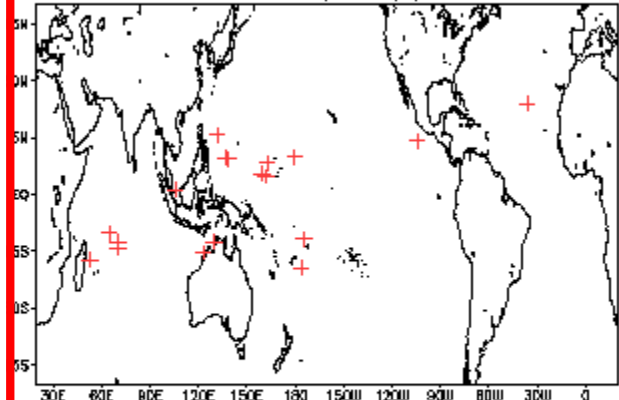
Phase 1 (48 days) 7 storms



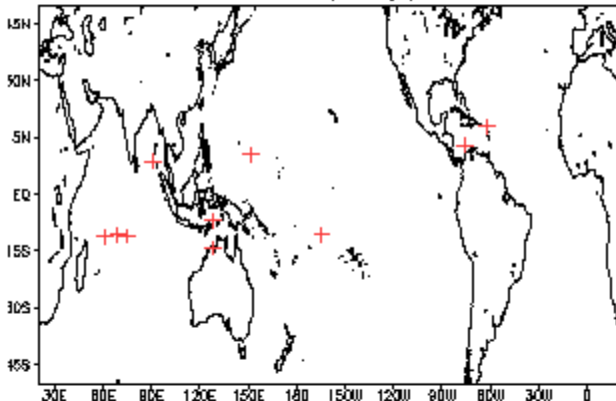
Phase 4 (72 days) 13 storms



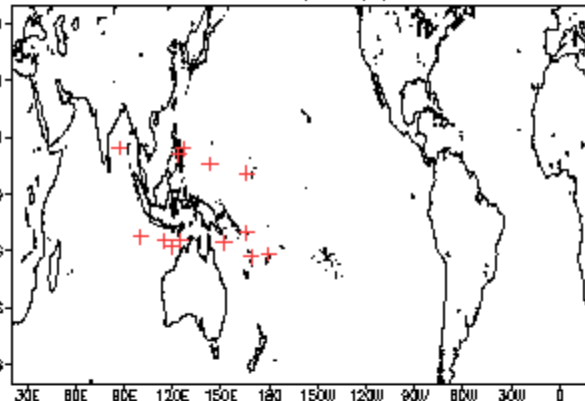
Phase 7 (103 days) 19 storms



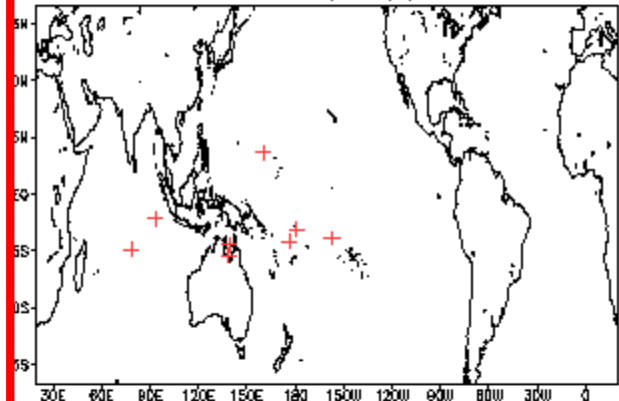
Phase 2 (67 days) 11 storms



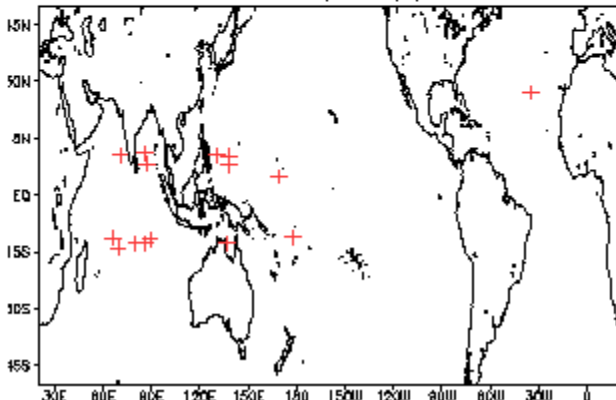
Phase 5 (73 days) 14 storms



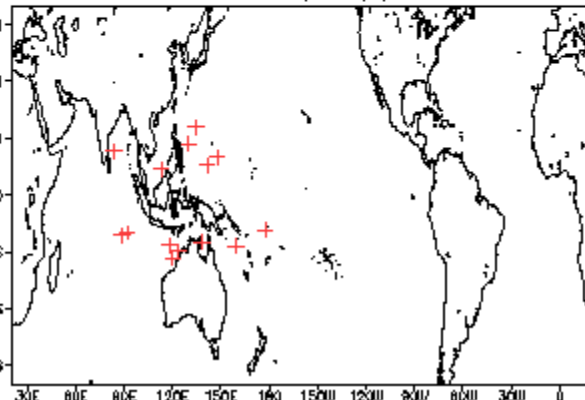
Phase 8 (76 days) 9 storms



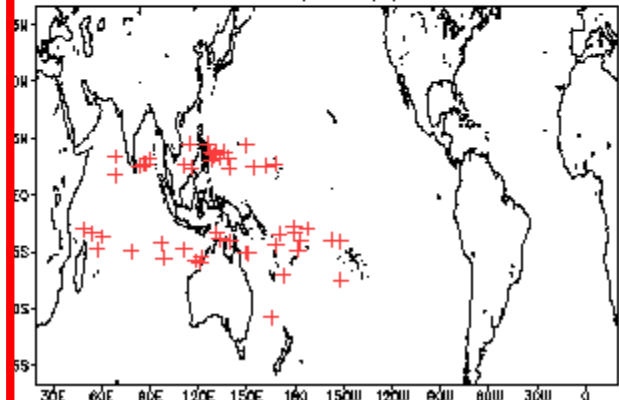
Phase 3 (101 days) 16 storms



Phase 6 (69 days) 15 storms



Null (416 days) 52 storms



Storm Track Density Distribution, IC=20211213  
 Week 1 Forecast: 1215-1221

TRACK DENSITY

FILTERED

CFS

CFS



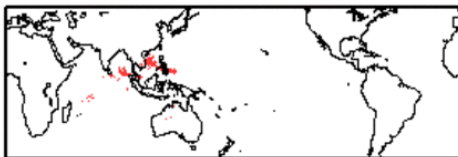
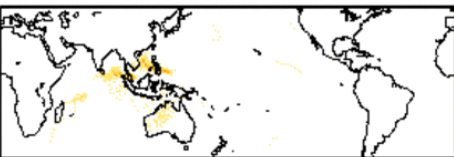
GEFS

GEFS



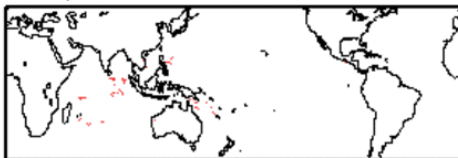
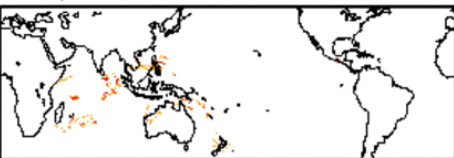
ECMWF

ECMWF



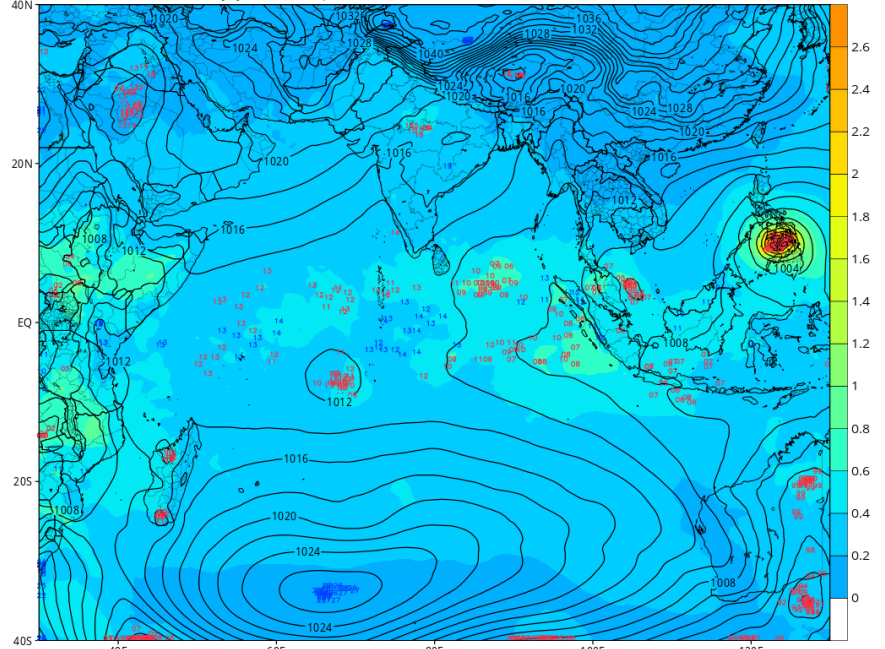
ECCC, IC=20211209

ECCC, IC=20211209

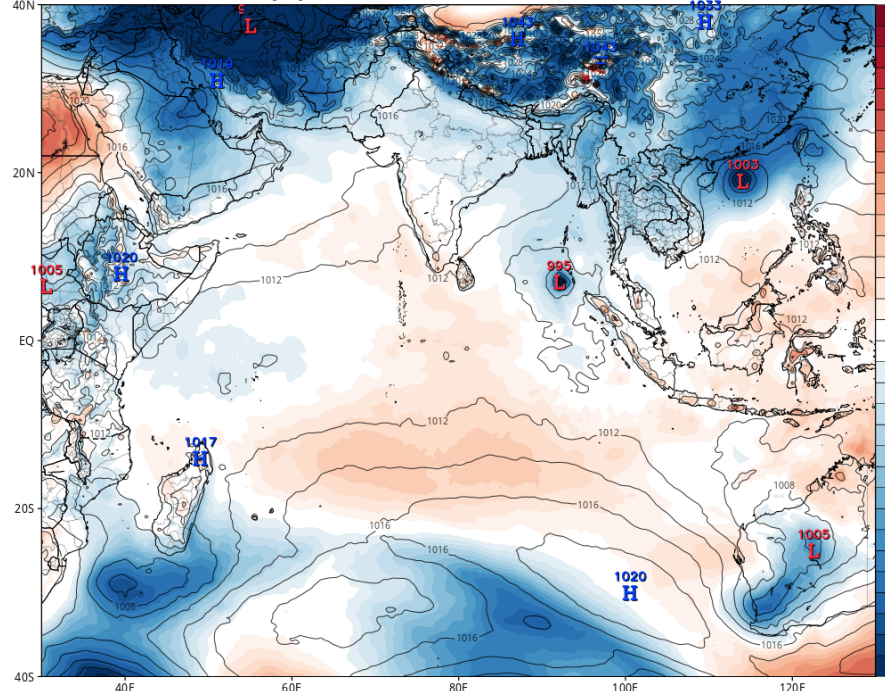


- Potential tropical cyclone development near Malaysia/Southern Thailand (GEFS), or further west over the Bay of Bengal (ECMWF).
- Both models converge on a track near the Andoman and Nicobar Islands.

GEFS Mean MSLP (mb), Ensemble Member Pressure Centers (Lows: red | High: blue), & Normalized Spread (σ)



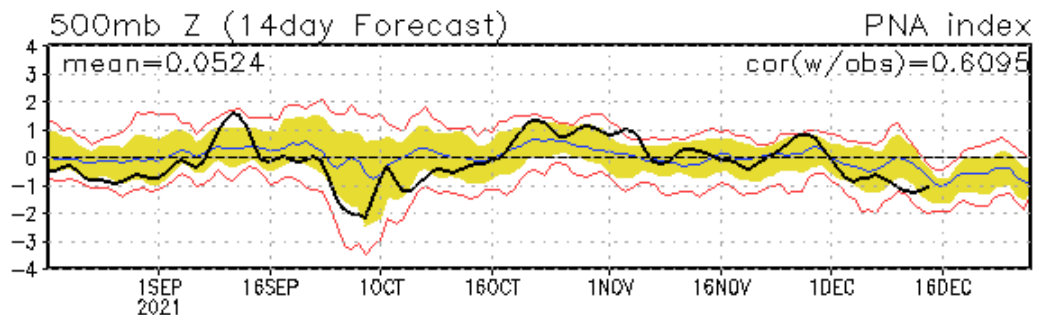
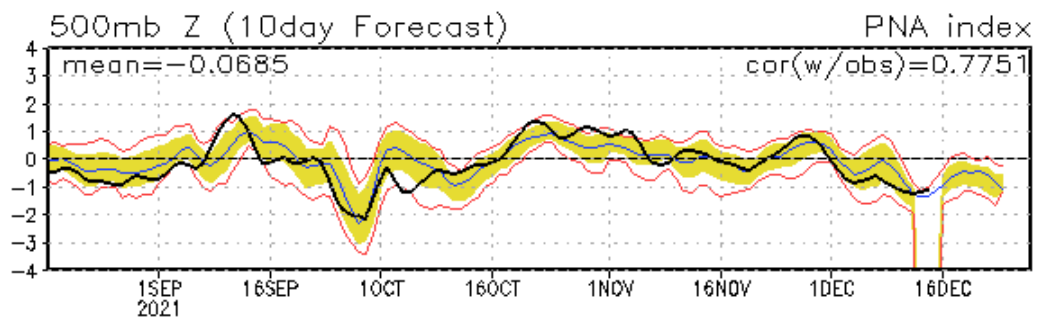
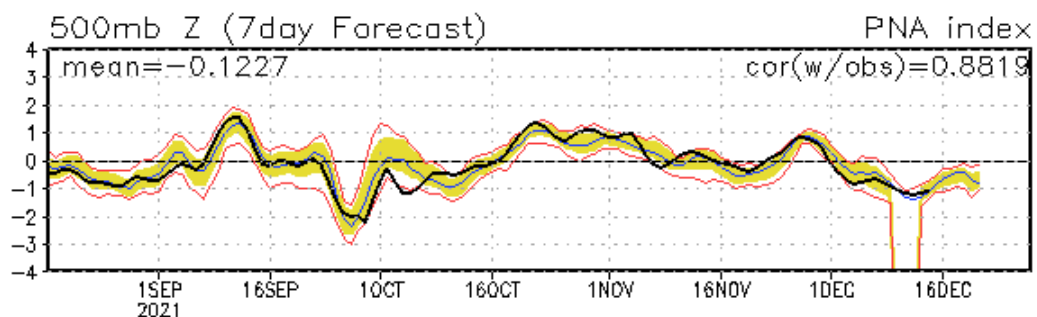
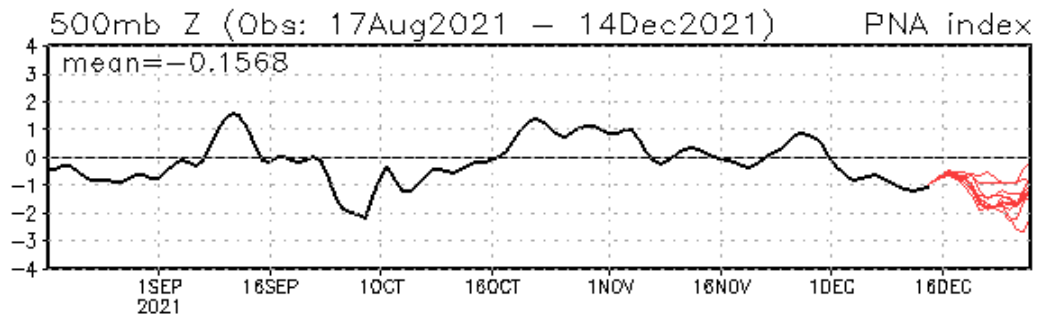
ECMWF MSLP and Anomaly (hPa) (based on CFSR 1981-2010 Climatology)



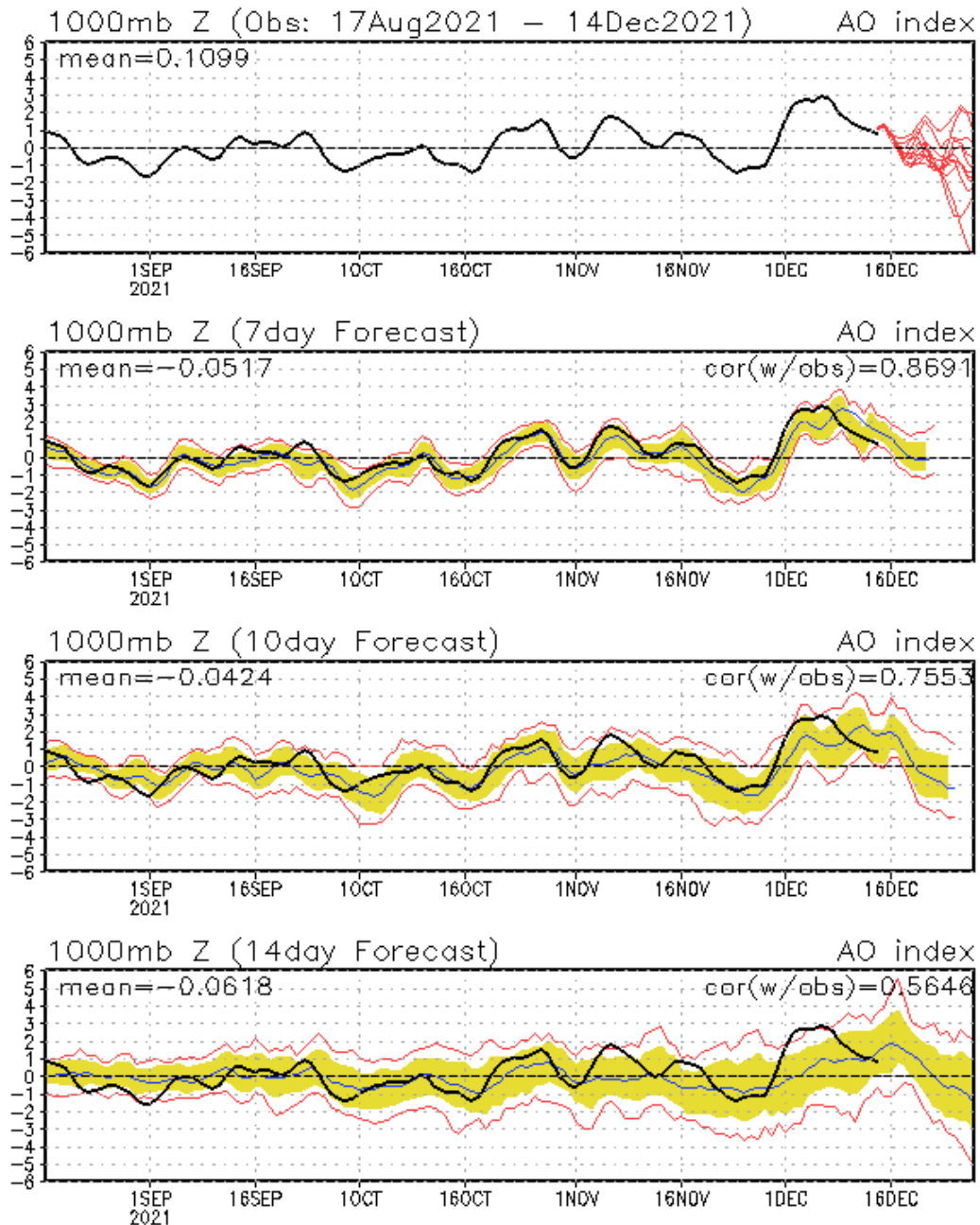
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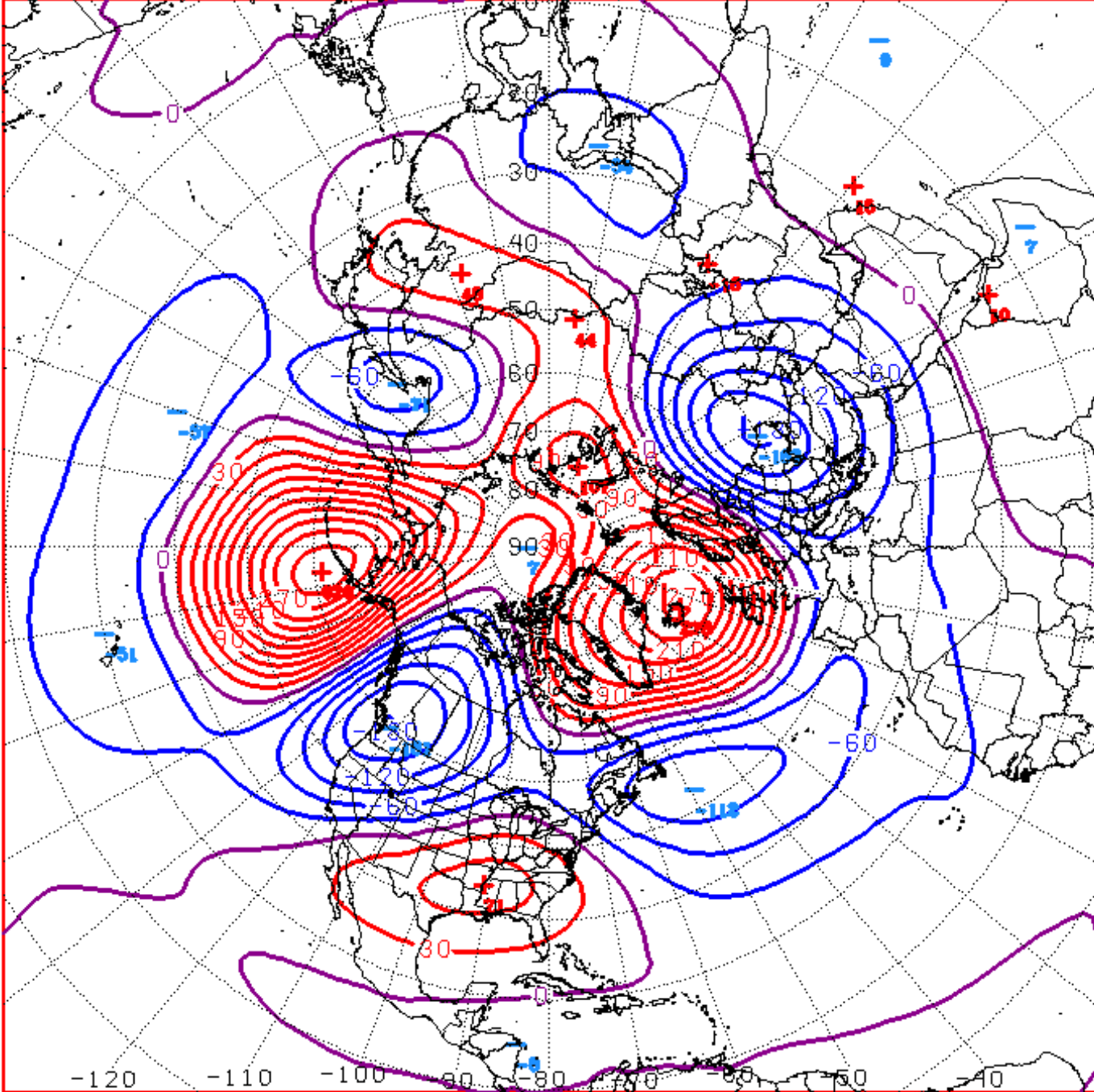


## PNA: Observed & ENSM forecasts



## AO: Observed & ENSM forecasts





D+11 500 MB ANOMALIES FROM ALZ ENSM  
 CPC MAP MADE DEC 14 2021 1357 UTC CNTD DEC 25 2021

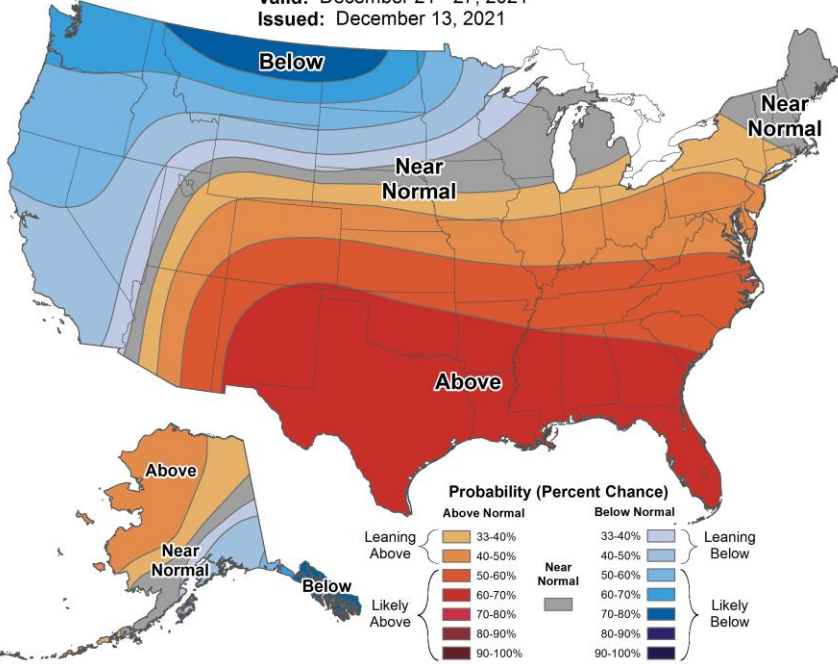
# Week 2 – Temperature and Precipitation



## 8-14 Day Temperature Outlook



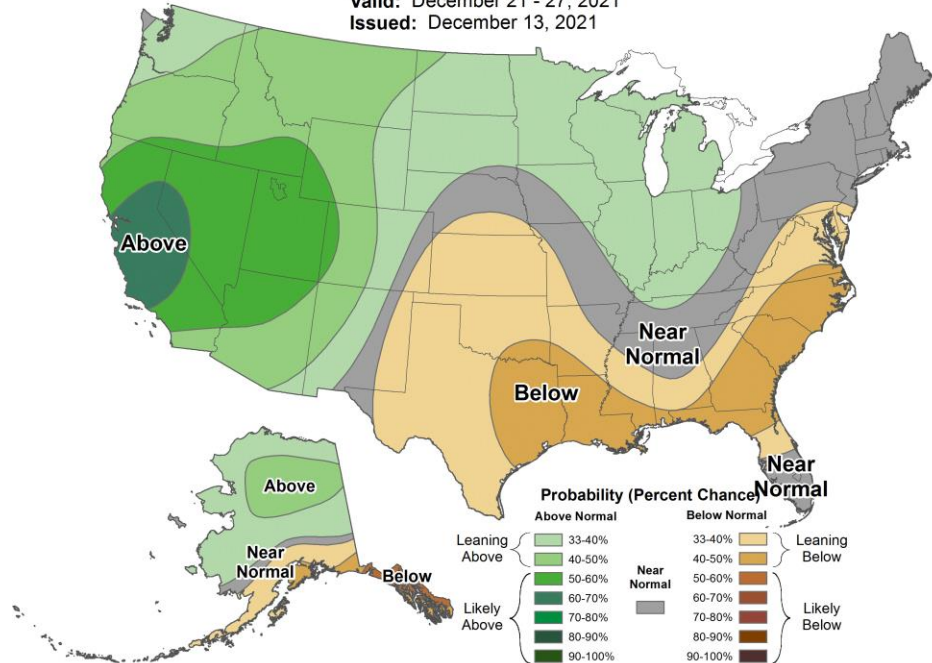
Valid: December 21 - 27, 2021  
 Issued: December 13, 2021



## 8-14 Day Precipitation Outlook



Valid: December 21 - 27, 2021  
 Issued: December 13, 2021



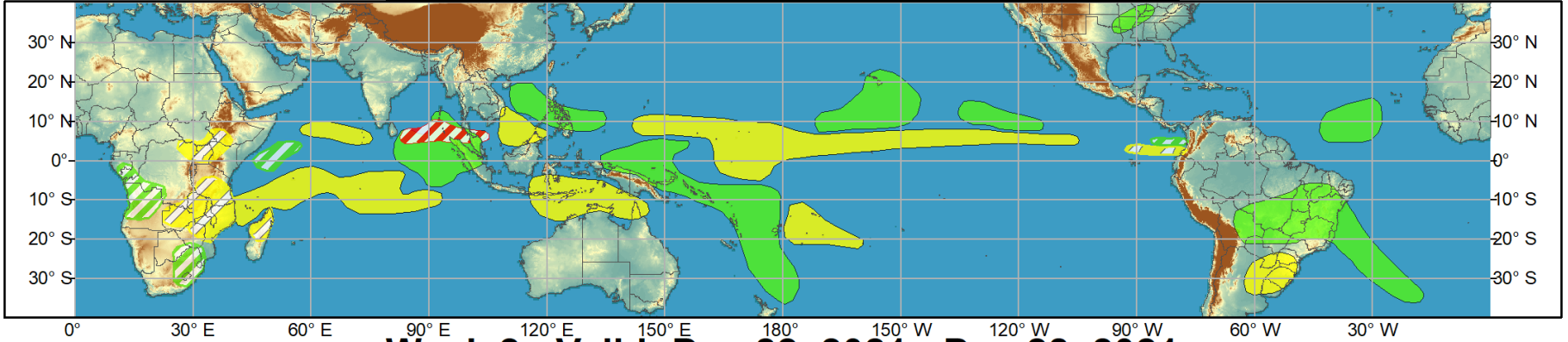
Since we are in an amplified, stable pattern today's outlooks are likely to be similar.



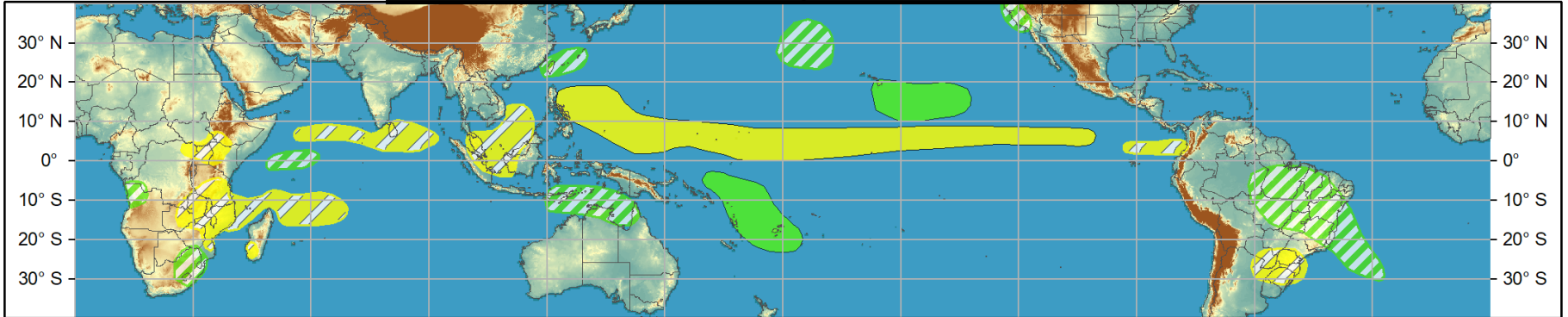
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