



# Weeks 2-3 Global Tropics Hazards Outlook

12/31/2024

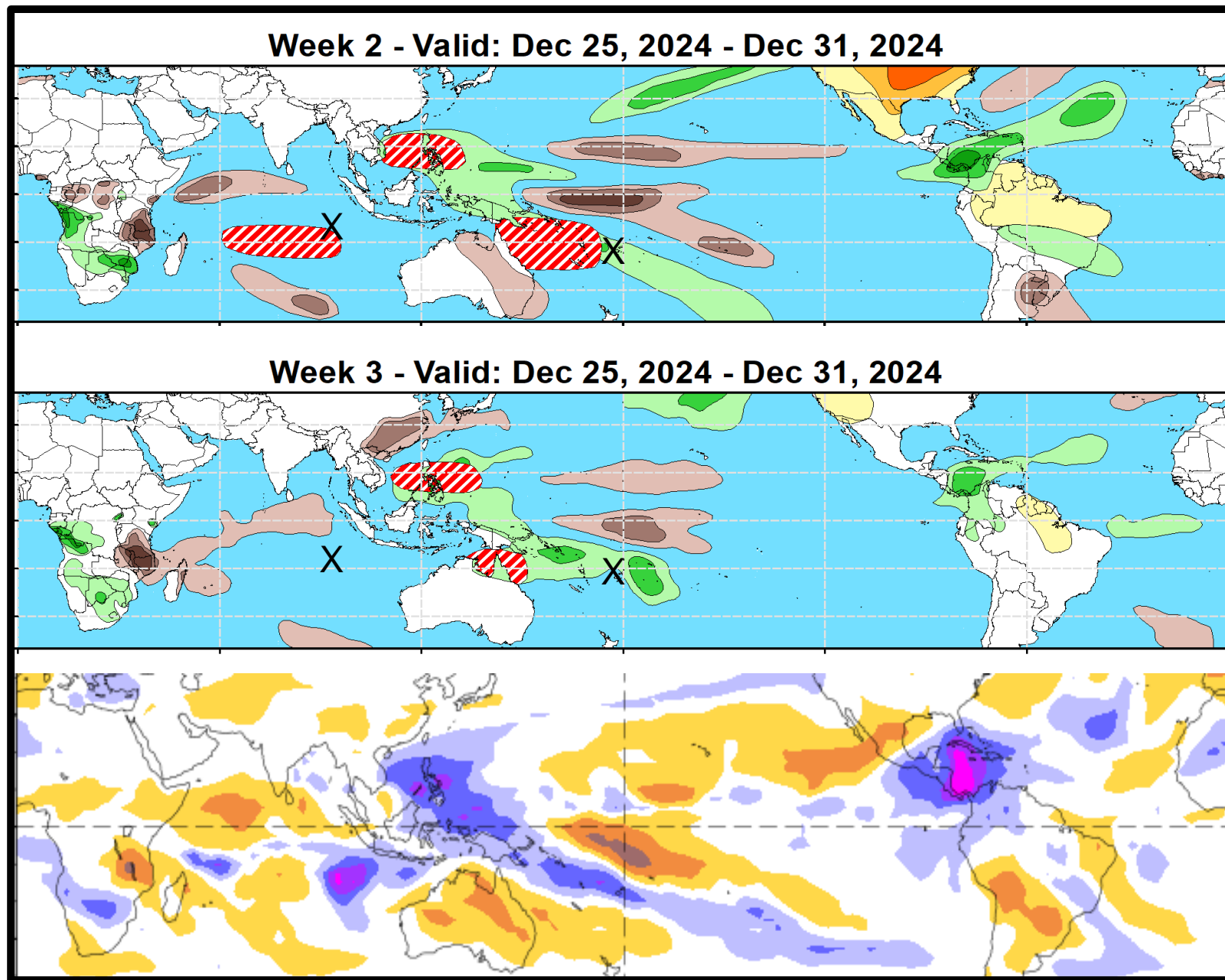
Nick Novella

NWS / NCEP / Climate Prediction Center



# Outlook Review: TC development & anomalous precipitation during the past week

- SIO: TC Five
- SPAC: TC Six



# Synopsis of Climate Modes:

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**ENSO:** (Dec 12, 2024 Update)      *next update on Thursday, Jan 9<sup>th</sup>*

- ENSO Alert System Status: [La Niña Watch](#)
- La Niña conditions are most likely to emerge in November 2024 - January 2025 (59% chance), with a transition to ENSO-neutral most likely by March-May 2025 (61% chance).

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

- The MJO remains active, and has slowly propagated from the Maritime Continent into the western Pacific during the past month.
- RMM forecasts generally favor continued eastward propagation of the MJO across the Western Hemisphere and reaching the Indian Ocean towards the middle of January. Due to destructive interference with emerging low frequency variability (i.e. La Nina, -IOD), this results in added uncertainty in the outlook
- Tied to the MJO, there remains support for tropical cyclogenesis in the Indian Ocean and South Pacific, with increasing confidence for an extratropical cold response over North America, producing in an Arctic air outbreak mainly over the central and eastern CONUS.

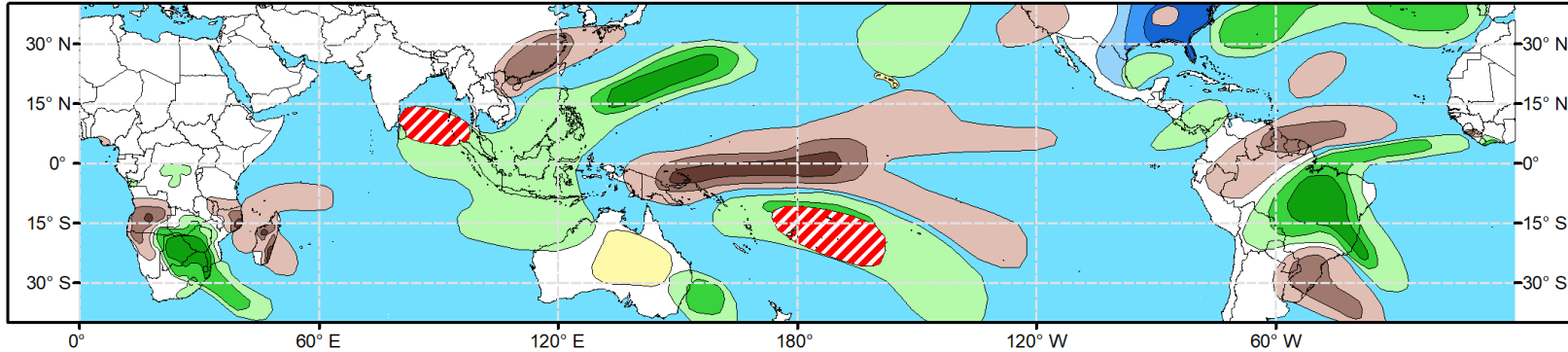
# GTH Outlook:



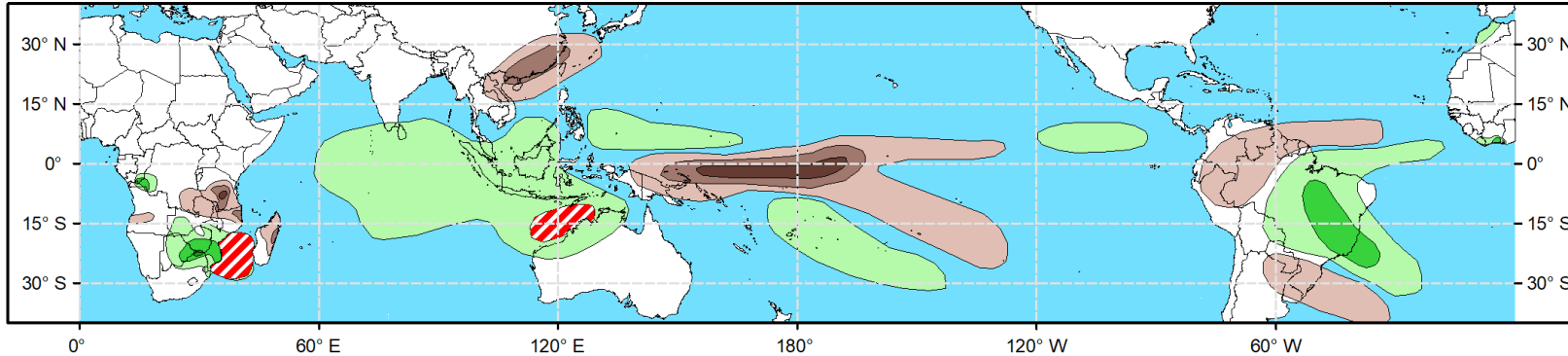
## Global Tropics Hazards Outlook Climate Prediction Center



**Week 2 - Valid: Jan 08, 2025 - Jan 14, 2025**



**Week 3 - Valid: Jan 15, 2025 - Jan 21, 2025**



**Tropical Cyclone (TC)  
Formation Probability**



>20% >40% >60%

*Tropical Depression (TD)  
or greater strength*

**Above-Average  
Rainfall Probability**



>50% >65% >80%

*Weekly total rainfall in the  
Upper third of the historical range*

**Below-Average  
Rainfall Probability**



>50% >65% >80%

*Weekly total rainfall in the  
Lower third of the historical range*

**Above-Average  
Temperatures Probability**



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*7-day max temperatures in the  
Upper third of the historical range*

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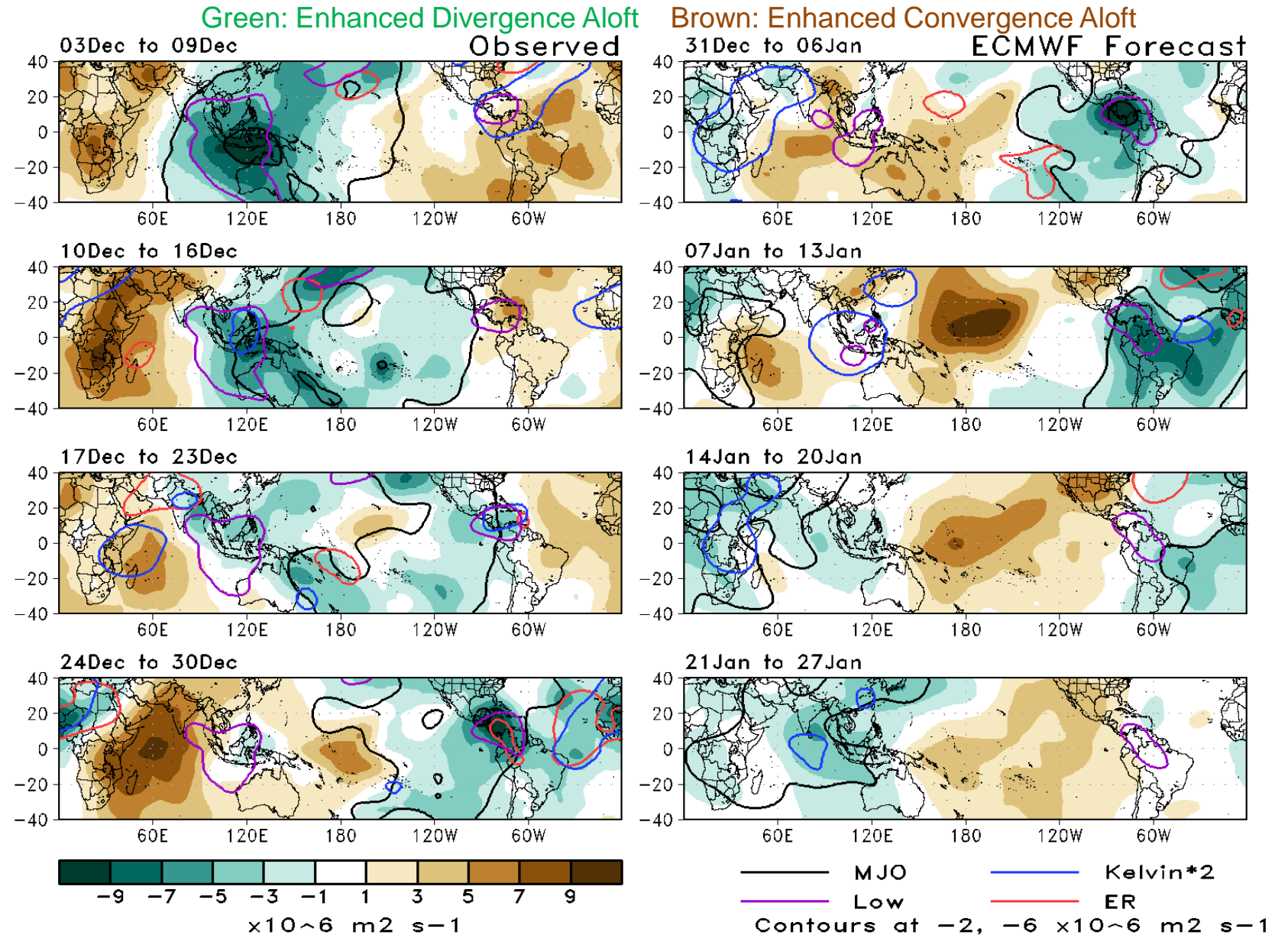
**Issued: 12/31/2024**

**Forecaster: Novella**

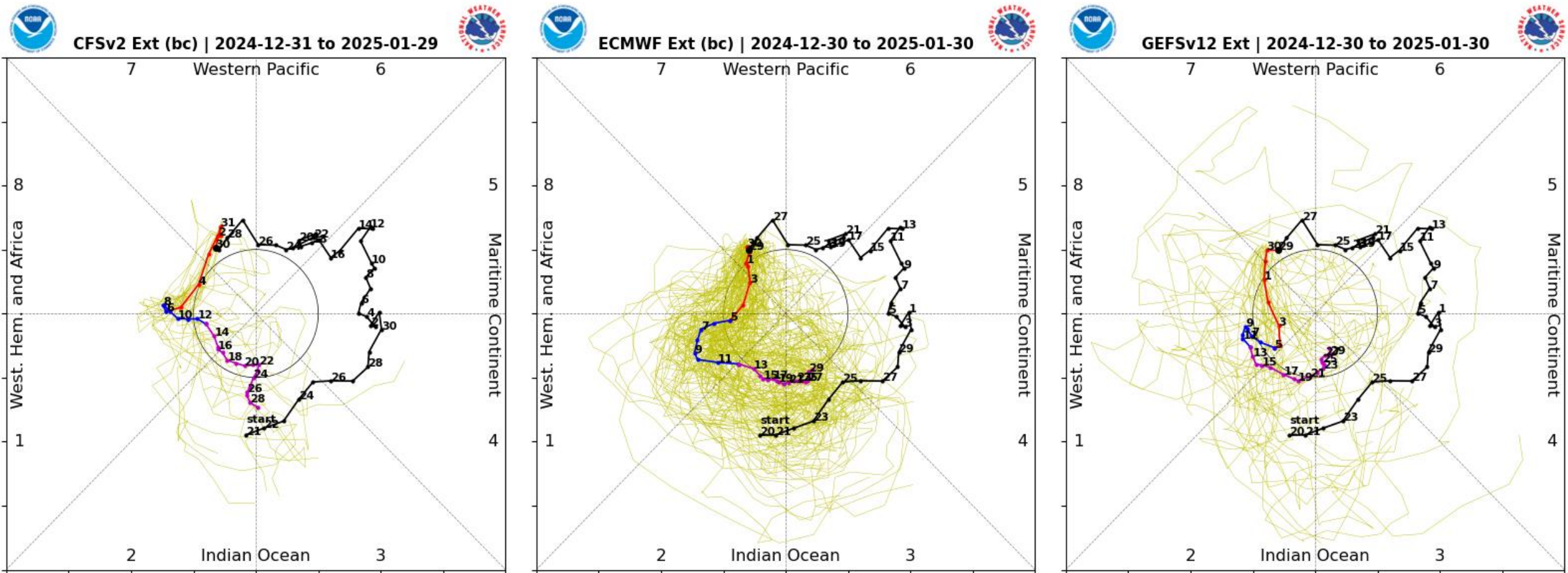
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# 200-hPa Velocity Potential Anomaly Maps:

- A wave-1 pattern was observed for most of December before the enhanced **MJO** envelope separated from the **Low Frequency** enhanced envelope more recently.
- A more disorganized pattern is forecast as the **MJO** destructively interferes with **Low Frequency** modes (La Nina, -IOD), but is followed by the return of a more canonical wave-1 pattern later in January.

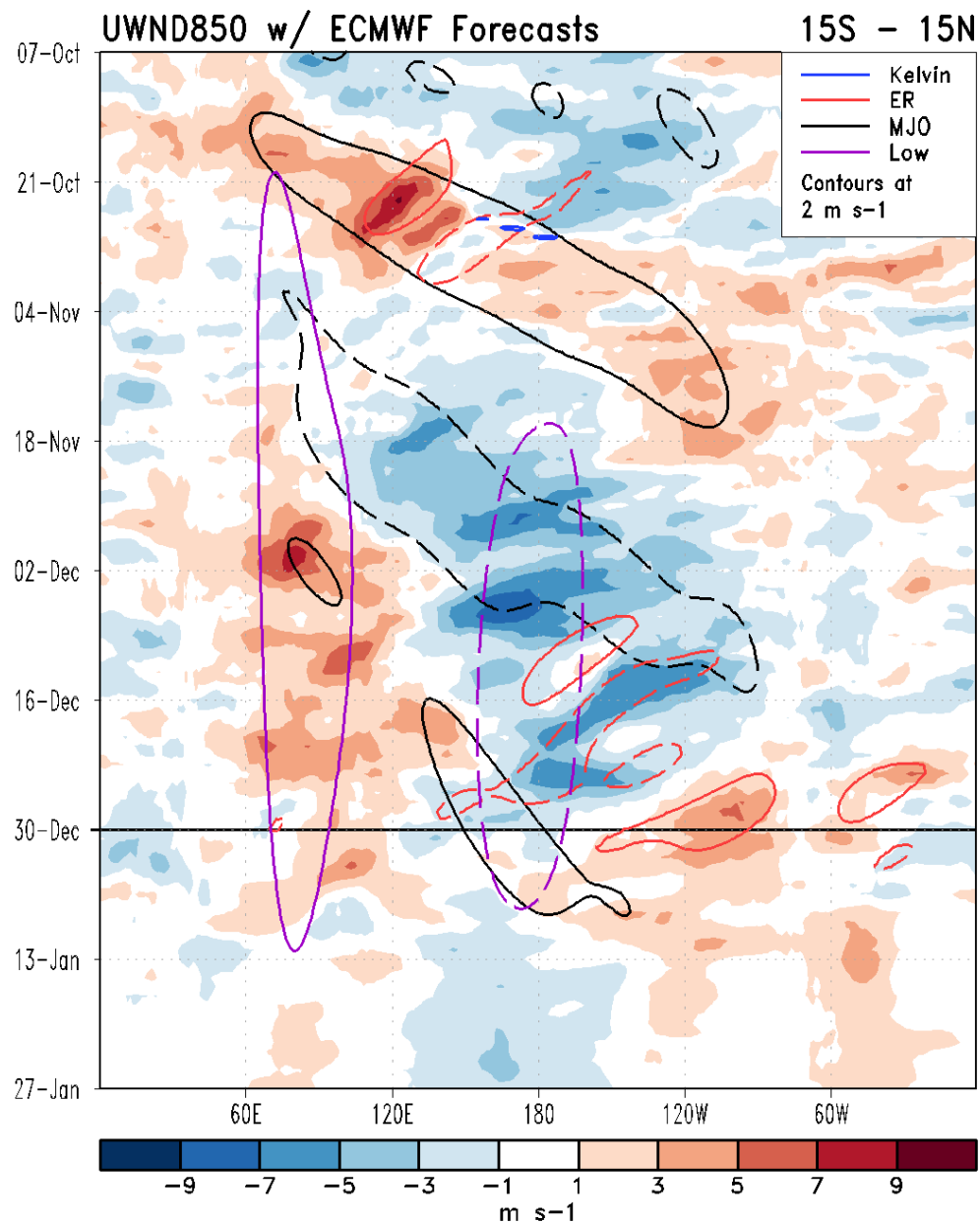
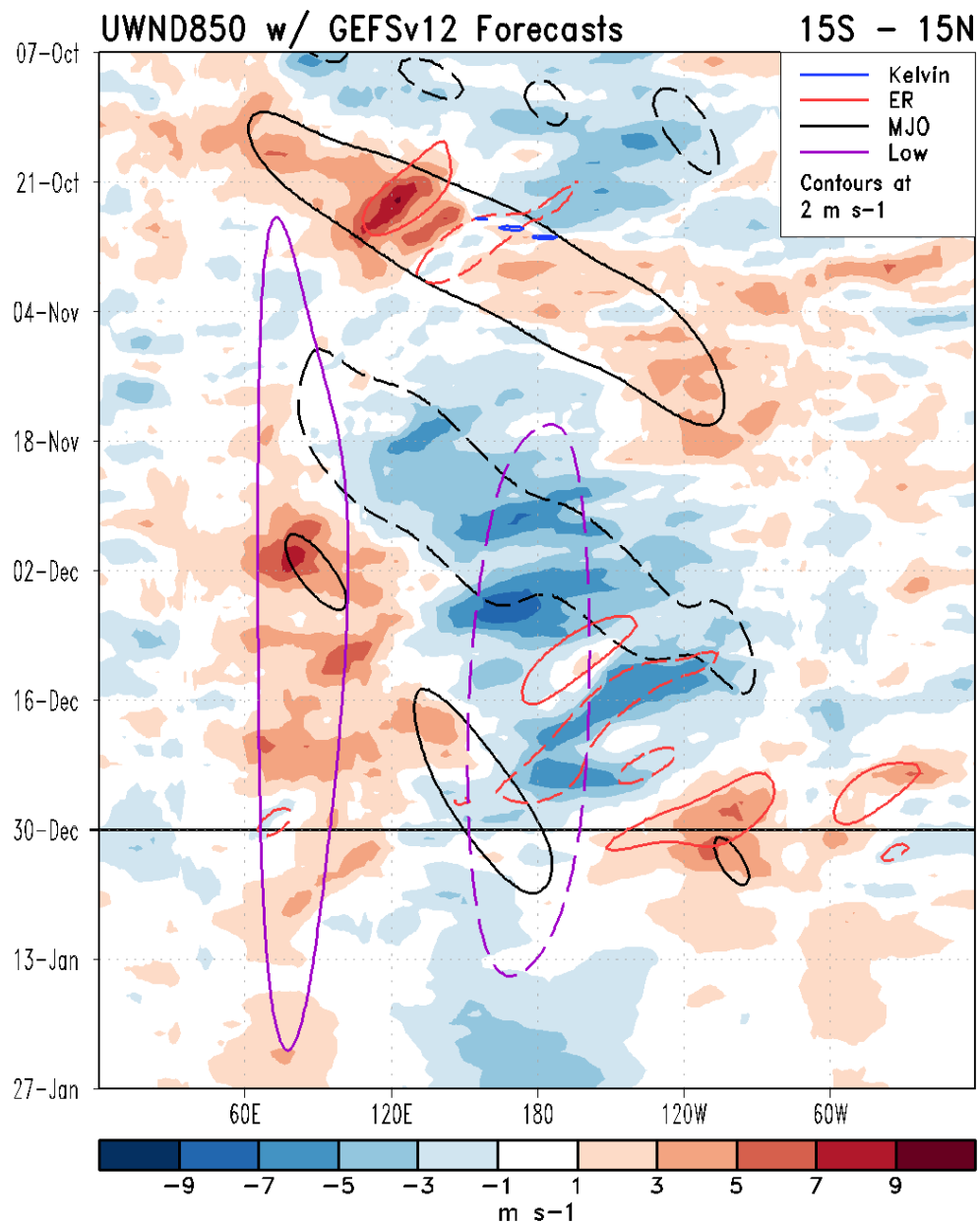


# RMM Index Observations & Forecasts:



- RMM forecasts have been consistent in propagating the MJO signal eastward across the Western Hemisphere and reaching the Indian Ocean towards the middle of January.
- The low amplitude forecast can be attributed to continued destructive interference with emerging low frequency variability, however several ensemble members point to a high amplitude event.

# Lower-Level Zonal Wind Anomaly Time/Lon Plots:

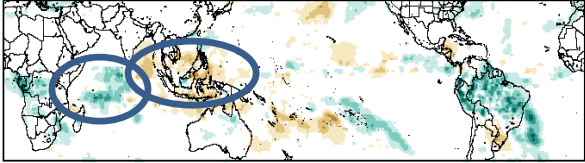


**Low Frequency** variability has become better established since late November, but looks to be interrupted by the **MJO** propagating eastward.

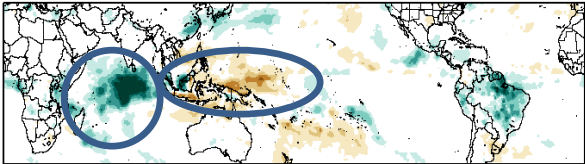
# Historical Precipitation Anomalies By MJO Phase and ENSO composite:

NDJ MJO Composite: GPCP1DD (mm/day)

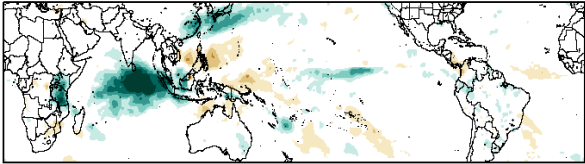
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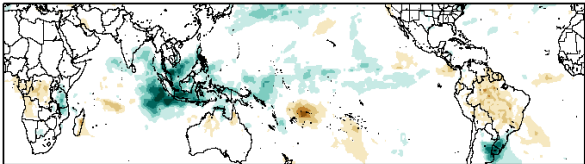
Phase 2



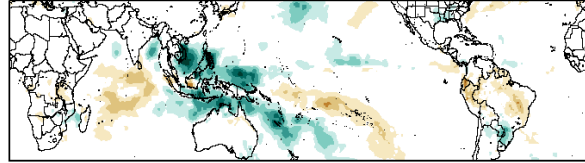
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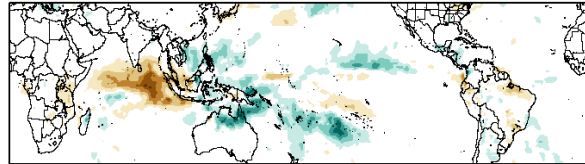
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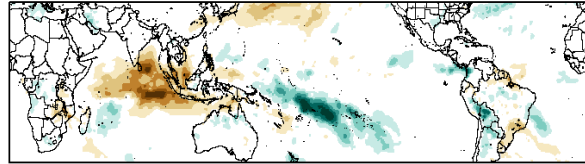
Phase 5



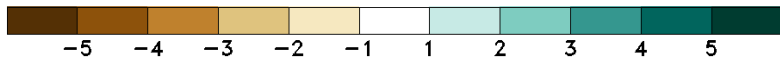
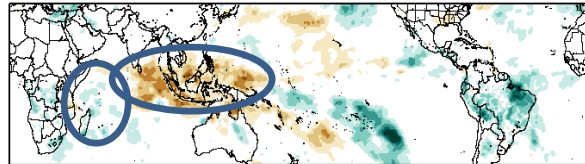
Phase 6



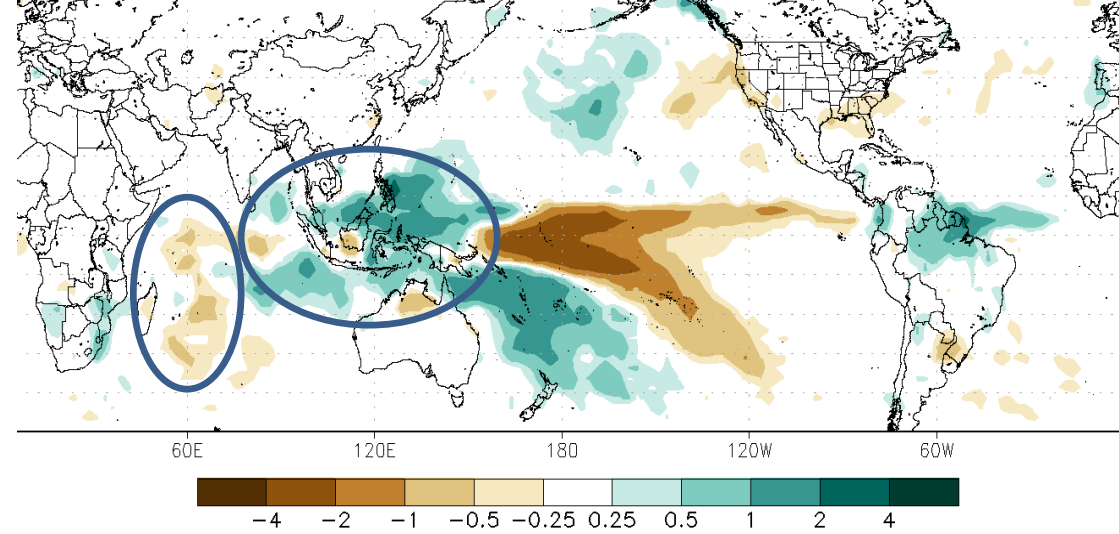
Phase 7



Phase 8



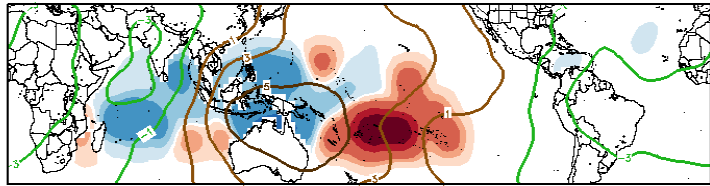
DJF La Nina Composite: GPCP (mm/day)



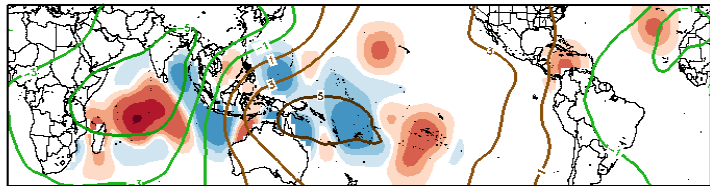


# Historical TC Origin Anomalies By MJO Phase & Weeks 2+3 Genesis Climo:

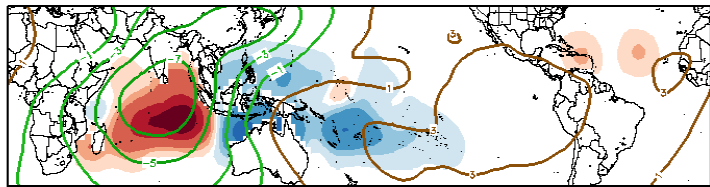
DJF MJO Composite: Mean TC Origin Density Anomaly ( $\#TCs/277km^2*100$ )  
w/ DJF CHI200 ( $\times 10^6 m^2 s^{-1}$ ) / Contours every  $2 \times 10^6 m^2 s^{-1}$



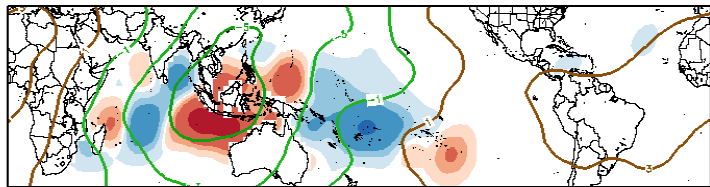
Phase 1



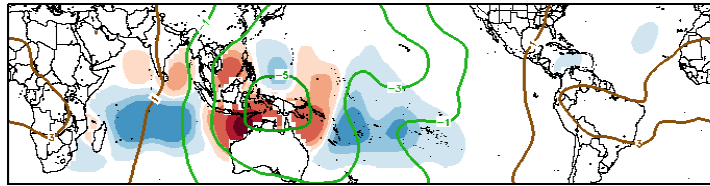
Phase 2



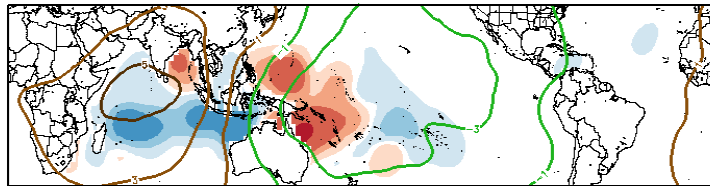
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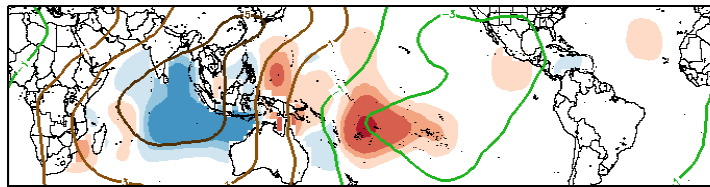
Phase 4



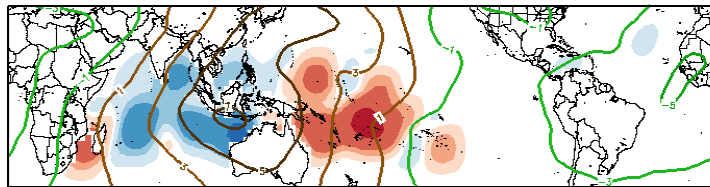
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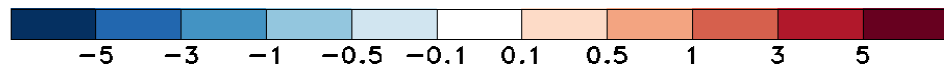
Phase 6



Phase 7



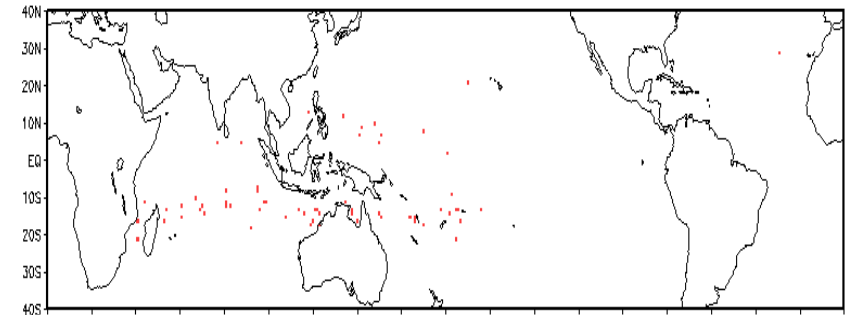
Phase 8



\*Experimental\*

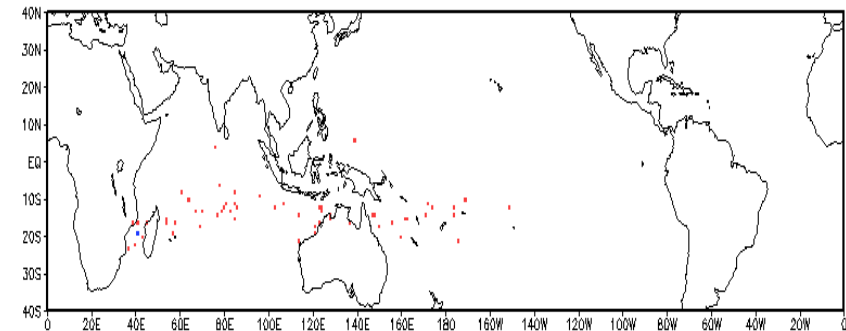
Observed TC Genesis, 1979–2021

7-day Period 0108 to 0114



Observed TC Genesis, 1979–2021

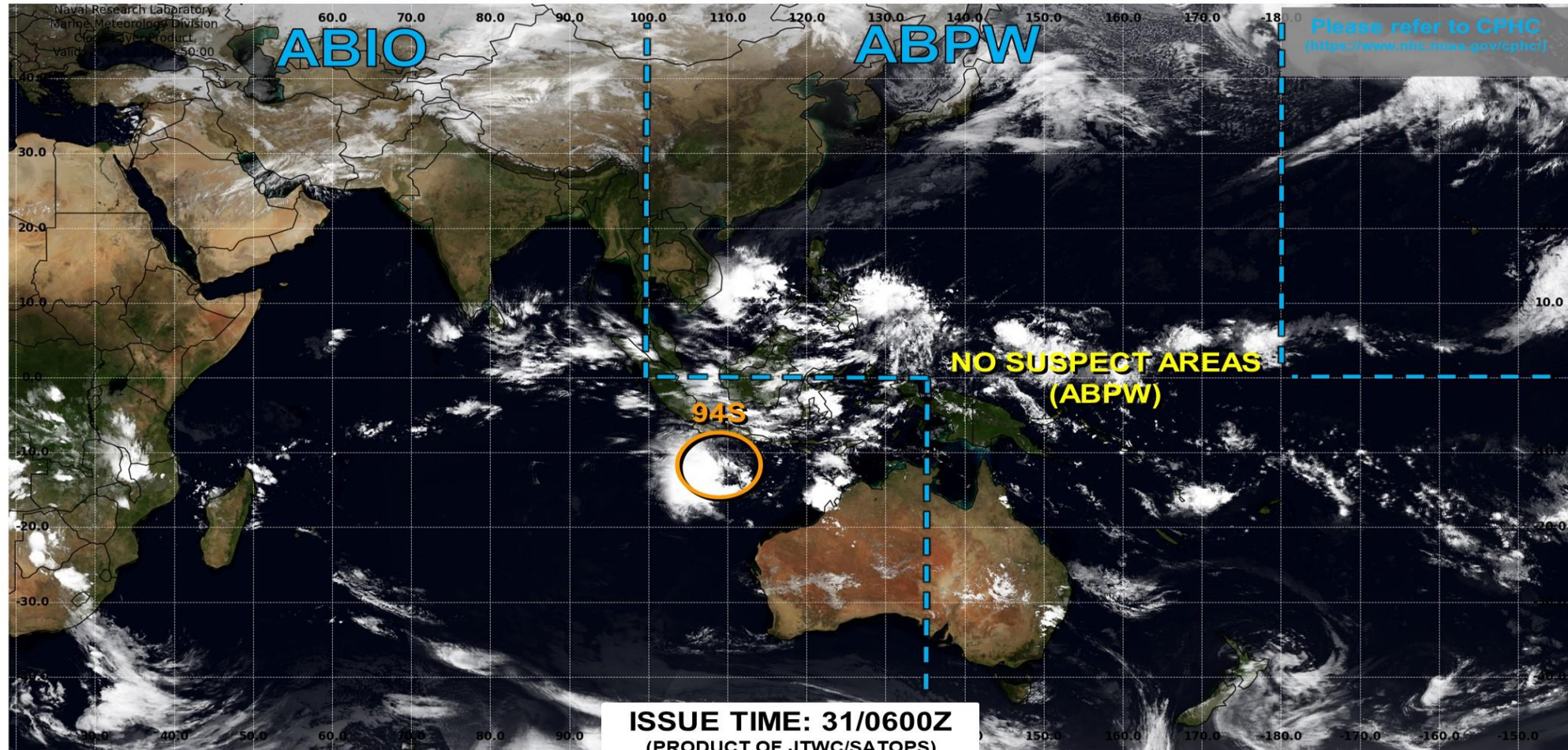
7-day Period 0115 to 0121



# Tropical Cyclone Monitoring/Forecast: JTWC



## JOINT TYPHOON WARNING CENTER



TC development unlikely  
within 24 hours



TC development likely, but  
expected to occur beyond  
24 hours



TC development likely within  
24 hours  
(Reference TCFA)



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

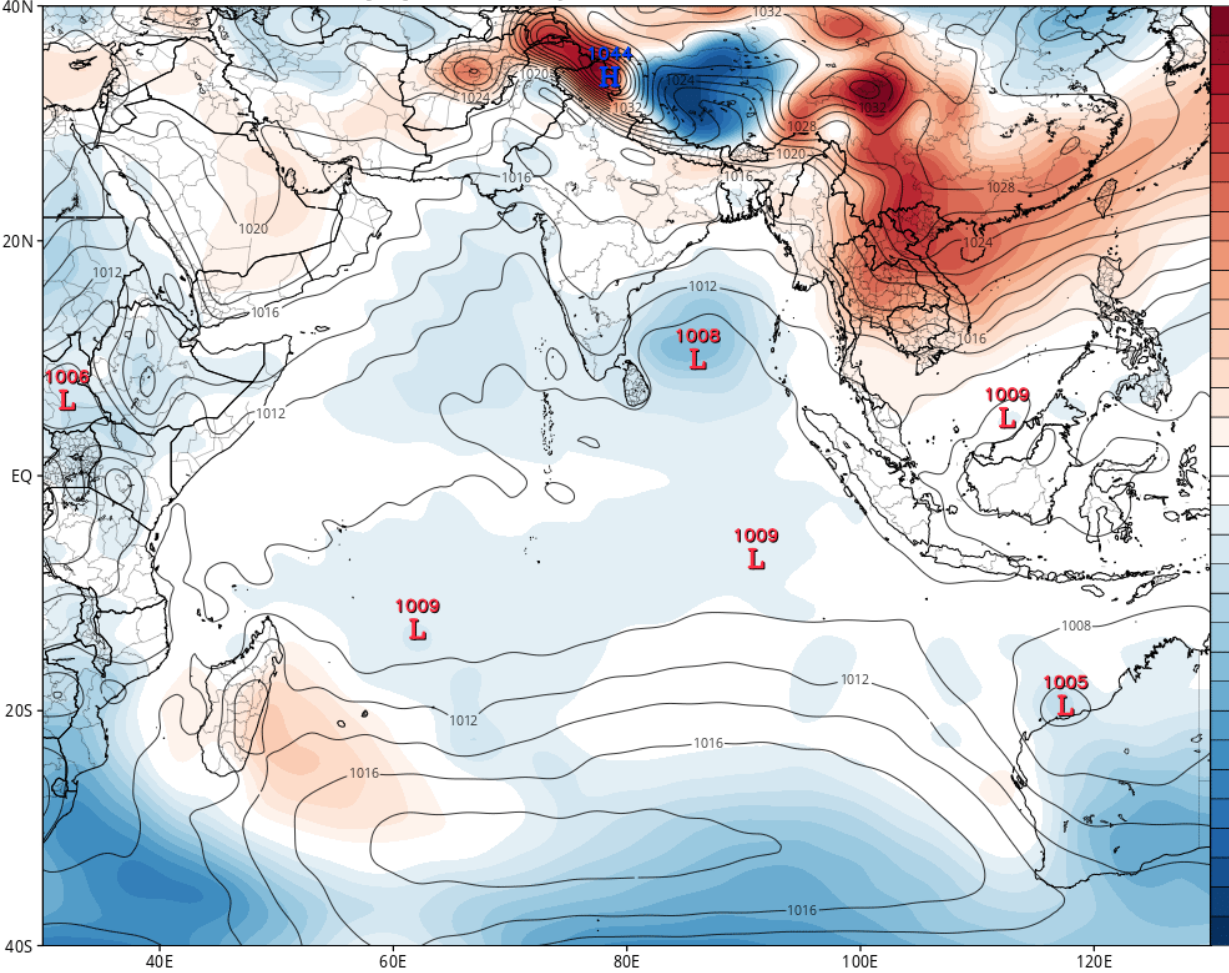


# TC Genesis Guidance: Week 2

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

Init: 12z Dec 31 2024 Forecast Hour: [252] valid at 00z Sat, Jan 11 2025

TROPICALTIDBITS.COM

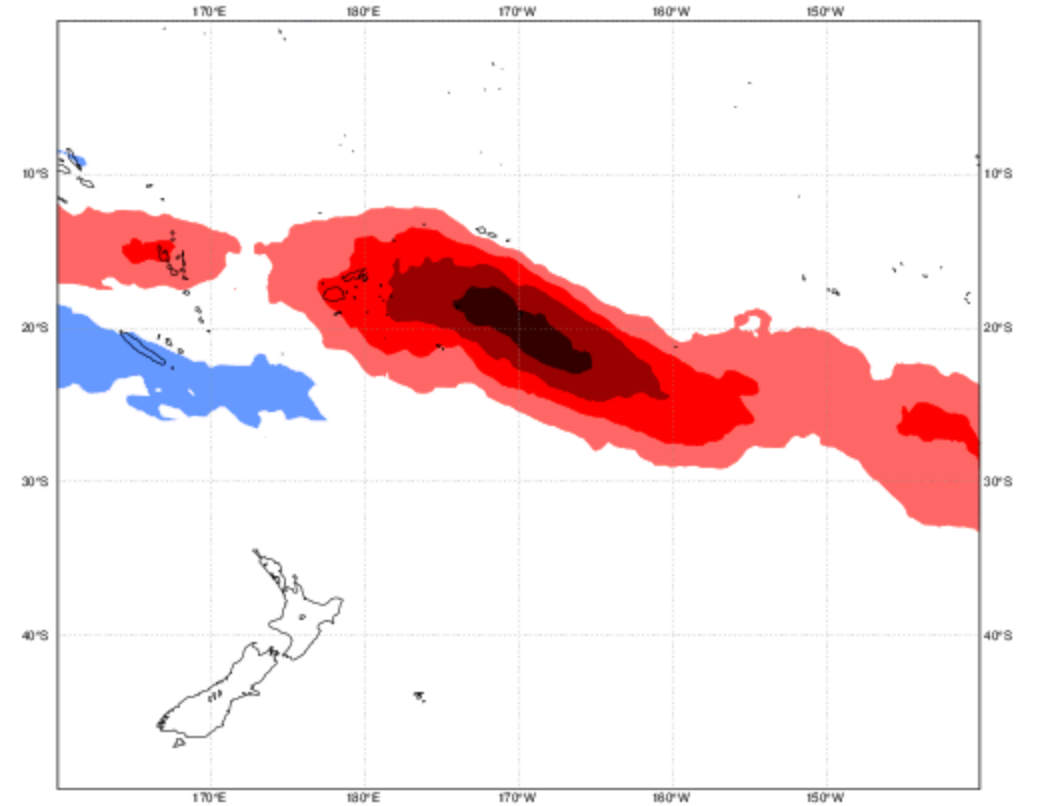


1/6 – 1/13

Weekly Mean Anomaly of Tropical Cyclone Strike Probability. Date: 20241230 0 UTC t+(168-336)  
Probability of a TC passing within 300km radius

Legend for strike probability anomalies:

- 100-40
- 40-30
- 30-20
- 20-10
- 10-10
- 10-20
- 20-30
- 30-40
- 40-100



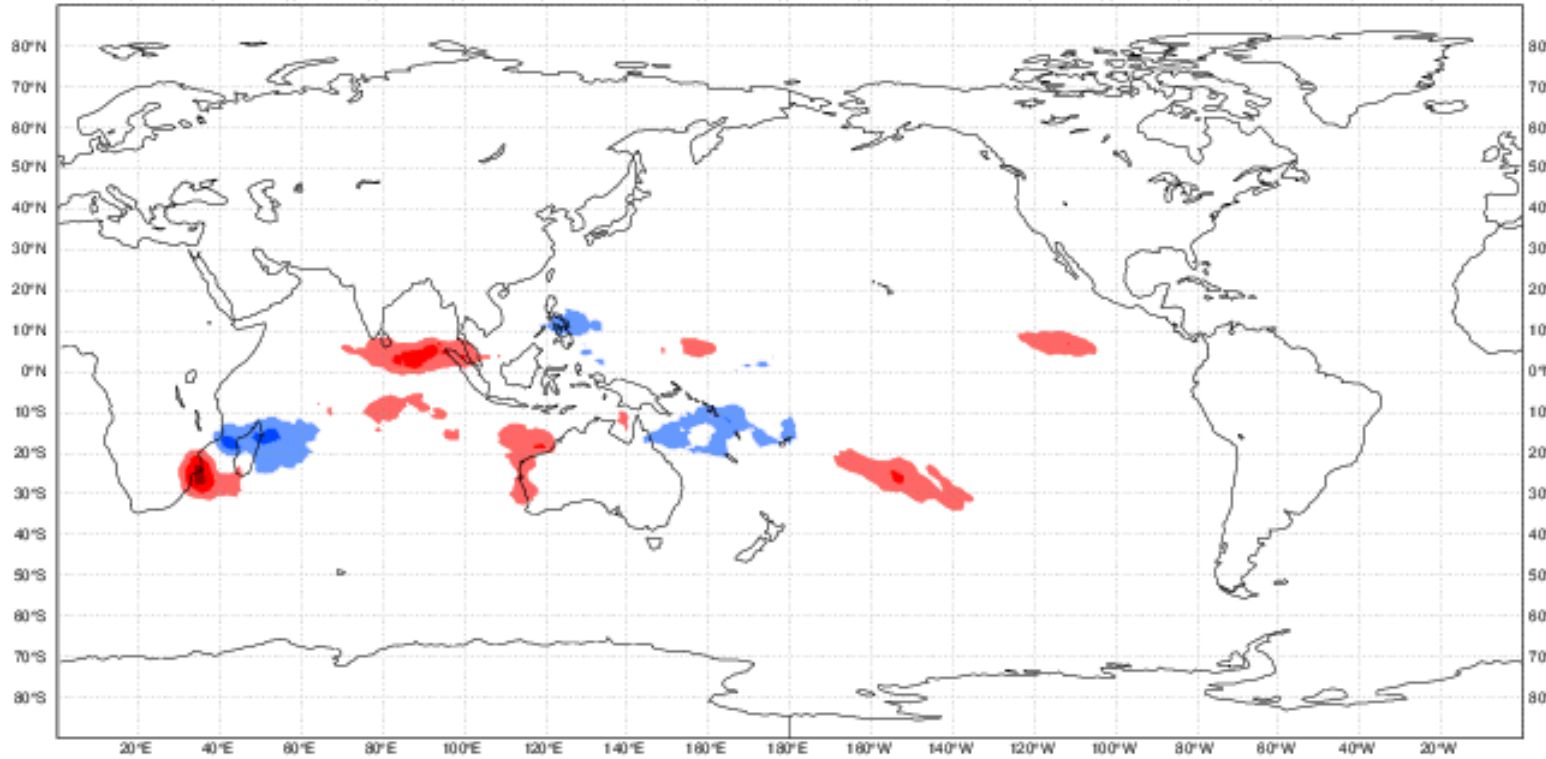
# TC Genesis Guidance: Week 3

1/13 – 1/25

Weekly Mean Anomaly of Tropical Cyclone Strike Probability. Date:20241230 0 UTC t+(336-504)  
Probability of a TC passing within 300km radius

■ -100-40 ■ -40-30 ■ -30-20 ■ -20-10 ■ -10-10 ■ 10-20 ■ 20-30 ■ 30-40 ■ 40-100

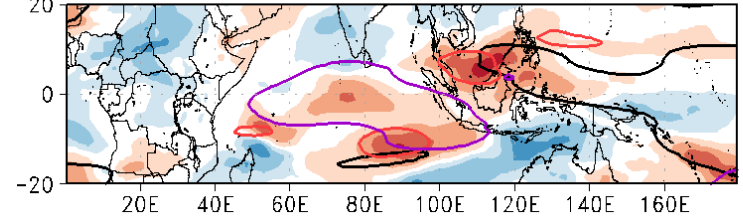
20°E 40°E 80°E 100°E 120°E 140°E 160°E 180°E 180°W 140°W 120°W 100°W 80°W 60°W 40°W 20°W



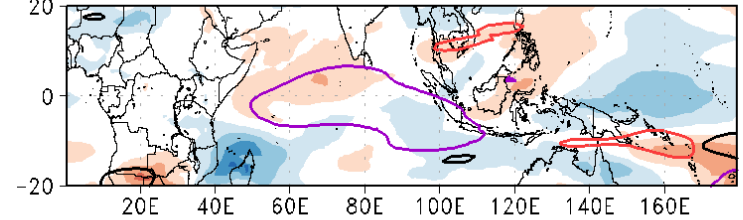
## Day Means

31Dec to 06Jan

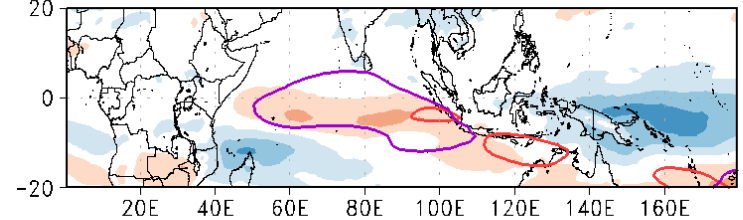
ECMWF Forecast



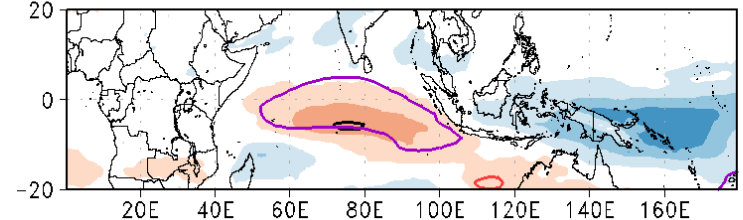
07Jan to 13Jan



14Jan to 20Jan



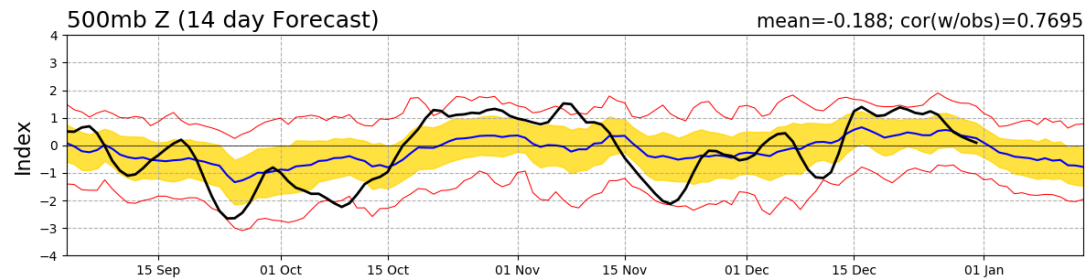
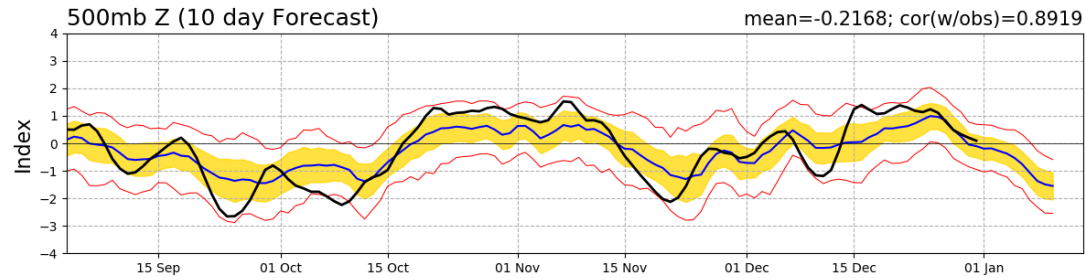
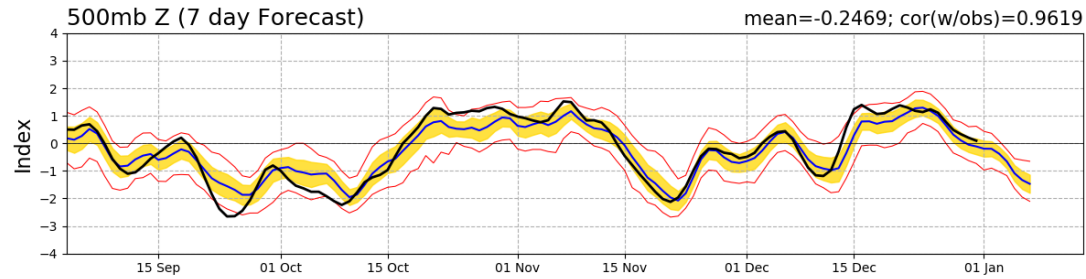
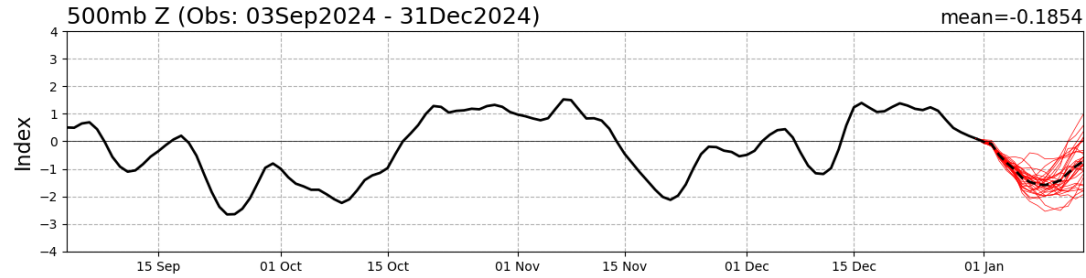
21Jan to 27Jan



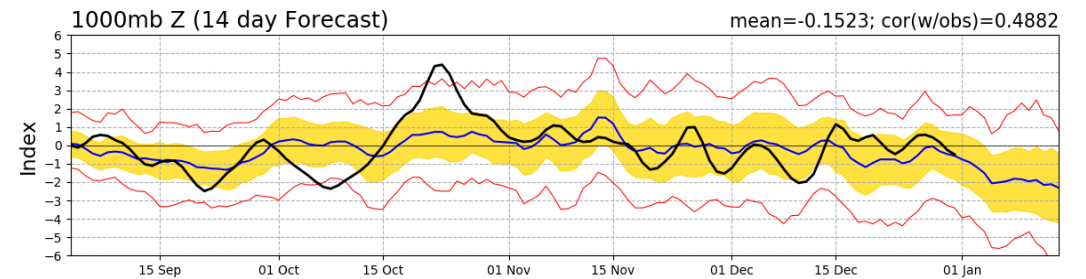
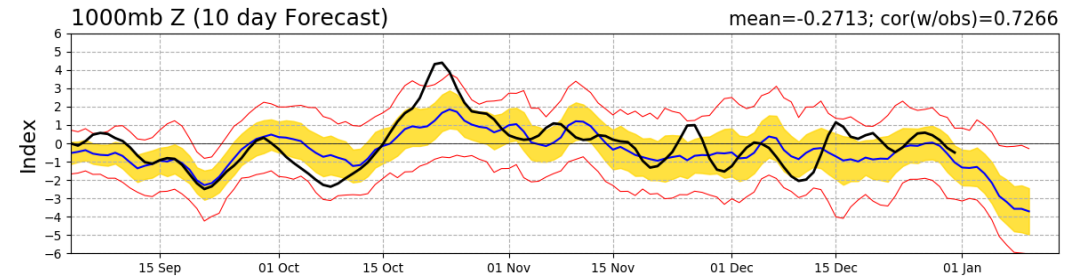
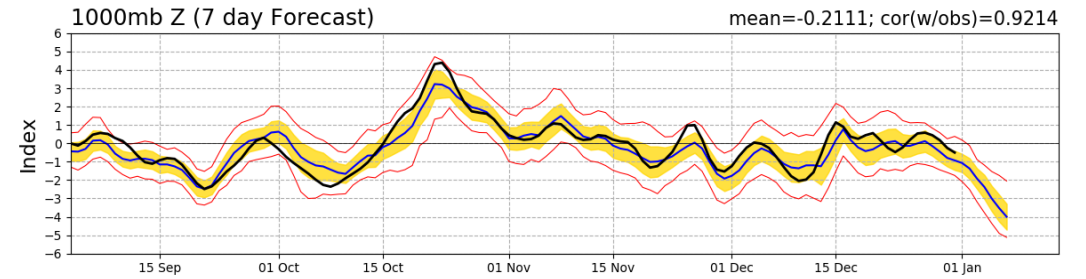
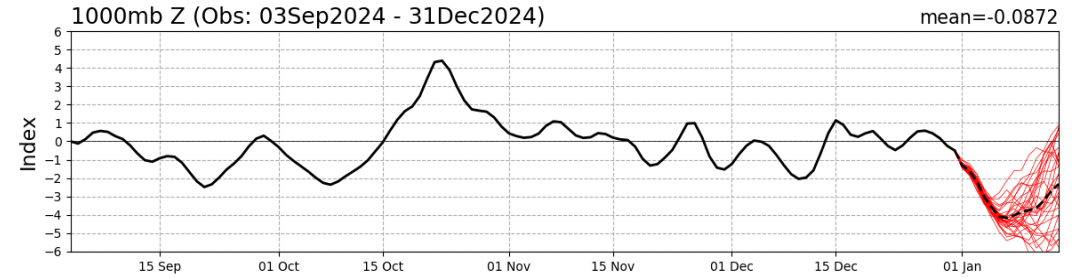
— MJO — Kelvin\*2  
— Low — ER  
Contours at 2, 6 m s<sup>-1</sup>

# Teleconnection Indices: NAO / AO:

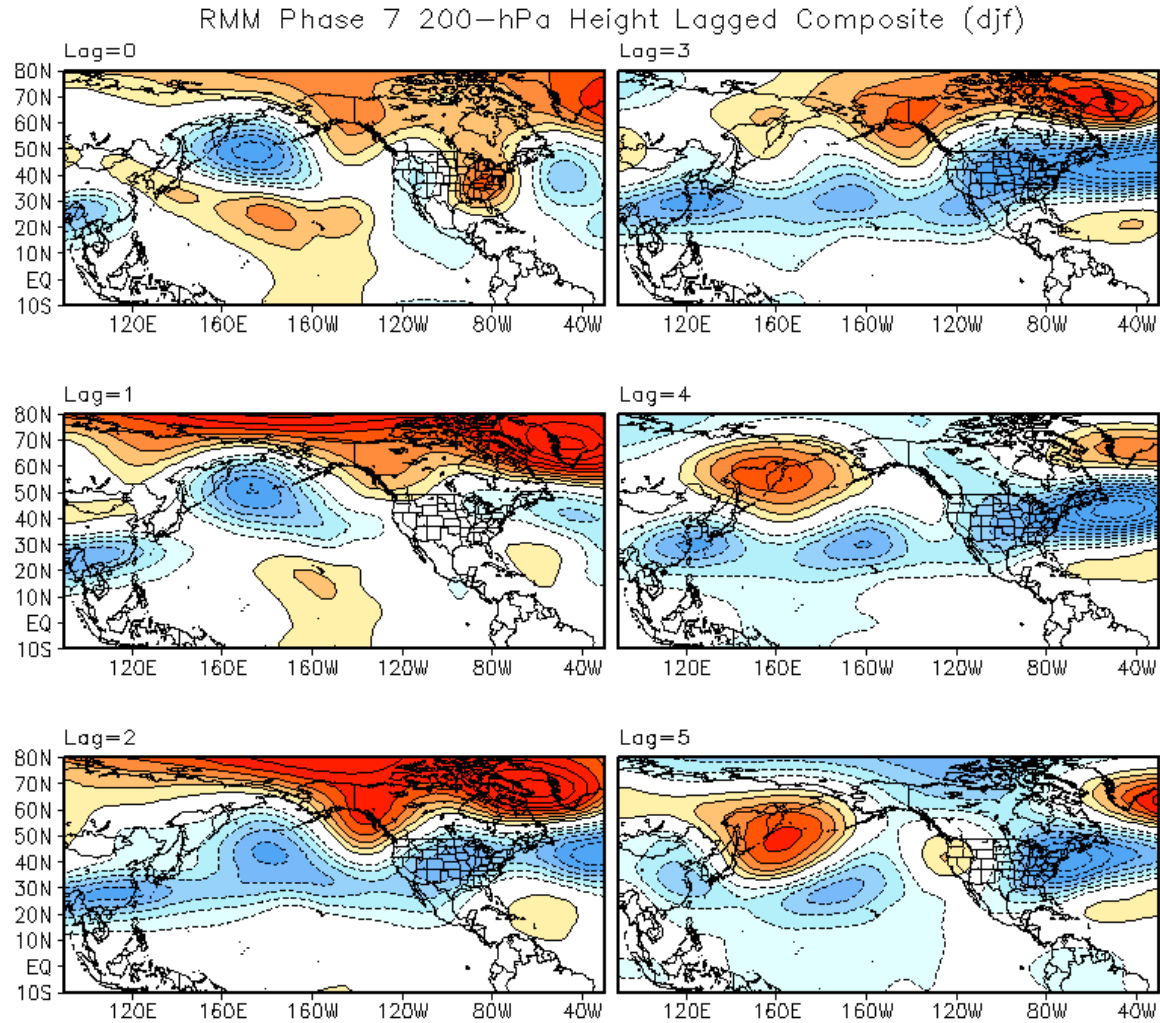
## NAO Index: Observed & GEFS Forecasts



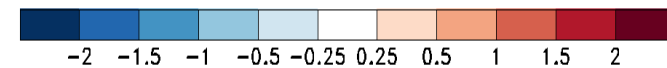
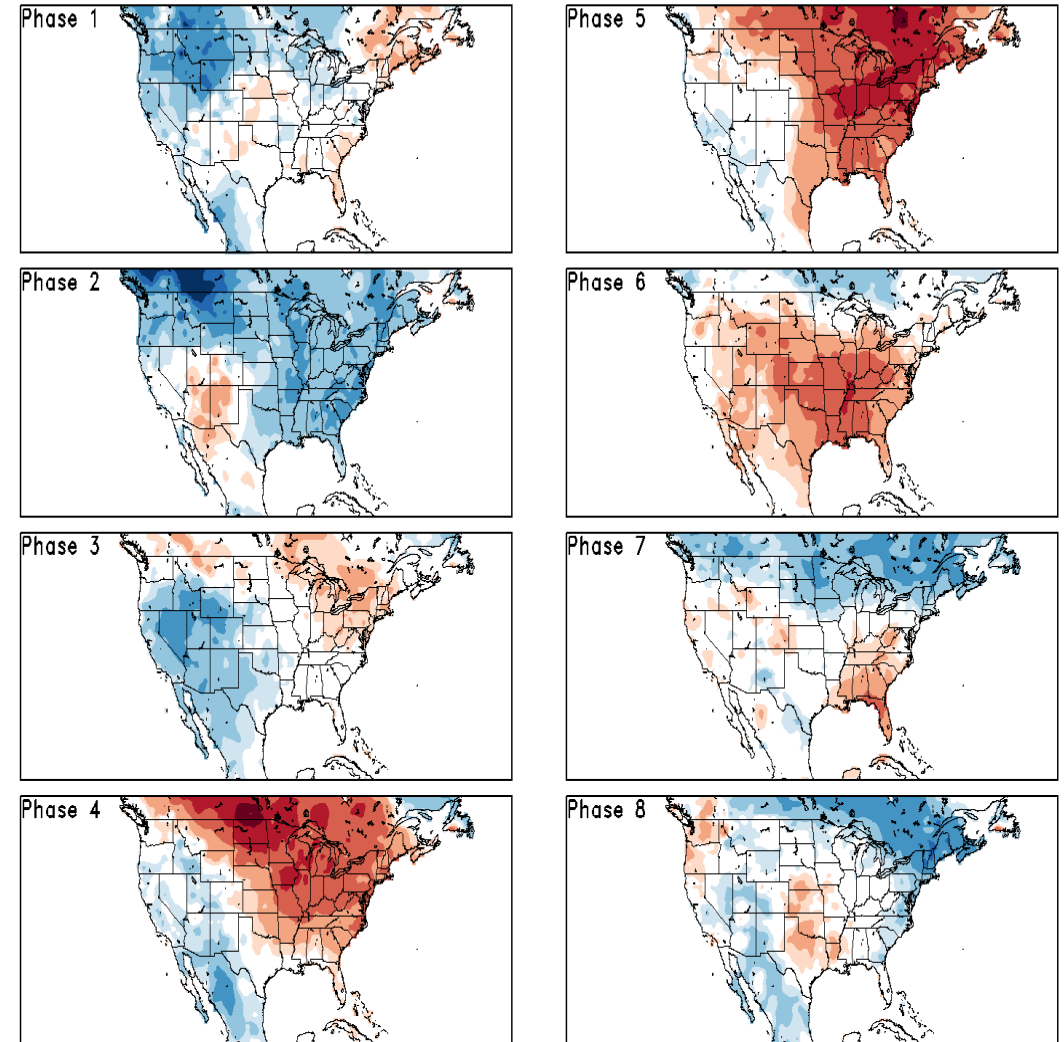
## AO Index: Observed & GEFS Forecasts



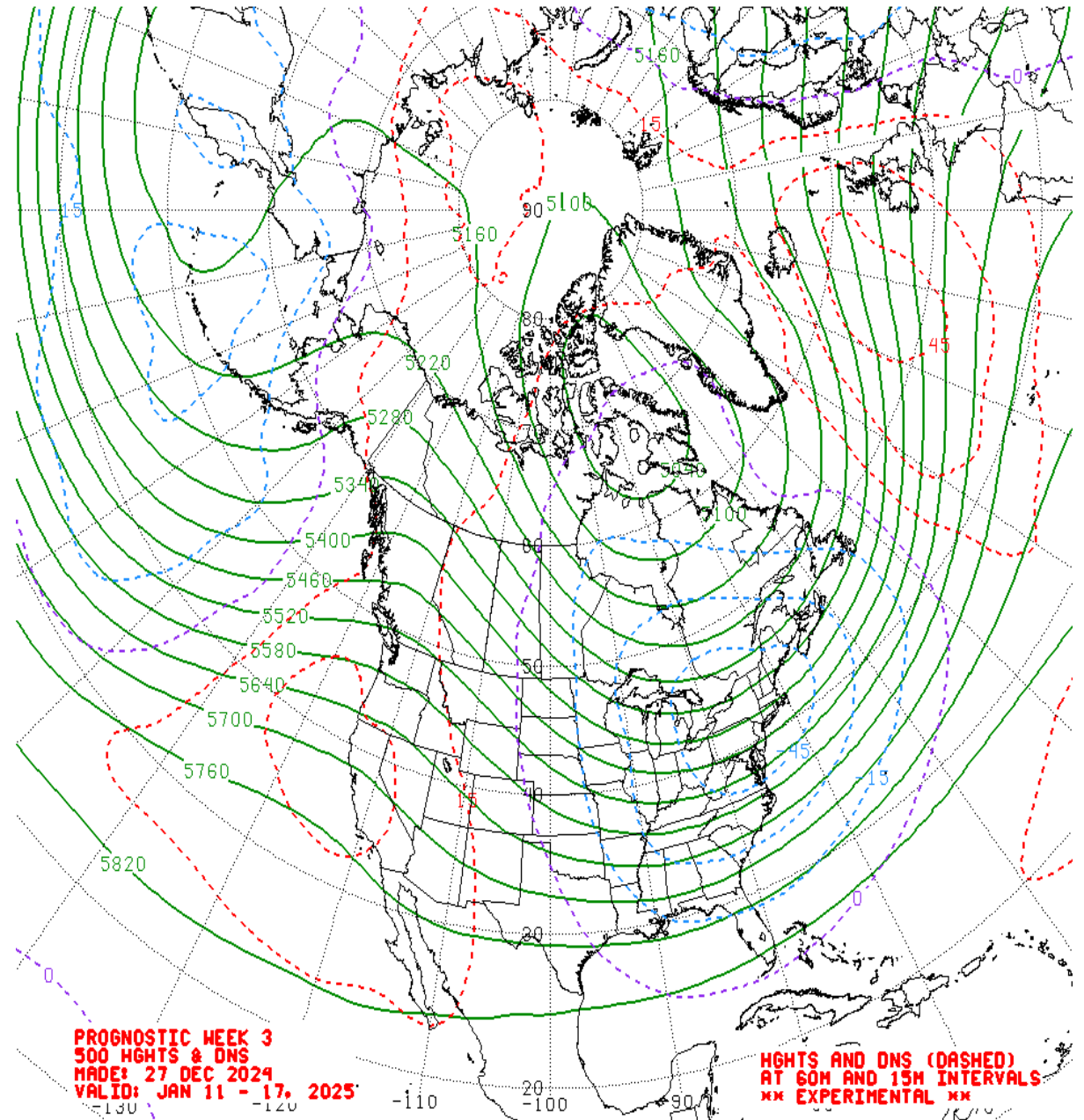
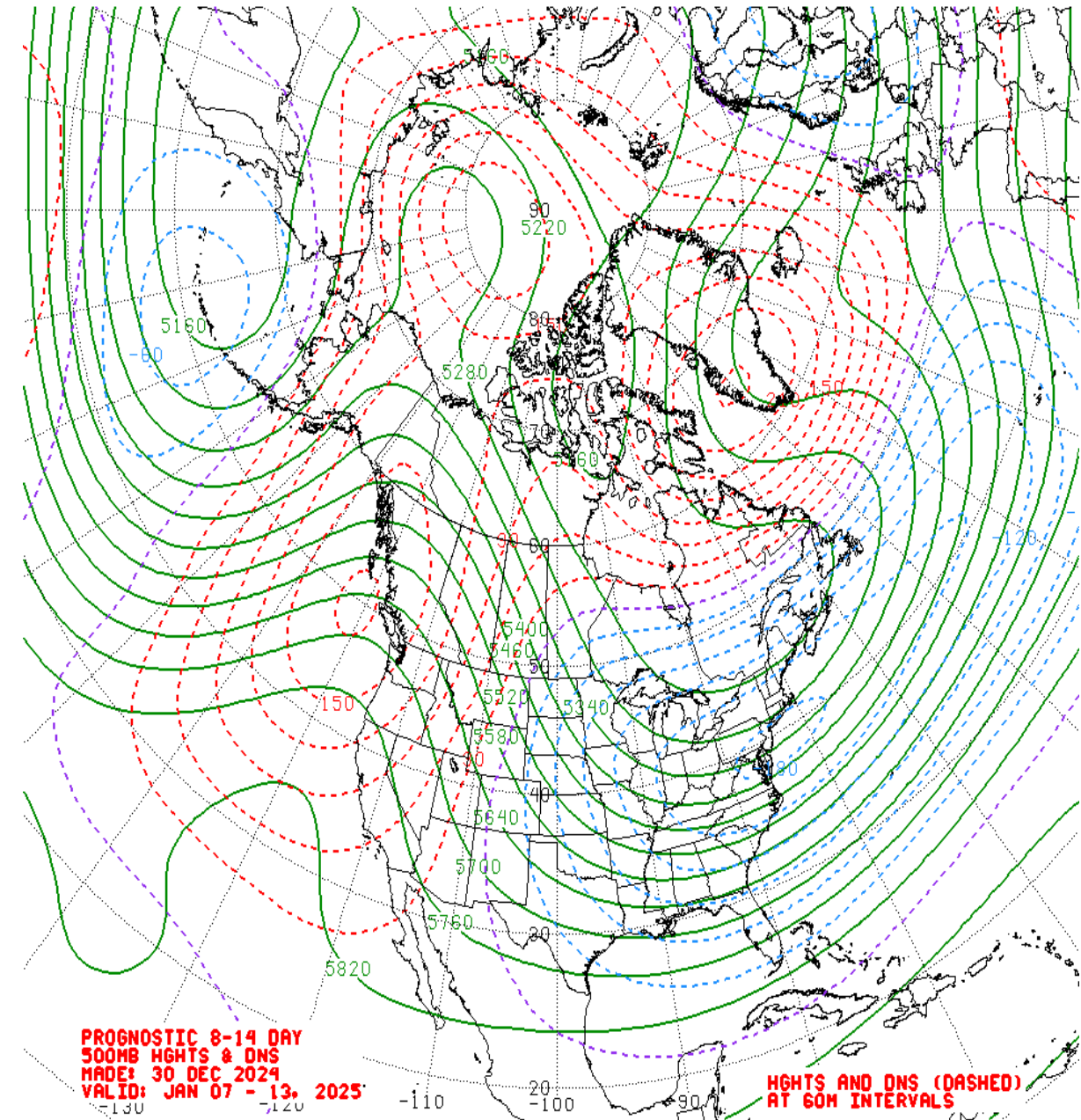
# Historical 500-hPa Height & U.S. Temperatures By MJO Phase:



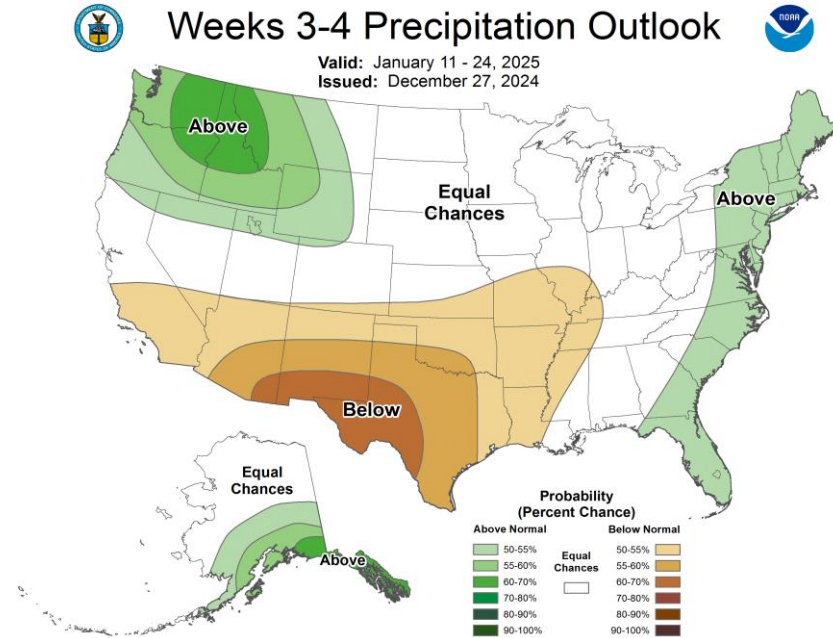
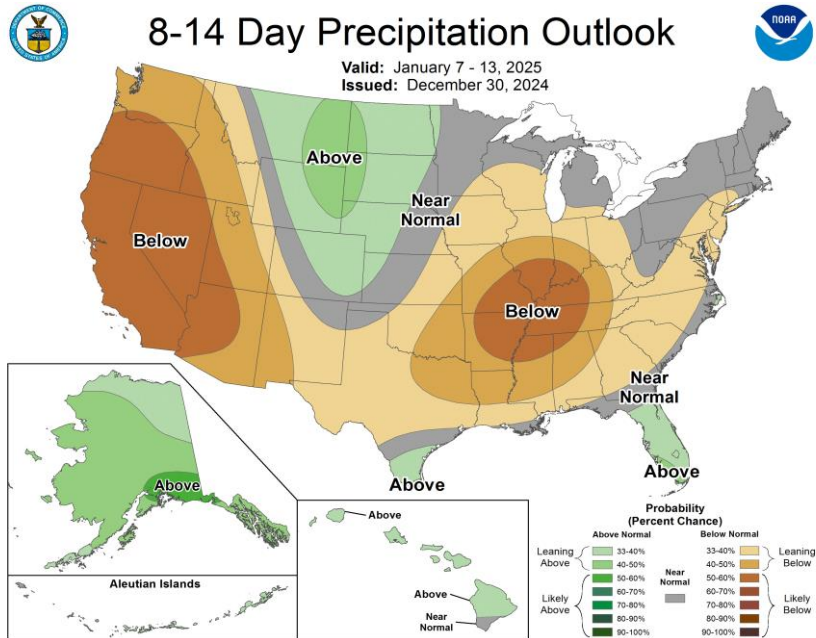
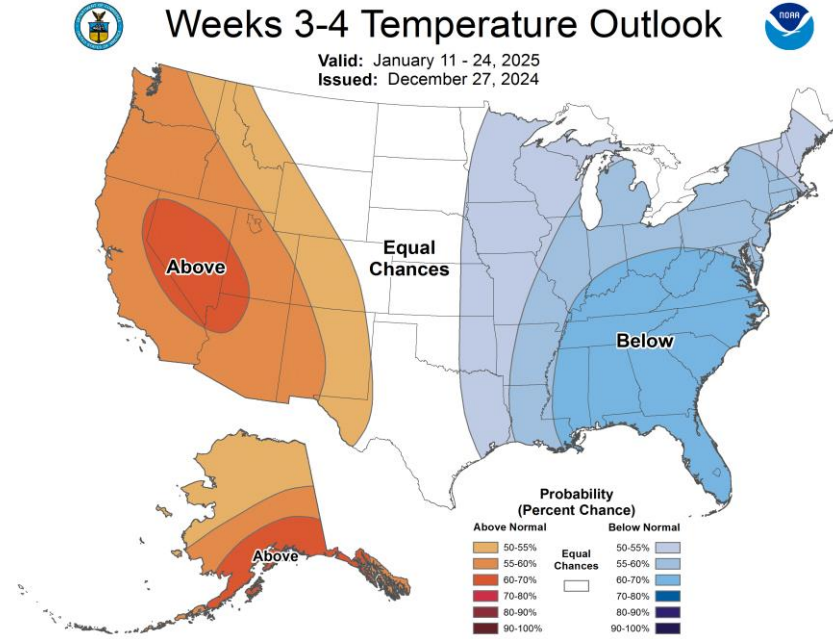
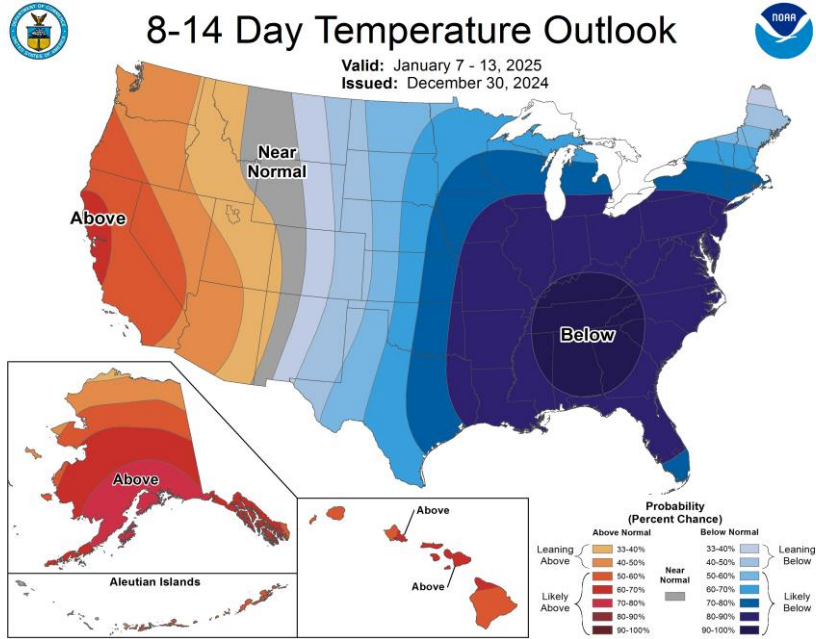
NDJ MJO Composite: GLBT (degC)



# Mean 500-hPa Height Anomaly Forecasts: Weeks 2+3



# Official Temperature & Precipitation Forecasts:





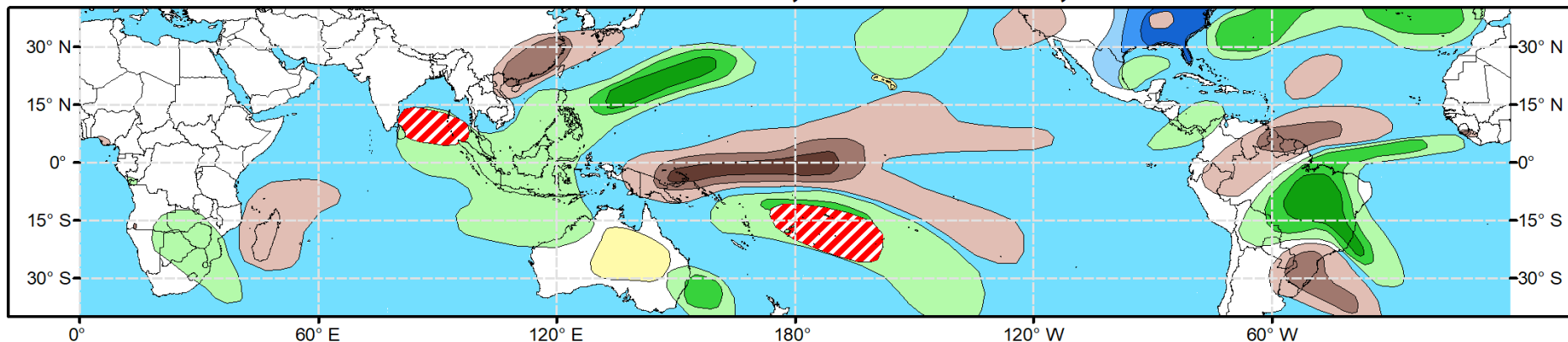


# Global Tropics Hazards Outlook

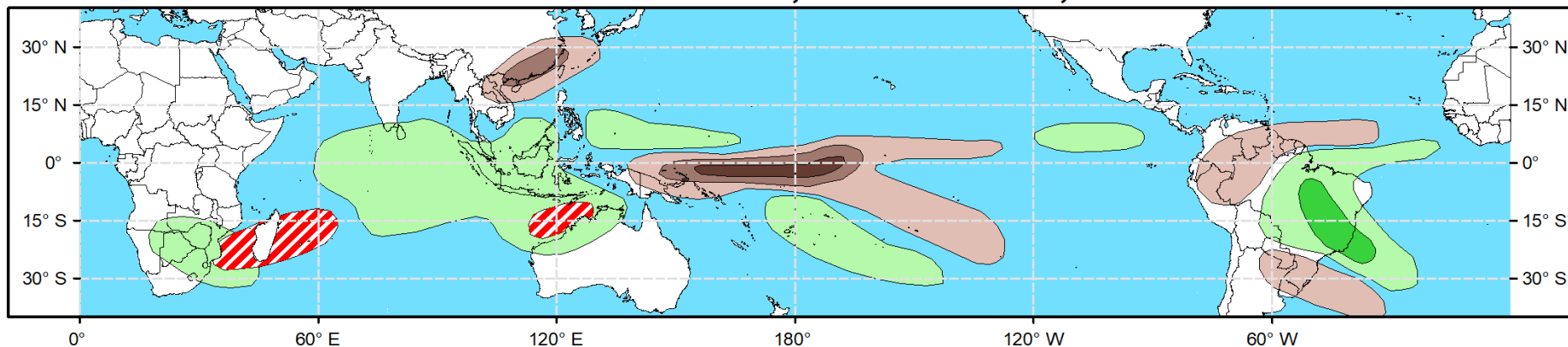
Climate Prediction Center



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