



166th Climate Forum  
22 November 2023

# Sub-seasonal to Seasonal (S2S) Climate Forecast

*Presented by:*

**REMEDIOS L. CIERVO**  
*Senior Weather Specialist, CLIMPS-CAD*  
**DOST-PAGASA**

Payong  
PAGASA

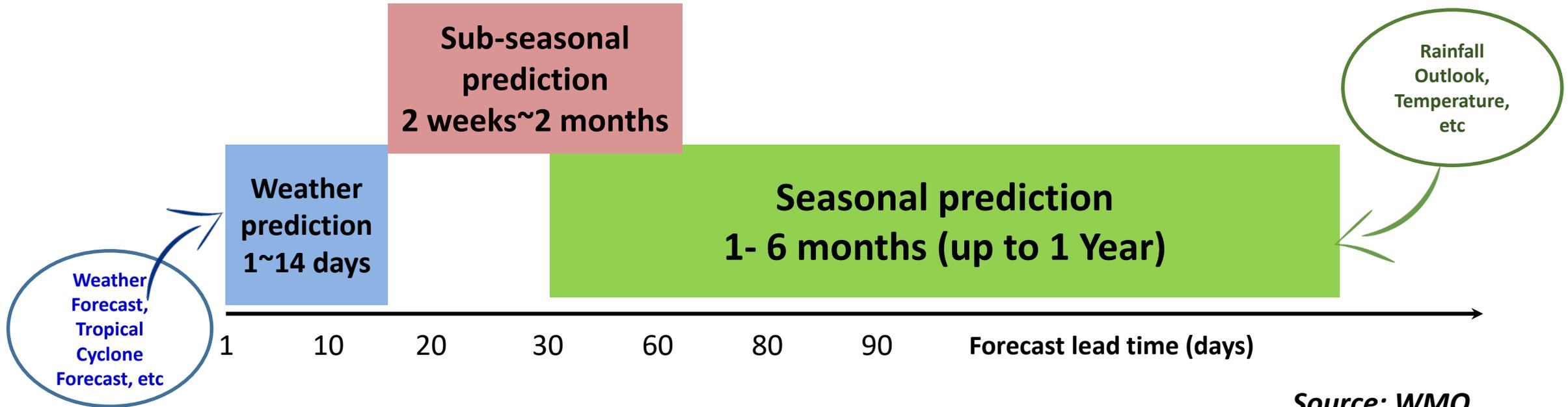


#BantayKlima

# OUTLINE

- What is a Sub-seasonal to Seasonal (S2S) Forecasting
- Sources of Predictability of S2S (MJO)
- Sub-seasonal Climate Forecast
- Summary

# 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

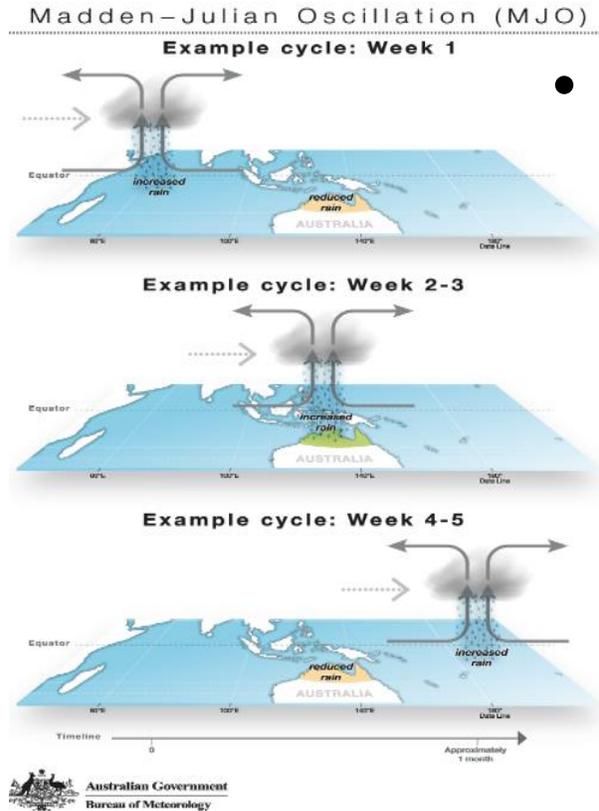
### Madden-Julian Oscillation (MJO) –

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 )

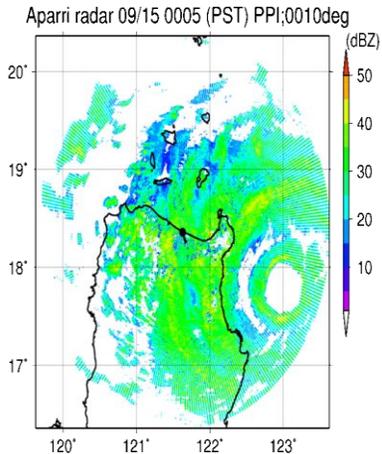
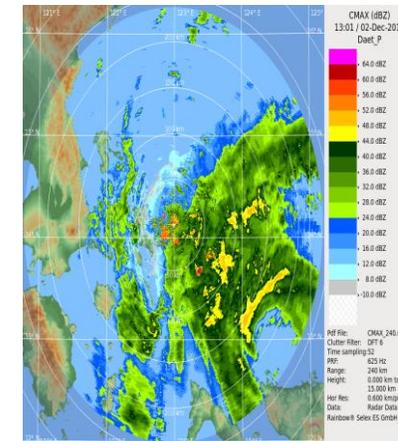


# Why is MJO important?

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



- Act as a modulator of Tropical Cyclone formation in the country.



# Composite of the MJO Lifecycle

Figure: Difference from average rainfall for all MJO events from 1979-2012 for **Nov – March** for the eight phases

## Tropical Rainfall

### Green to Blue areas

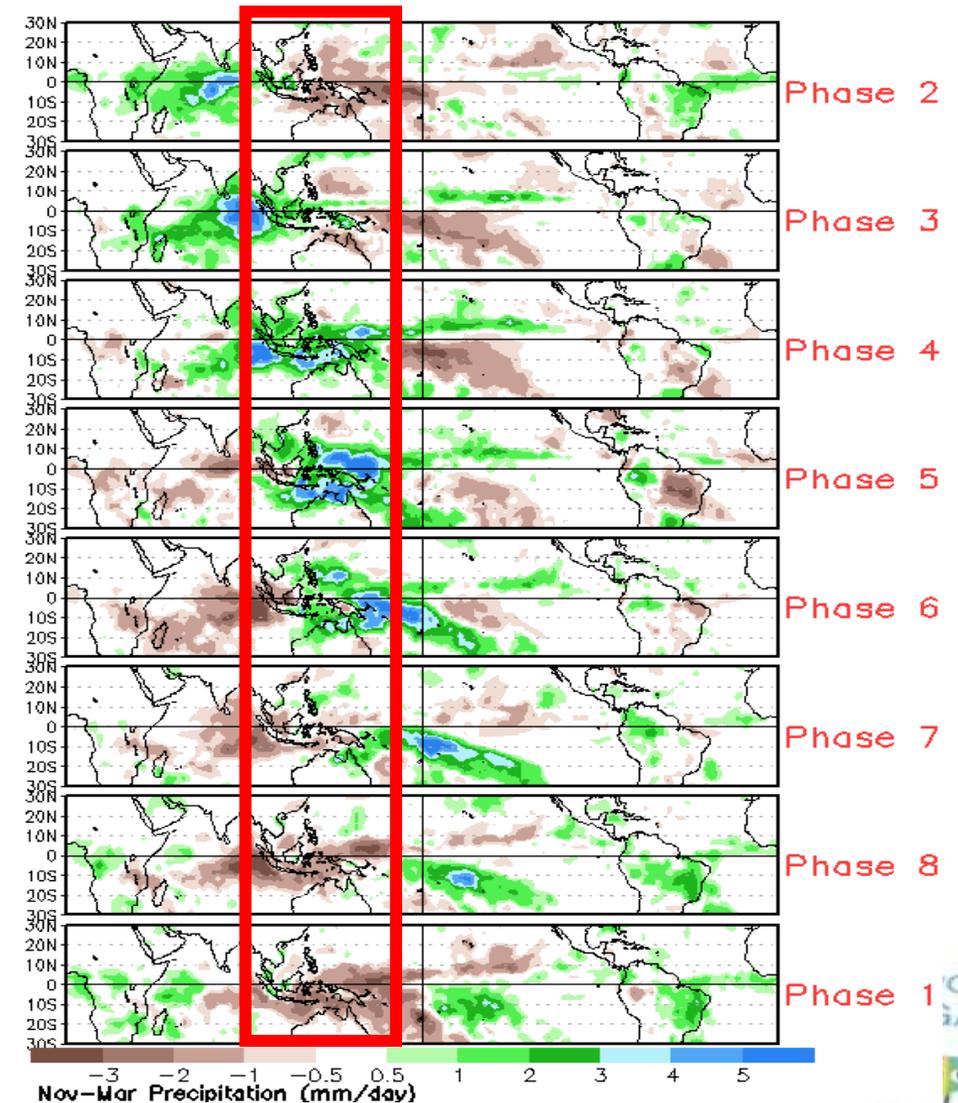
Increased rainfall  
Enhanced phase of the MJO

### Brown areas

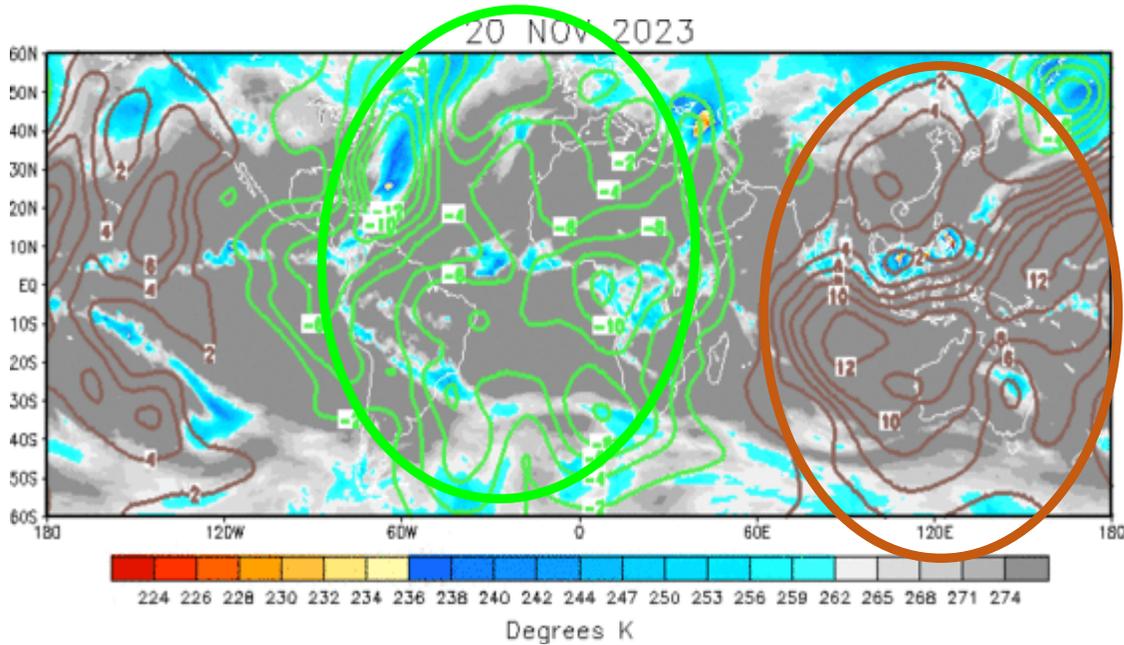
Decreased rainfall  
Suppressed phase of the MJO

<https://www.cpc.ncep.noaa.gov/products/precip/CWlink/MJO/mjo.shtml>

## Precipitation Anomalies



# MJO Recent Evolution



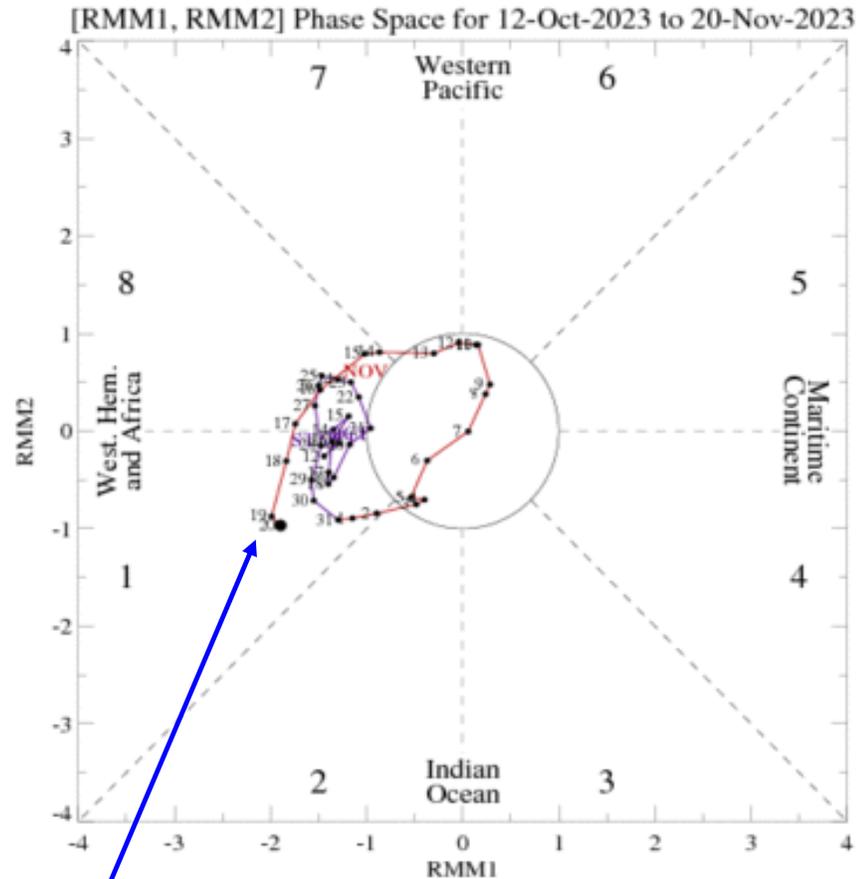
200-hPa Velocity Potential Anomalies

Green – Increased cloud formation (favorable for precipitation)

Brown - Less cloud formation (unfavorable for precipitation)

Images adapted from CPC NOAA (Nov. 22, 2023 update).

## MJO phase in the past 40 days



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

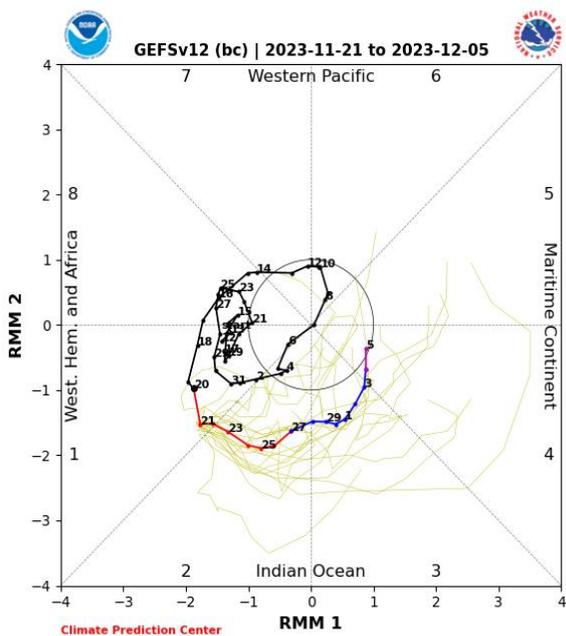
When this index is within the centre circle the MJO is considered weak. Outside of this circle the index is stronger and will usually move in an anti-clockwise direction as the MJO moves from west to east.

MJO active phase is showing a strong signal between phases 8 and 1 (Americas and Africa) while its suppressed phase is between phases 3 and 4 (Indian Ocean and Maritime Continent). After a brief increase in amplitude, the diagram shows that the MJO index decreased the past weeks.

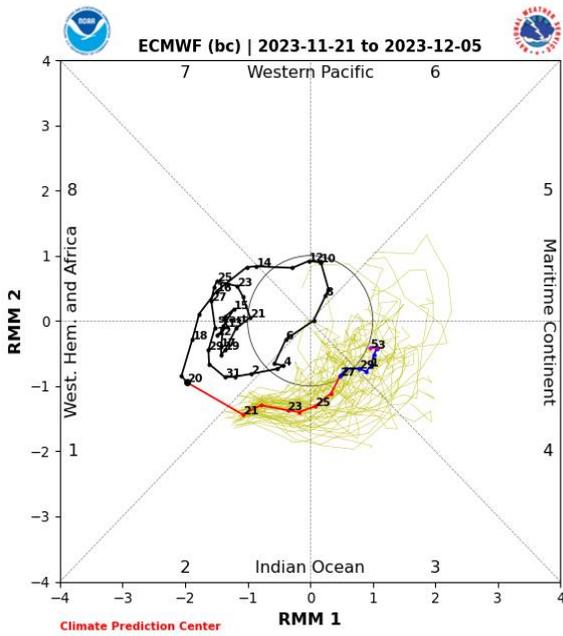
# MJO Forecast Evolution (November 21 – December 05, 2023)



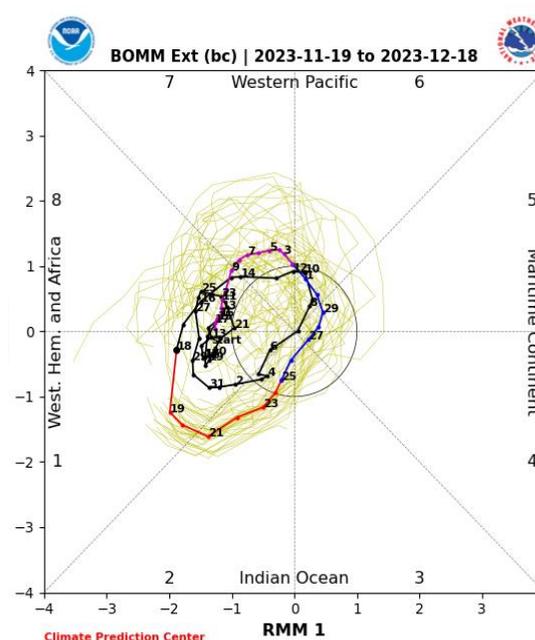
MJO phase forecast in the next 15 days



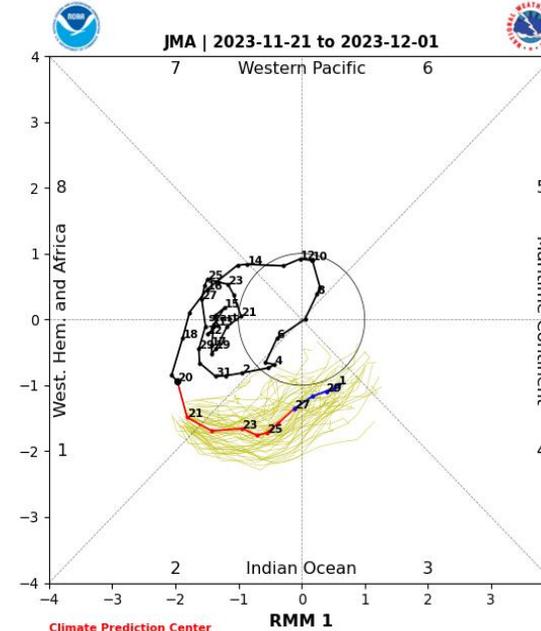
GEFS Forecast



ECMWF Forecast



BOM Forecast



JMA Forecast

Models suggest a continued eastward movement of MJO from Africa to the Indian Ocean and likely to weaken before reaching the Maritime Continent over the next two weeks.

# Sub-seasonal Climate (S2S) Forecast



(November 22 – December 05, 2023)

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

# Tropical Cyclone (TC)-Threat Potential

Initialization: 21 November (8 AM)

Date Issued: 22 November 2023

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

## Forecast Summary:

### Week-1 (November 22 – 28, 2023)

- Forecast indicates a low likelihood of TC-like vortex formation (TCLV) near or within the PMD in Week-1.

### Week-2 (November 29 – December 05, 2023)

- Forecast suggest that a TCLV1 will likely emerge over the West Philippine Sea will move north-westward as it exit the PAR
- TCLV1 has a low likelihood of TC formation.

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

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

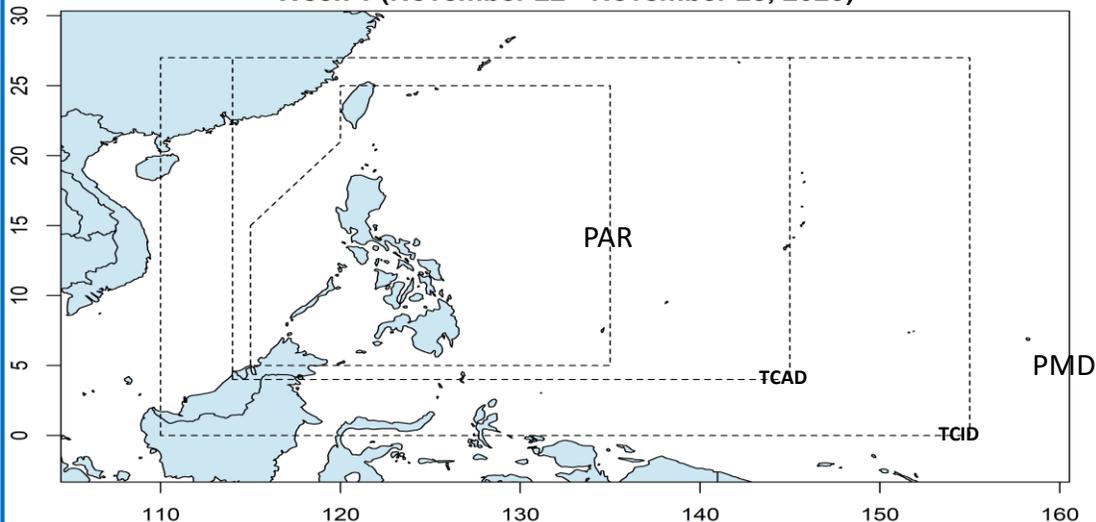
Note: The information contained here is based on the 6-hourly forecasts of the NCEP-GEFS issued in the past 24 hours where the Central Weather Bureau (CWB) TC Tracking algorithm was applied. This product was part of the collaboration between PAGASA and CWB through the MECO/TECO VOTE Project. This is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

For Weather Updates, kindly refer to: [www.bagong.pagasa.dost.gov.ph/weather](http://www.bagong.pagasa.dost.gov.ph/weather)

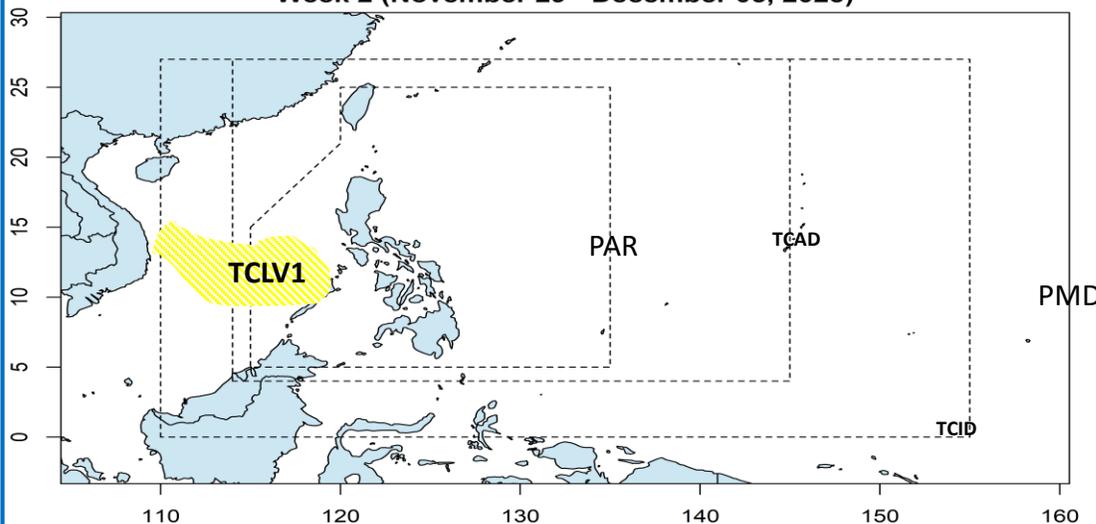
PMD: PAGASA Monitoring Domain  
PAR: Philippine Area of Responsibility

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

Week 1 (November 22 - November 28, 2023)



Week 2 (November 29 - December 05, 2023)



## Likelihood of TC Formation



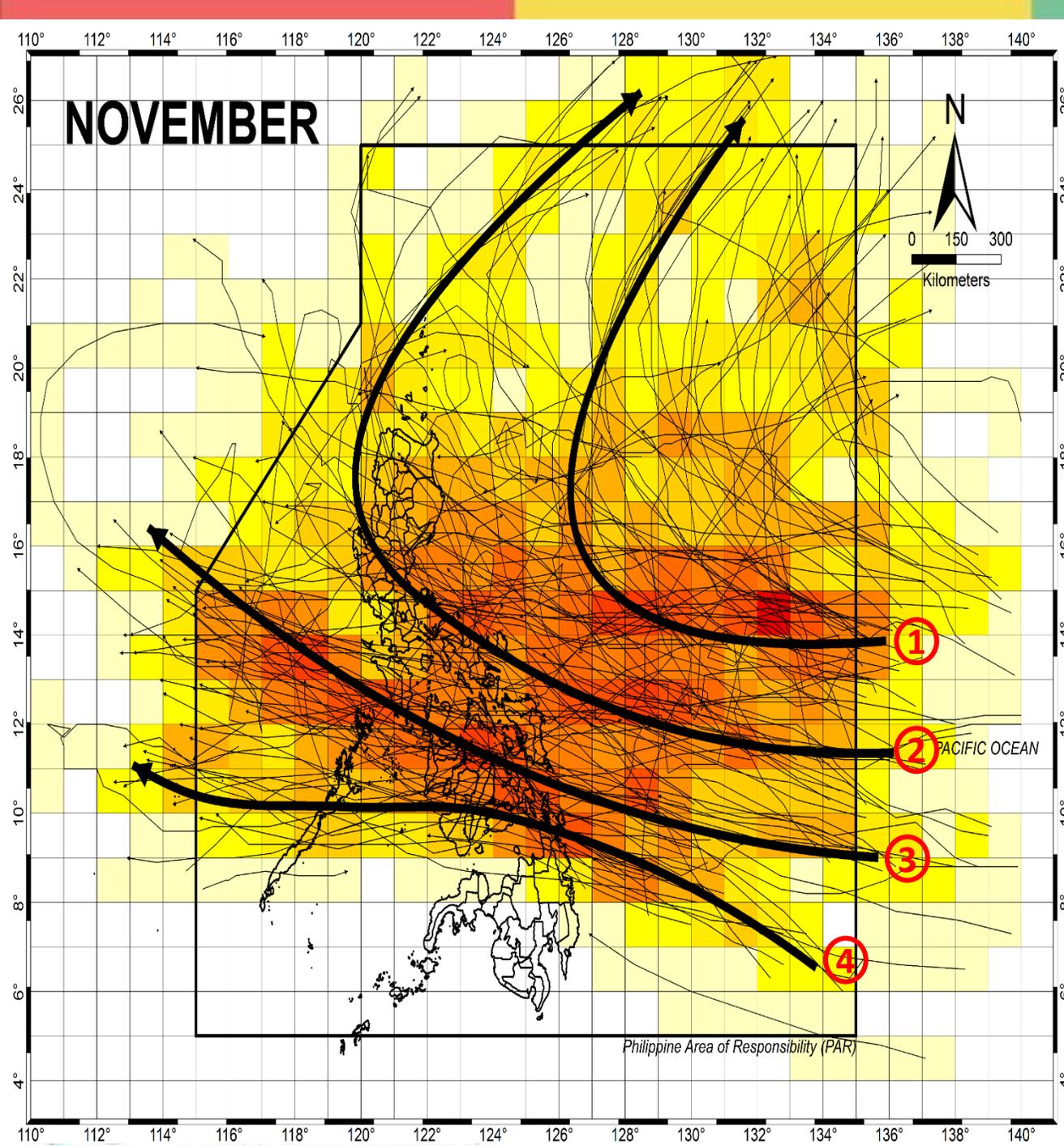
Low: Less chance of formation  
Moderate: Has a chance of formation  
High: Higher chance of formation  
Active TC: Existing TC inside the PMD



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

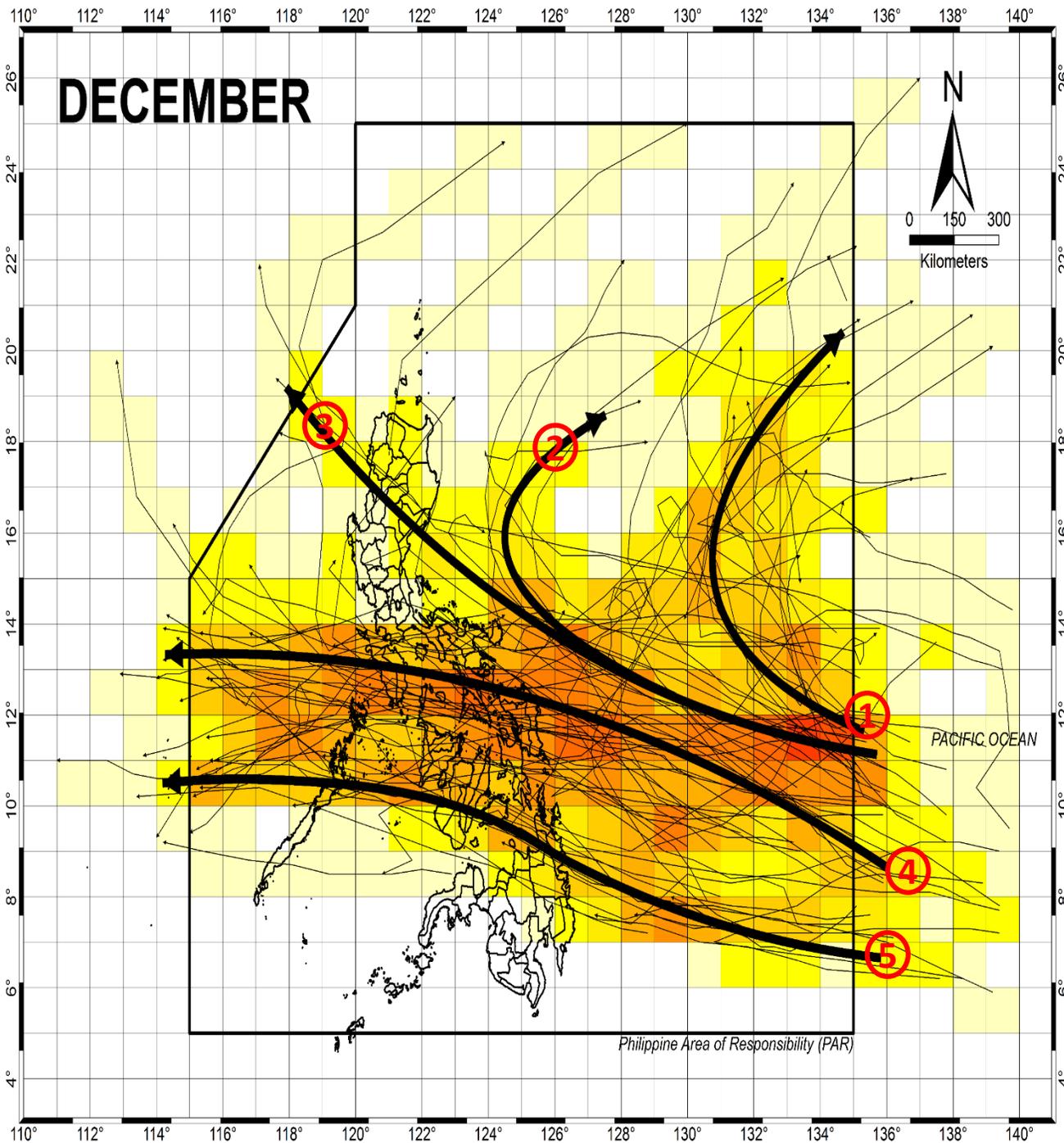




## Tropical Cyclone Climatological Tracks for November in the Philippine Area of Responsibility (PAR)

Climatological tracks for the month of November suggest the 4 most common tracks:

1. TCs formed in the western Pacific entering the Philippine Area of Responsibility (PAR); recurving towards the northeastern part of PAR (non-landfalling), and then moving toward Japan or Korea.
2. Landfalling TCs traversing Southern to Northern or Central Luzon; then recurving toward Japan or Korea after exiting the landmass.
3. Landfalling TCs traversing Central Philippines; moving toward Vietnam.
4. Landfalling TCs traversing the southern Visayas; moving toward Thailand.



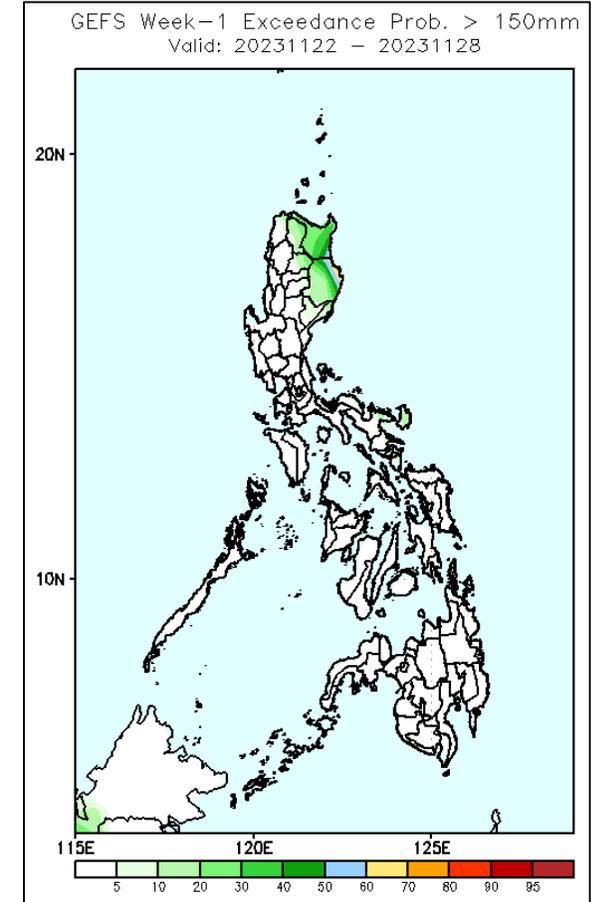
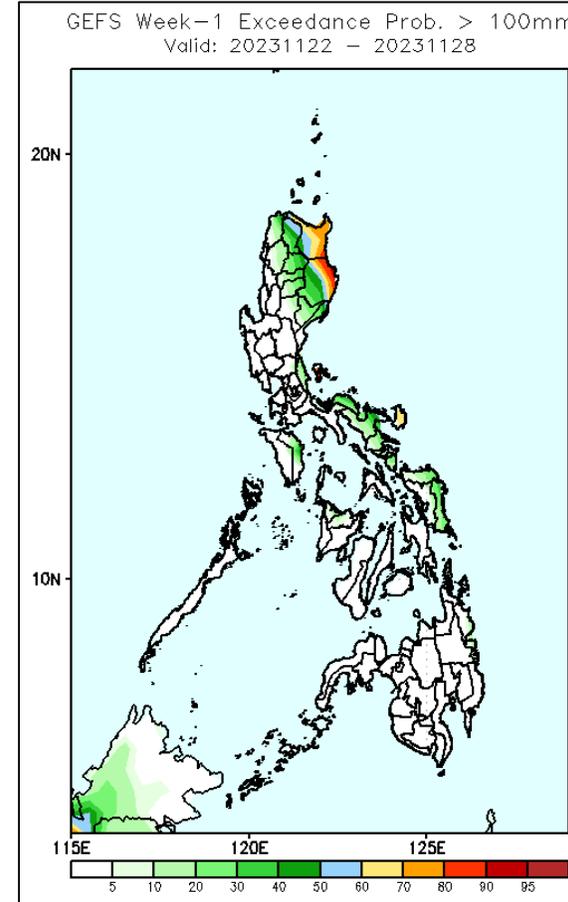
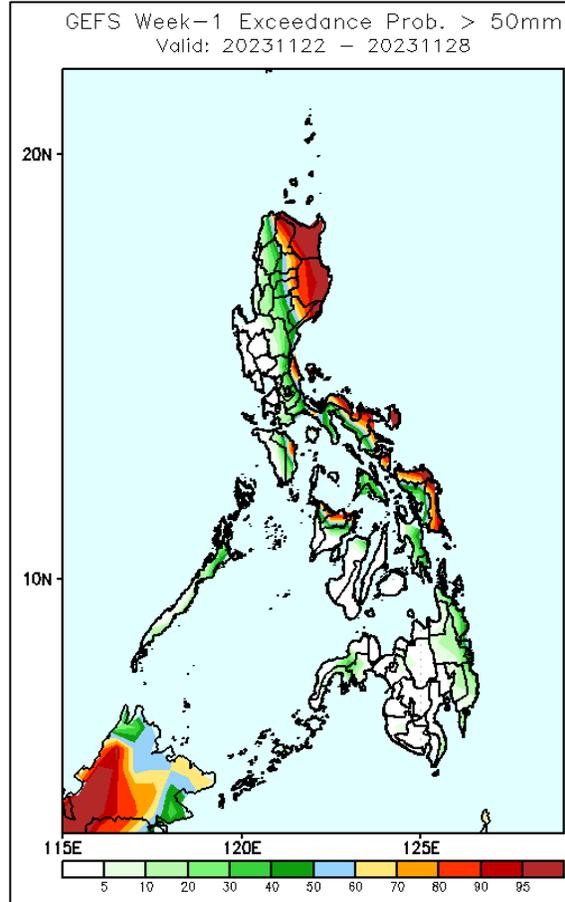
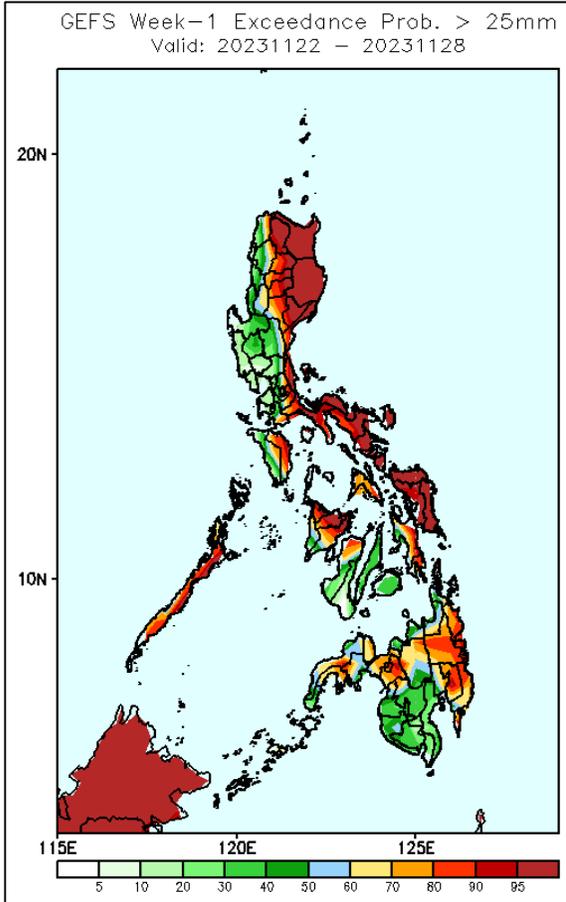
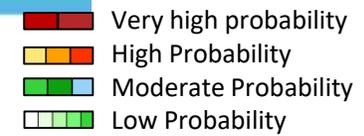
## Tropical Cyclone Climatological Tracks for December in the Philippine Area of Responsibility (PAR)

Climatological tracks for the month of December suggest 5 most common tracks:

1. TCs formed in the western Pacific that entered the Philippine Area of Responsibility(PAR) but recurve afterwards towards the eastern part of PAR (non-landfalling) then move towards Japan.
2. TCs formed in the western Pacific that entered the Philippine Area of Responsibility(PAR) but recurve before making landfall towards the north-eastern part of PAR (non-landfalling) then move towards Japan.
3. Landfalling TCs traversing Northern or Central Luzon; moving towards Hongkong after exiting the landmass.
4. Landfalling TCs traversing southern Luzon – northern Visayas area, ; moving towards Vietnam.
5. Landfalling TCs traversing Southern Visayas – Northern Mindanao area; moving towards Thailand.

# WEEK - 1: RAINFALL EXCEEDANCE PROBABILITY FORECAST

## November 22 – 28, 2023



### Probability to Exceed 25mm

- High to very high over most parts of CAR, Eastern Luzon, Bicol Region, Eastern Visayas, Oriental Mindoro and Palawan;
- Moderate to high over Western Visayas and most parts of Mindanao; the rest of the country.
- Low to moderate over the rest of the country.

### Probability to Exceed 50mm

- High to very high Apayao, Cagayan and Isabela;
- Moderate to high over CAR, Aurora, Quezon, Bicol Region, Samar provinces, Oriental Mindoro, Aklan and Capiz;
- Low elsewhere.

### Probability to Exceed 100mm

- Moderate to high over Cagayan, Isabela, Catanduanes;
- Low elsewhere.

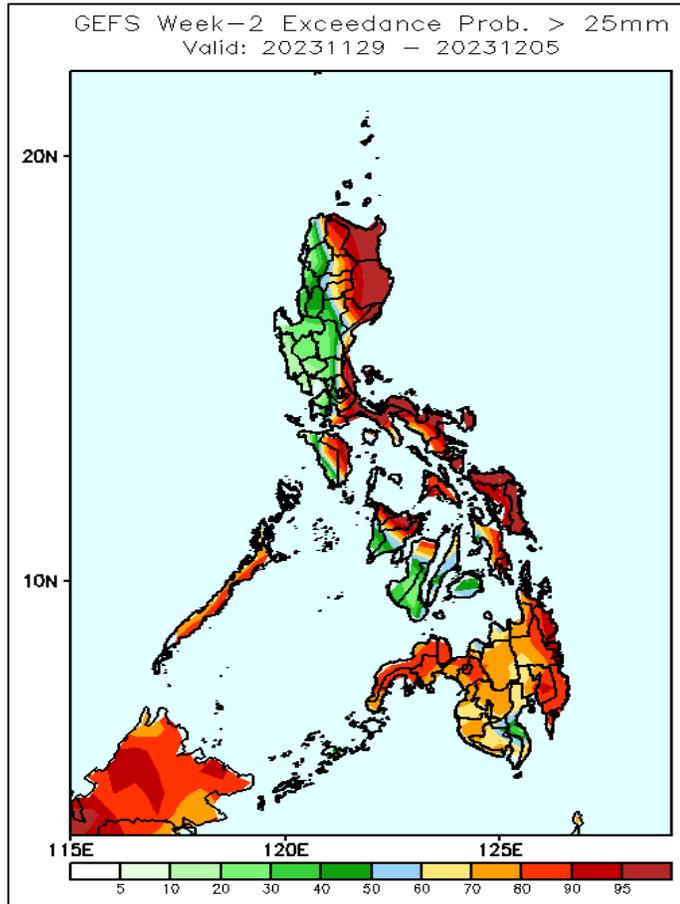
### Probability to Exceed 150mm

- Moderate to high over the eastern section of Cagayan and Isabela;
- Low elsewhere.

# WEEK - 2: RAINFALL EXCEEDANCE PROBABILITY FORECAST

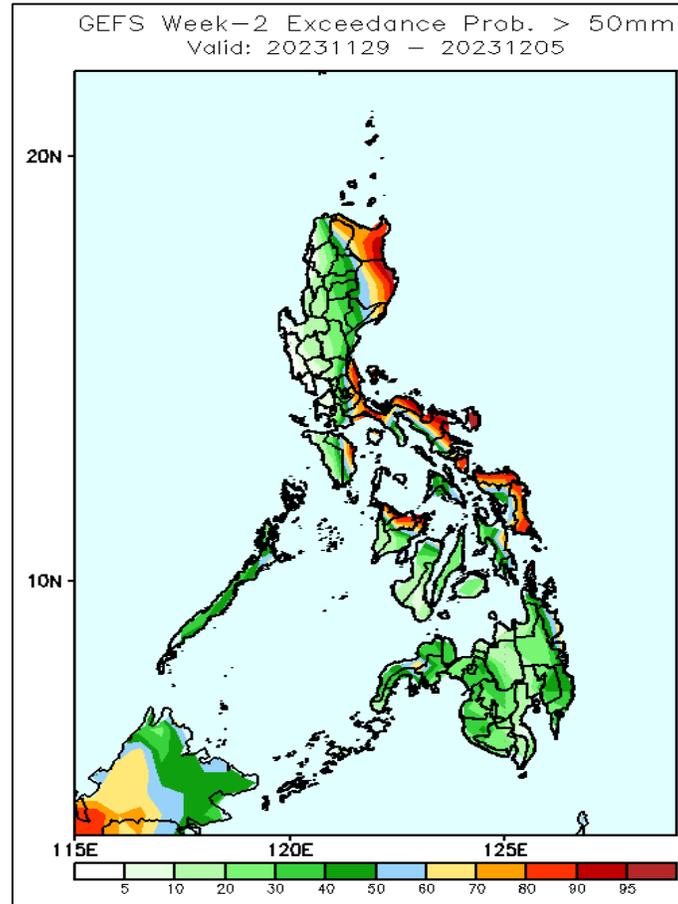
## November 29 – December 05, 2023

- Very high probability
- High Probability
- Moderate Probability
- Low Probability



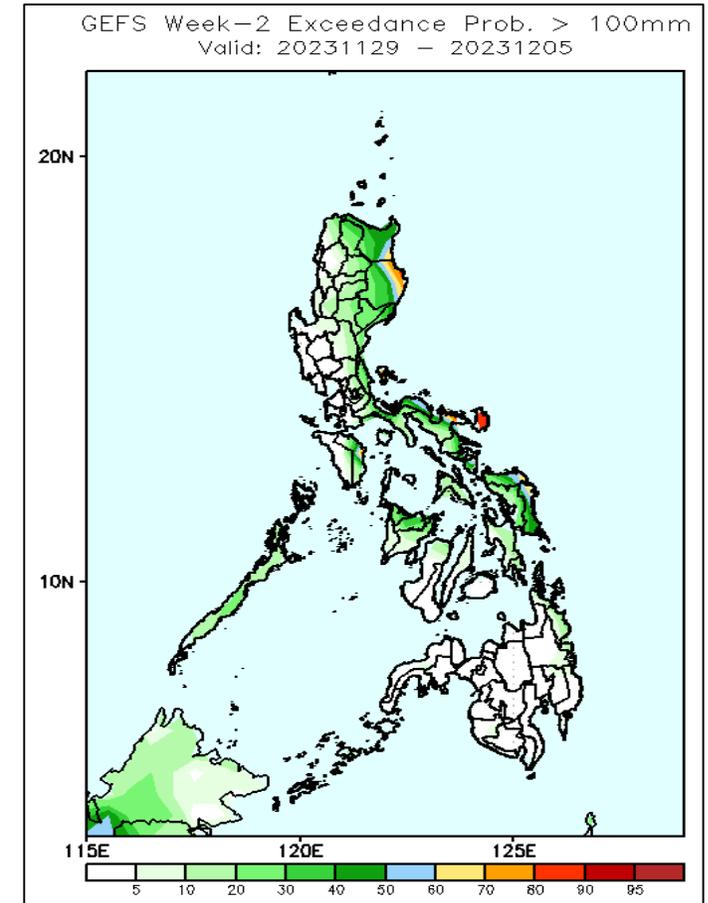
### Probability to Exceed 25mm

- High to very high over most parts of CAR, Eastern Luzon, Bicol Region, Eastern Visayas and most of Mindanao
- Moderate to high over the rest of the country.



### Probability to Exceed 50mm

- Moderate to high over Eastern Luzon, Bicol Region, Oriental Mindoro, Palawan, Eastern Visayas, Aklan, Capiz, and most of Mindanao;
- Low to moderate elsewhere.



### Probability to Exceed 100mm

- Moderate to high over eastern section of Cagayan, Isabela, Catanduanes and Northern and Eastern Samar; Low over the rest of the country.

# SUMMARY OF SUB-SEASONAL FORECAST

**Current MJO Status:** MJO active phase is showing a strong signal between phases 8 and 1 (Americas and Africa).

**MJO Forecast Evolution:** Models suggest a continued eastward movement of MJO from Africa to the Indian Ocean and likely to weaken before reaching the Maritime Continent over the next two weeks.

## High-impacts Weather Events

### 1. Tropical Cyclone (TC) Threat Potential Forecast

#### ○ Week-1 to Week 2: (Nov 22– Dec 05, 2023):

- ✓ TC-THREAT potential is unlikely over the next two weeks due to low probability of TC-like vortex formation (TCLVs) developing into a TC

# SUMMARY OF SUB-SEASONAL FORECAST

## Rainfall Exceedance Forecast (25mm,50mm,100mm, 150mm)

- **Week-1: (November 22 – 28, 2023)**
  - ✓ **25 mm:** High to very high over most parts of CAR, Eastern Luzon, Bicol Region, Eastern Visayas, Oriental Mindoro and Palawan;  
Moderate to high over Western Visayas and most parts of Mindanao;  
Low to moderate over the rest of the country.
  - ✓ **50 mm:** High to very high Apayao, Cagayan and Isabela;  
Moderate to high over CAR, Aurora, Quezon, Bicol Region, Samar provinces, Oriental Mindoro, Aklan and Capiz;  
Low elsewhere.
  - ✓ **100mm:** Moderate to high over Cagayan, Isabela, Catanduanes;  
Low elsewhere
  - ✓ **150mm:** Moderate to high over the eastern section of Cagayan and Isabela  
Low elsewhere

# SUMMARY OF SUB-SEASONAL FORECAST

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

- **Week-2: (November 29 – December 05, 2023)**
  - ✓ **25 mm:** High to very high over most parts of CAR, Eastern Luzon, Bicol Region, Eastern Visayas and most of Mindanao  
Moderate to high over the rest of the country.
  - ✓ **50 mm:** Moderate to high over Eastern Luzon, Bicol Region, Oriental Mindoro, Palawan, Eastern Visayas, Aklan, Capiz, and most of Mindanao;  
Low to moderate elsewhere.
  - ✓ **100mm:** Moderate to high over eastern section of Cagayan, Isabela, Catanduanes and Northern and Eastern Samar; Low over the rest of the country.

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Department of Science and Technology  
Philippine Atmospheric, Geophysical and Astronomical Services Administration

WEATHER FLOOD TROPICAL CYCLONE CLIMATE AGRI-WEATHER ASTRONOMY REGIONAL FORECAST

Philippine Standard Time  
02:29:56 PM  
28 June 2022

Low Pressure Area and Southwest Monsoon  
At 10:00 AM today, the Low Pressure Area (LPA) was estimated based on all avail...

PAGASA Advisory  
PAGASA would like to inform and caution the public of unauthorized individuals posing...

Port Area, Metro Manila  
LIGHT RAINS  
High 31°C | Low 25°C  
Temperature: 26°C Rainfall: -mm Winds: 10.8 km/hr SSE

Weather Station: Tagaytay AWS  
As of 2:06 pm  
Temperature: 25°C Precipitation: 0 mm/hr Humidity: 91% Winds: 0

Forecast for Port Area, Manila  
Source: PAGASA WRF Model As of: June 28, 2022 @ 00 AM

TC-Threat Potential Forecast

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WEATHER FLOOD TROPICAL CYCLONE CLIMATE AGRI-WEATHER ASTRONOMY REGIONAL FORECAST

Philippine Standard Time  
02:31:15 PM  
28 June 2022

Low Pressure Area and Southwest Monsoon  
At 10:00 AM today, the Low Pressure Area (LPA) was estimated based on all avail... See More

PAGASA Advisory  
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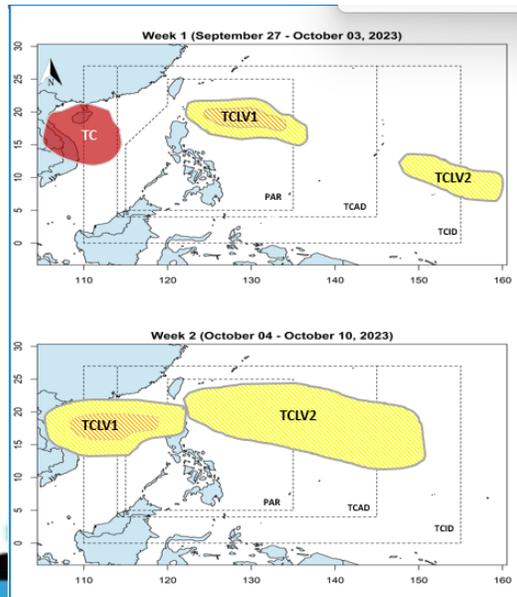
Port Area, Metro Manila  
LIGHT RAINS  
High 31°C | Low 25°C  
Temperature: 26°C Rainfall: -mm Winds: 10.8 km/hr SSE

Weather Station: Tanay, Rizal AWS  
As of 2:06 pm  
Temperature: 23°C Precipitation: 0 mm/hr Humidity: 98% Winds: 10.8 km/hr SE

Forecast for Port Area, Manila  
Source: PAGASA WRF Model As of: June 28, 2022 @ 00 AM

Climate Prediction

Sub Seasonal



## Tropical Cyclone (TC)-Threat Potential

Initialization: 26 September (2 AM)

Date Issued: 27 September 2023

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

### Forecast Summary:

#### Week-1 (September 27 – October 03, 2023)

- A TC is present in the western boundary of the PMD, outside the PAR.
- Likewise, TC-like vortices (TCLVs) are present near/within the PMD.
- Models predict that TCLV1 in the TCAD region will likely enter the PAR with a low to moderate likelihood of cyclogenesis.
- While, TCLV2 will likely form and enter the PMD with a low likelihood of TC genesis.
- Therefore, **TC-THREAT POTENTIAL IS LIKELY** in week-1.

#### Week-2 (October 04 – October 10, 2023)

- TCLV1, still with a low to moderate likelihood of TC-genesis inside the PAR will likely move in a westerly direction but has a low likelihood of making landfall.
- Moreover, TCLV2, still with a low likelihood of TC-genesis will likely enter the PAR.
- Therefore, **TC-THREAT POTENTIAL IS STILL LIKELY** over week-2.

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

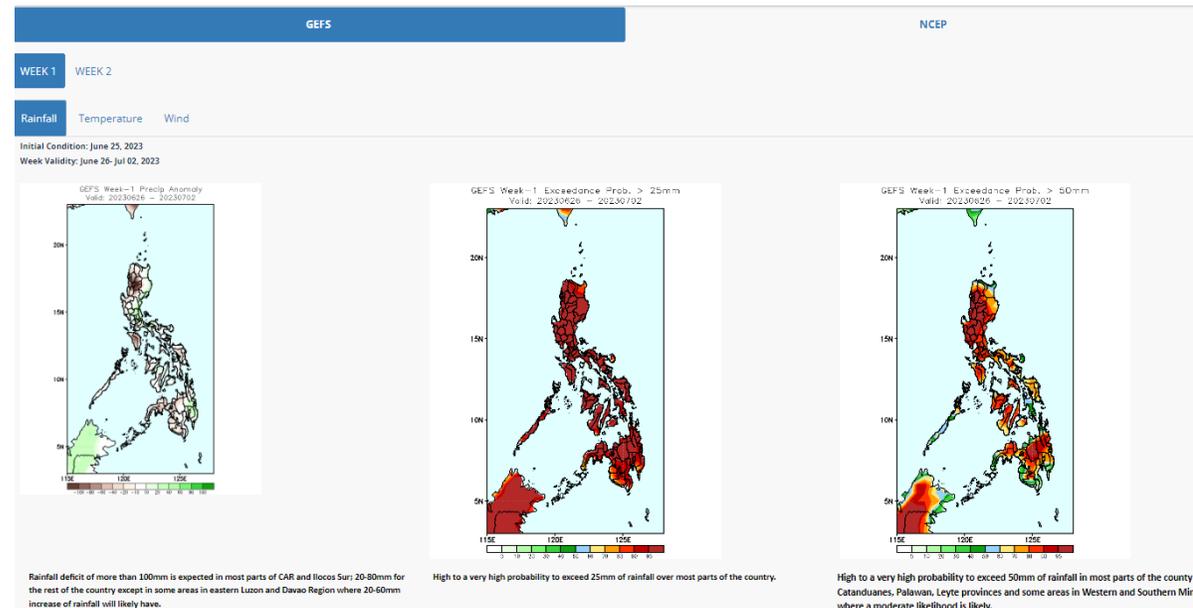
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**FLOOD: 4855**

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*Thank you for  
listening!*