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170th Climate Forum

Sub-seasonal to Seasonal (S2S) Climate Forecast

Presenter:

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CLIMPS-CAD, DOST-PAGASA



AT THE FRONTLINE OF
CLIMATE ACTION
National & World
Meteorological Day 2024

OUTLINE

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What is Sub-seasonal to Seasonal (S2S) Forecasting?

Sources of Predictability of S2S (MJO)

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S2S Climate Forecast

Summary

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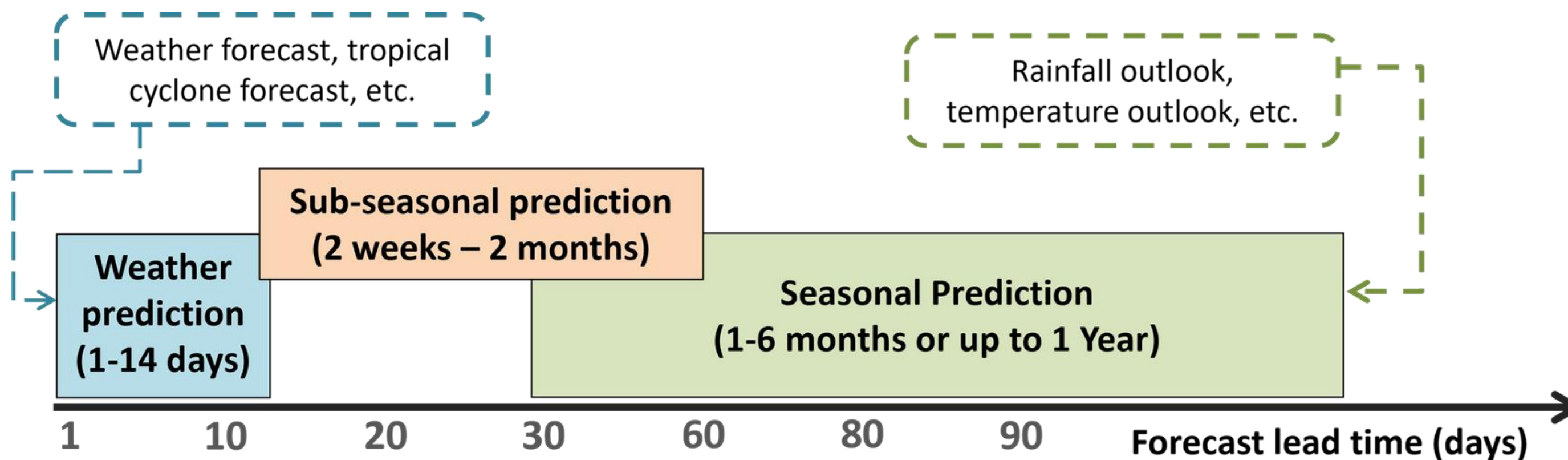
DOST



PAGASA

The Weather and Climate Authority

Sub-seasonal predictions contribute to fill the gap between weather and seasonal time scales



Source: WMO

- It is a time-averaged (i.e., pentad, weekly) climate forecast with timescales from 2 weeks up to ~2 months.
- The goal is to improve the forecast skill and understanding on **high impact weather events (i.e., Rainfall, Tropical cyclones)**

Main sources of S2S predictability

- Madden-Julian Oscillation (MJO)
- Ocean/land/ice surface conditions
 - El Nino Southern Oscillation (ENSO); Soil Moisture; Snow Cover
- Stratosphere-Troposphere interaction



What is MJO?

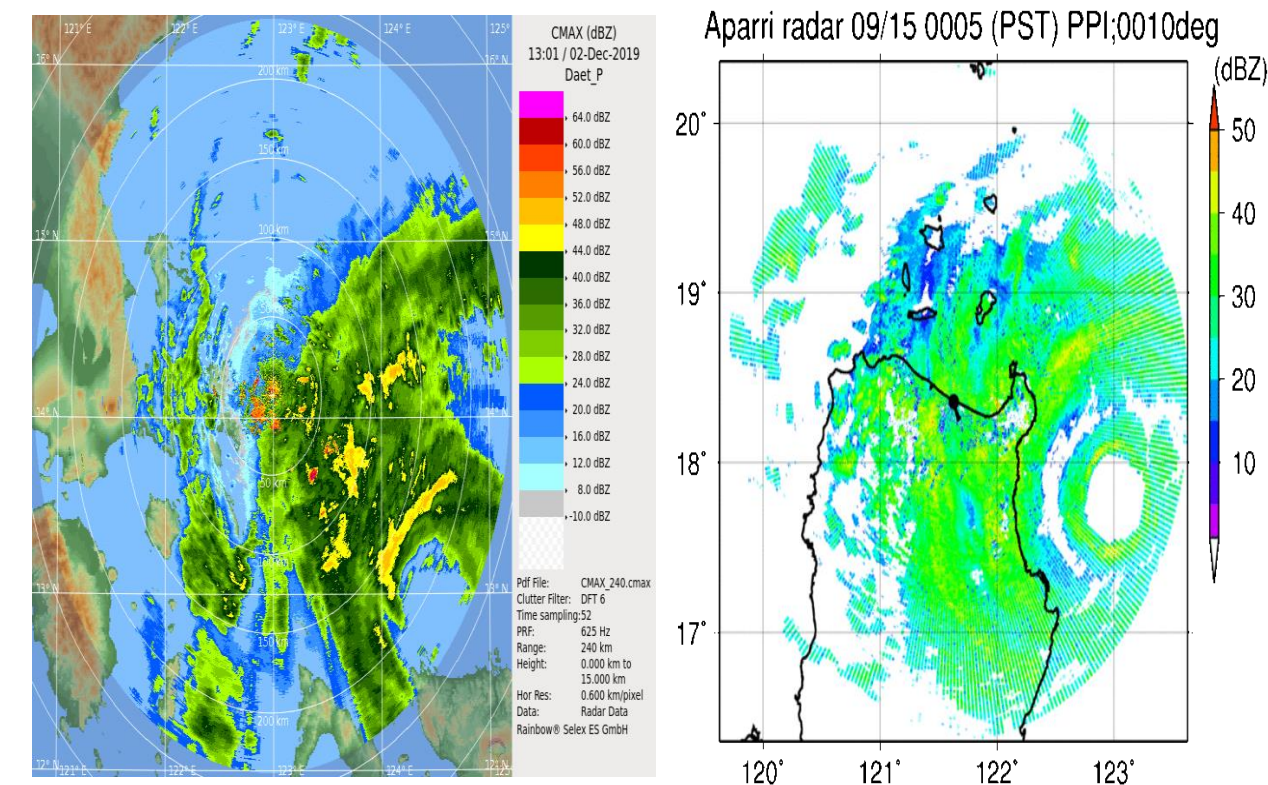
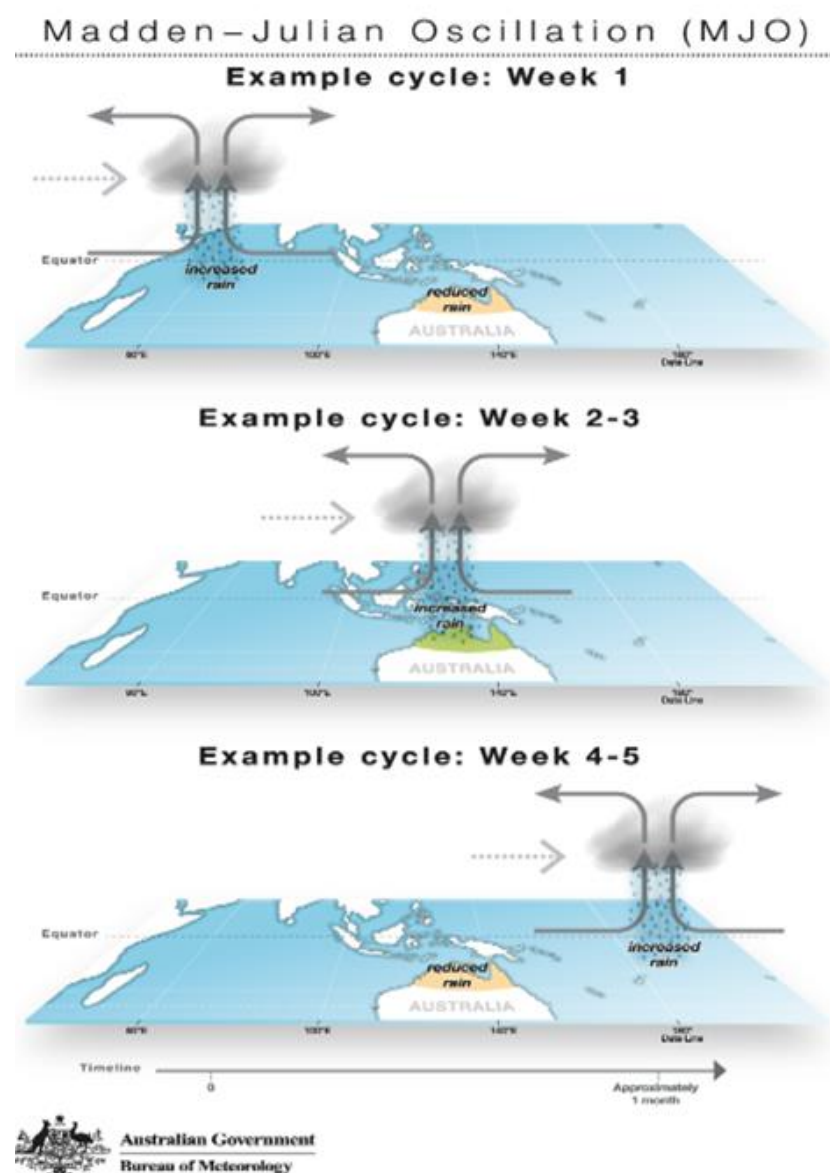
Madden-Julian Oscillation (MJO) – is an intra-seasonal eastward-moving disturbance of clouds, winds, rainfall, and pressures that circles the tropical areas of the globe in 30 to 60 days oscillation. (Named after the two scientists (Dr. Roland Madden and Dr. Paul Julian))

Why is MJO important?

1 It can enhance or suppress the rainfall in the equatorial area including the Philippines.



2 Act as a modulator of tropical cyclone formation in the country.

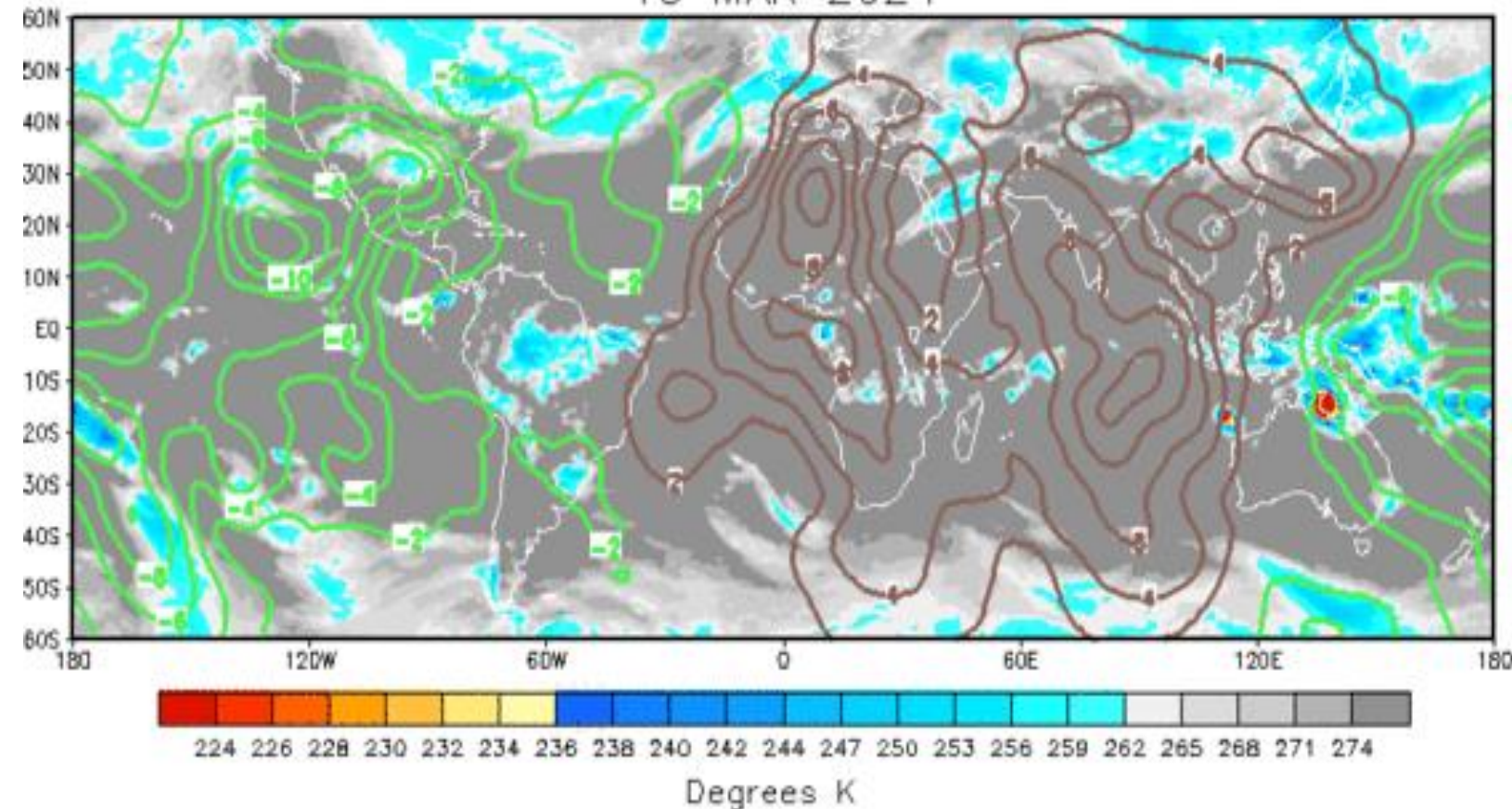


MJO Recent Evolution

MJO phase in the past 40 days

200-hPa Velocity Potential Anomalies

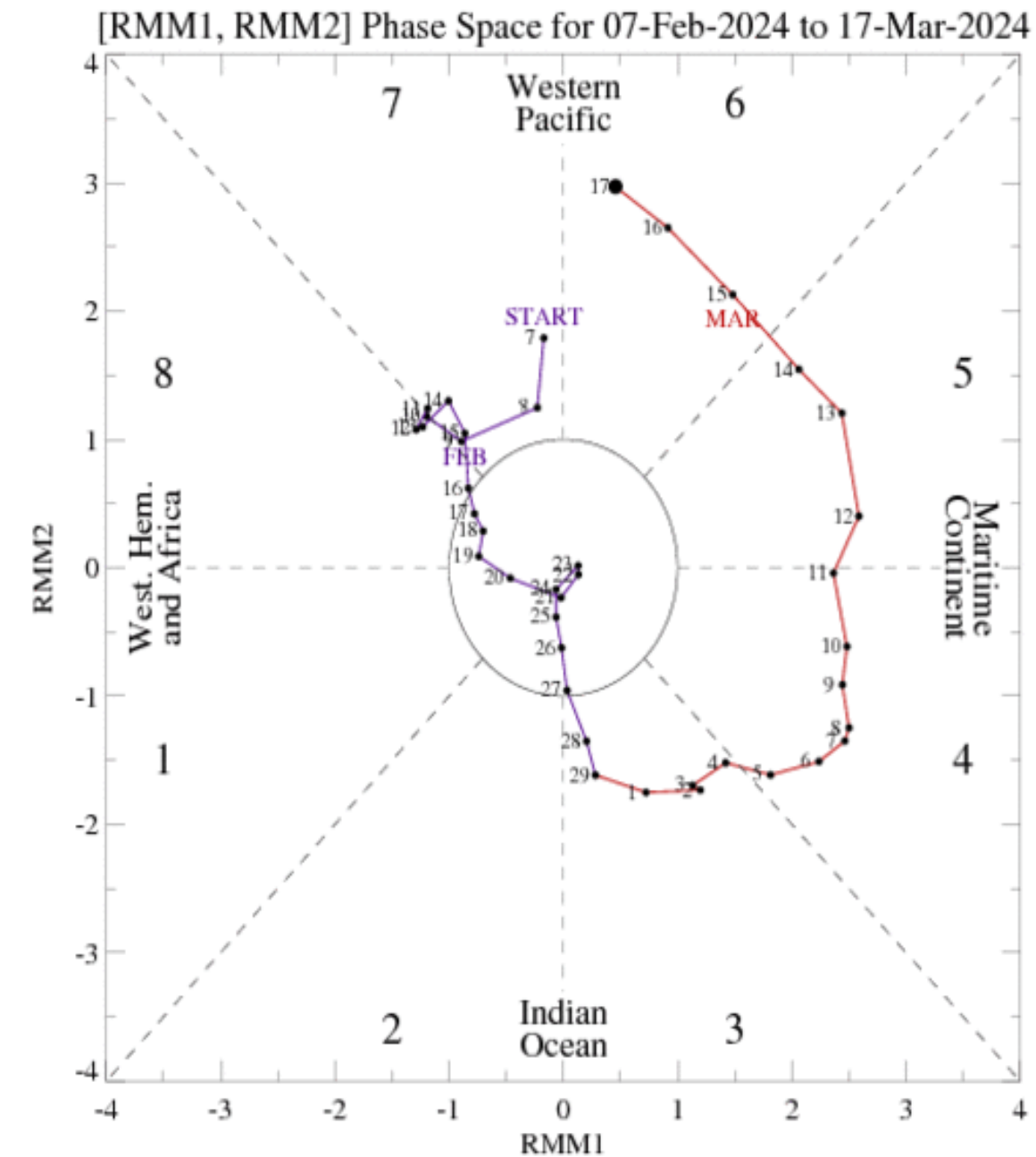
18 MAR 2024



Green – Increased cloud formation (favorable for precipitation)

Brown - Less cloud formation (unfavorable for precipitation)

Images adapted from CPC NOAA (Mar. 17, 2024 update)



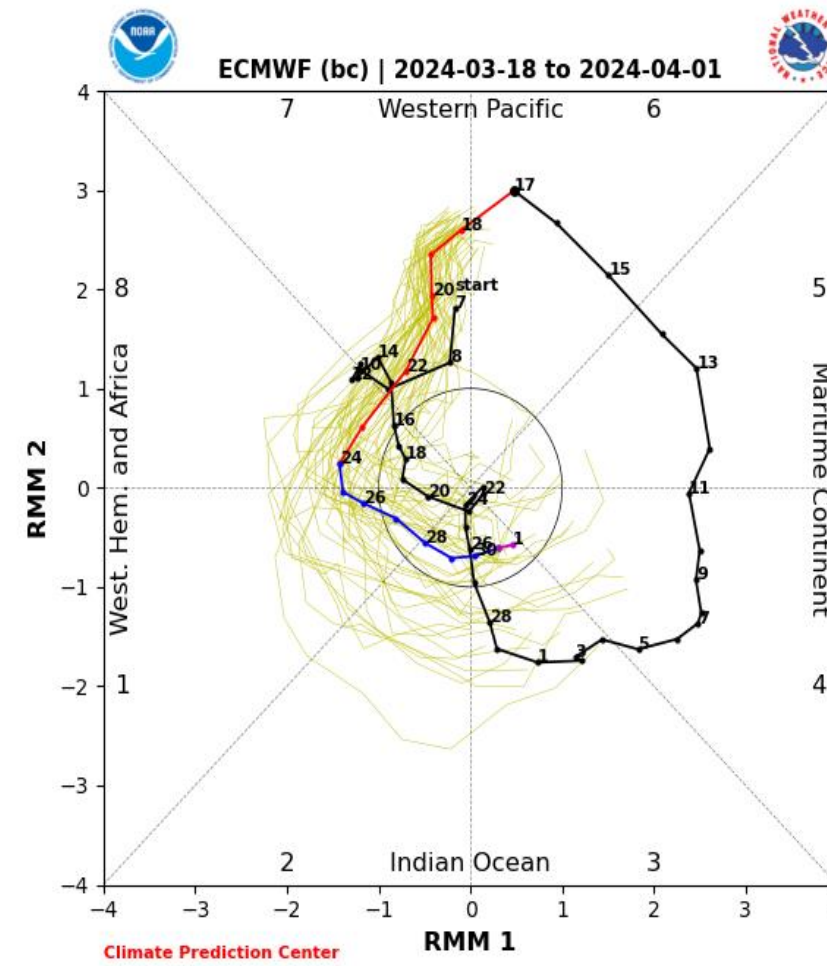
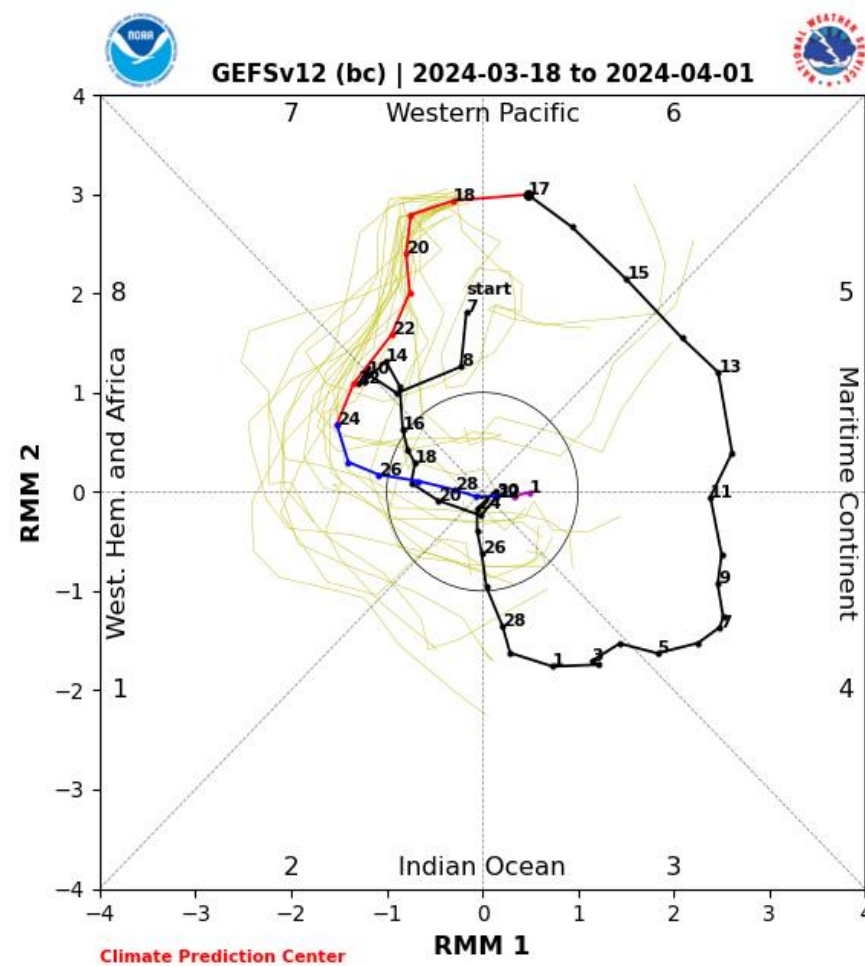
RMM1 and RMM2 are mathematical methods that combine cloud amounts and winds at upper and lower levels of the atmosphere to measure the strength and location of the MJO.

When this index is within the center circle the MJO is considered weak. Outside of this circle the index is stronger and will usually move in an anti-clockwise direction as the MJO moves from west to east.

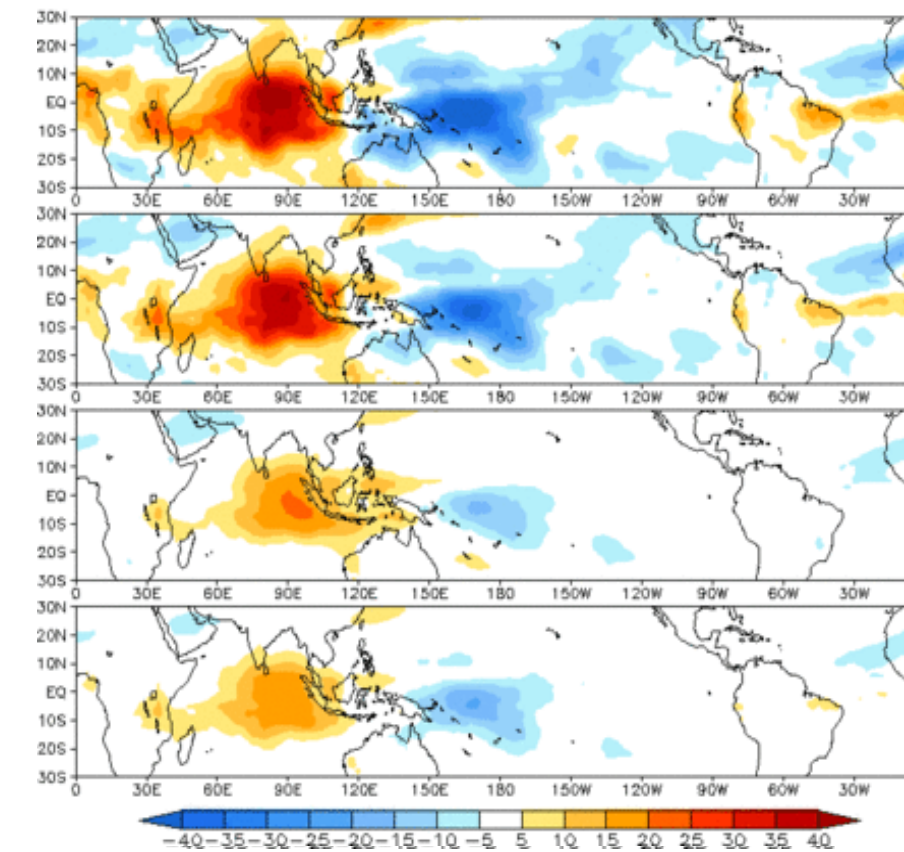
Strong MJO activity, with clearly established eastward propagation from the Indian Ocean well into the Western Pacific at high amplitude.

MJO Forecast Evolution (March 20 – April 1, 2024)

MJO phase forecast in the next 15 days



Prediction of MJO-related anomalies using GEFS operational forecast
Initial date: 17 Mar 2024
OLR



- The models show very good agreement in predicting that the MJO will continue to propagate eastward but weakens over time.
- The OLR forecast shows a steady propagation of the suppressed phase from the Indian Ocean into the Maritime Continent and the emergence of enhanced convection over Africa during week-2.



Sub-seasonal to Seasonal (S2S) Climate Forecast

(March 20, 2024 – April 02, 2024)

1. Tropical Cyclone (TC)-Threat Potential
2. Rainfall Exceedance Probability Forecast

Tropical Cyclone (TC)-Threat Potential

Initialization: 19 March (8 AM)

Date Issued: 20 March 2024

Validity: Valid within the forecast period, unless superseded by succeeding forecast.

Forecast Summary:

Week-1 (March 20 – 26, 2024)

- No TC-like vortex (TCLV) is present within the PMD.
- Forecasts indicate a low likelihood of TCLV formation near or within the PAR in week-1.

Week-2 (March 27 – April 2, 2024)

- The model projections show that there is still a low likelihood of TCLV development near or within the PAR over week-2.
- Therefore, the **TC-THREAT POTENTIAL IS UNLIKELY** over the forecast period.

However, any changes in the forecast pattern will be closely monitored and updates will be issued as needed.

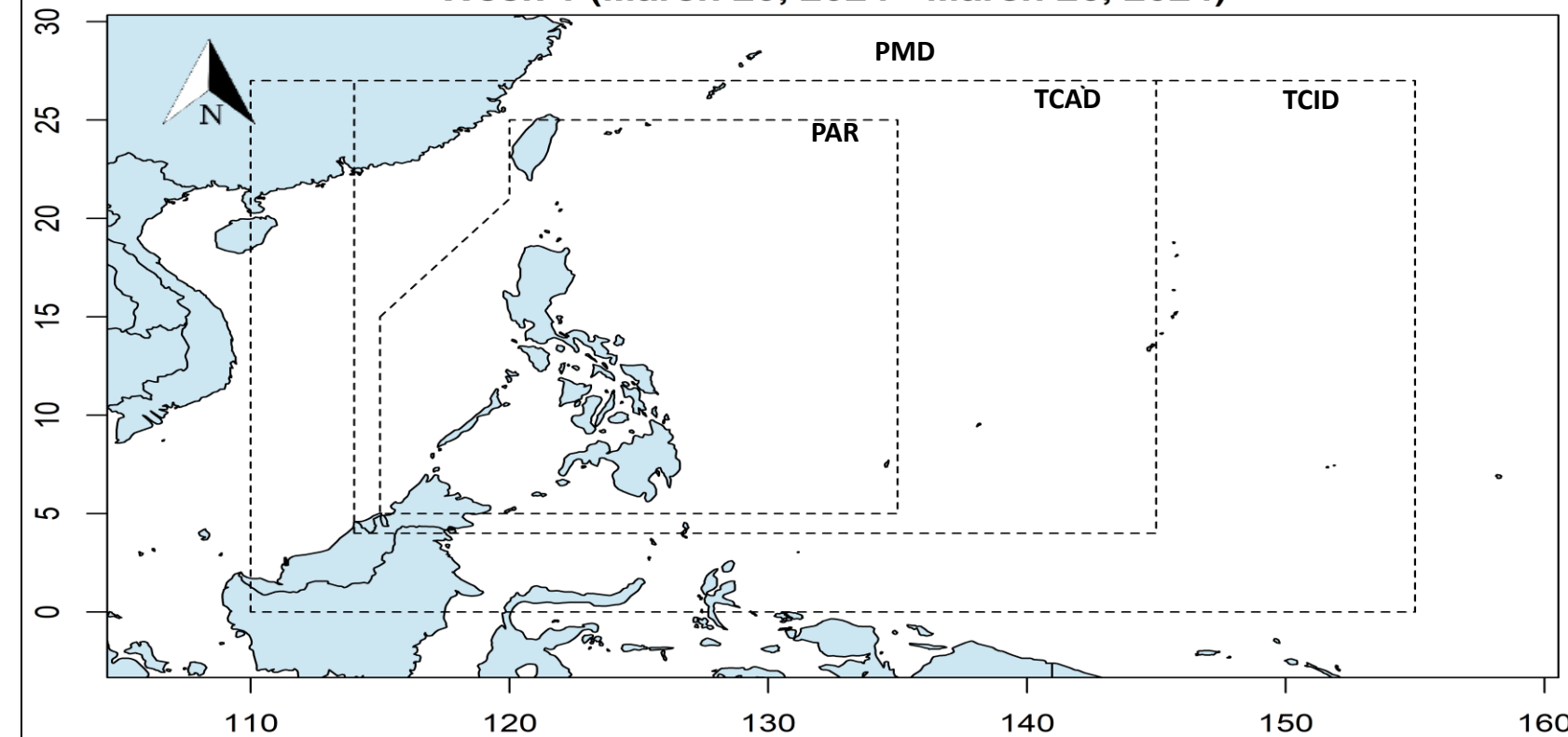
Note: The information contained here is based on the 6-hourly forecasts of the NCEP-GEFS issued in the past 24 hours where the Central Weather Administration (CWA) TC Tracking algorithm was applied. This product was part of the collaboration between PAGASA and CWA through the MECO/TECO VOTE Project. This is for guidance purposes only.

For Weather Updates, kindly refer to: www.bagong.pagasa.dost.gov.ph/weather

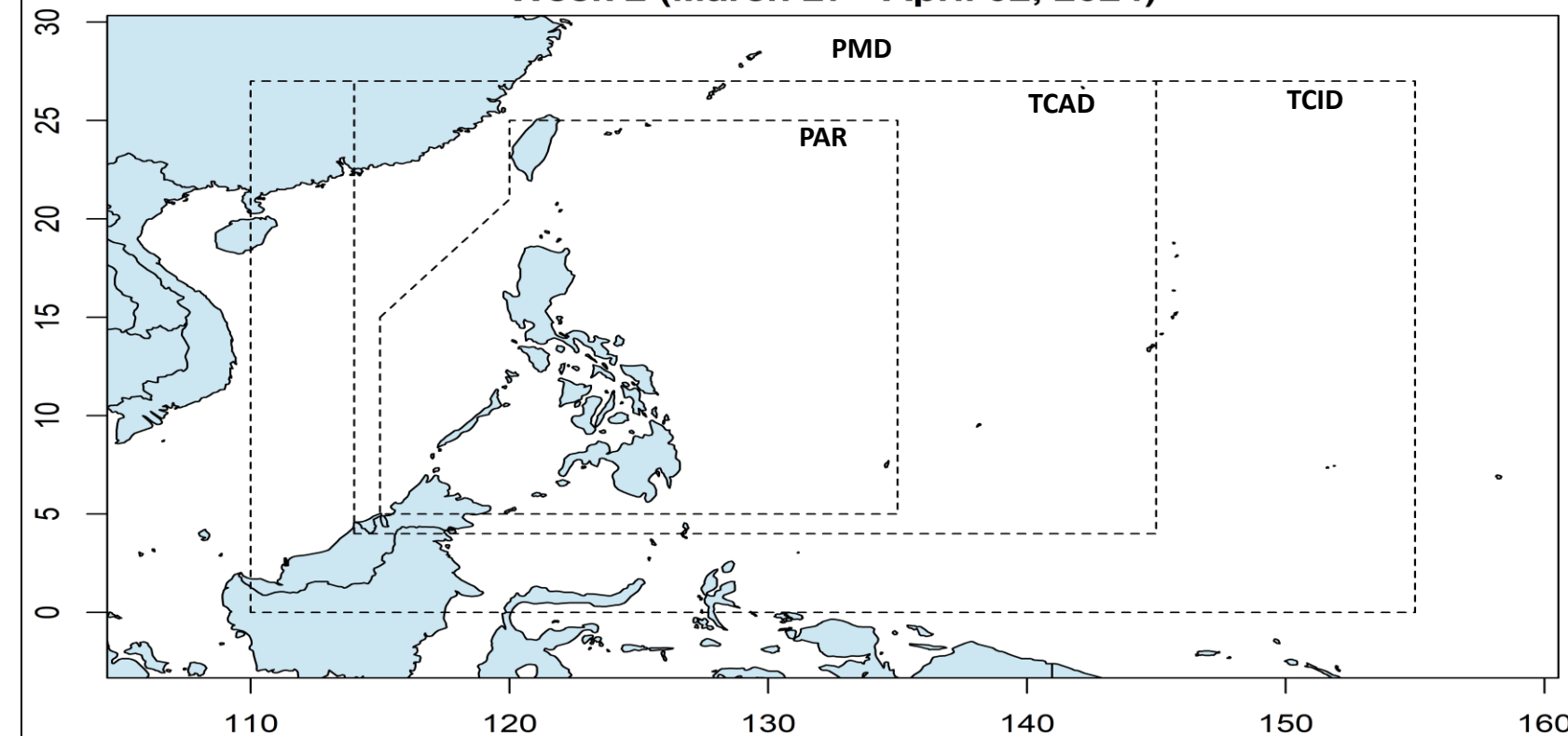
PMD: PAGASA Monitoring Domain
PAR: Philippine Area of Responsibility

TCAD: Tropical Cyclone Advisory Domain
TCID: Tropical Cyclone Information Domain

Week 1 (March 20, 2024 - March 26, 2024)



Week 2 (March 27 - April 02, 2024)

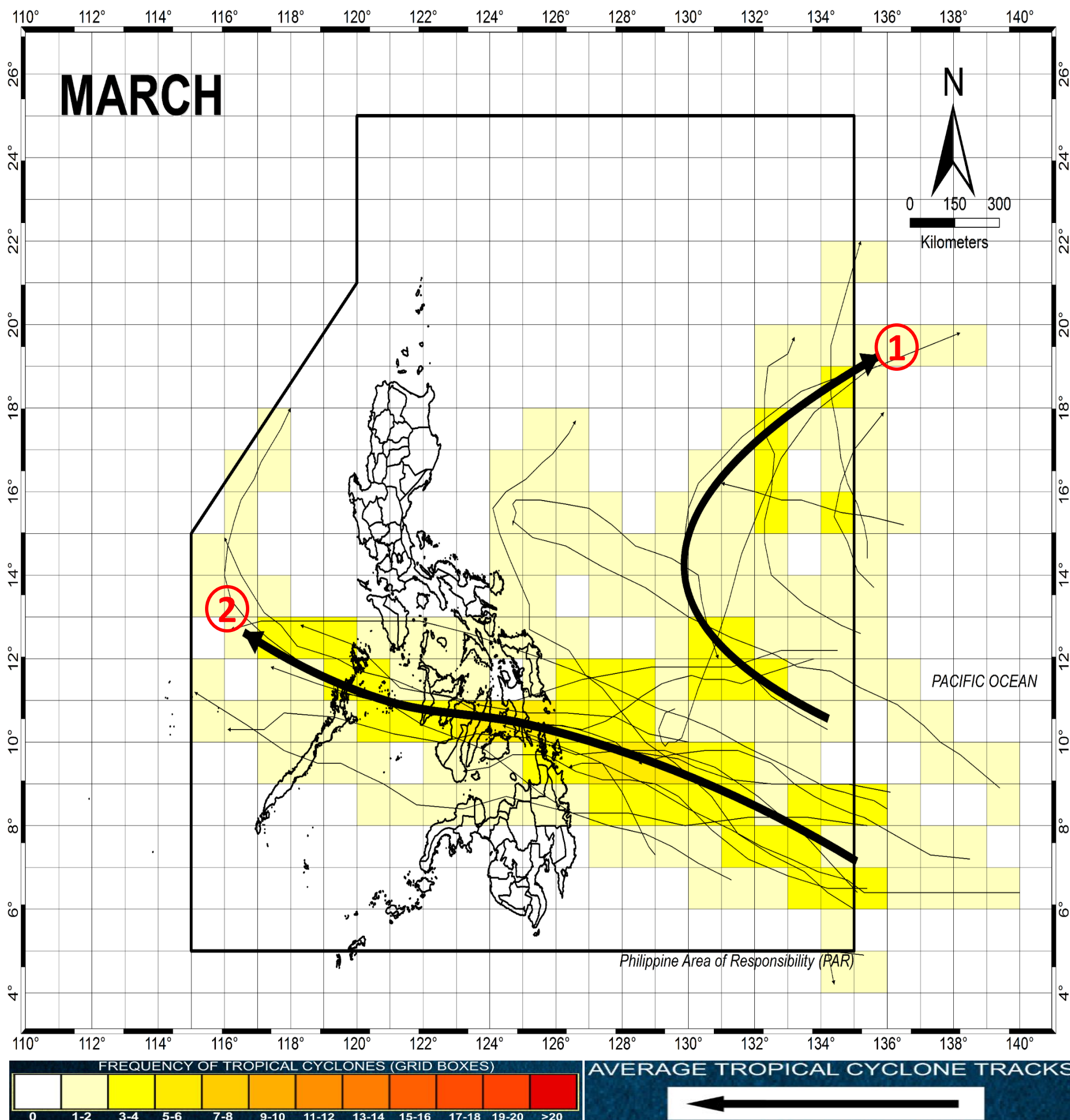


Likelihood of TC Formation



Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA)

Prepared by: CAD-CLIMPS-Contact us @Tel no:(02)8284-0800 loc. 4920/4921 or Email: pagasa.climps@gmail.com



Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)

Tropical Cyclone Climatological Tracks for March in the Philippine Area of Responsibility (PAR)

Climatological tracks for the month of March suggest 2 most common tracks (Lesser chance of TC formation during this month):

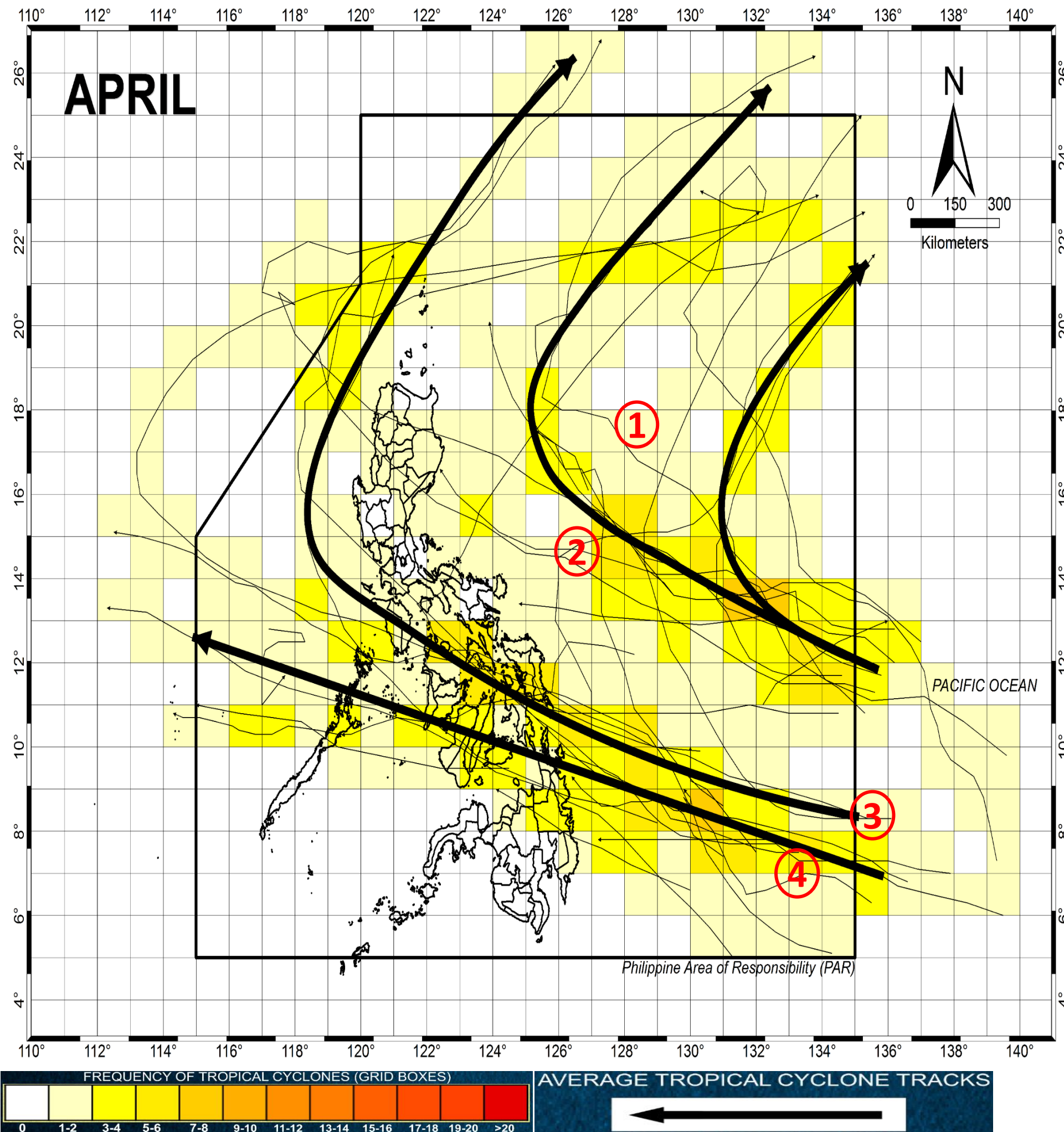
1. TCs formed in the Western Pacific which may enter the PAR but recurve afterwards.
2. TCs formed in the Western Pacific which may enter the PAR and make landfall in Central Philippines before dissipating in the South China Sea.



Tropical Cyclone Climatological Tracks for April in the Philippine Area of Responsibility (PAR)

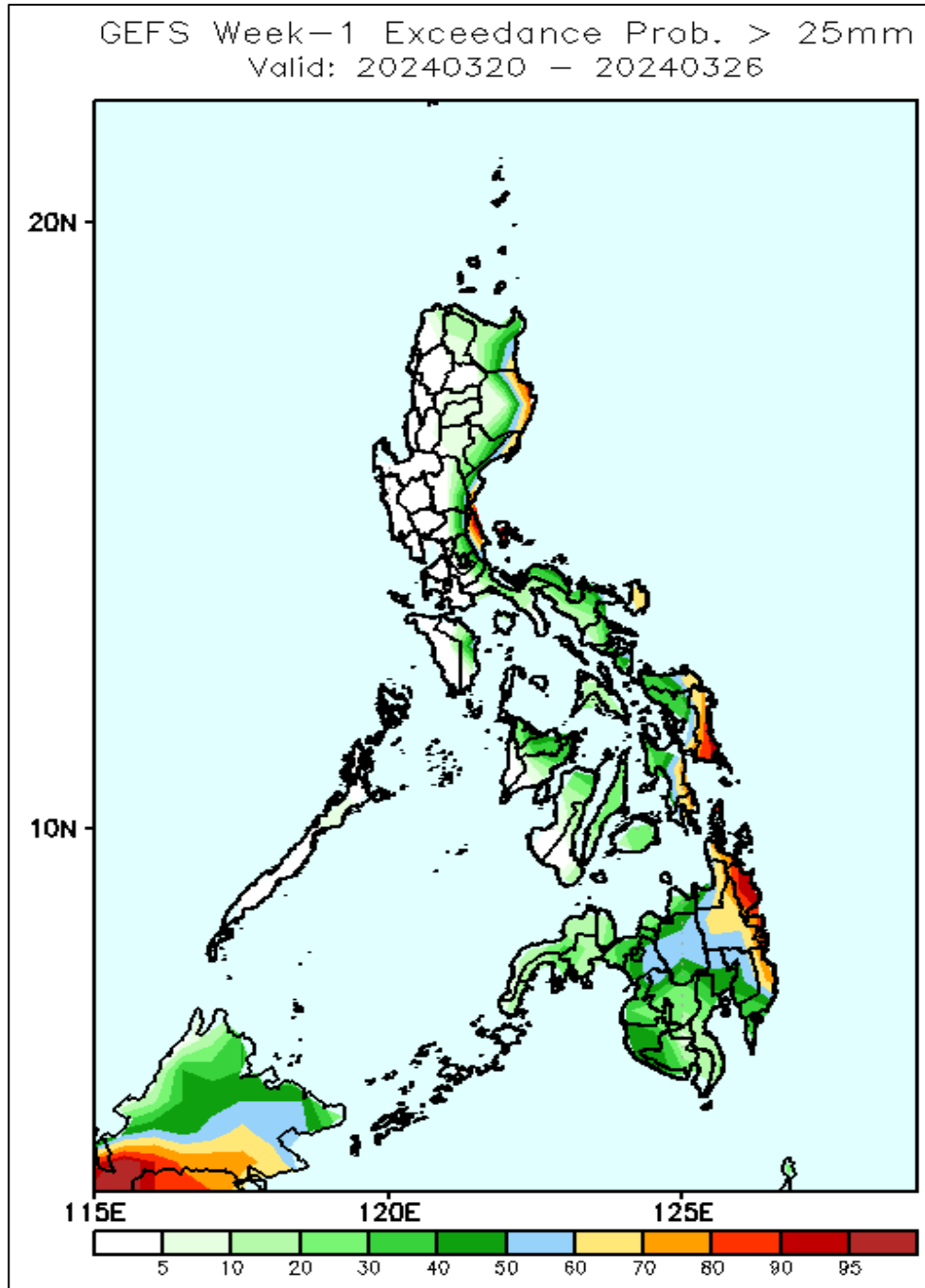
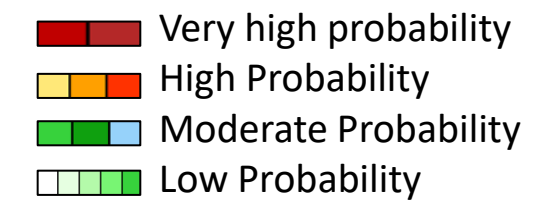
Climatological tracks for the month of April suggest 4 most common tracks (Lesser chance of TC formation during this month):

1. TCs formed in the Western Pacific which may enter the PAR but recurve afterwards towards Southern Japan.
2. TCs formed in the Western Pacific which may enter the PAR but recurve afterwards towards Japan.
3. TCs formed in the Western Pacific which may enter the PAR and traverse the Central Philippines then recurve towards Japan.
4. TCs formed in the Western Pacific which may enter the PAR and traverse the Central Philippines and move towards Vietnam.



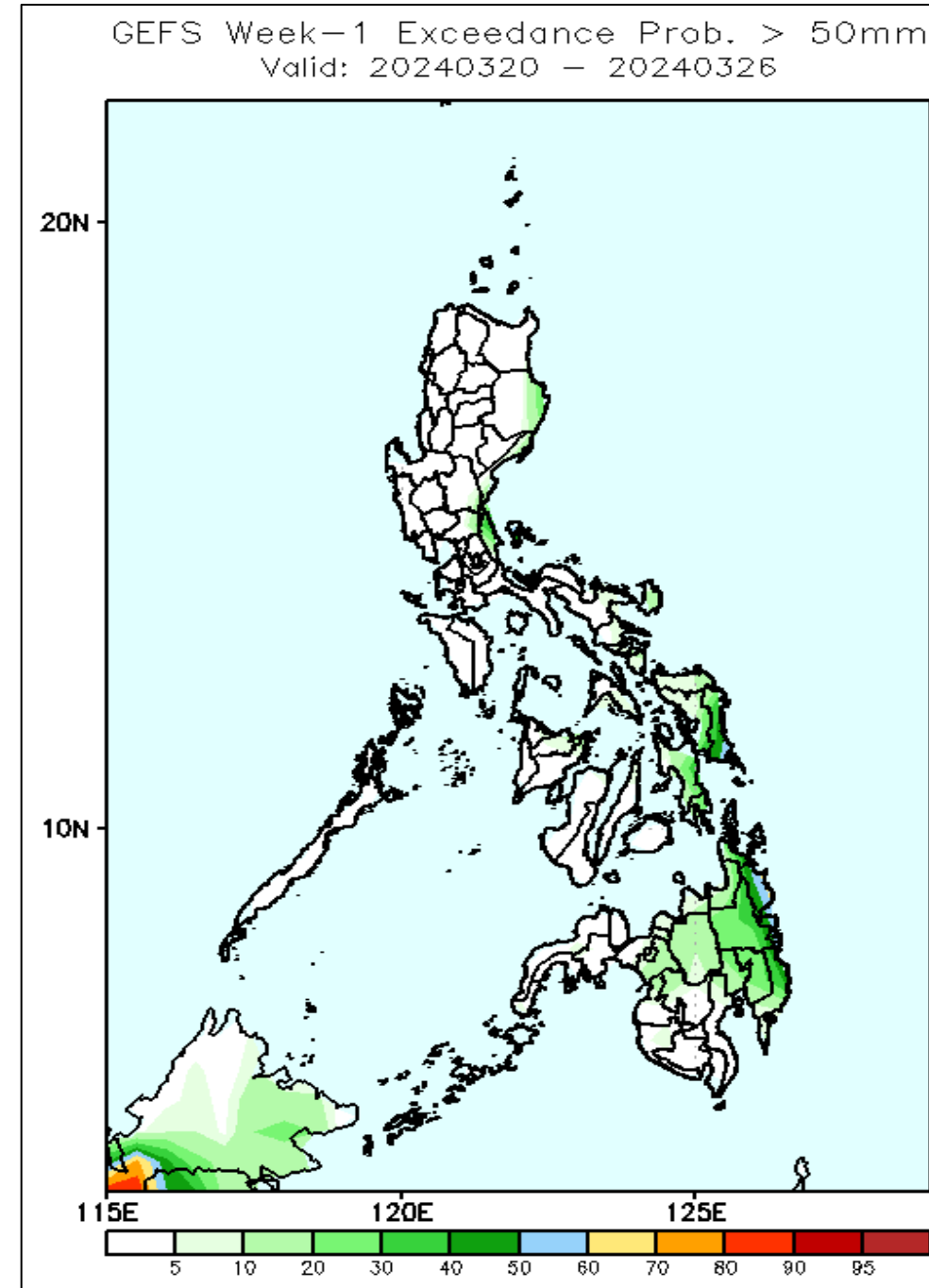
WEEK - 1: RAINFALL EXCEEDANCE PROBABILITY FORECAST

March 20 - 26, 2024



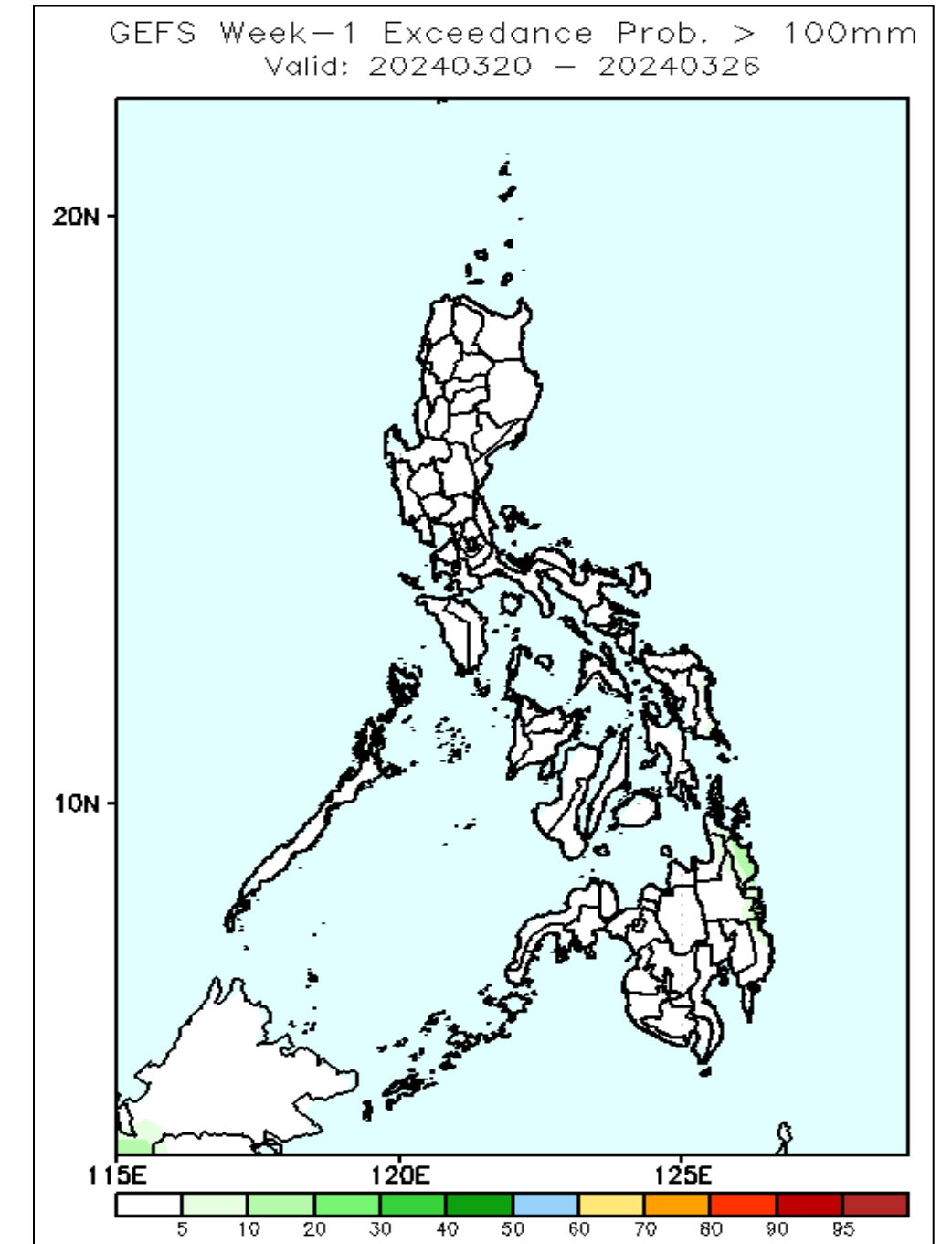
Probability to Exceed 25mm

- Moderate to high over the eastern portions of Cagayan and Isabela, Aurora, northern Quezon, Catanduanes, Eastern Visayas and Eastern Mindanao;
- Low to moderate over the rest of the eastern sections of Luzon;
- Low over the rest of the country.



Probability to Exceed 50mm

- Low to moderate over Eastern Samar and Surigao del Sur;
- Low over the rest of the country.

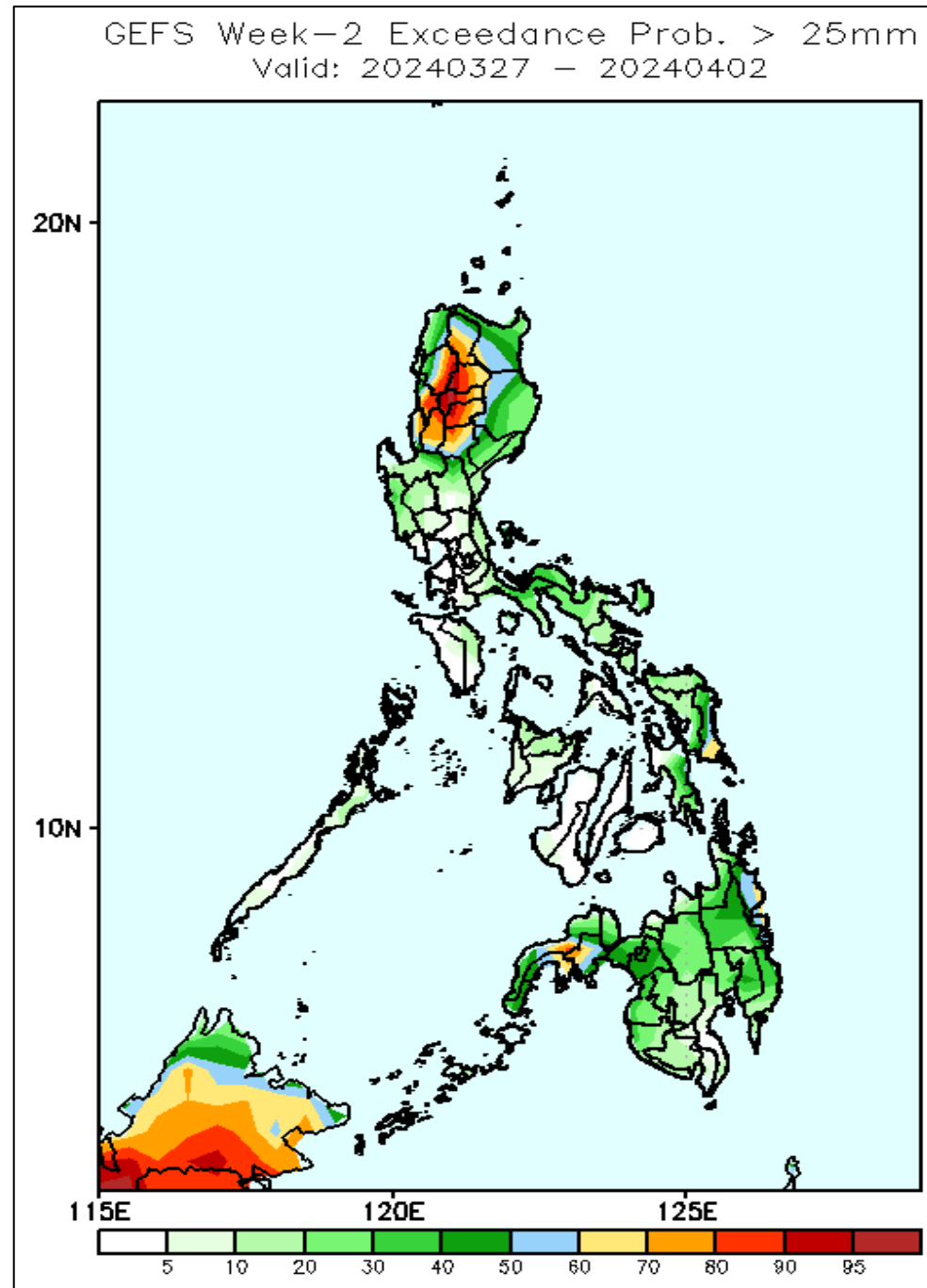
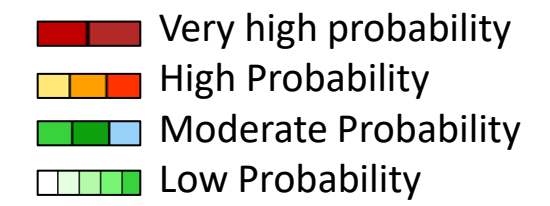


Probability to Exceed 100mm

- Low across the country.

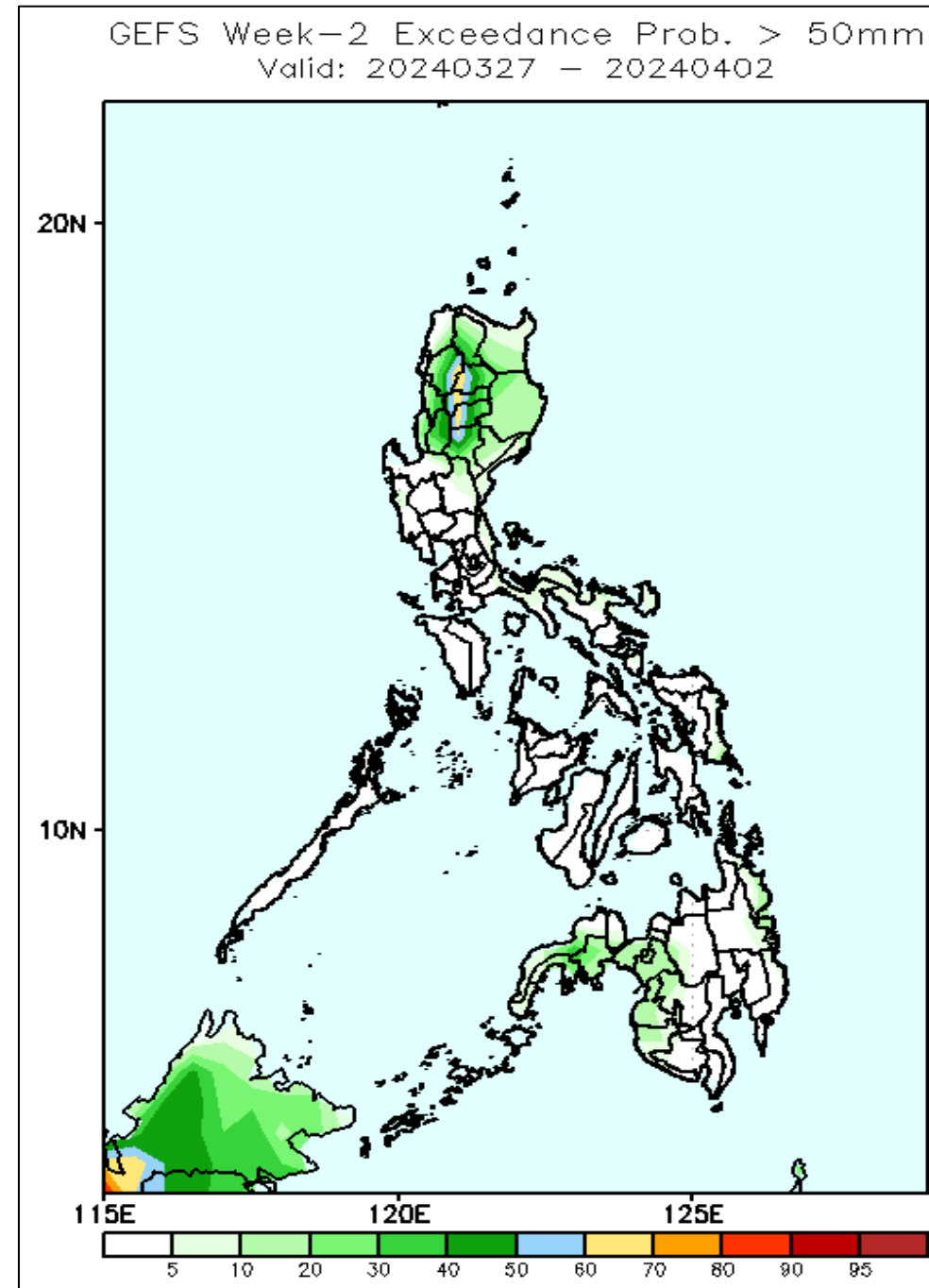
WEEK - 2: RAINFALL EXCEEDANCE PROBABILITY FORECAST

March 27 – April 2, 2024



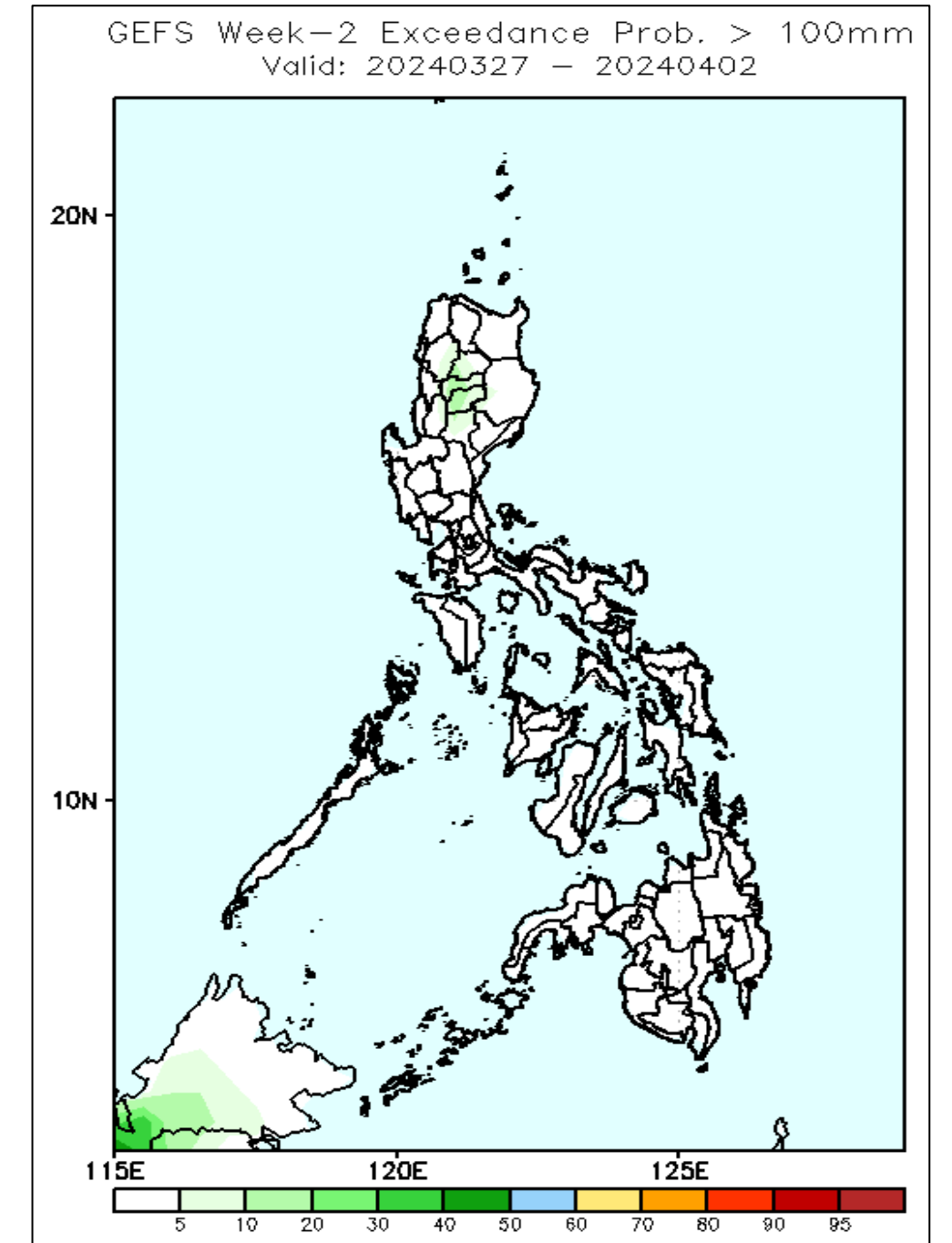
Probability to Exceed 25mm

- Moderate to high over most parts of CAR, La Union, Nueva Vizcaya, Eastern Samar, Surigao del Sur and portions of Zamboanga Peninsula;
- Low to moderate over the rest of Luzon, Eastern Visayas and most parts of Mindanao;
- Low over the rest of the country.



Probability to Exceed 50mm

- Low across the country.



Probability to Exceed 100mm

- Low across the country.

SUMMARY OF SUB-SEASONAL FORECAST

Current MJO Status: Active phase of MJO in the Western Pacific.

MJO Forecast Evolution: Models predict MJO will continue to propagate eastward but weakens over time.

High-impacts Weather Events

1. Tropical Cyclone (TC) Threat Potential Forecast

○ Week-1 to Week 2: (March 20 – April 2, 2024):

- ✓ TC-THREAT potential (formation of (Tropical Cyclone like vortex (TCLV))) is **UNLIKELY** over the next two weeks.

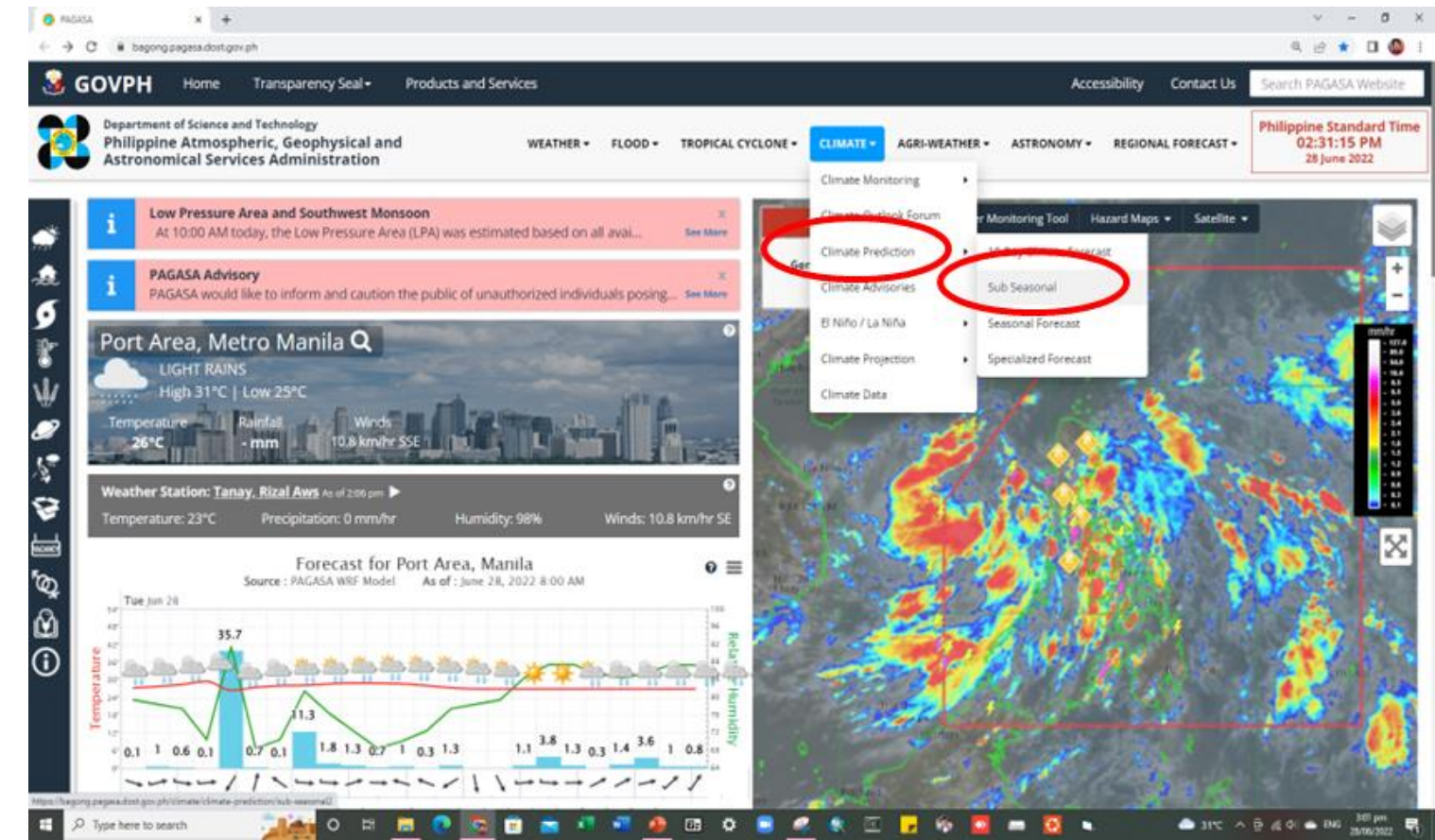
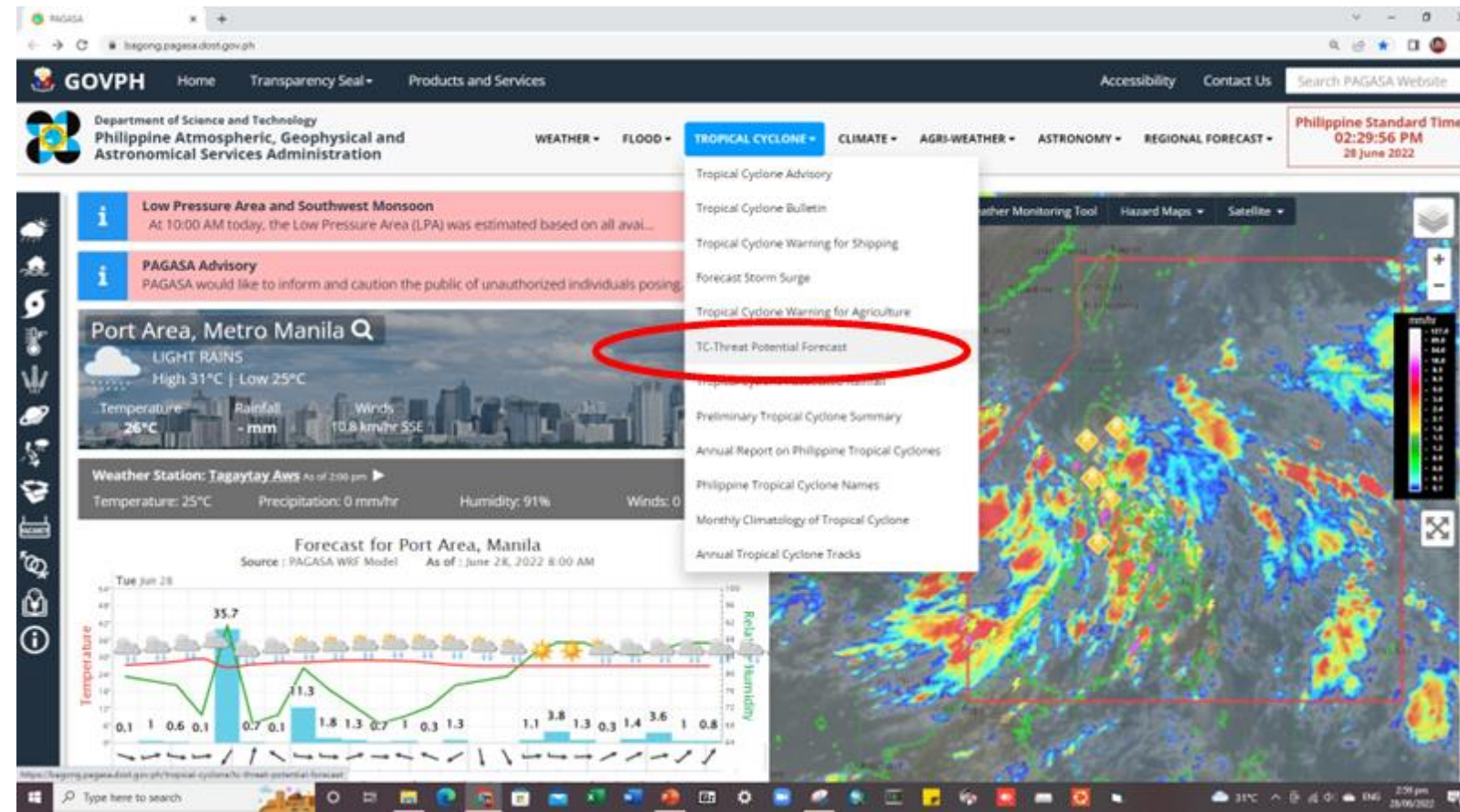
SUMMARY OF SUB-SEASONAL FORECAST

Rainfall Exceedance Forecast (25mm,50mm,100mm)

- **Week-1: (March 20 – 26, 2023)**
 - ✓ **>25 mm:** Moderate to high over the eastern portion of the country.
 - >50 mm: Low over the rest of the country**
- **Week-2: (March 27 – April 2, 2024)**
 - ✓ **>25 mm:** Moderate to high over some parts of Northern Luzon, Eastern Visayas and Mindanao. the eastern portion of the country.
 - >50 mm: Low over the rest of the country**

<https://bagong.pagasa.dost.gov.ph/tropical-cyclone/tc-threat-potential-forecast>

<https://bagong.pagasa.dost.gov.ph/climate/climate-prediction/sub-seasonal2>



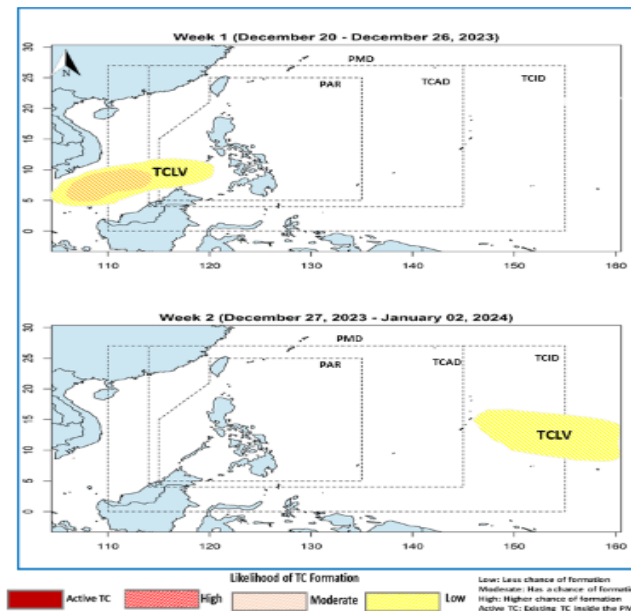
TC-Threat Potential Forecast

PAGASA TC Threat Potential Forecast (TTPF) was formulated in order to detect/evaluate likelihood of TC formation within the Philippine Area of Responsibility and the possibility forecast in track and direction for the next 2-w utilized to objectively detect probability of TC formation in the global numerical weather prediction models.

This product was part of the collaboration between PAGASA and CWB through the MECO/TECO VOTE Project.

Disclaimer: The information contained herein are based on the 6-hourly forecasts of the NCEP-GEFS issued in the past 24hrs where the CWB TC Tracking algorithm was applied and on some climate indicators that are known requiring more specific information related to TC forecasts are advised to use the bulletins being used by PAGASA once the TC is already developed and observed inside the Philippine Area of Responsibility (PAR).

For your questions and queries please contact us: Tel: (02)8248-0800 loc. 906 (CLIMPS-CAD) or email: pagasa.climps@gmail.com Tel: (02)8248-0800 loc. 805 (Weather Forecasting Section)



Tropical Cyclone (TC)-Threat Potential

Initialization: 19 December (8AM)

Date issued: 20 December 2023
Validity: Valid within the forecast period, unless superseded by succeeding forecast.

Forecast Summary:

Week-1 (December 20 - 26, 2023)

- A TCLV is present inside the PAR near the Palawan Area.
- Forecasts indicate that the TCLV will move towards the West Philippine Sea with a low to moderate likelihood of TC formation.

Week-2 (December 27, 2023 - January 02, 2024)

- Forecast indicates that TCLV will emerge over the easternmost of TCID with a low likelihood of TC development.

Therefore, the **TC-THREAT POTENTIAL IS UNLIKELY** over the forecast period.

However, any changes in the forecast pattern will be closely monitored, and updates will be issued as needed.

Note: The information contained herein is based on the 6-hourly forecasts of the NCEP-GEFS issued in the past 24 hours where the Central Weather Administration (CWA) TC Tracking algorithm was applied. This product was part of the collaboration between PAGASA and CWA through the MECO/TECO VOTE Project. This is for guidance purposes only.

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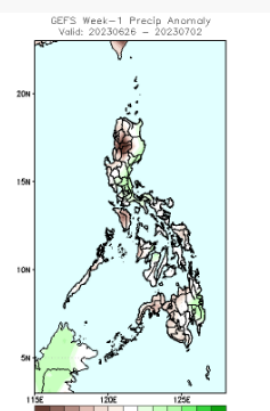
GEFS

NCEP

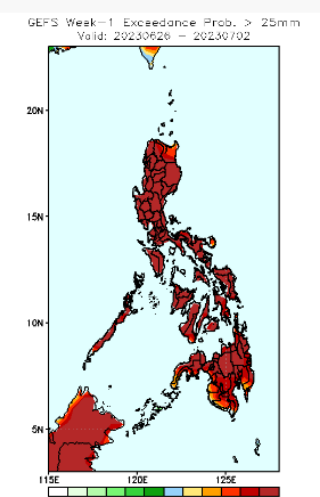
WEEK 1 WEEK 2

Rainfall Temperature Wind

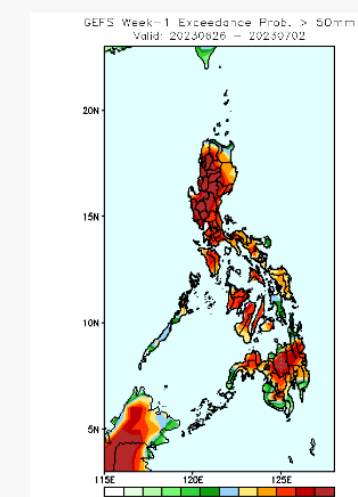
Initial Condition: June 25, 2023
Week Validity: June 26-Jul 02, 2023



Rainfall deficit of more than 100mm is expected in most parts of CAR and Ilocos Sur; 20-80mm for the rest of the country except in some areas in eastern Luzon and Davao Region where 20-60mm increase of rainfall will likely have.



High to a very high probability to exceed 25mm of rainfall over most parts of the country.



High to a very high probability to exceed 50mm of rainfall in most parts of the country except Catanduanes, Palawan, Leyte provinces and some areas in Western and Southern Mindanao where a moderate likelihood is likely.



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**Thank you
for
listening!**