



Weeks 2-3 Global Tropics Hazards Outlook

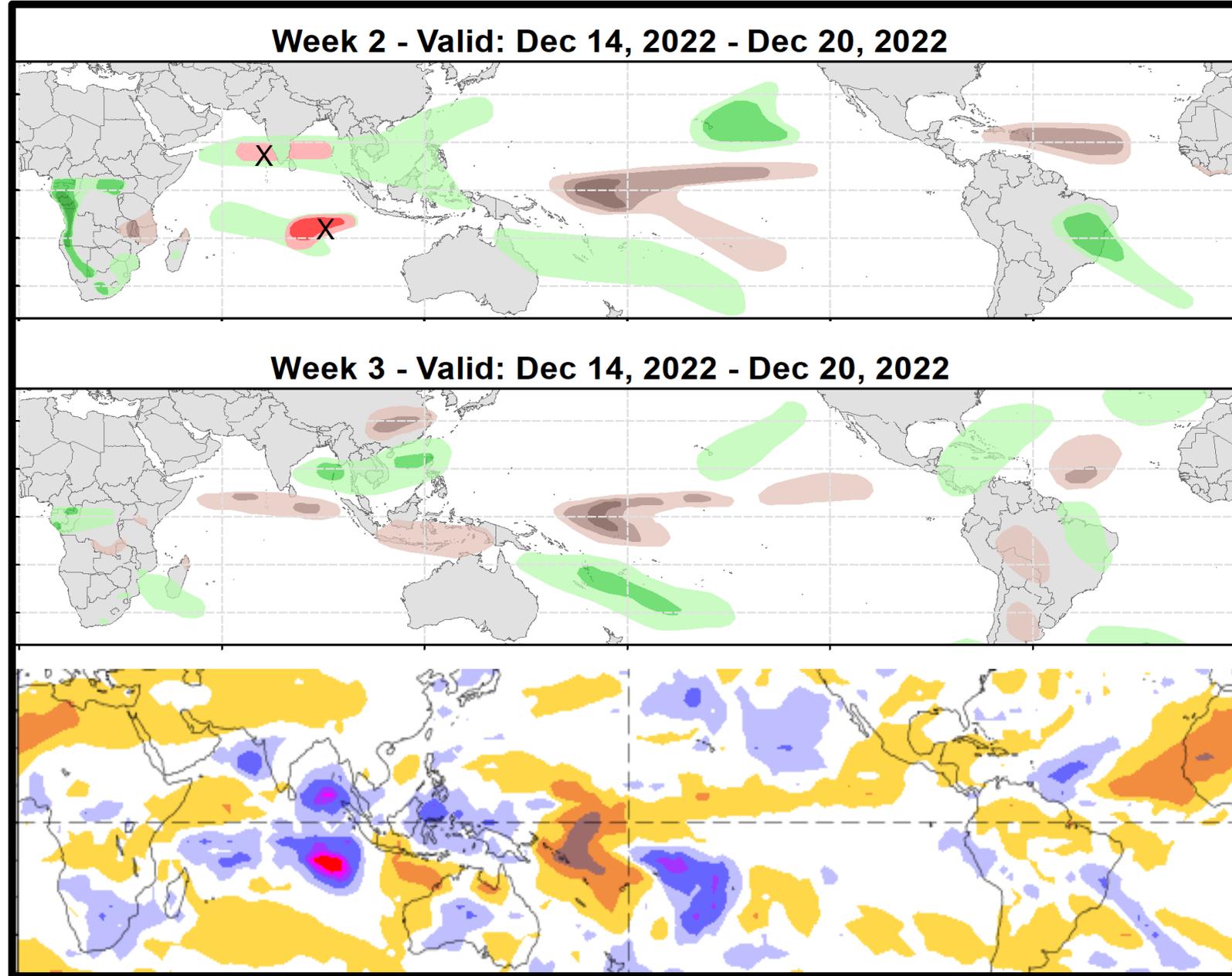
12/20/2022

Nick Novella

NWS / NCEP / Climate Prediction Center

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

- NIO: TC Seven (ARB03) 12/14
- SIO: Darian 12/18



Synopsis of Climate Modes:

ENSO: (Dec 8, 2022 Update) *next update on Thursday, Jan 12th 2023*

- ENSO Alert System Status: [La Niña Advisory](#)
- La Niña is expected to continue in the winter, with equal chances of La Niña and ENSO-neutral during Jan-Mar 2023. In Feb-Apr 2023, there is a 71% chance of ENSO-neutral.

MJO and other subseasonal tropical variability:

- While RMM observations continue to depict a weak, and ill-defined intraseasonal signal through mid-Dec, upper-level velocity potential anomalies and filtered fields reveal a more coherent representation of the MJO where it has continued to propagate eastward across the Indian Ocean.
- RMM forecasts have become more supportive of an MJO reemerging over the Maritime Continent, and propagates eastward into the western Pacific during the next 3 weeks. Some models eventually weaken the MJO likely due to destructive interference with La Niña over the equatorial Pacific, however a healthy MJO signal is manifest south of the equator entering the New Year.
- The large-scale environment is expected to be favorable for additional tropical cyclogenesis across the eastern Indian Ocean and Pacific during the outlook period. The extratropical response associated with a more coherent MJO over the Maritime Continent historically favors warmer than normal conditions over much of the CONUS.

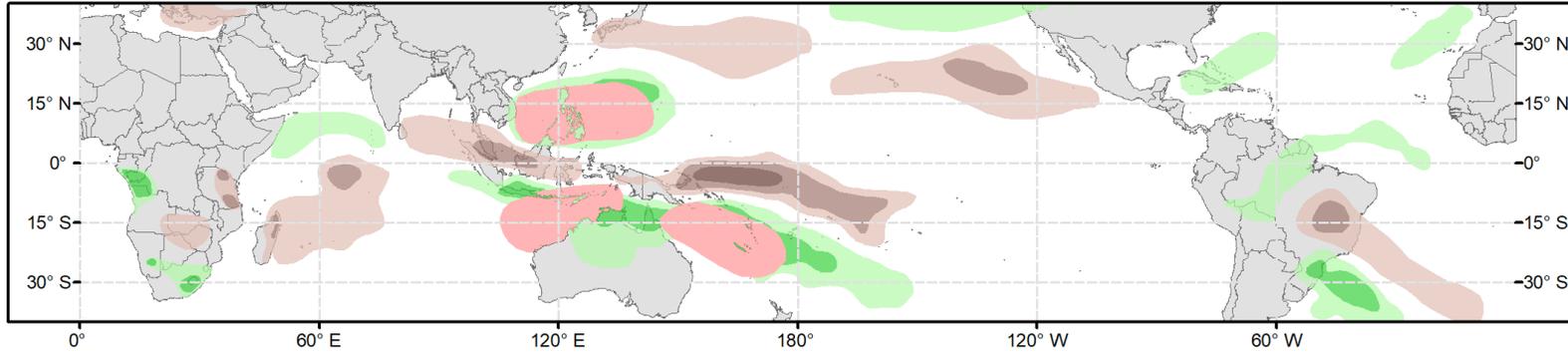
GTH Outlook:



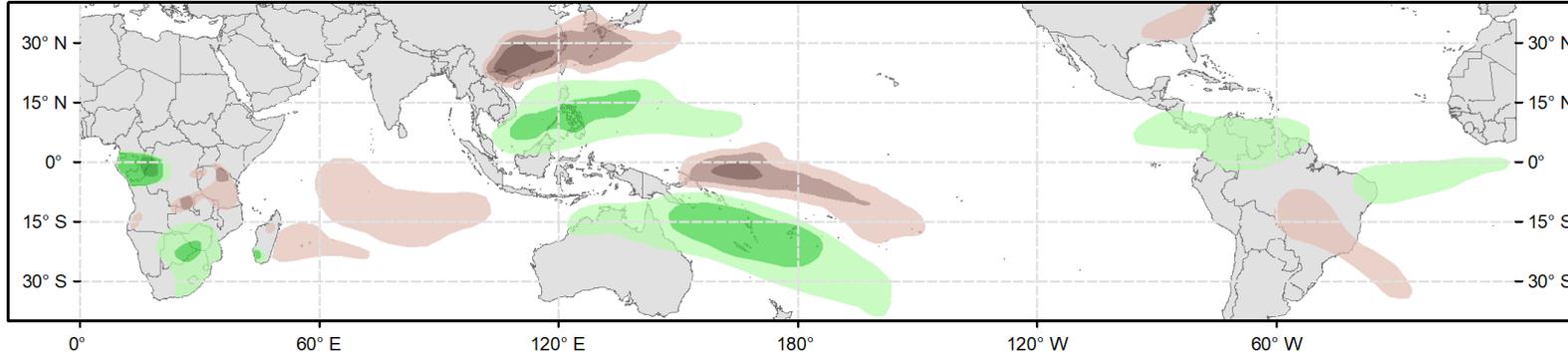
Global Tropics Hazards Outlook Climate Prediction Center



Week 2 - Valid: Dec 28, 2022 - Jan 03, 2023



Week 3 - Valid: Jan 04, 2023 - Jan 10, 2023



Week-2 Only
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

>50% >65% >80%

7-day mean temperatures in the Upper third of the historical range

Below-Average Temperatures Probability

>50% >65% >80%

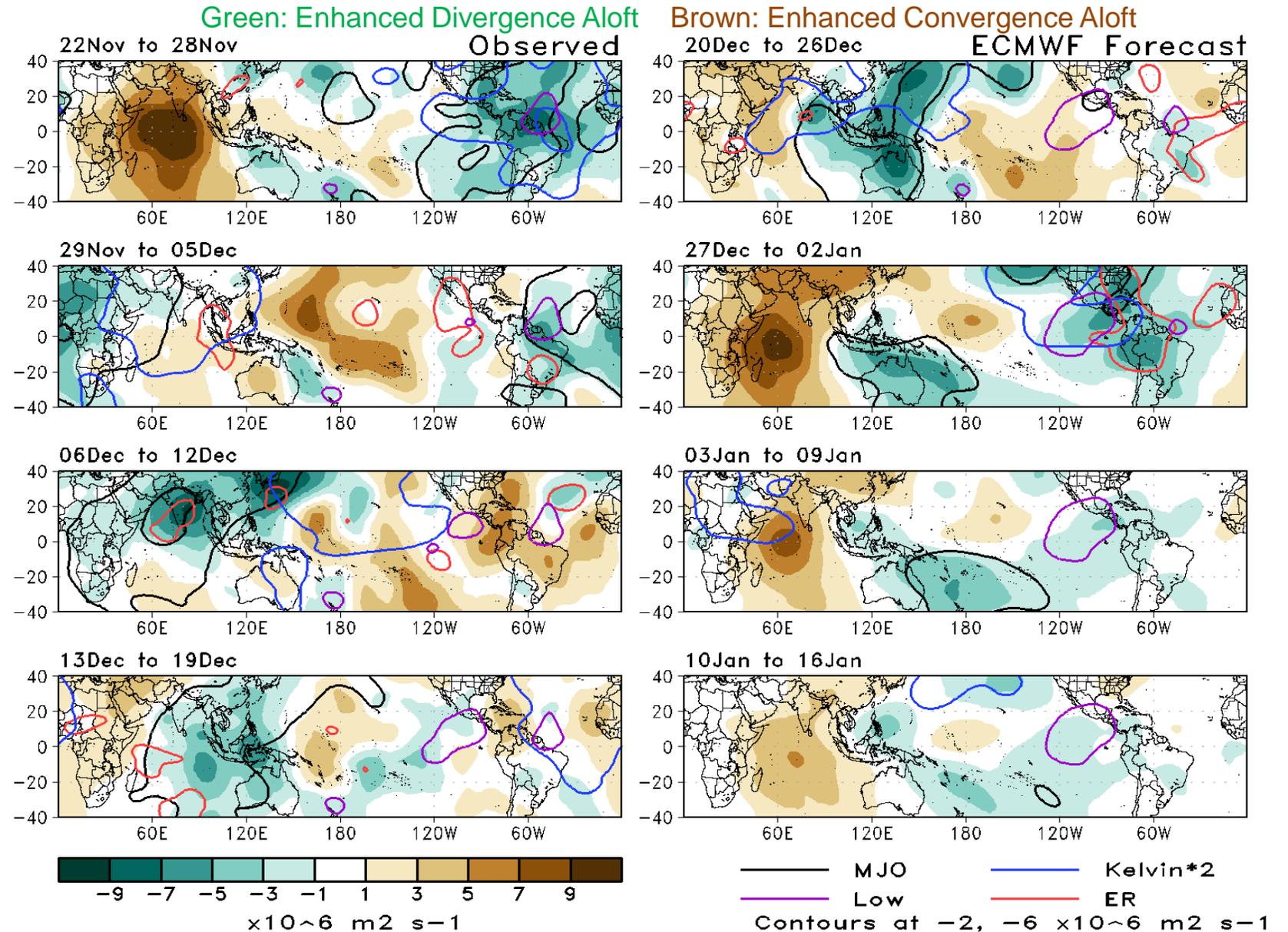
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Issued: 12/20/2022
Forecaster: Novella

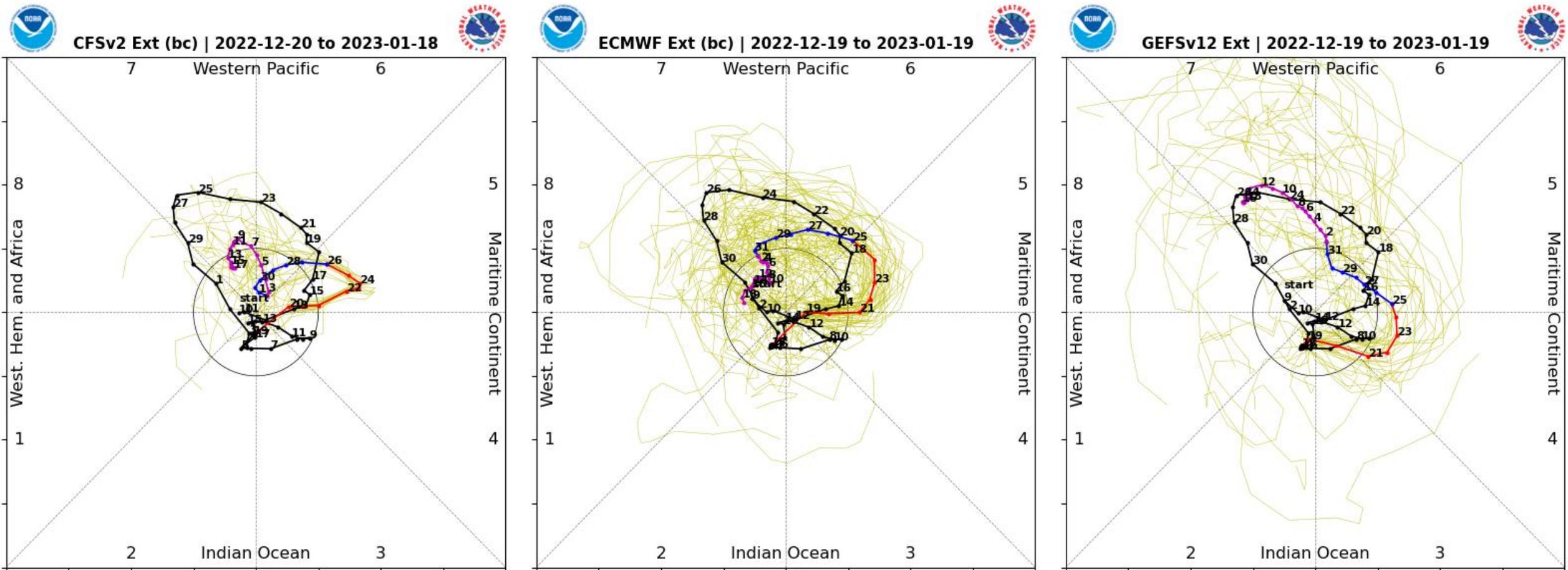
This product is updated once per week and targets broad scale conditions integrated over a 7-day period for US interests only. Consult your local responsible forecast agency.

200-hPa Velocity Potential Anomaly Maps:

- Objective filtering reveals an active MJO envelope shifting eastward over the Indian Ocean, and likely contributed to the pair of TCs formed during the last week.
- The forecast fields show a more coherent pattern developing early in the period before the MJO encounters the low frequency footprint in the Pacific and breaks down. However, enhanced conditions and MJO activity continue to shift eastward south of the equator by early Jan.

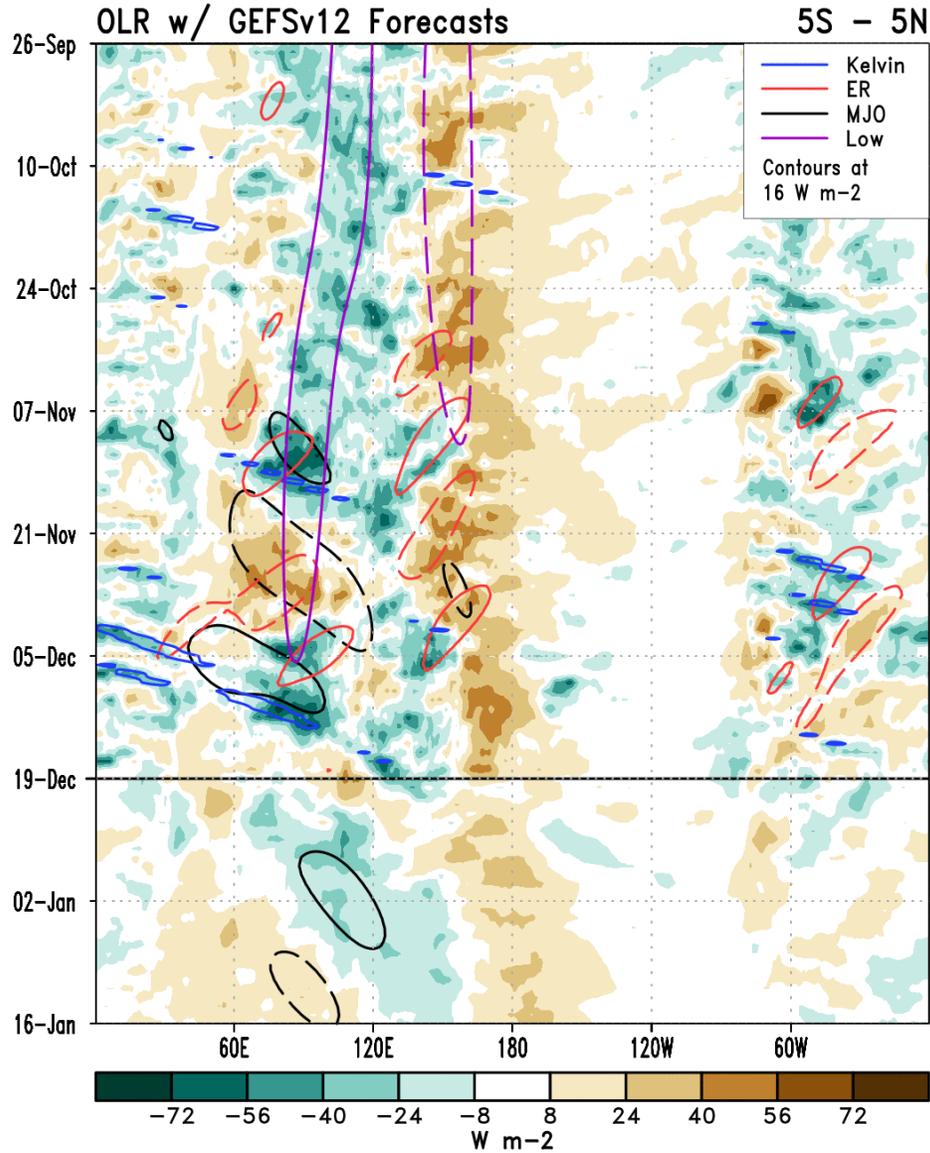


RMM Index Observations & Forecasts:

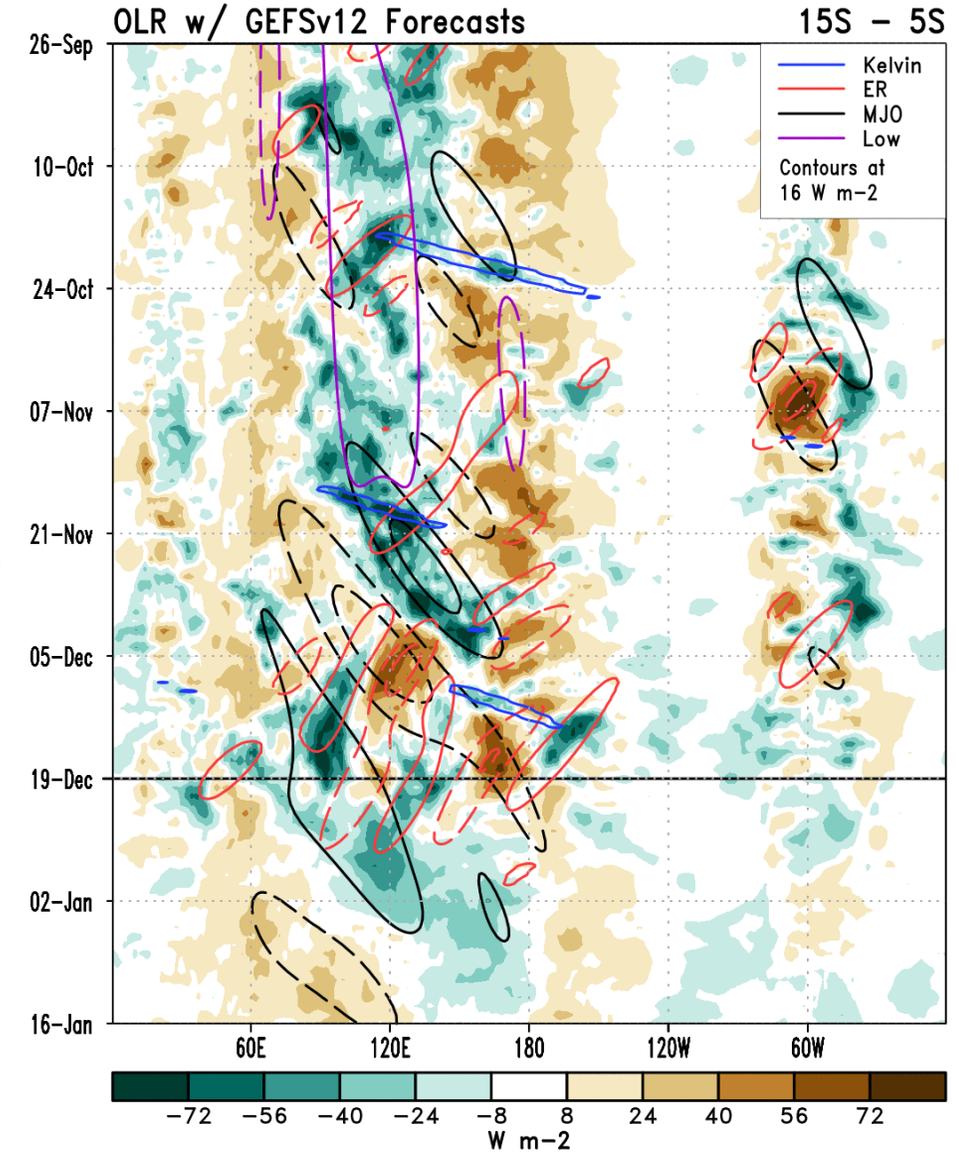


- Models generally favor a reemerging MJO over the Maritime Continent during week-1 that propagates eastward into the western Pacific during weeks 2 and 3.
- Unlike the ECWMF, the CFS and GEFs favor a weakened MJO signal as it enters into phase 6.

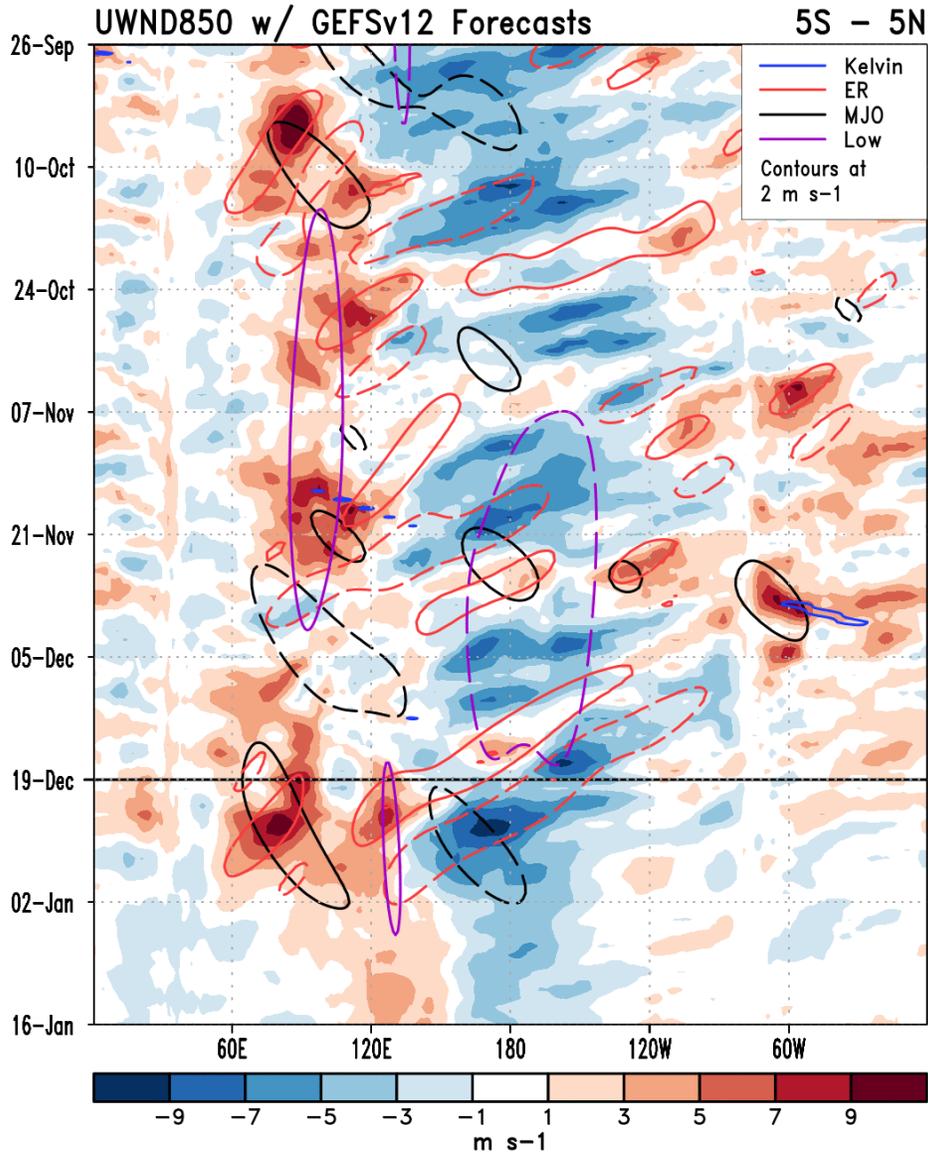
Outgoing Longwave Radiation (OLR) Anomaly Time/Lon Plots:



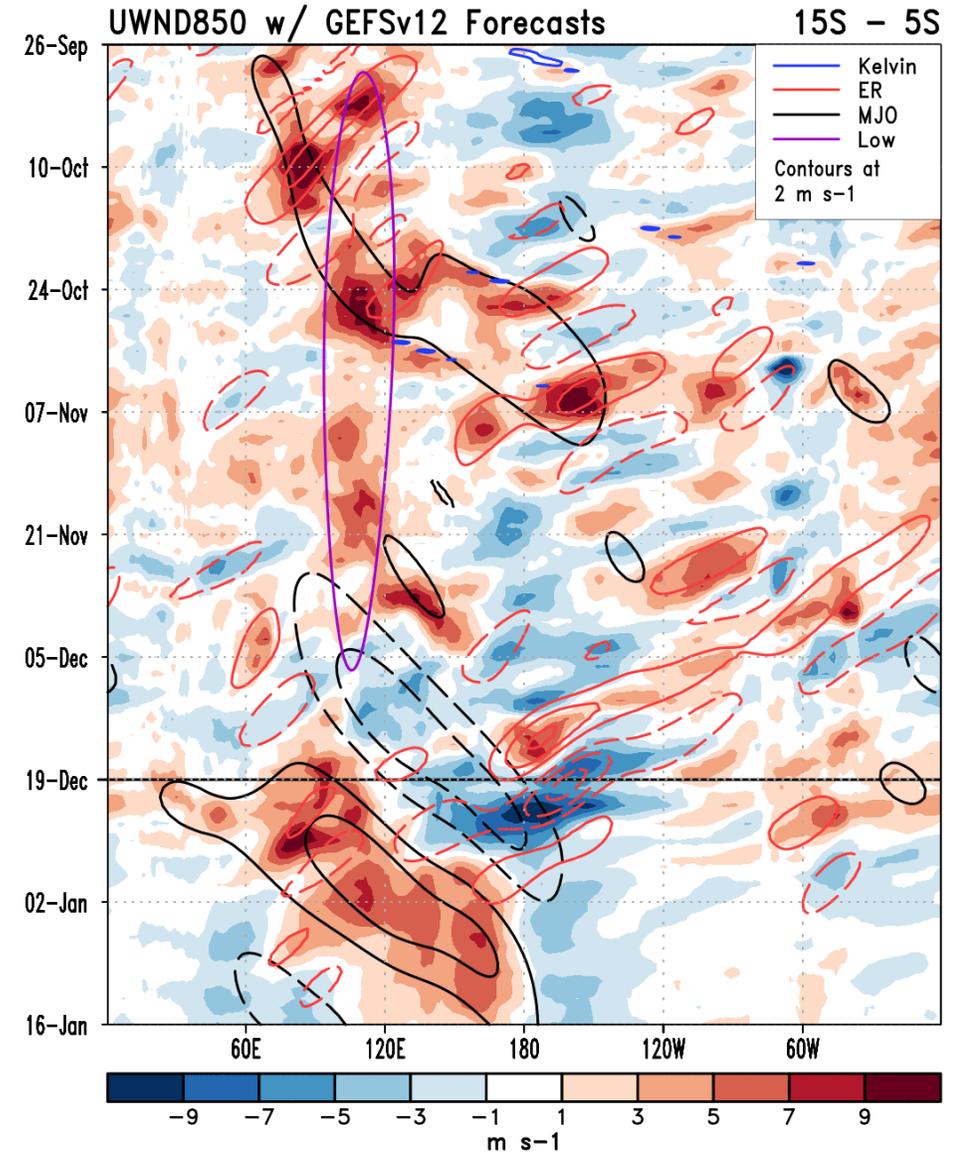
The convective MJO pattern forecast is less amplified along the equator (left) compared to that south of equator (right), which is also consistent with the velocity potential fields.



Lower Level Zonal Wind Anomaly Time/Lon Plots:



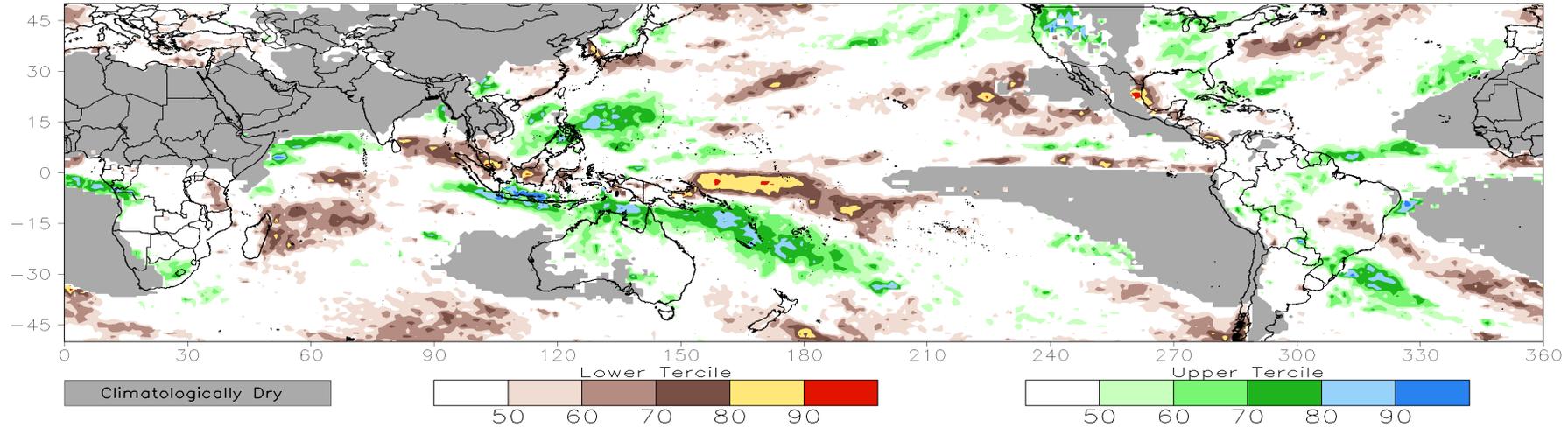
Similarly, the eastward propagation of the MJO is more evident south of the equator (right) in the lower-level zonal wind fields, which is likely to promote an enhanced SPCZ an environment favorable for TC formation.



Consolidated Probabilistic Precipitation: Weeks 2 & 3

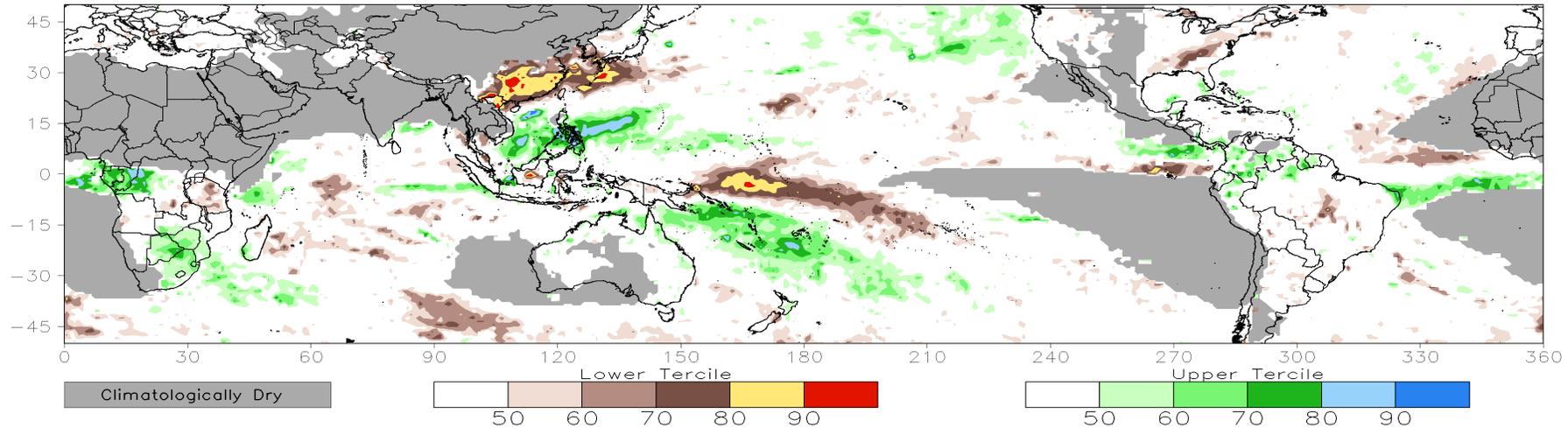
CONS 00z: Week2 Probability for Total Rainfall Below(Above) Lower(Upper) Tercile (%)

Valid: 28Dec2022-03Jan2023



CONS 00z: Week3 Probability for Total Rainfall Below(Above) Lower(Upper) Tercile (%)

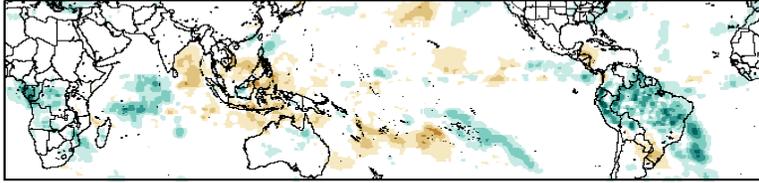
Valid: 04Jan2023-10Jan2023



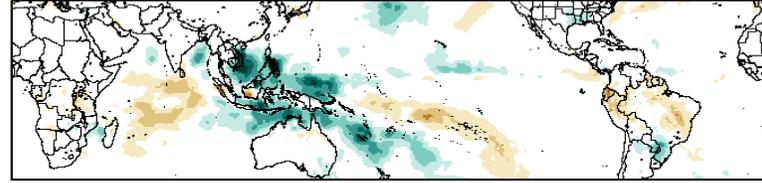
Historical Precipitation Anomalies By MJO Phase:

NDJ MJO Composite: GPCP1DD (mm/day)

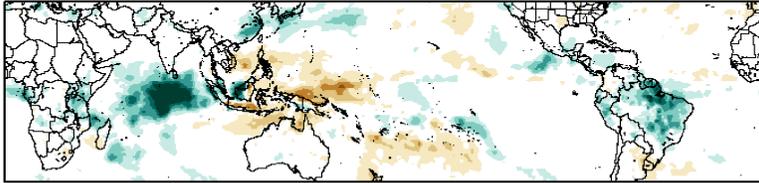
Phase 1



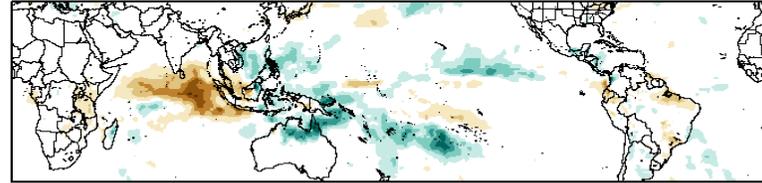
Phase 5



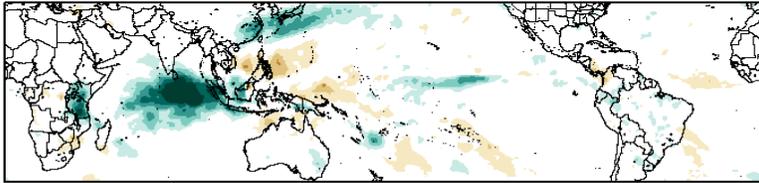
Phase 2



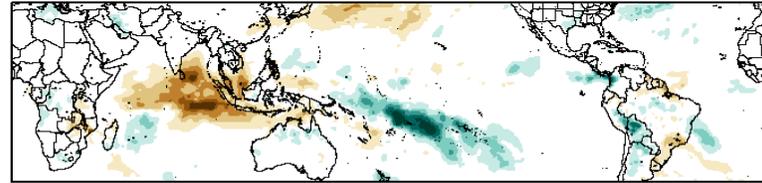
Phase 6



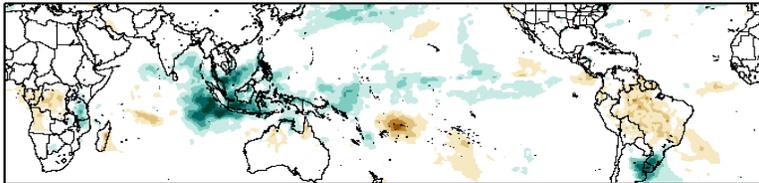
Phase 3



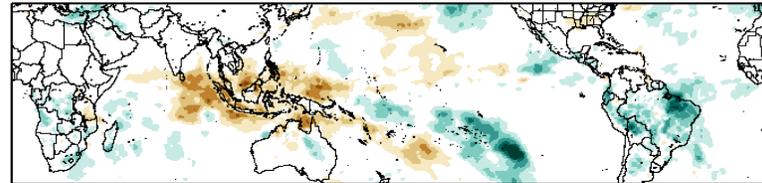
Phase 7



Phase 4



Phase 8



Week-1

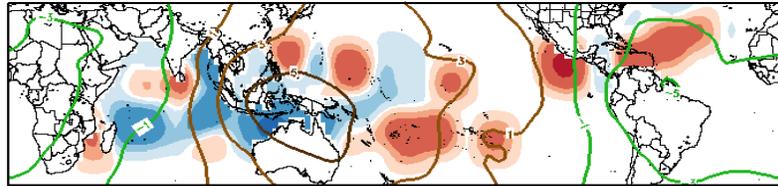
Weeks-2 & 3

Week-1

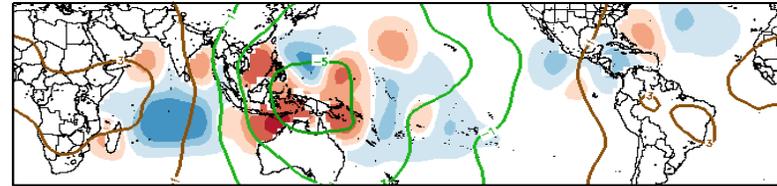


Historical TC Genesis Origins By MJO Phase:

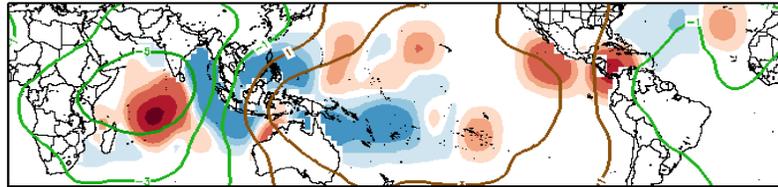
NDJ MJO Composite: Mean TC Origin Density Anomaly ($\#TCs/277km^2 \cdot 100$)
w/ NDJ CHI200 ($\times 10^{-6} m^2 s^{-1}$) / Contours every $2 \times 10^{-6} m^2 s^{-1}$



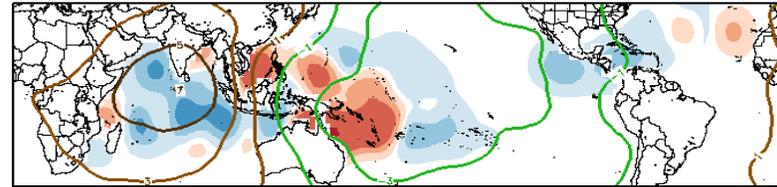
Phase 1



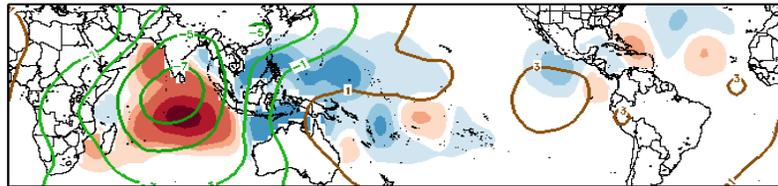
Phase 5



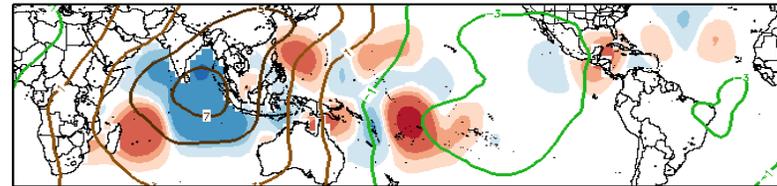
Phase 2



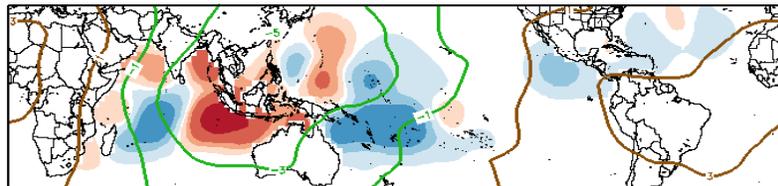
Phase 6



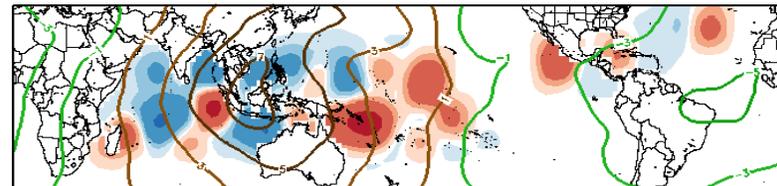
Phase 3



Phase 7



Phase 4

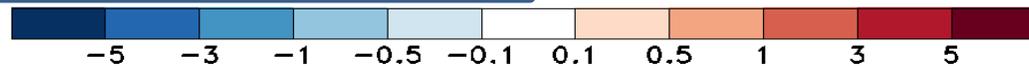


Phase 8

Week-1

Weeks-2 & 3

Week-1

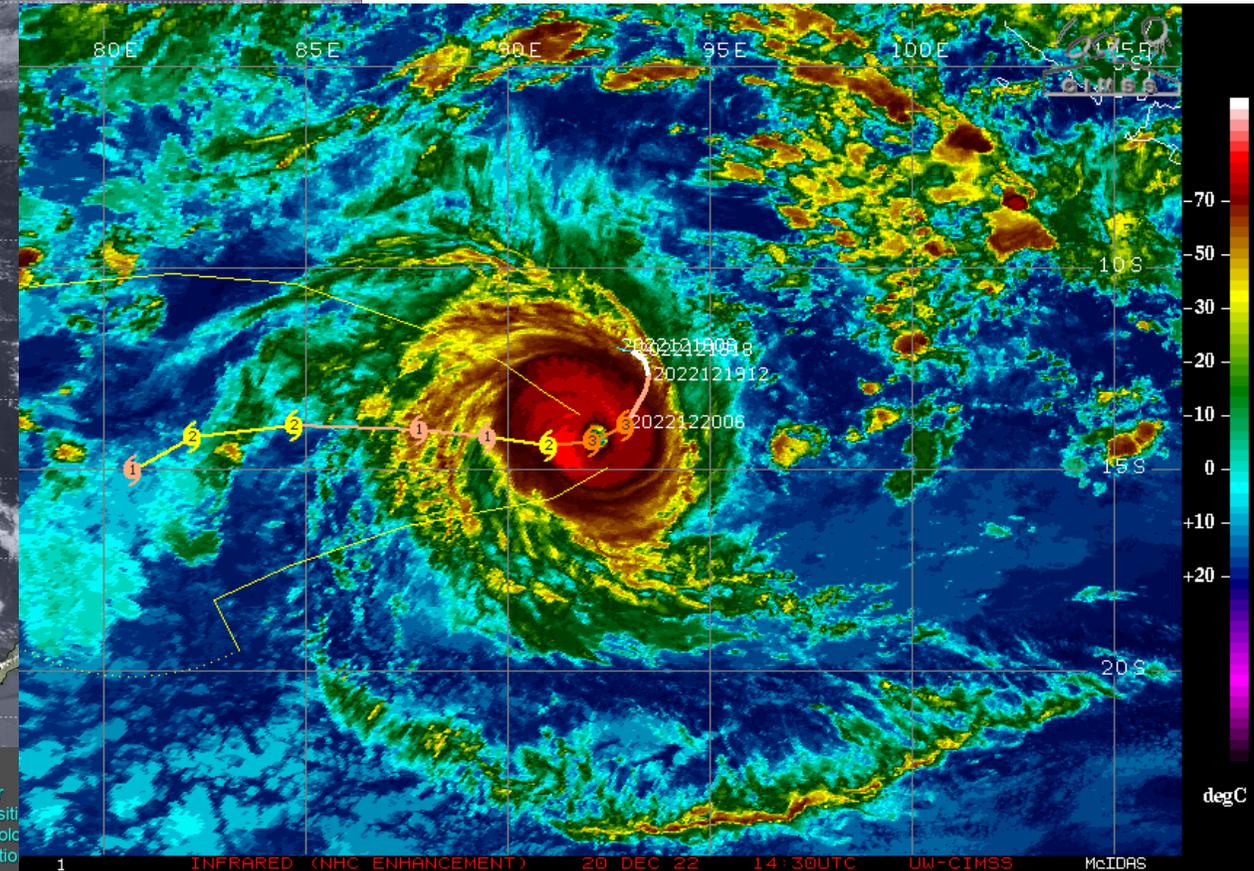
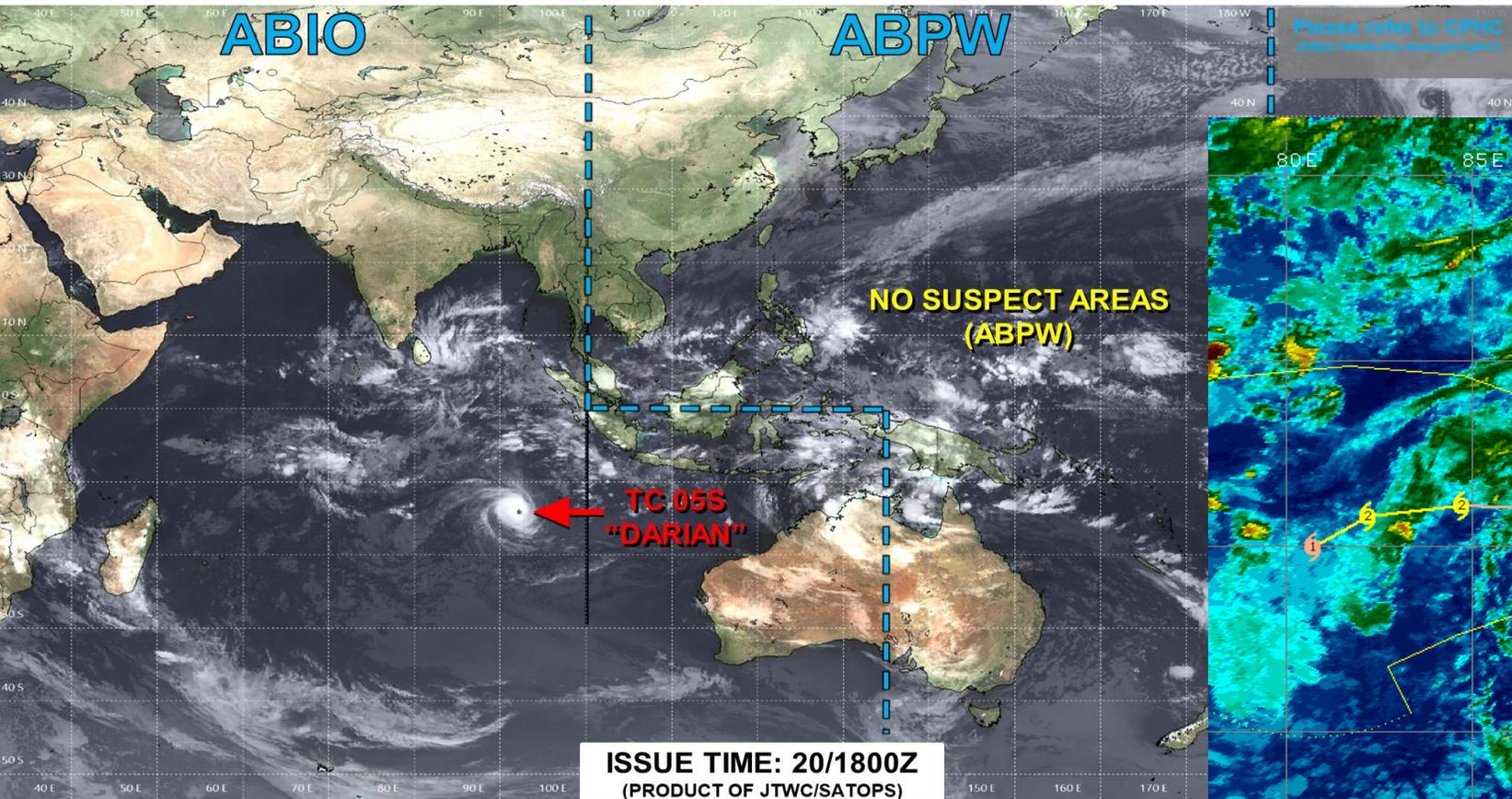


Experimental

Tropical Cyclone Monitoring/Forecast: JTWC



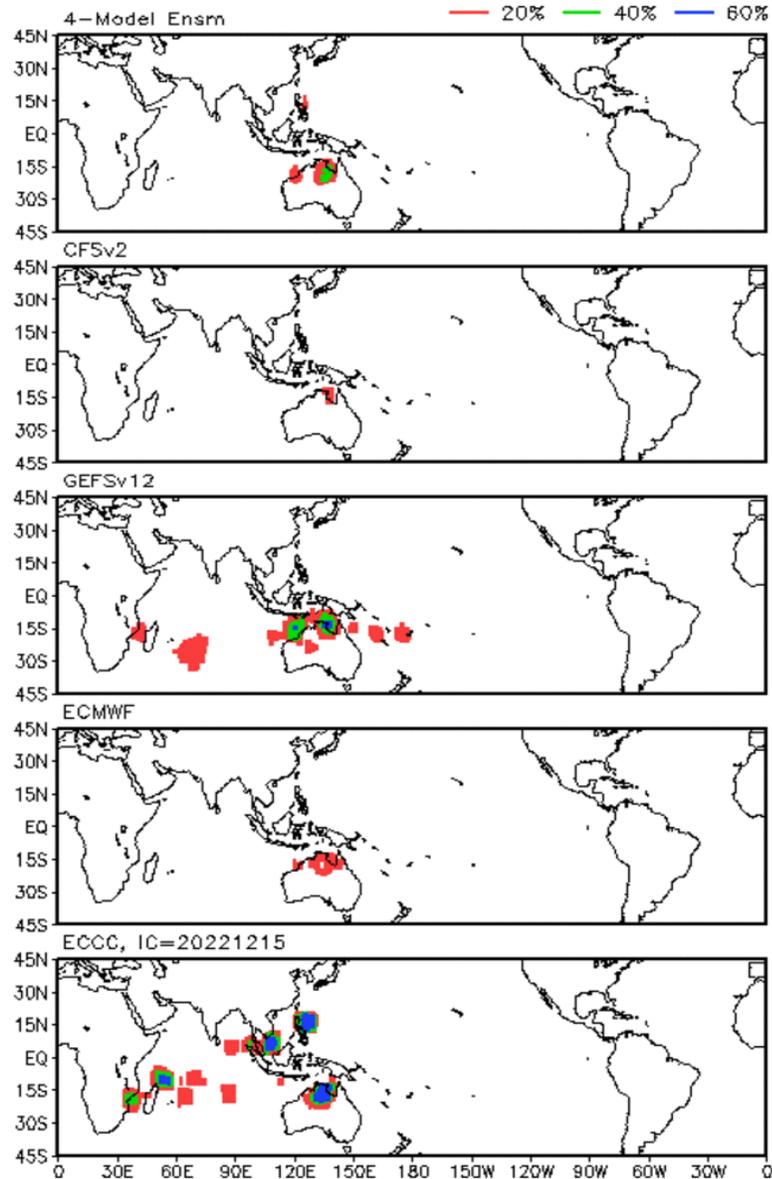
JOINT TYPHOON WARNING CENTER



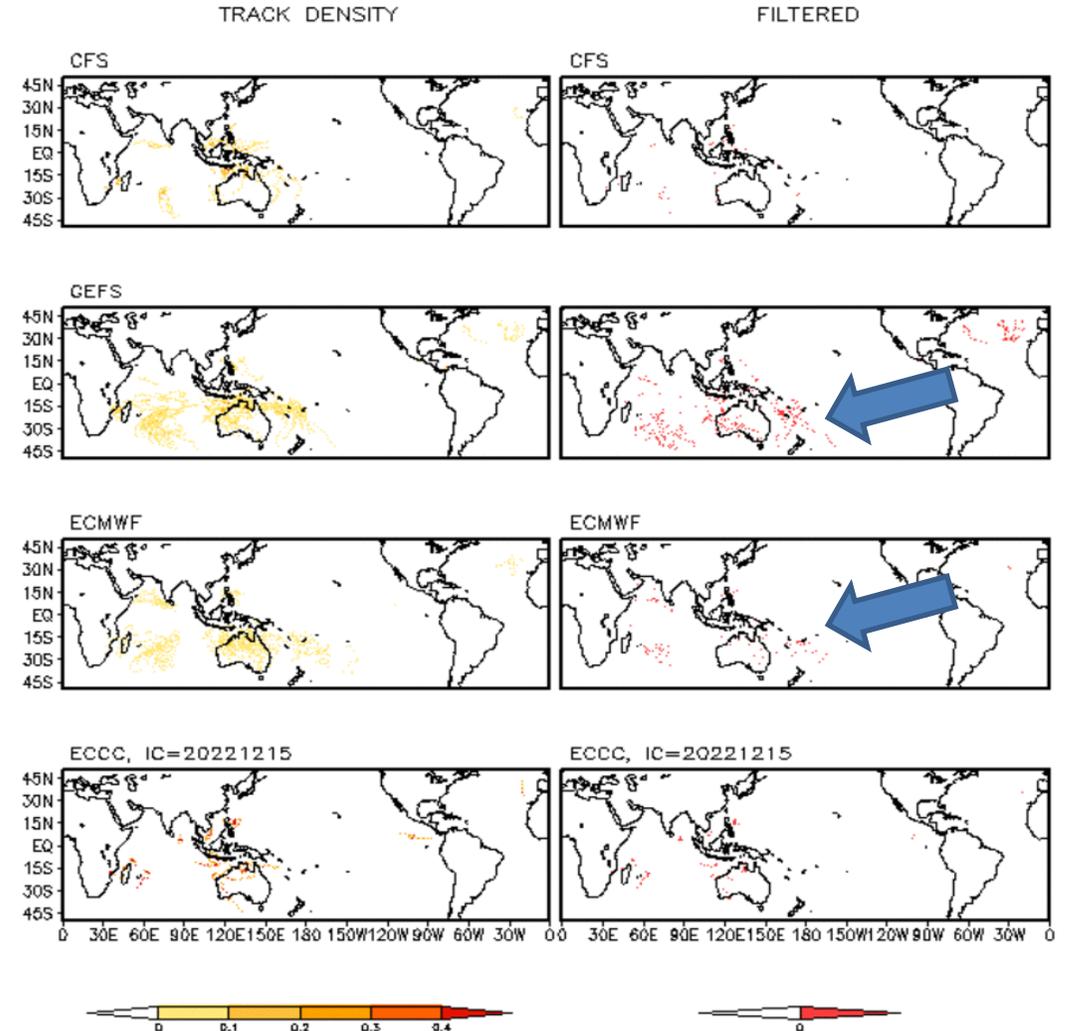
- LOW** TC development unlikely within 24 hours
- MEDIUM** TC development likely, but expected to occur beyond 24 hours
- HIGH** TC development likely within 24 hours (Reference TCFA)
- SUB TROPICAL** Monitoring for potential transition. Invest label color tropical transition

Multi-Model TC Track Probabilities/Densities: Week-2

Storm Track Probabilities, IC=20221219
Week 2: 1228 - 0103



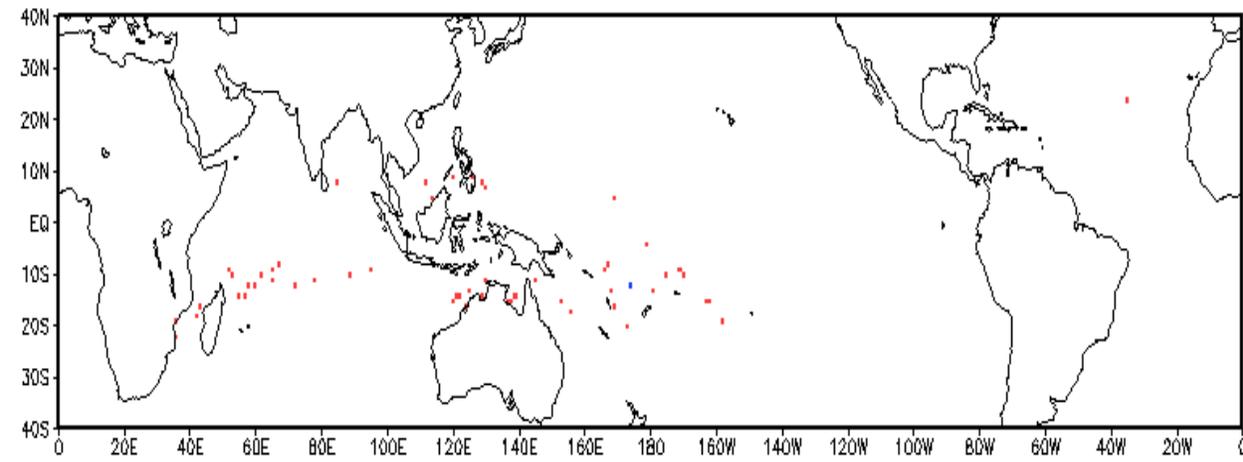
Storm Track Density Distribution, IC=20221219
Week 2 Forecast: 1228-0103



TC Climatological Genesis: Weeks 2 & 3

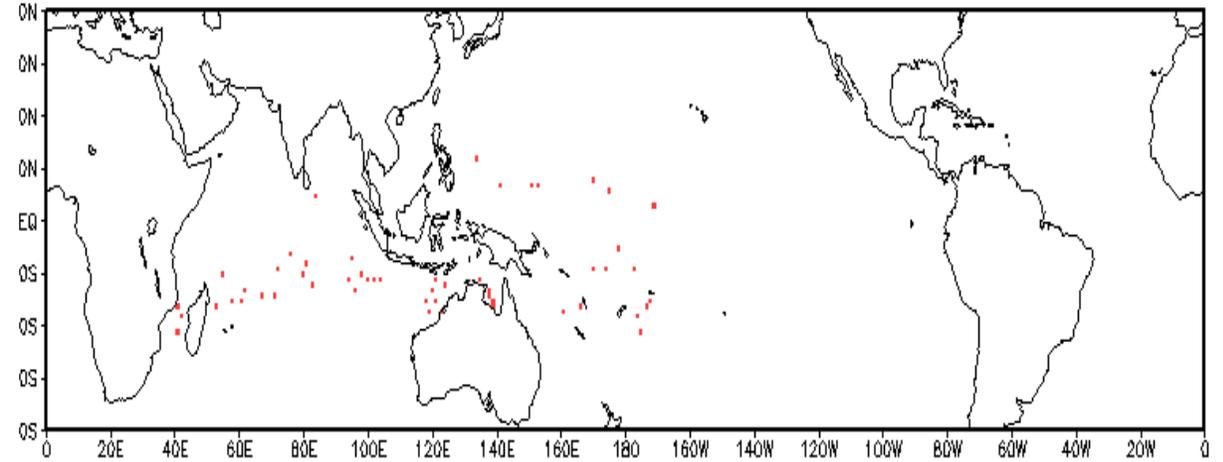
Observed TC Genesis, 1979–2021

7-day Period 1228 to 0103



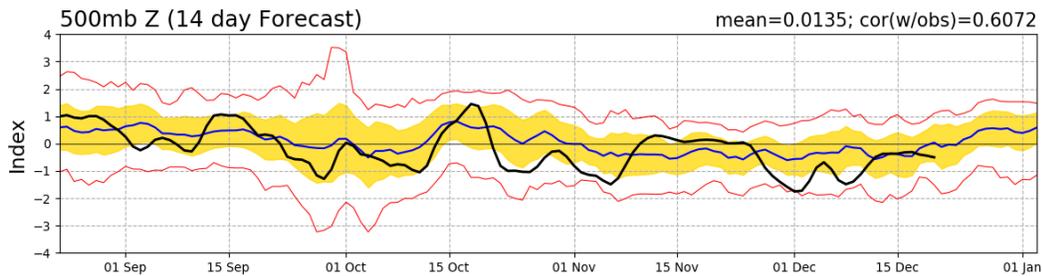
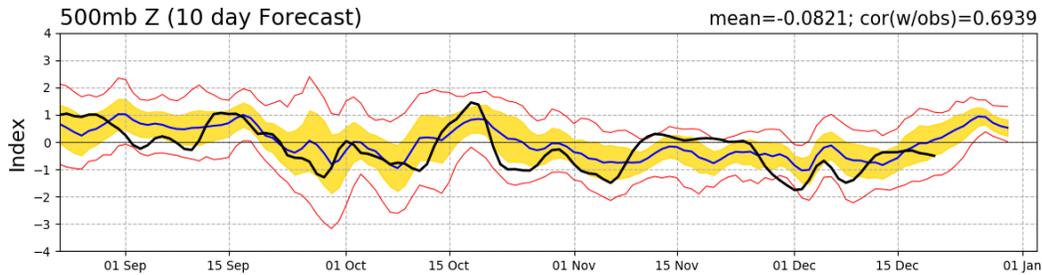
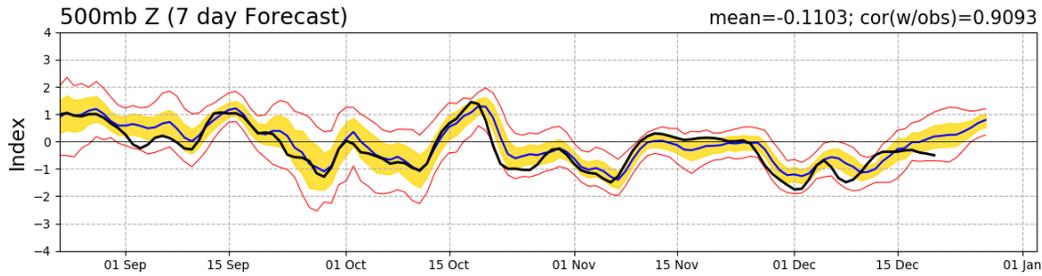
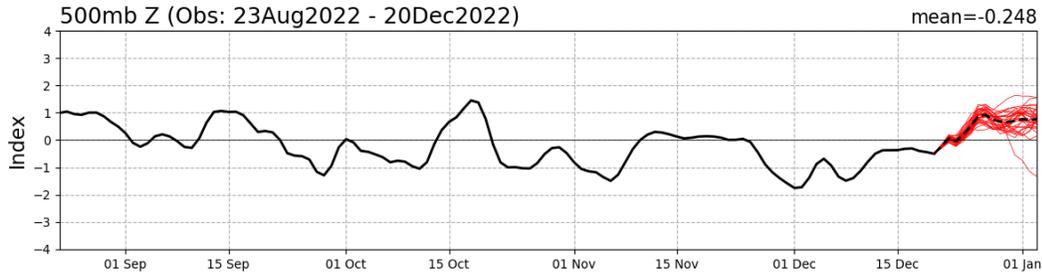
Observed TC Genesis, 1979–2021

7-day Period 0104 to 0110

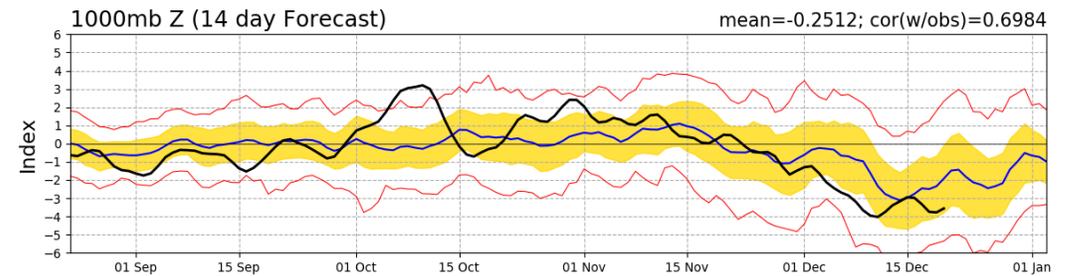
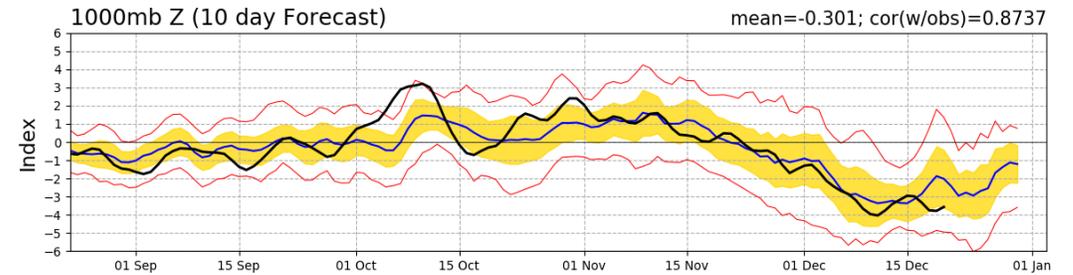
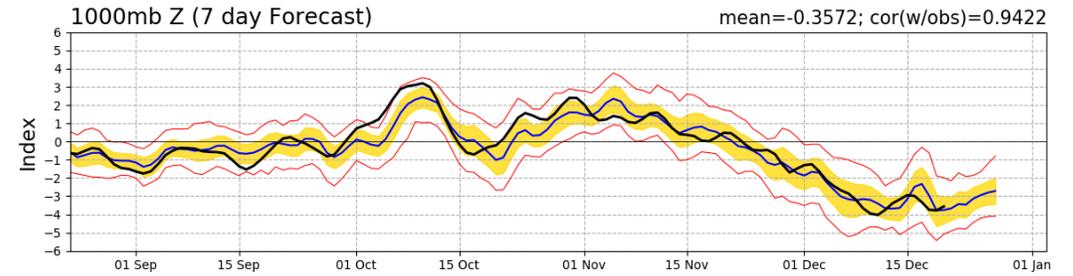
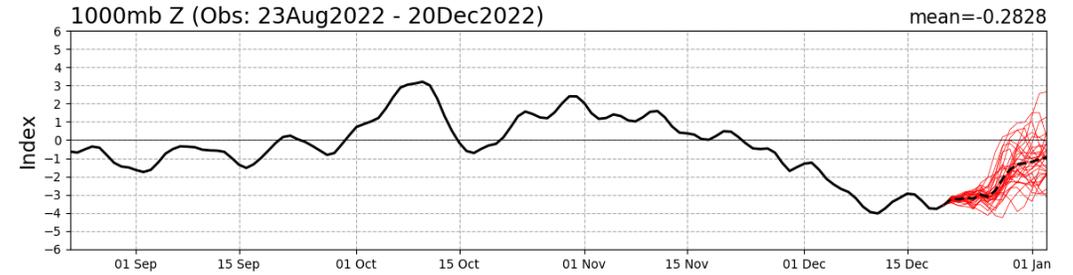


Teleconnection Indices: PNA / AO:

PNA Index: Observed & GEFS Forecasts

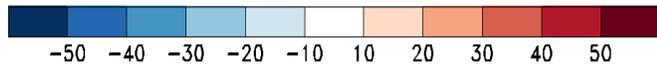
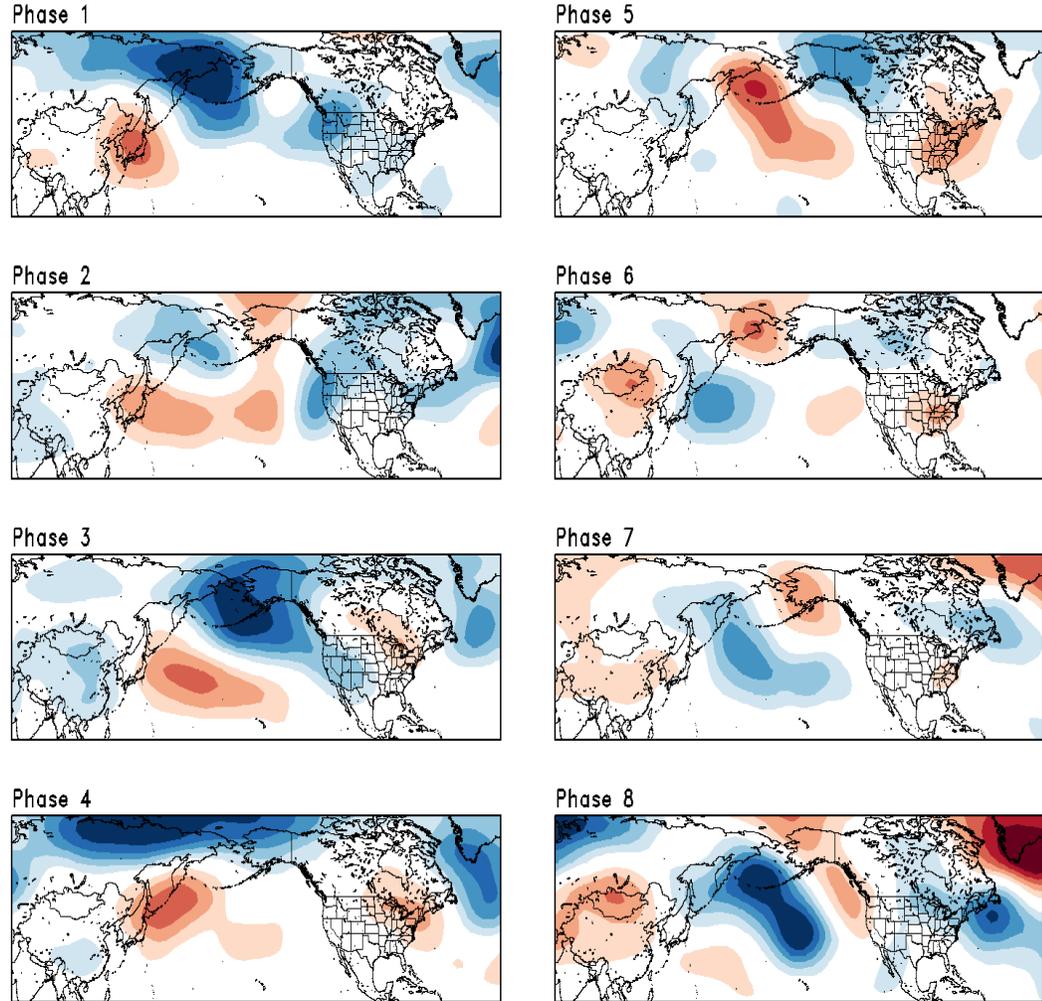


AO Index: Observed & GEFS Forecasts

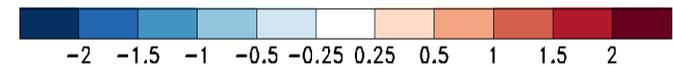
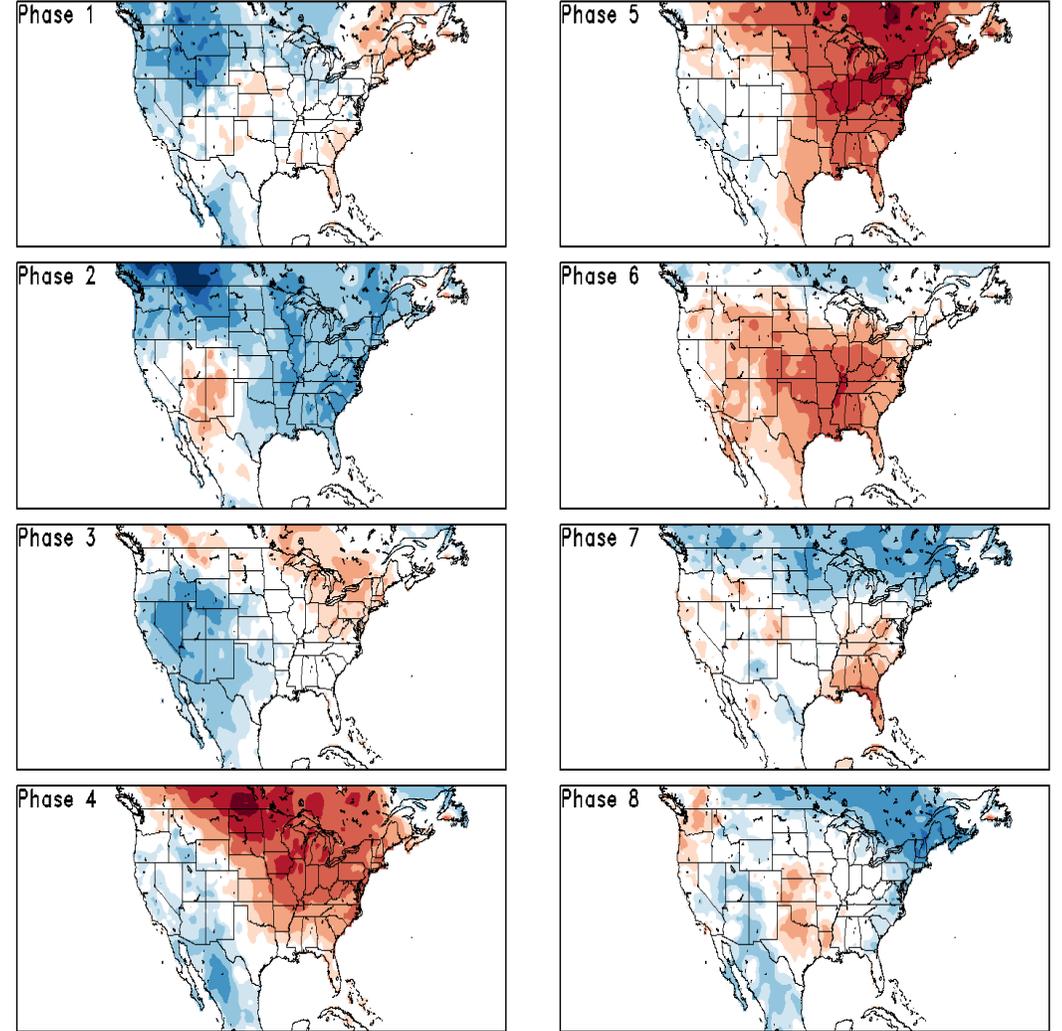


Historical 500-hPa Height & U.S. Temperatures By MJO Phase:

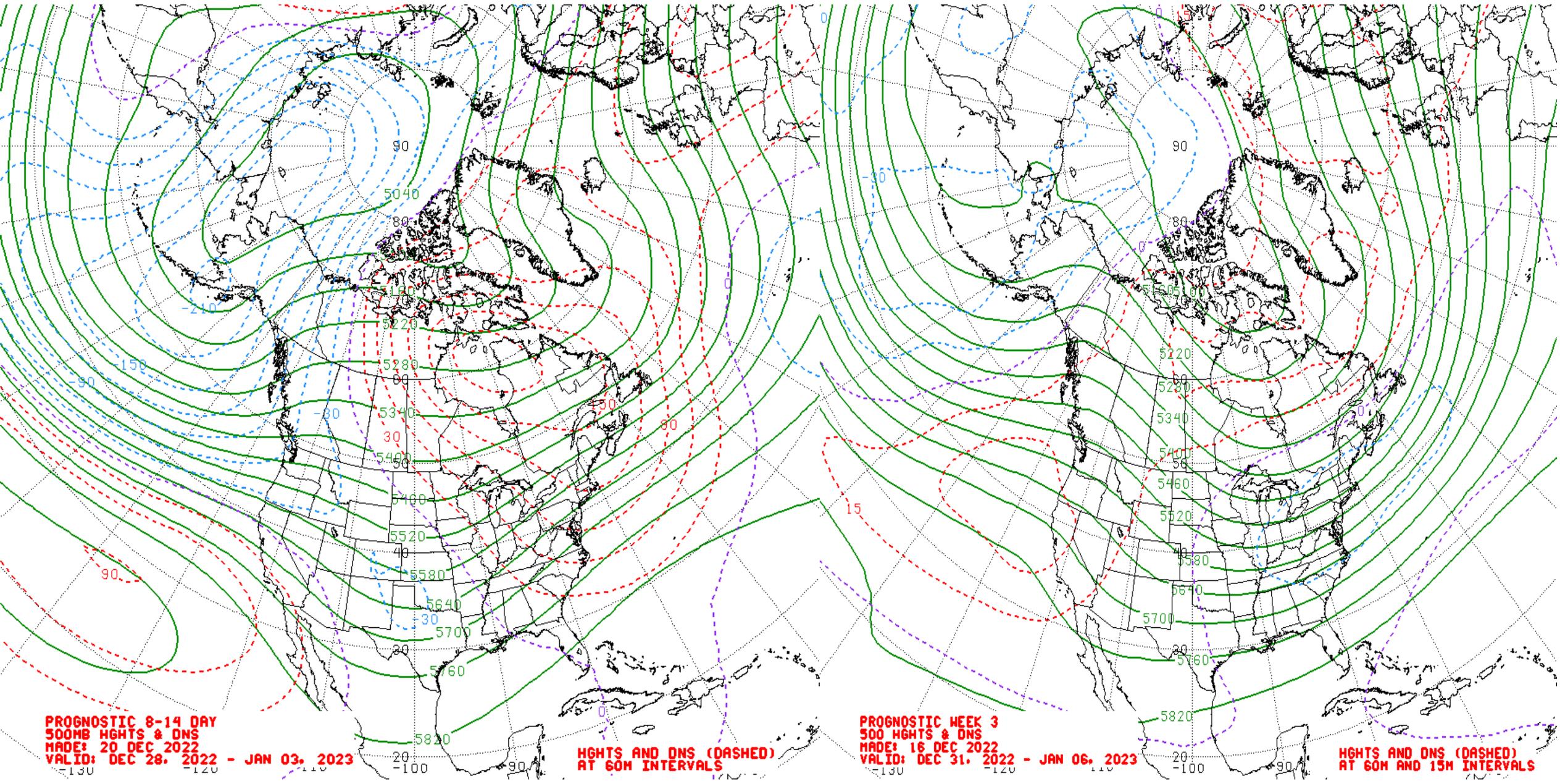
NDJ MJO Composite: CDAS 500-hPa Height (m)



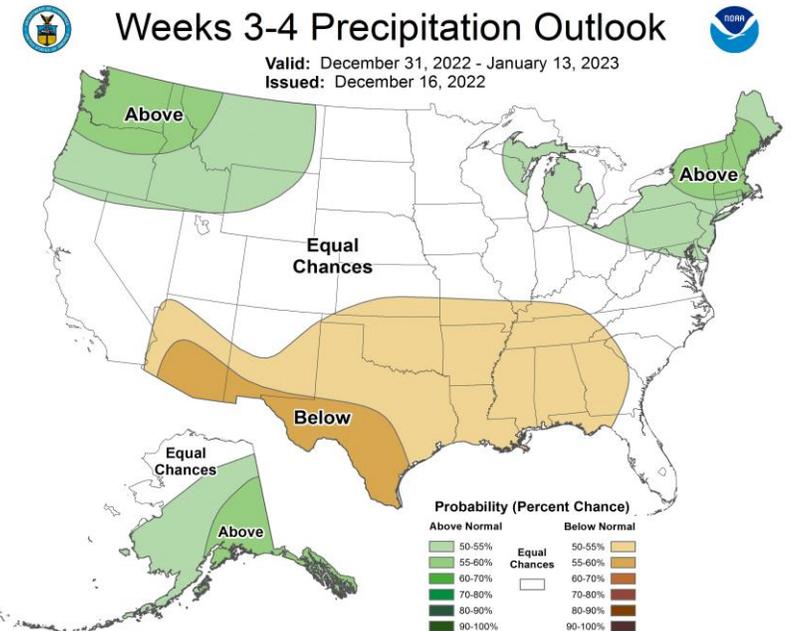
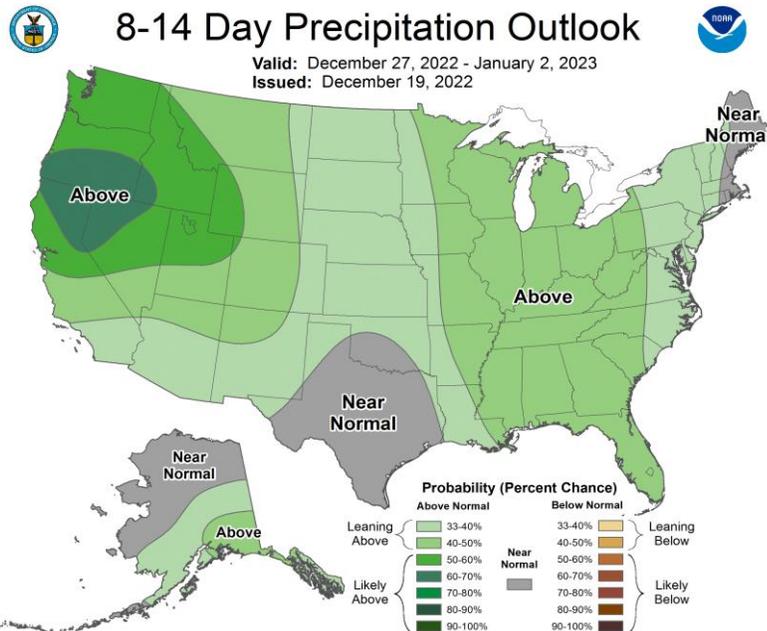
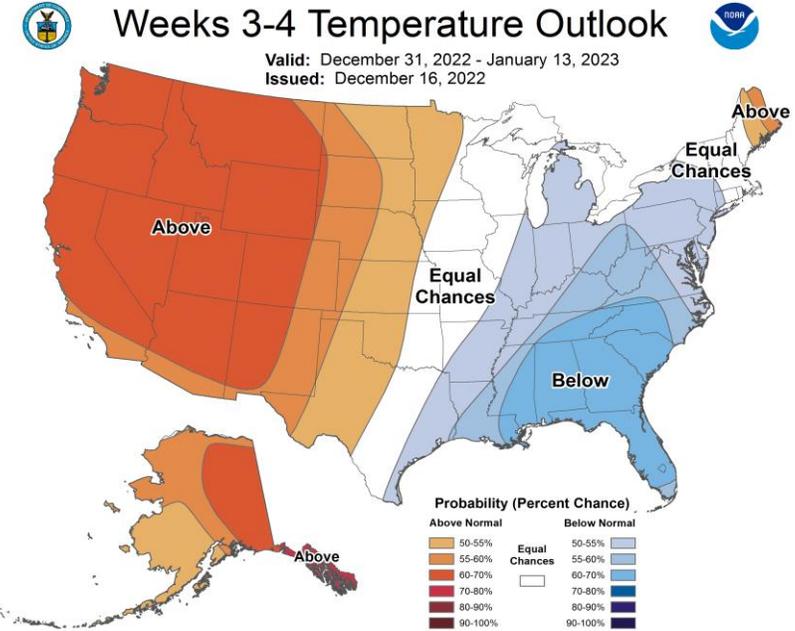
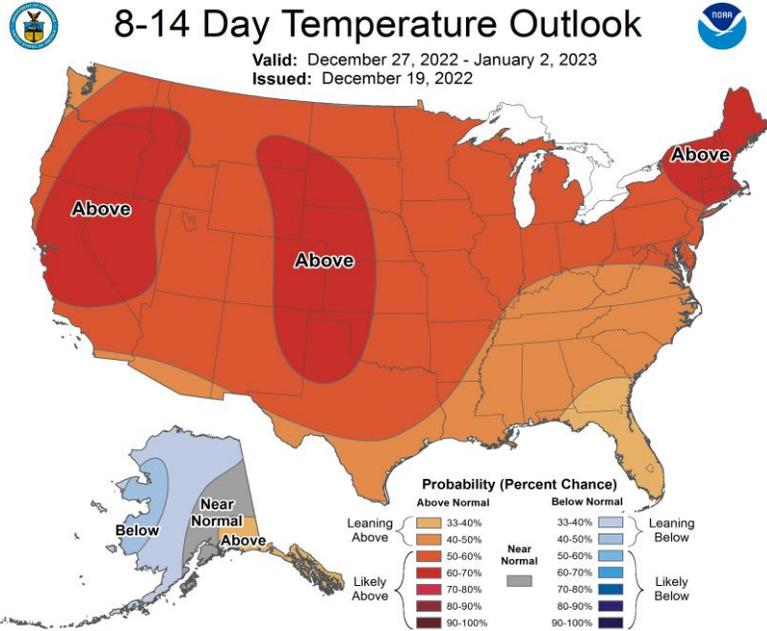
NDJ MJO Composite: GLBT (degC)



Mean 500-hPa Height Anomaly Forecasts:



Official Temperature & Precipitation Forecasts:



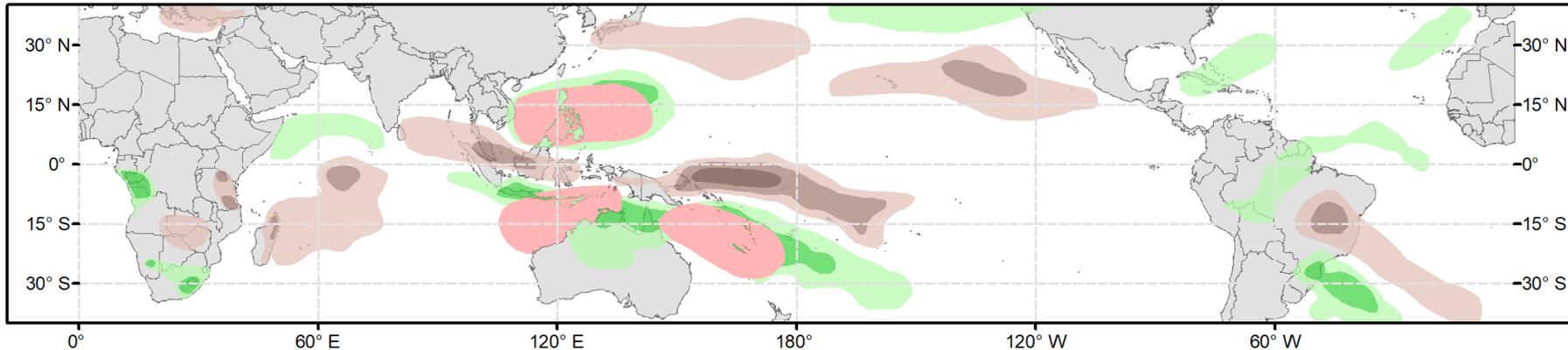


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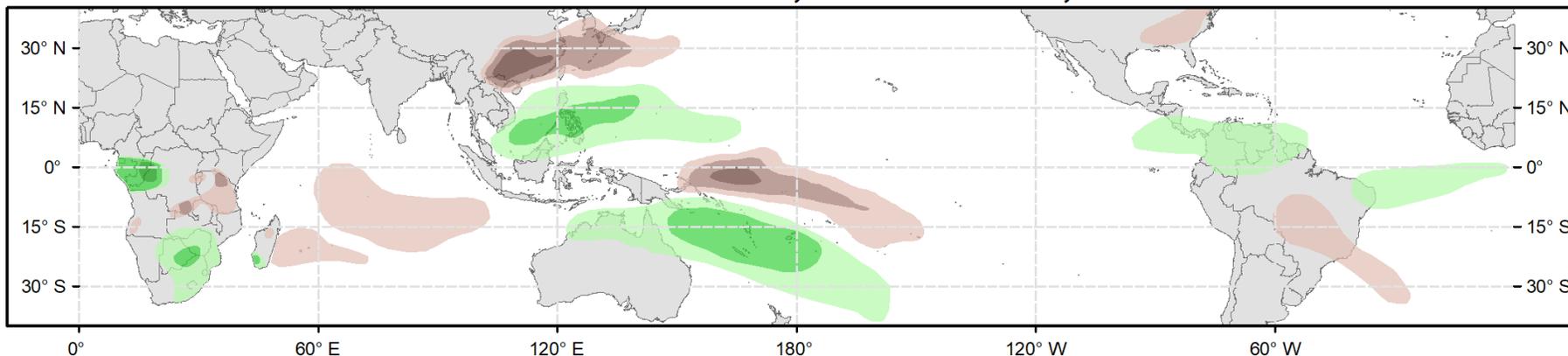
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