



# PACIFIC ISLANDS CLIMATE OUTLOOK FORUM - 13

23 - 27 OCTOBER, 2023  
NADI, FIJI





# Climate impacts over the last six months (May – Oct 2023)



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Climatologists

PNG, Samoa, Palau and SPREP

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# Presentation Outline

1. Past 6 months climate
2. General impacts
3. Country specific impacts

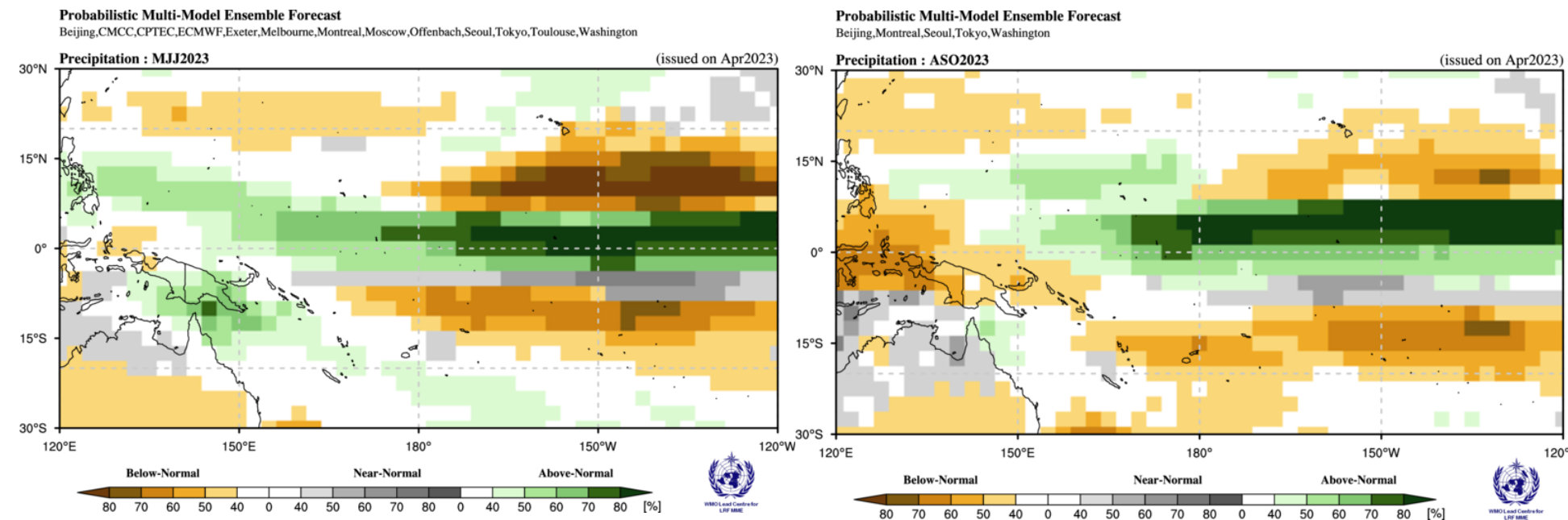




# Past six months climate

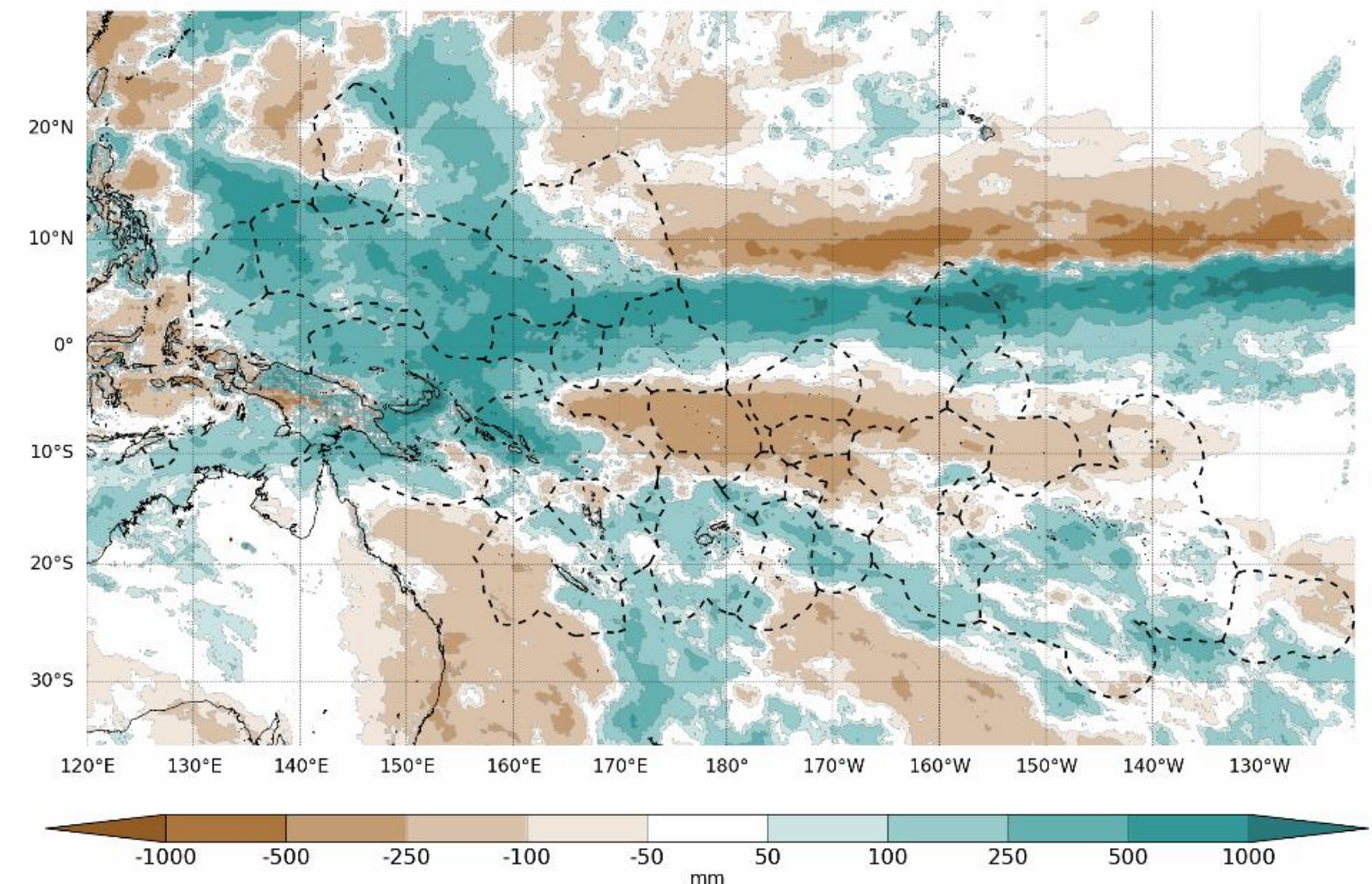
1. Forecast – **2023MJJ**: Wet conditions for the equatorial region and Melanesia; Dry conditions for the off-equatorial region east of the Date Line
2. Forecast- **2023ASO**: Wet conditions for the equatorial region; Weakening chances for dry conditions; Dry conditions for Melanesia
3. Observation - Rainfall was above normal for Palau, Guam, FSM, south RMI, southeastern PNG and Islands regions, Nauru, northern Kiribati, eastern New Caledonia, southern Vanuatu, most of Fiji, northern Tonga, Niue, southern Cook Islands, central and southern French Polynesia and southern Pitcairn Islands.
4. Observation: -Below normal was observed in eastern Australia, CNMI, western New Caledonia, northern Vanuatu, northern Fiji (Rotuma), southern Tonga, Tuvalu, Wallis and Futuna, Samoa, American Samoa, Kiribati (southern Phoenix and Line islands), Tokelau, northern Cook Islands, northern French Polynesia and eastern Pitcairn Islands

## Forecast



## Observation

6-month total rainfall anomaly ending September 2023





# General Impacts

- Drier than normal conditions are favoured for the off-equatorial region east of the Date Line which is likely to weaken towards the third quarter of this year.
- Wetter than normal conditions are favoured for islands along the equator and the Melanesian countries.
- Warmer than normal air temperature likely for the whole of the Pacific Islands.
- Sea surface temperatures (SSTs) are favoured to be above normal across most of western, central, and southwestern Pacific.
- The risk for coral bleaching is enhanced along the entire equatorial Pacific between 10°S and 10°N latitudes from July.
- Sea level is favoured to be notably higher than normal for most of the countries across central to eastern equatorial Pacific, and at PNG, Solomon Is., Vanuatu, and southern Fiji/Tonga/Niue.
- El Niño events are associated with increase cyclone activities in the tropical northwest Pacific.



# **Country specific Impacts – Micronesian countries**



# Republic of Palau Climate Impacts



WSO Palau Upper Air day before Typhoon Surigae' arrival and Storm Surge impacts on arrival, Angaur State Apr 16, 2021 PC: Ngesur Alonz

Typhoon Surigae, Storm Surge impacts, Ngeremlengui State, Friday, April 16, 2021 10:44am ROPST

Typhoon Surigae inundation and flooding Impacts, Kayangel Apr 16, 2021

Monsoon impacts, Ngechesar State, Oct 10, 2021 PC: Mouais Moki

Tropical Cyclone 27W, Tropical Depression Banyan impacts, Koror State, Mingles Restaurant Oct 31 2022

**Kikuko K. Mochimaru**

Staff Meteorologist

Palau National Weather Service Office-WSO Palau



**SPREP**  
Secretariat of the Pacific Regional  
Environment Programme



Pacific Community  
Communauté  
du Pacifique



**NIWA**  
Taihoro Nukurangi





# The Monsoon Fury

Monsoon Season from June to Oct./Nov.

Monsoon Troughs with Embedded:

- Circulations
- Tropical Disturbances (Invest Areas)
- Tropical Cyclones

Monsoon Surges

- Hazardous Winds:
  - Fresh to Strong Prevailing Westerlies
  - Near-gale to Gale force gusts

- Torrential Rainfall
- Continuous Rainfall
- Hazardous Seas and Surf

Obscuration

- Haze
- Beautiful Sunsets

No Impacts to report.  
Previous years the Monsoon  
and Tropical Cyclones that  
damaged infrastructure, such as  
buildings and roads, have  
mostly been repaired or are  
currently a work in progress.



WFO Guam WCM Marcus L. Aydlett  
post on personal social media on  
August 6, 2023: A Monsoon Stormy  
Night over Koror, Palau Japan-Palau  
Friendship Bride.

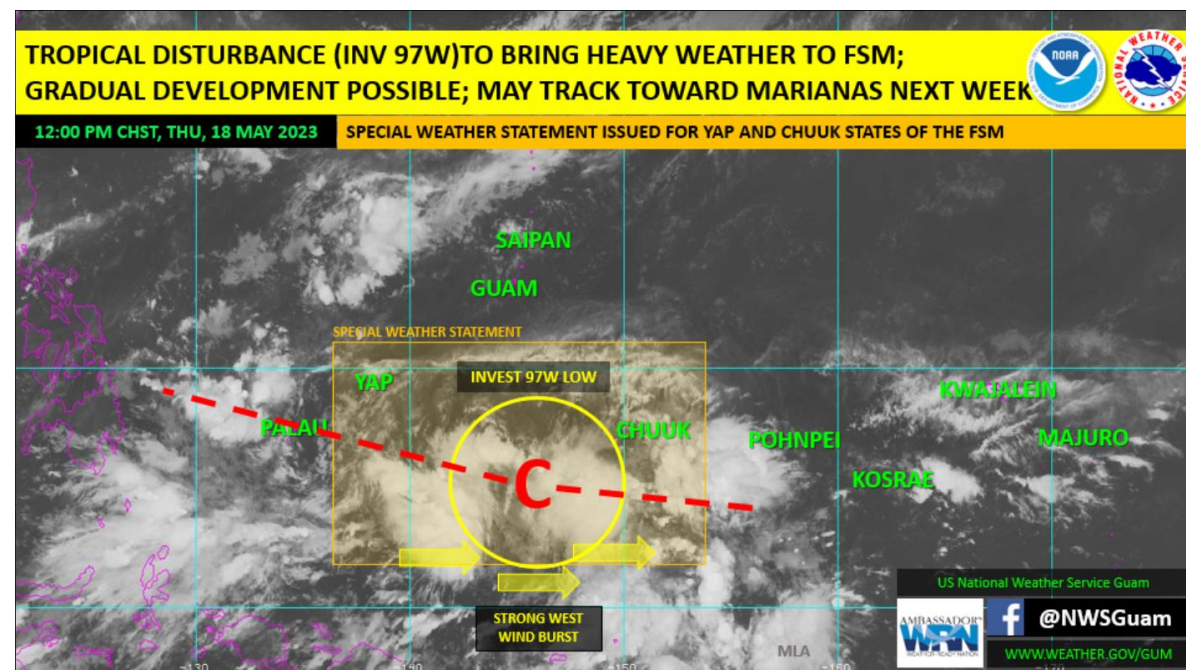




# May 2023: The Monsoon Trough

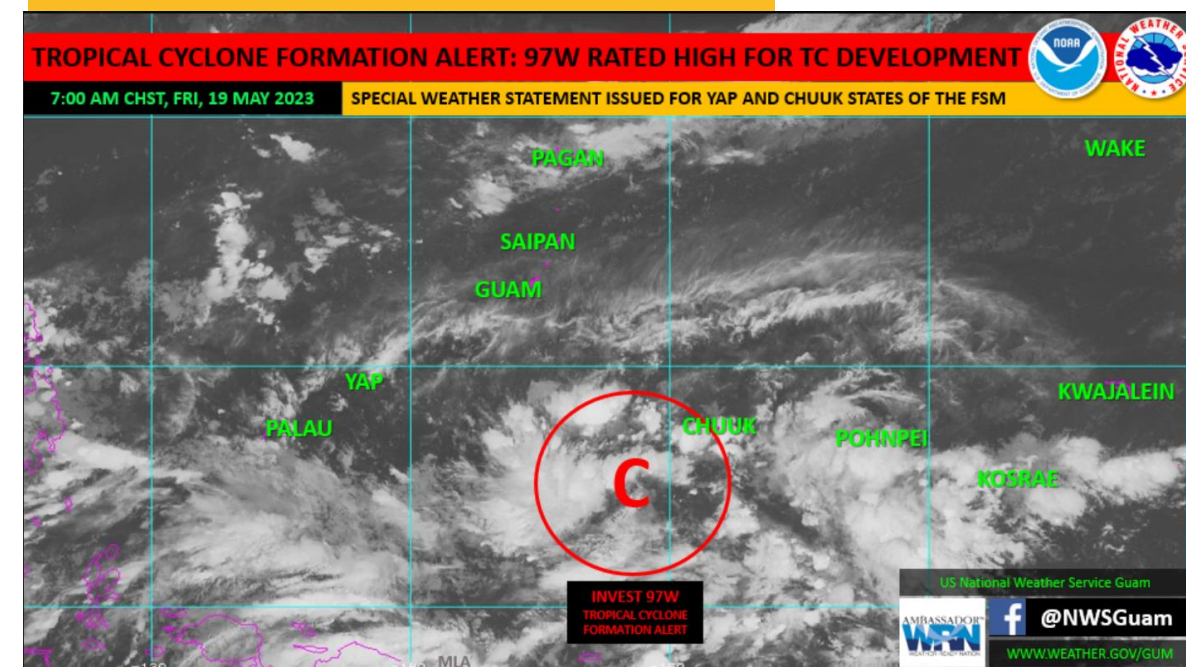
WFO Guam social media post on Thur May 18, 2023 at 1100am ROPST, **Monsoon trough** over ROP linked to **Invest 97W** southwest of Chuuk.

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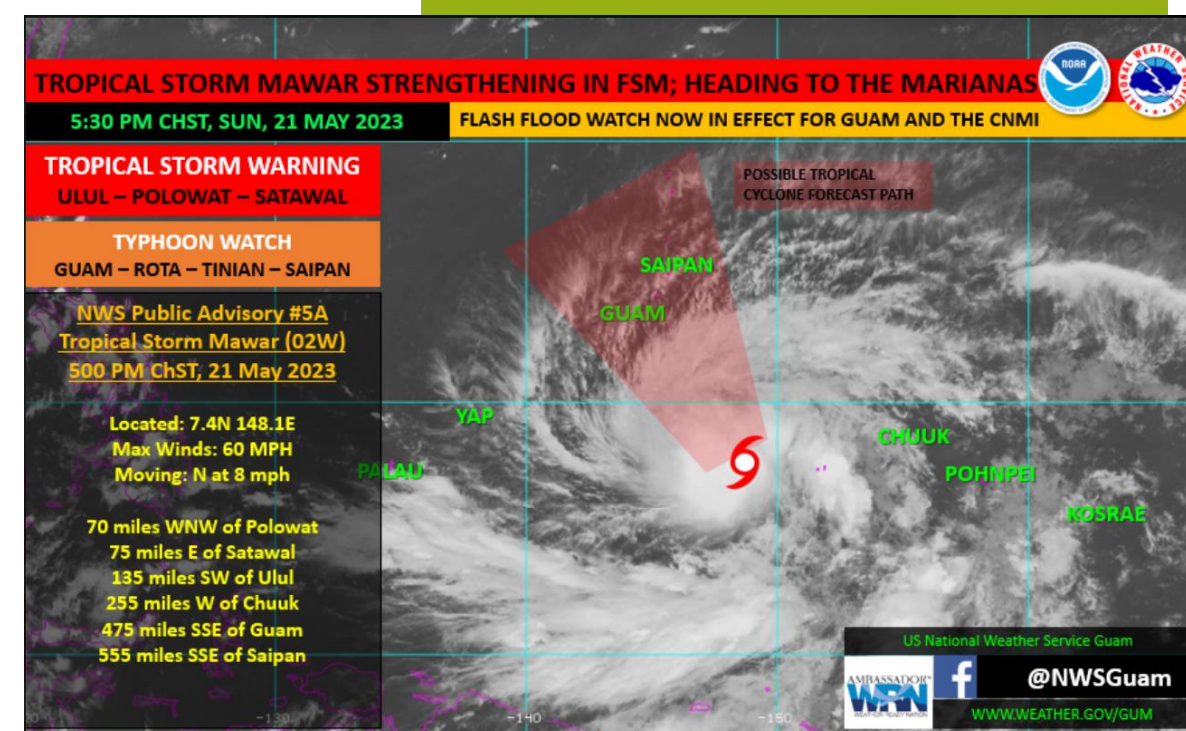


WFO Guam social media post on Friday, May 19, 2023 at 6:00 AM ROPST. Tropical Cyclone Formation Alert (TCFA) on **Invest 97W**. WSO Palau measured 4.45 inches on May 19, 2023 from the **Monsoon trough** associated with this feature.

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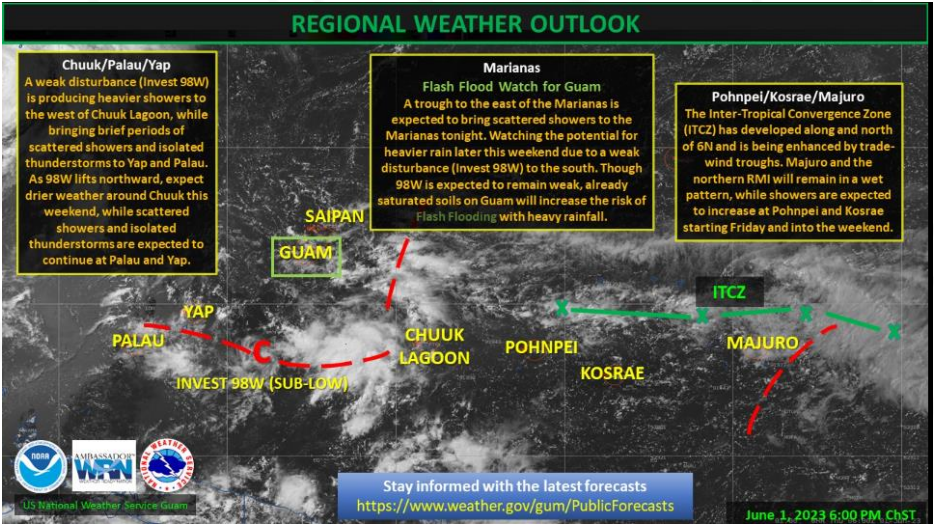


WFO Guam social media post on Sunday, May 21, 2023. **Invest 97W** became the second Tropical Cyclone in the west Pacific, becoming Super Typhoon Mawar before downgrading to a Typhoon as it passed near north of Guam. Mawar helped to sustain **Monsoon conditions** across Palau. Greatest 24-hr Rainfall Days were recorded on May 19 through May 27, 2023.





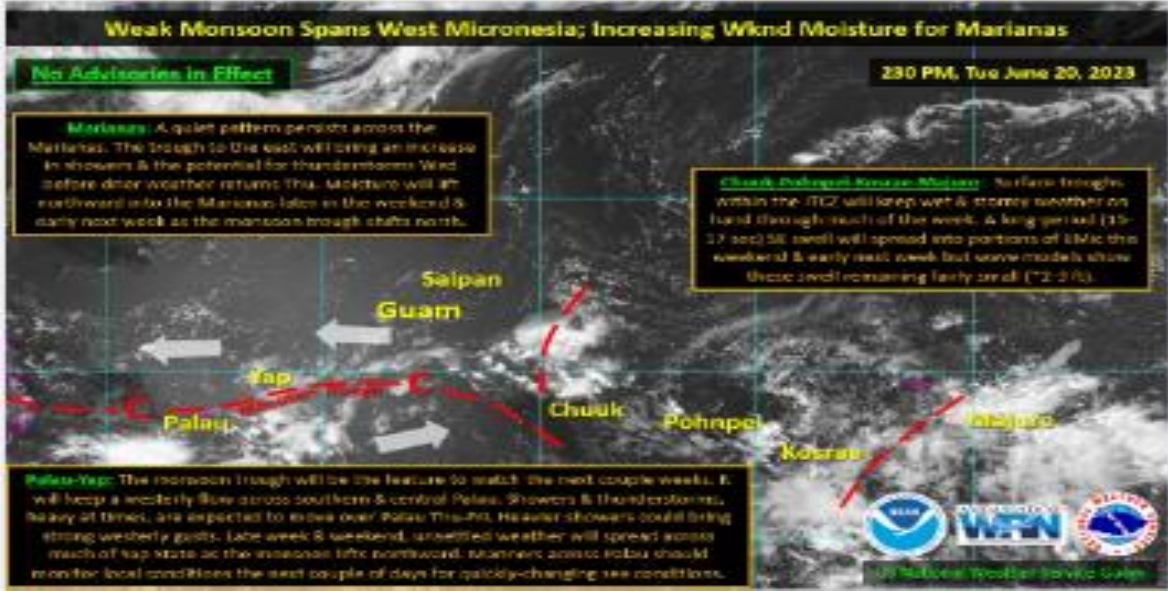
# June 2023: Monsoon Trough with embedded...



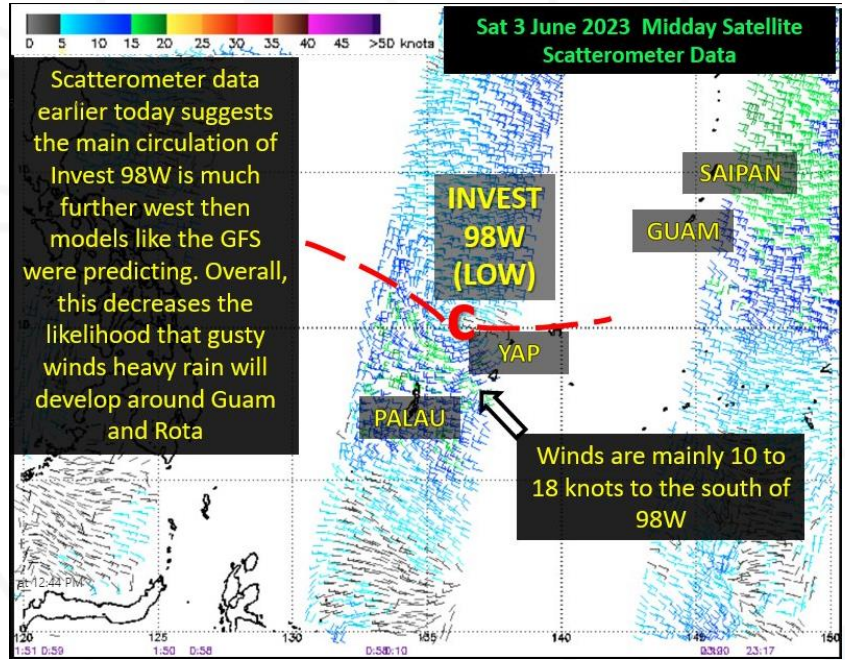
June 1, 2023: A weak disturbance (Invest 98W) is producing heavier showers to the west of Chuuk Lagoon, while bringing brief periods of scattered showers and isolated thunderstorms to Yap and Palau.

- Circulations
- Invest Area 98W
- Tropical Cyclone 03W

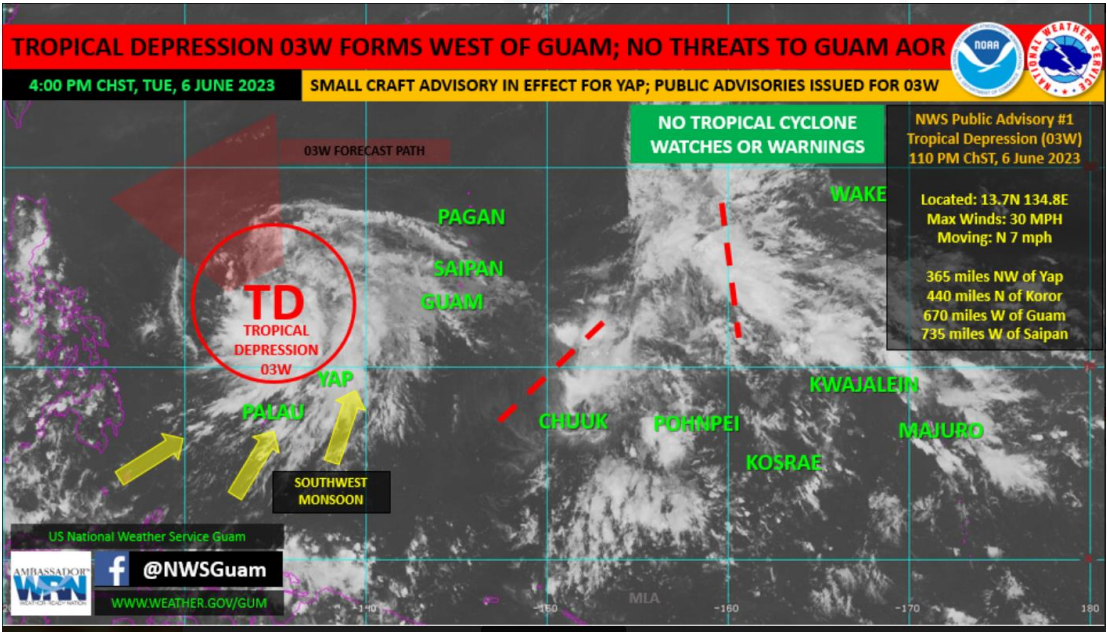
## WFO Guam Social Media posts



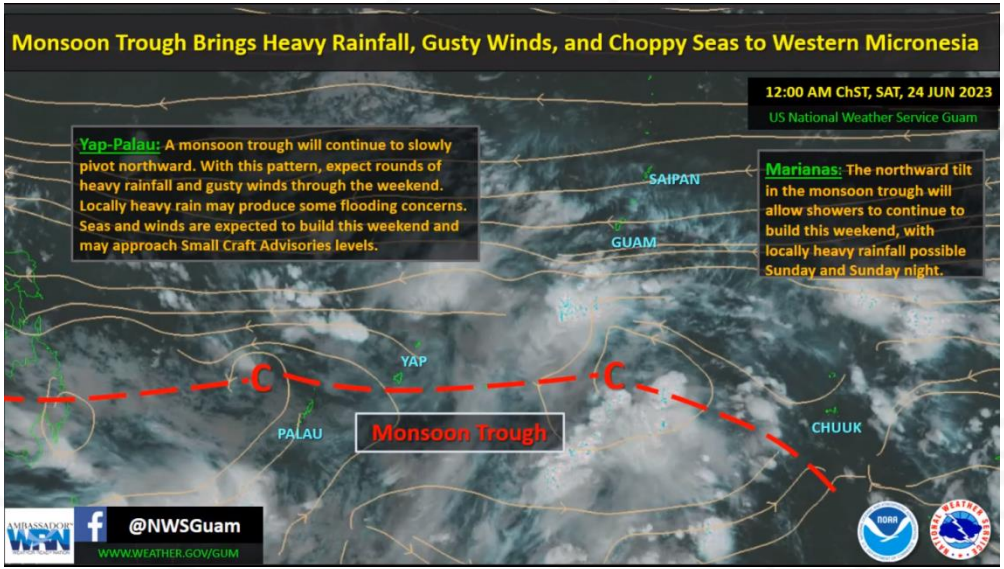
Regional Weather Update on June 20, 2023: For Palau, the **monsoon trough** over western Micronesia will bring westerly winds. Showers, heavy at times, and thunderstorms will be seen Thursday and Friday.



Sat 3 June 2023 - Late Night Meteorologist's Thoughts in left black box. **Monsoon trough** and **Invest 98W** northeast of Palau.



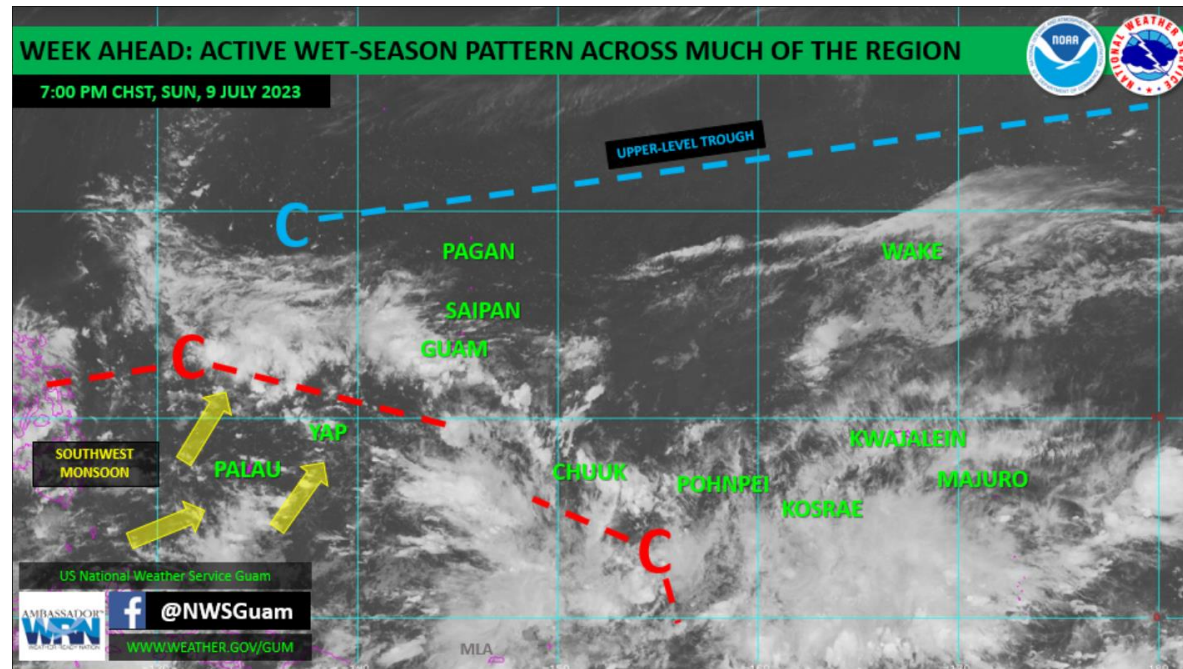
Tuesday, June 6, 2023: For Yap and Palau, TD 03W will pull northward and away, but a **wet monsoon pattern** will persist across this region through the end of the week. Expect south to southwest gusty winds, choppy seas, showers and thunderstorms the next few days.



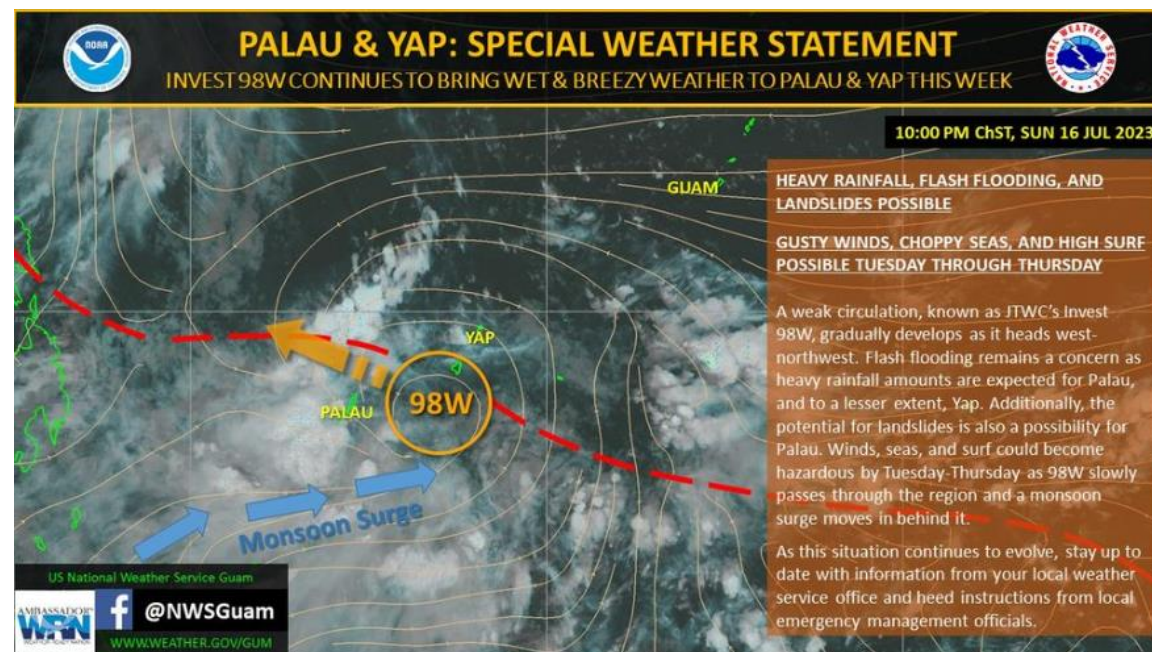
June 24, 2023: **Monsoon trough** brings heavy rainfall, gusty winds, and choppy seas to western Micronesia. Expect rounds of heavy rainfall and gusty winds through the weekend. Locally heavy rain may produce some flooding concerns. Seas and winds are expected to build this weekend and may approach Small Craft Advisories levels.



# July 2023: The Monsoon Trough with Circulations & Invest Area 98W

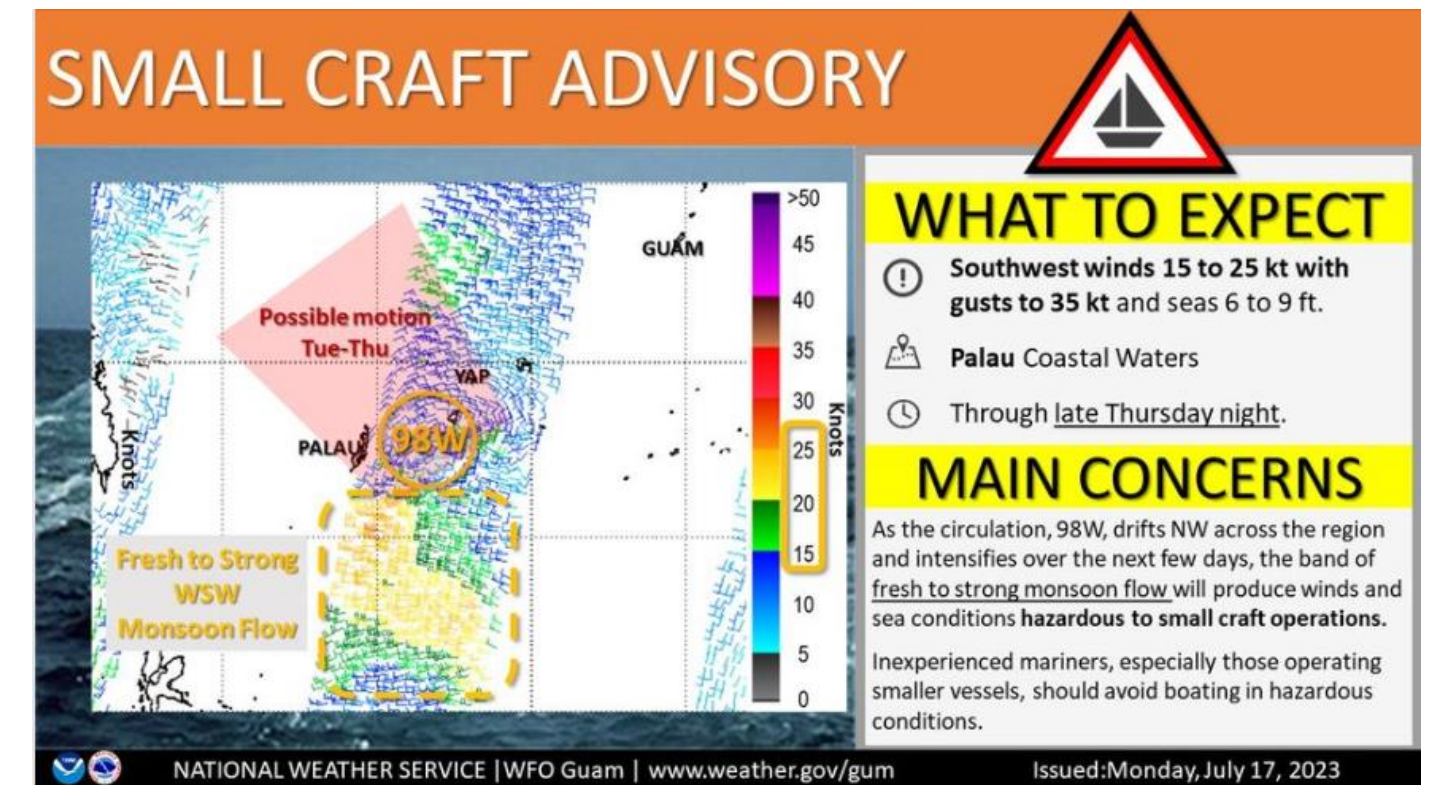


Weekly Regional Weather Outlook by Landon Aydlett, WCM Sunday, issued July 9, 2023: A wet-season pattern fills much of the NWS Guam Area of Responsibility (AOR) this evening with the **monsoon active over western Micronesia**, a weak disturbance in central Micronesia, and surging trades converging across eastern Micronesia.

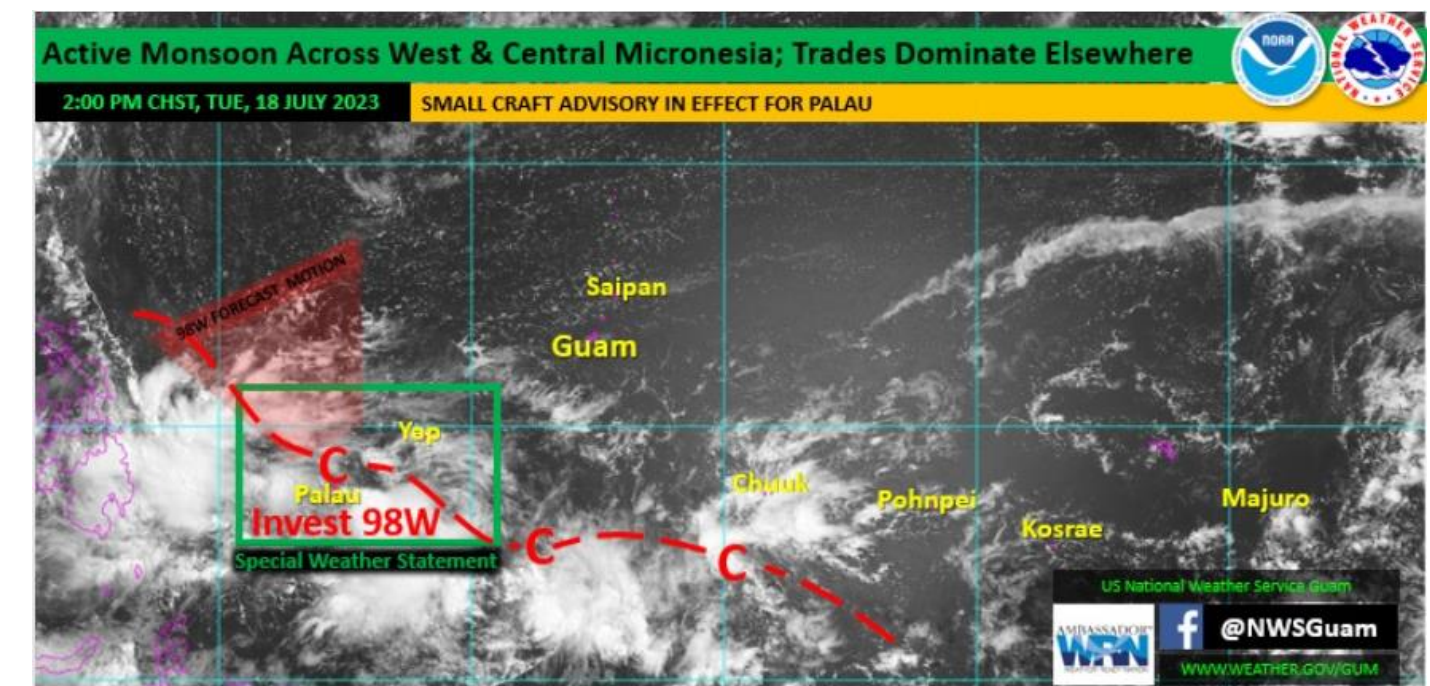


Sunday, July 16, 2023 WFO Guam social media post, Palau & Yap Special Weather Statement. **Invest 98W** continues to **bring wet & breezy weather to Palau and Yap** this week.

- Monsoon surge
- Hazardous Winds
- Severe Gusts
- Hazardous Seas
- Long term, torrential rainfall



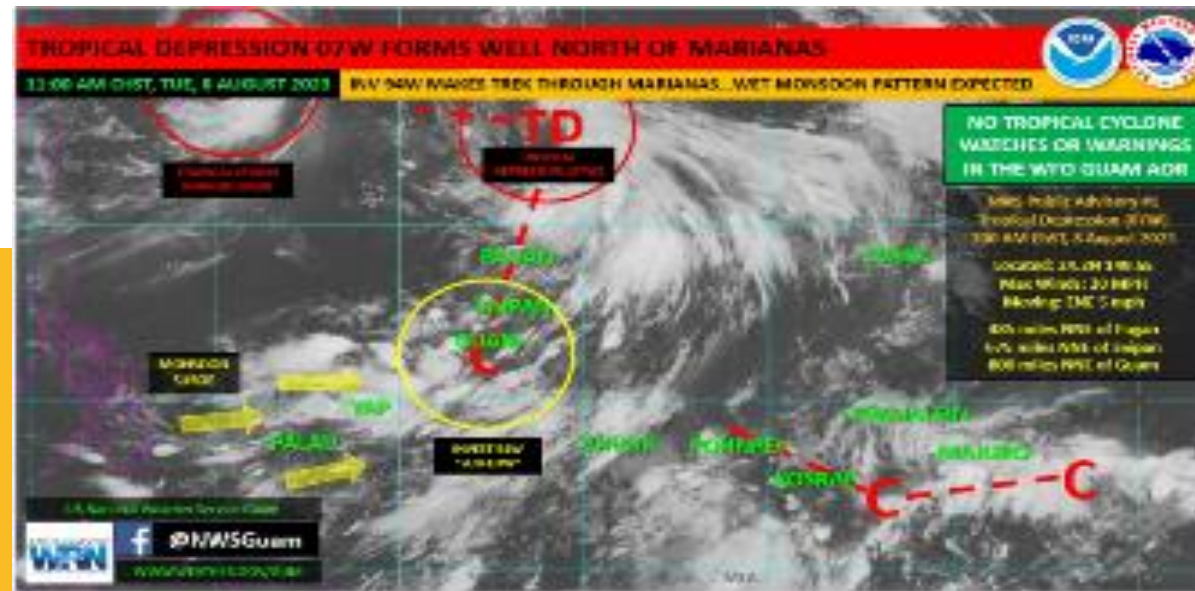
Monday July 17, 2023, WFO Guam social media post, “Small Craft Advisory” for Palau through late Thursday.



Tuesday, July 18, 2023, WFO Guam social media post on “Active Monsoon Across West & Central Micronesia: Trades Dominate Elsewhere”.



# August 2023: More of the Monsoon Trough



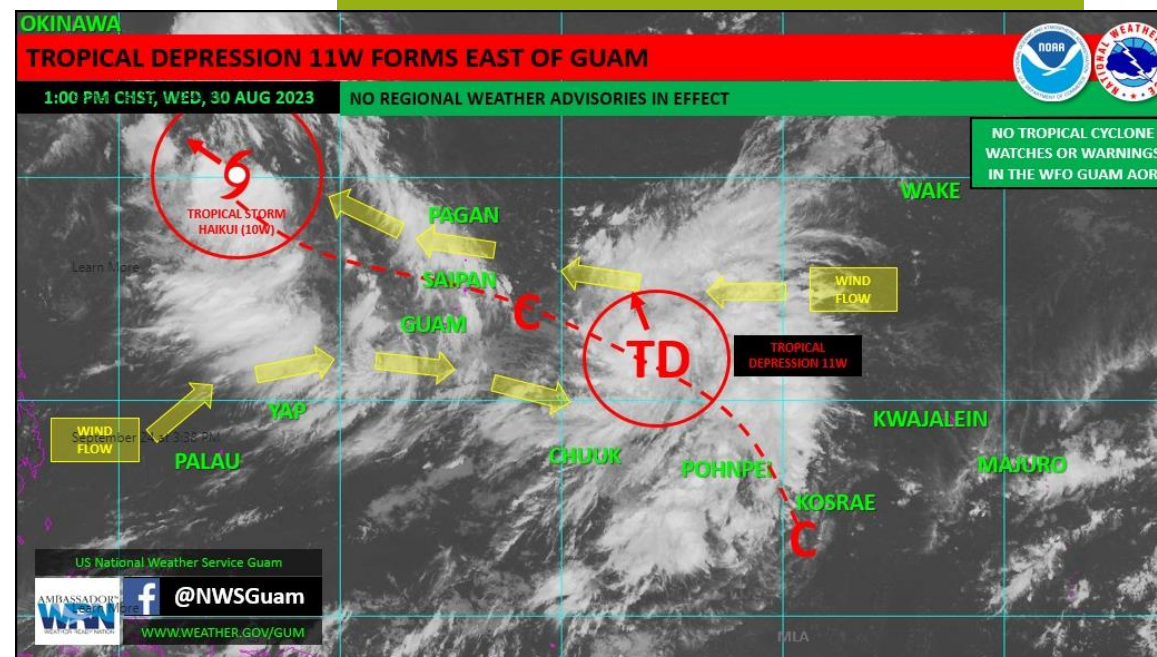
A complex weather pattern remains in place across the region with newly-formed **Tropical Depression 07W** (formerly **Invest 95W**) situated well north of the Marianas near 24.2N 149.5E, **Tropical Storm Khanun (06W)** still meandering outside the NWS Guam Area of Responsibility (AOR) near Okinawa, and the tropical disturbance, **Invest 94W** near Guam. **For Palau and Yap, the monsoon pattern will persist into the weekend with periods of showers, locally heavy at times, thunderstorms and stronger, gusty winds. Wind gusts could reach up to 25 to 30 knots the next couple of days resulting in hazardous sea conditions for small craft. Recent heavy rains across Yap and Palau could result in flash flooding and mudslide concerns with any additional heavy rainfall the next couple of days.**



WFO Guam social media post, Thursday, August 24, 2023:

**TROPICAL DEPRESSION 08W GRADUALLY REDIRECTS TO THE NORTHEAST  
MONSOON FLOW PERSISTS FOR THE MARIANAS, PALAU, AND YAP.**

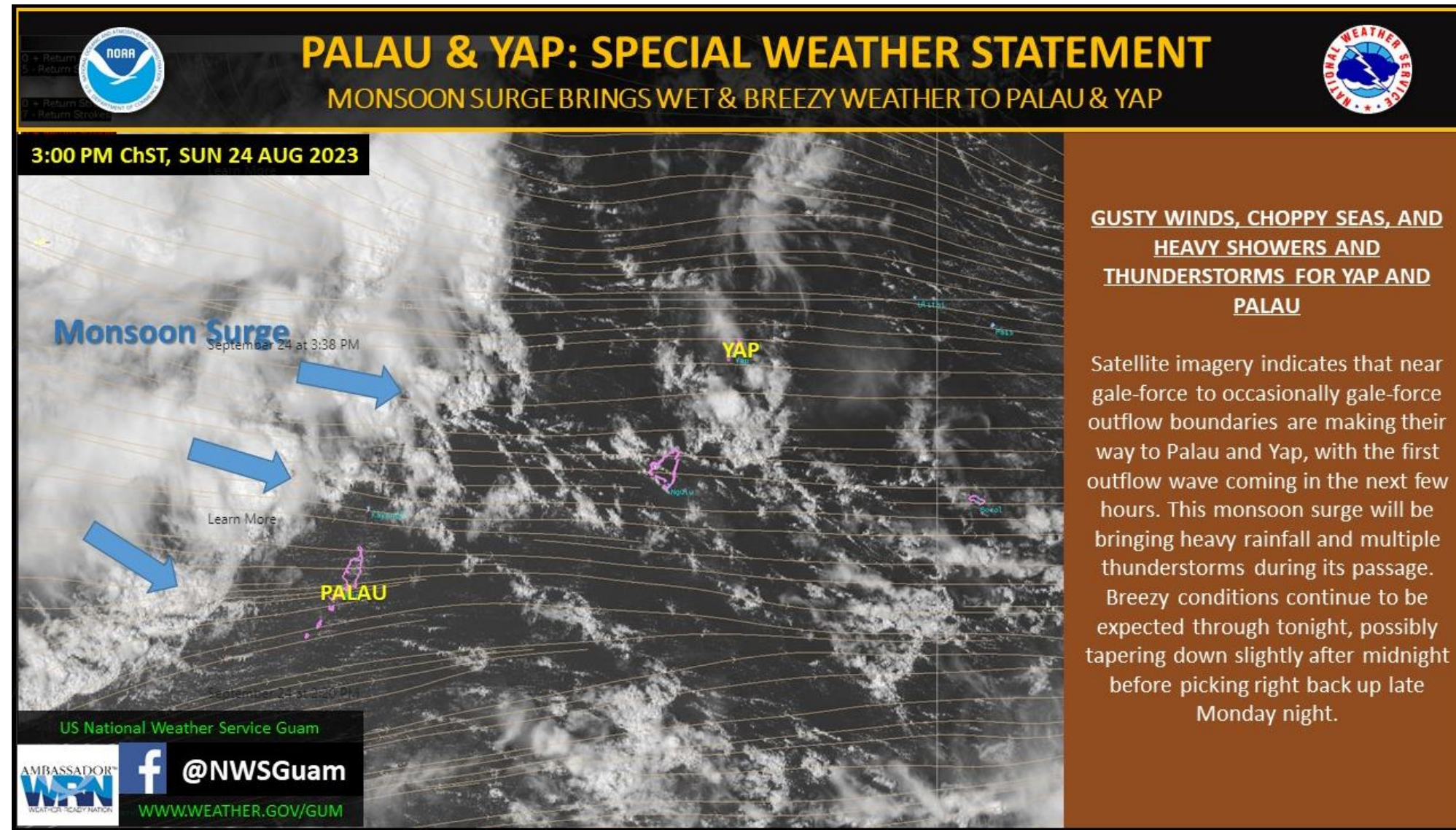
Although TD 08W gradually pulls away to the northeast over the next couple days, a wet monsoon pattern will continue over the Marianas and far western Micronesia. Within this monsoon flow, an area of heavy showers and thunderstorms with gusts up to 30 mph are moving over Yap Proper and is expected to persist through this evening.



WFO Guam social media post, TROPICAL WEATHER UPDATE AUG 30, 2023: The tropical disturbance northwest of Pohnpei, **Invest 94W**, was upgraded overnight to a Tropical Cyclone Formation Alert by the Joint Typhoon Warning Center. As of 1:00 PM ChST, 94W is now **Tropical Depression 11W**. It is the 11th tropical cyclone in the western North Pacific in 2023. Weather-wise, **monsoonal flow will persist across the region as the monsoon trough remains in place over the Marianas.**



# Monsoon Surge



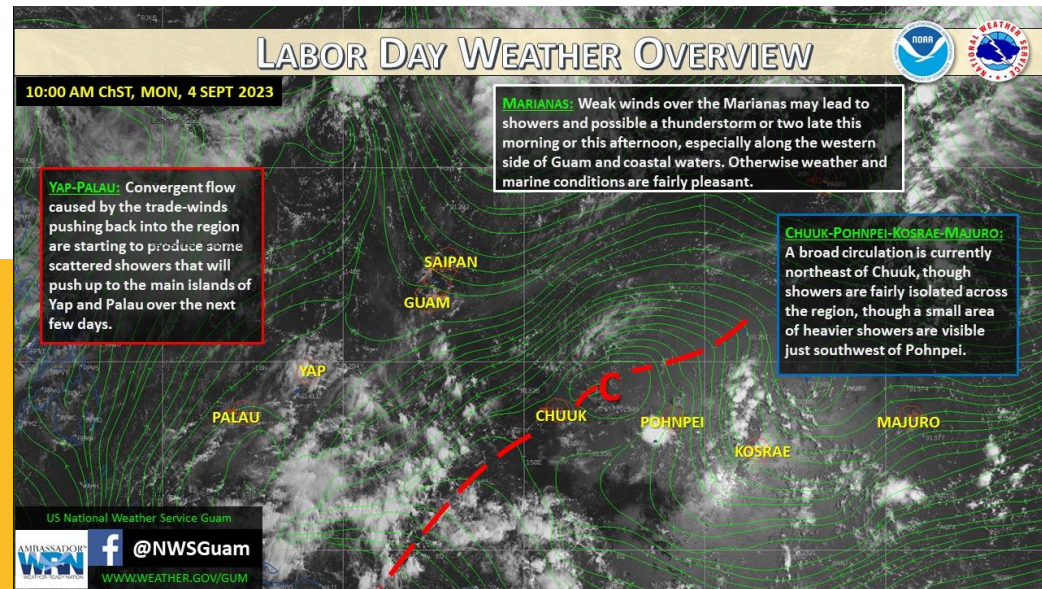
WFO Guam social media post, SUN 24 AUG 2023

**GUSTY WINDS, CHOPPY SEAS, AND HEAVY SHOWERS AND THUNDERSTORMS FOR PALAU AND YAP**

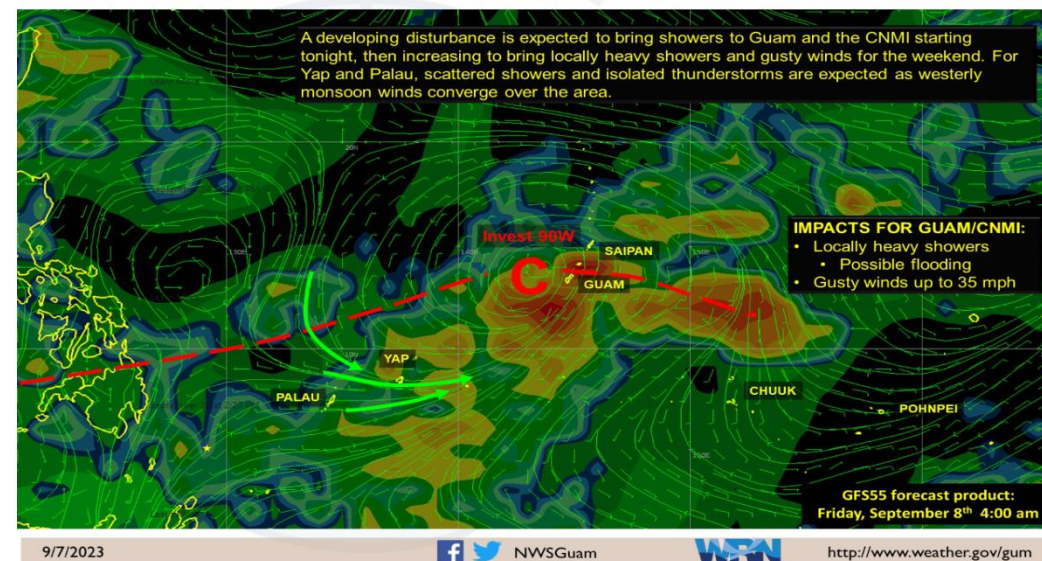
***Satellite imagery indicates that near gale-force to occasionally gale-force outflow boundaries are making their way to Palau and Yap, with the first outflow wave coming in the next few hours. This monsoon surge will be bringing heavy rainfall and multiple thunderstorms during its passage. Breezy conditions continue to be expected through tonight, possibly tapering down slightly after midnight before picking right back up late Monday night.***



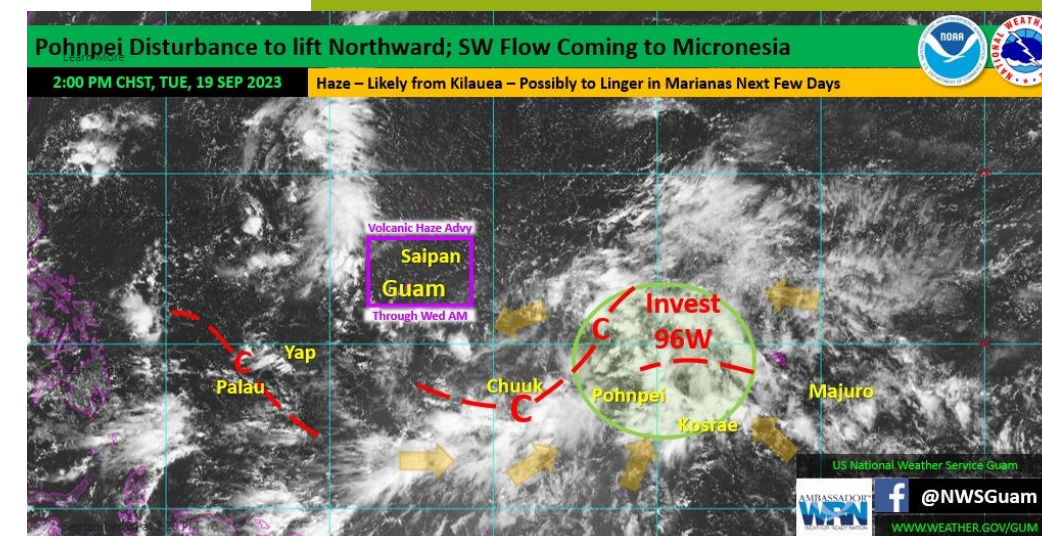
# September 2023: The Monsoon Trough



WFO Guam social media post, Monday, September, 4, 2023: Yap-Palau: Convergent flow caused by the **trade-winds** pushing back into the region are starting to produce some scattered showers that will push up to the main islands of Yap and Palau over the next few days.



WFO Guam social media post, Thursday, September 7, 2023: Yap-Palau: **Convergent flow of westerly monsoon winds** will produce some scattered showers that will push up to the main islands of Yap and Palau over the next few days.



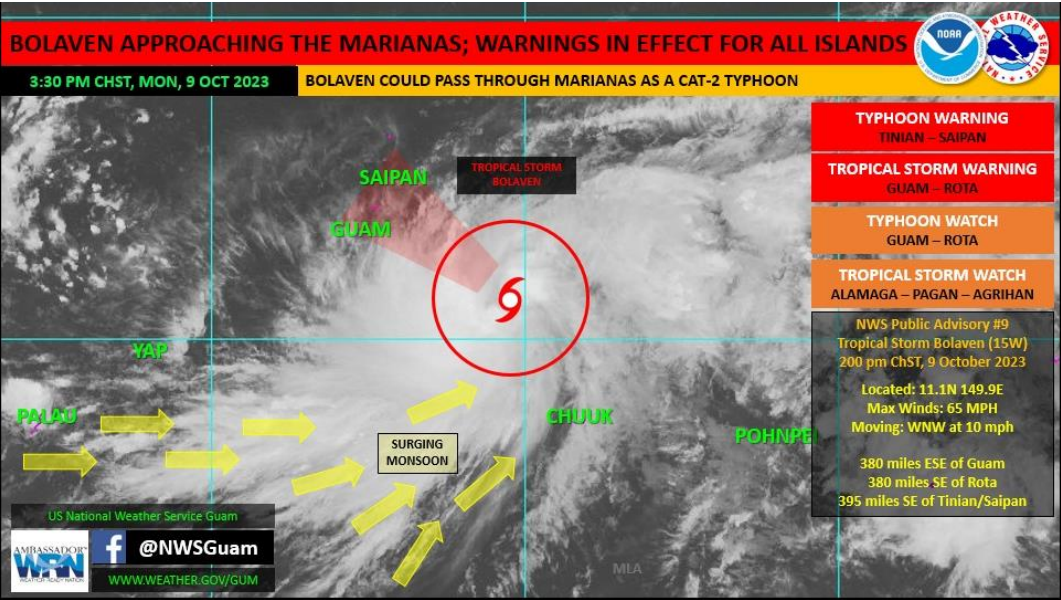
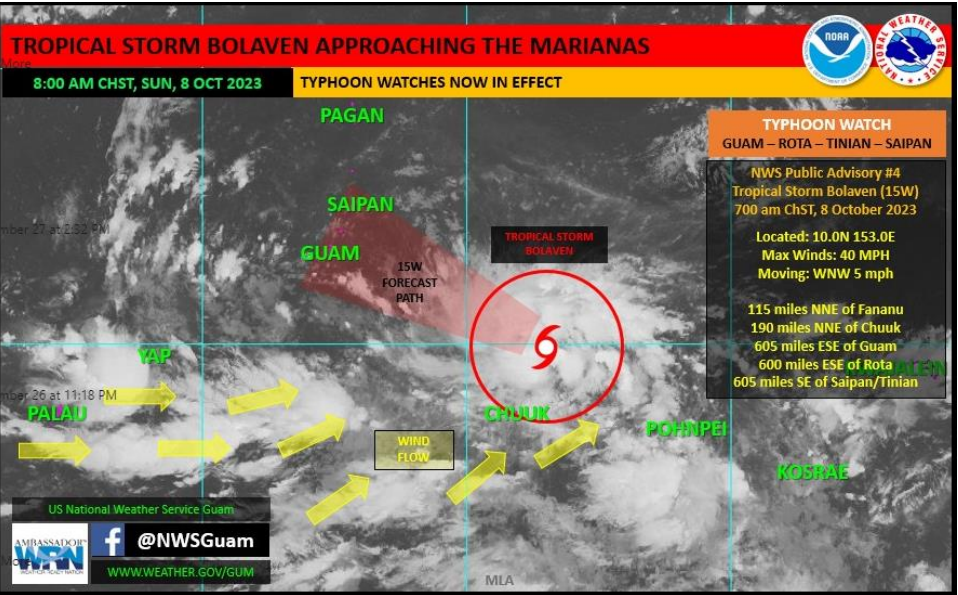
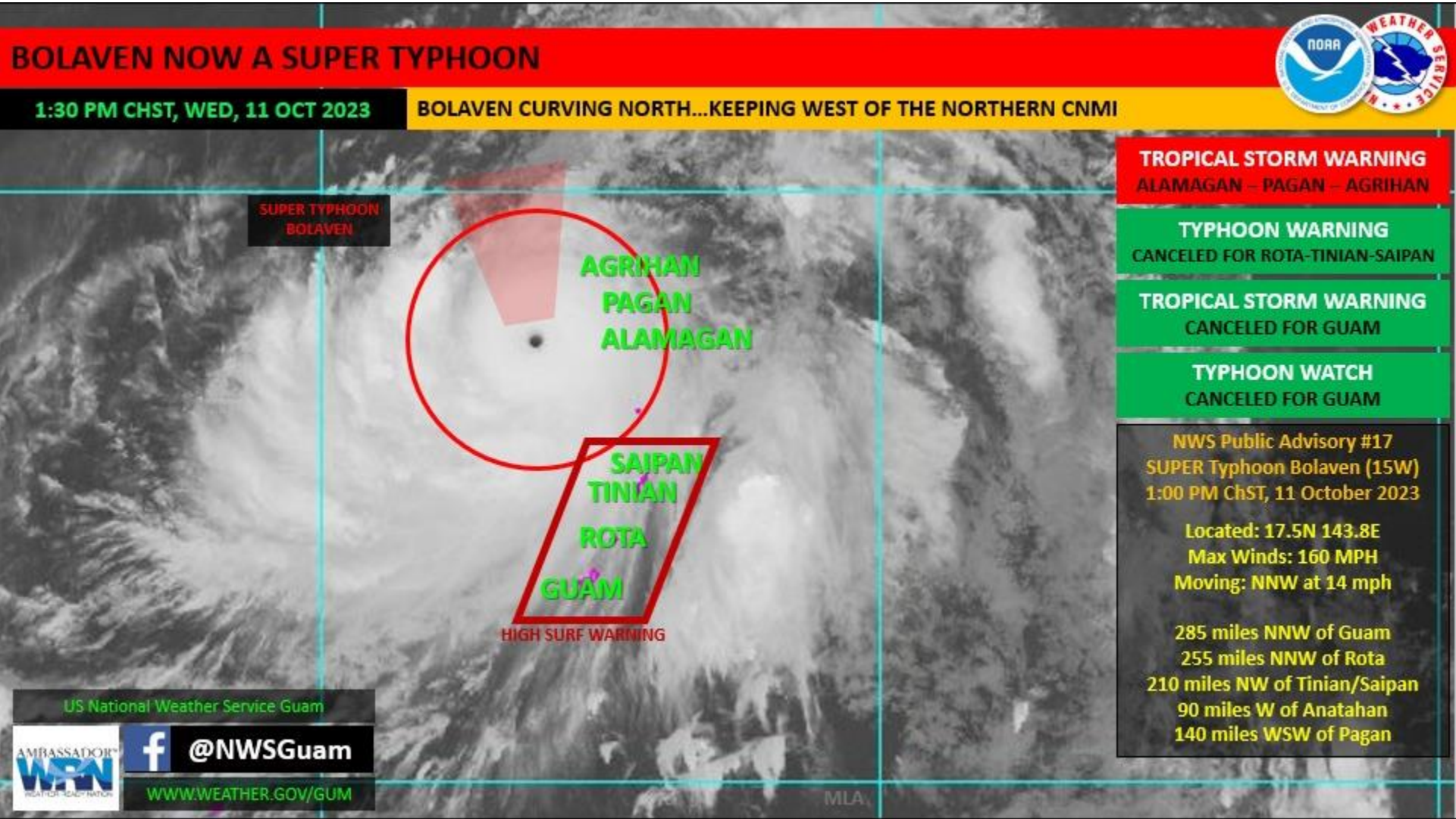
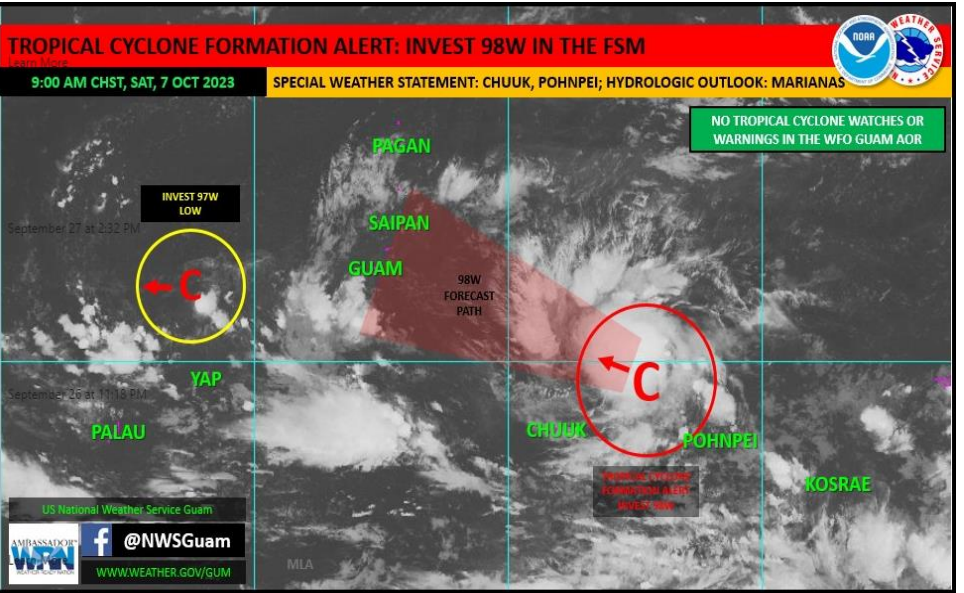
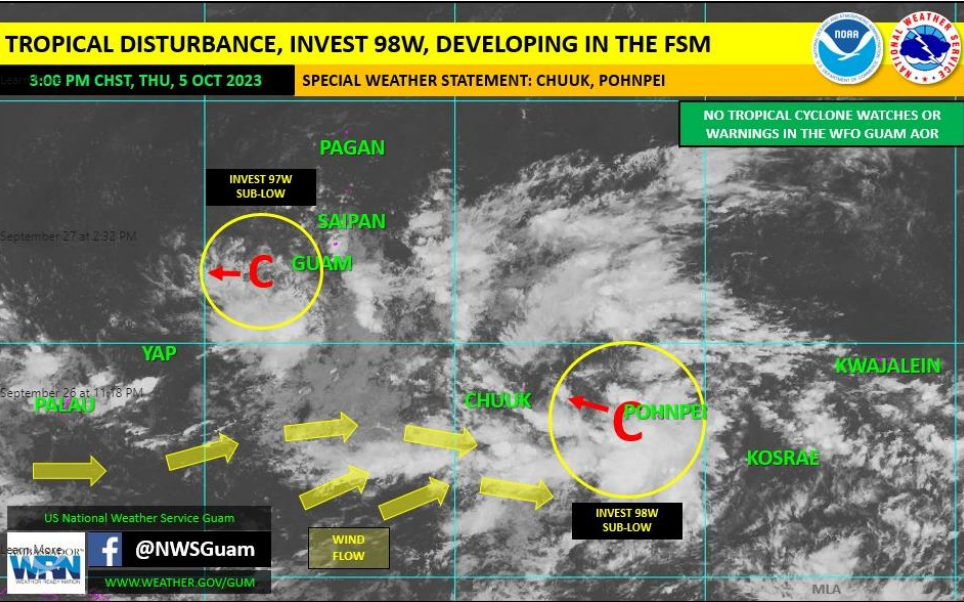
---REGIONAL OVERVIEW, Tuesday September 19---

**Wet season persists across the region** and a broad, disorganized disturbance (**JTWC Invest 96W**) will be the feature to watch for the coming week. Currently without an identifiable low-level circulation center, this system is anticipated to evolve in the coming days to eventually form a circulation somewhere north of Chuuk-Pohnpei-Kosrae. While computer models still disagree on the nature of the future circulation (location, size, intensity – TC or not), the common picture shows a broad west-east-oriented monsoon trough stretching from the Palau-Yap region to the disturbance by the weekend – at this time, likely somewhere east of the Marianas.



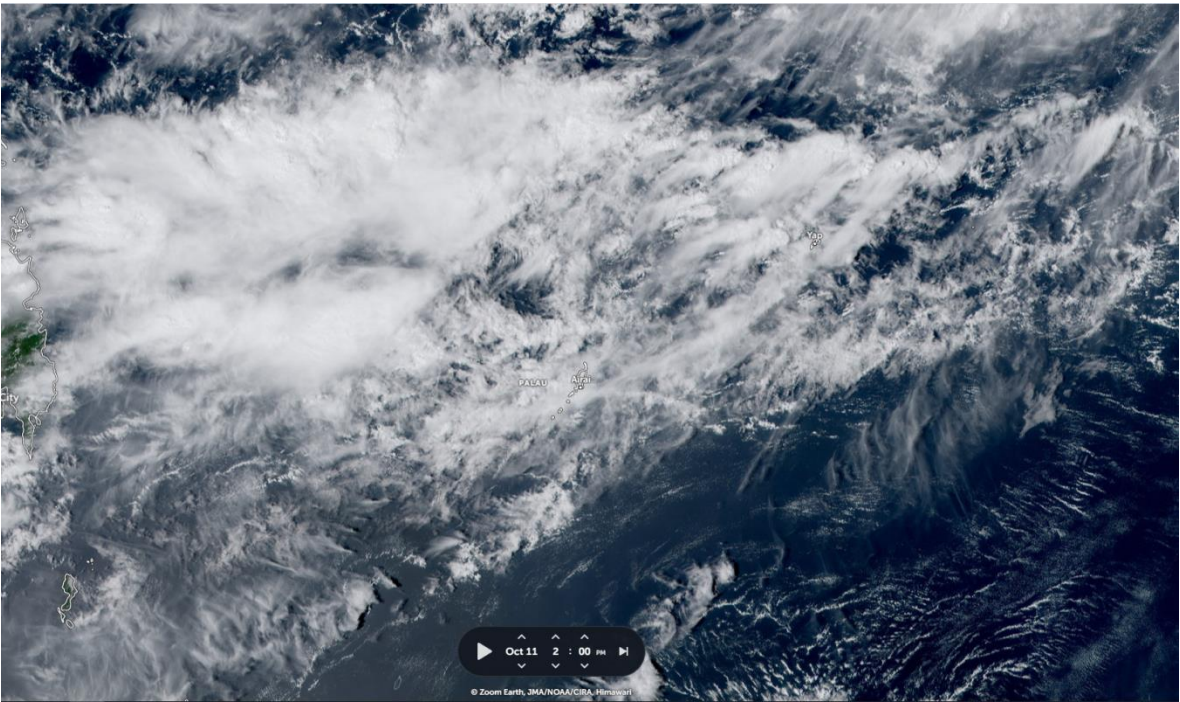
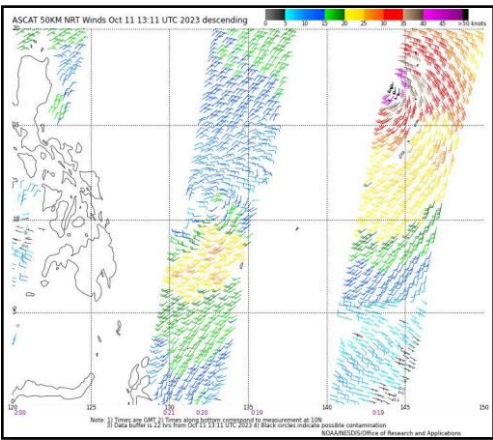
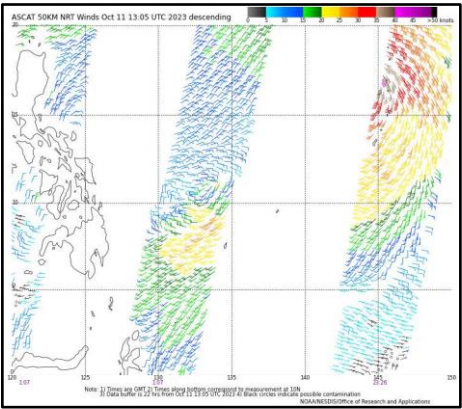
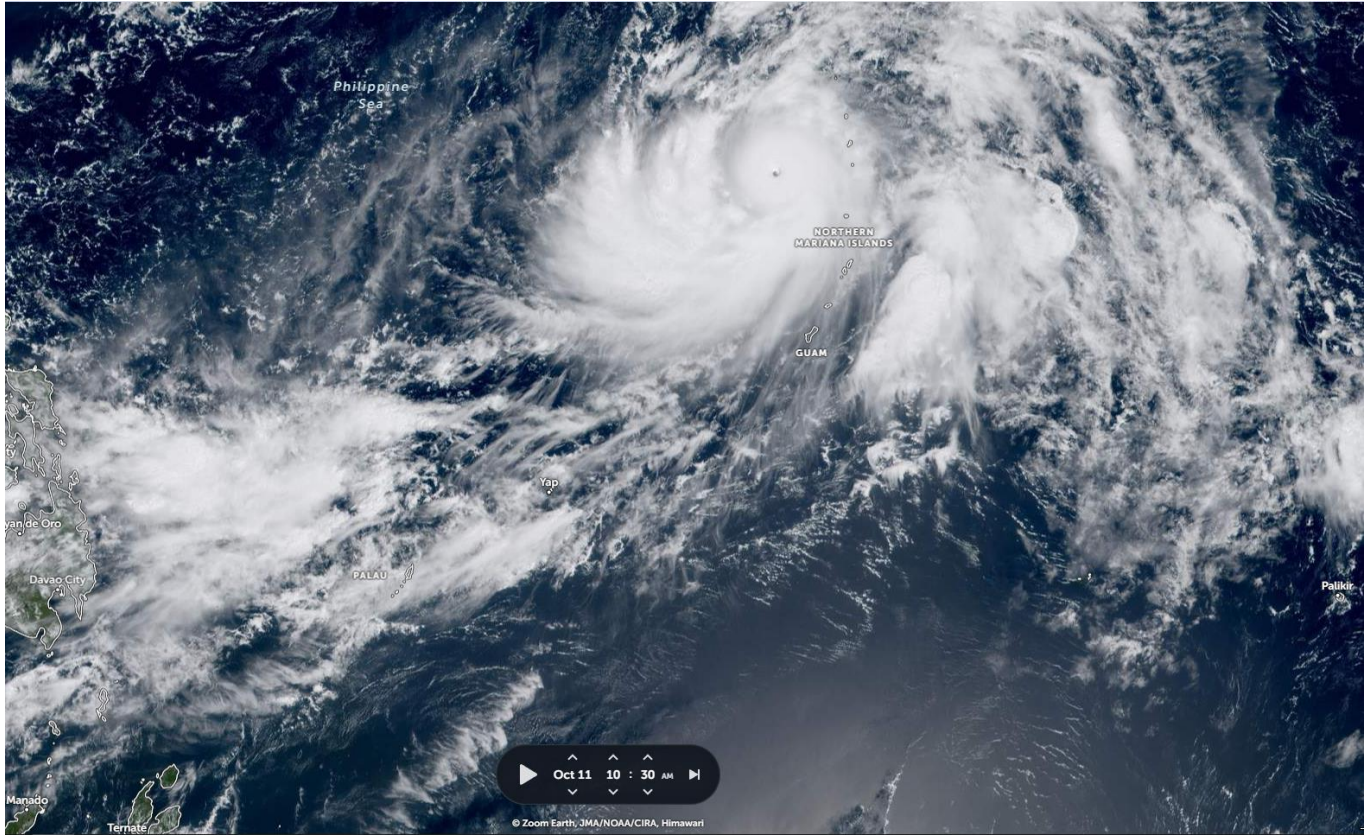
# October 2023: Monsoon Trough, Invest Areas and Tropical Cyclone

WFO Guam social media posts from Oct 5-11 of the Monsoon conditions over Palau and Yap, within the trough: Invest Areas 97W and 98W, and Super Typhoon Bolaven (former Invest 98W) impacting Guam and the Marianas.

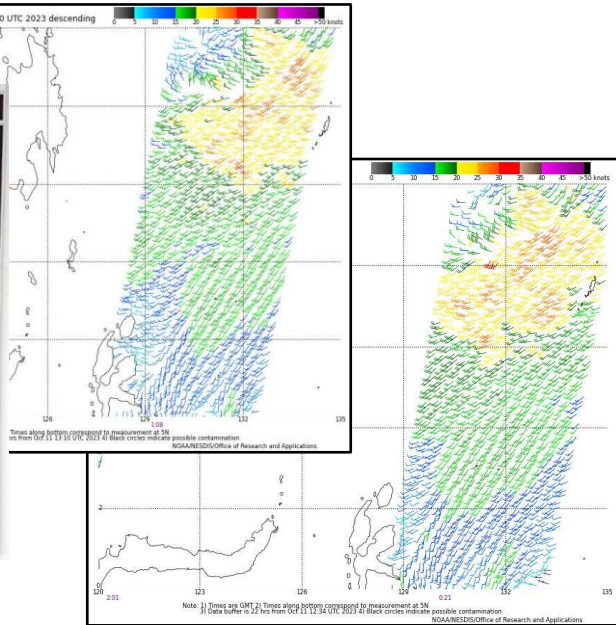




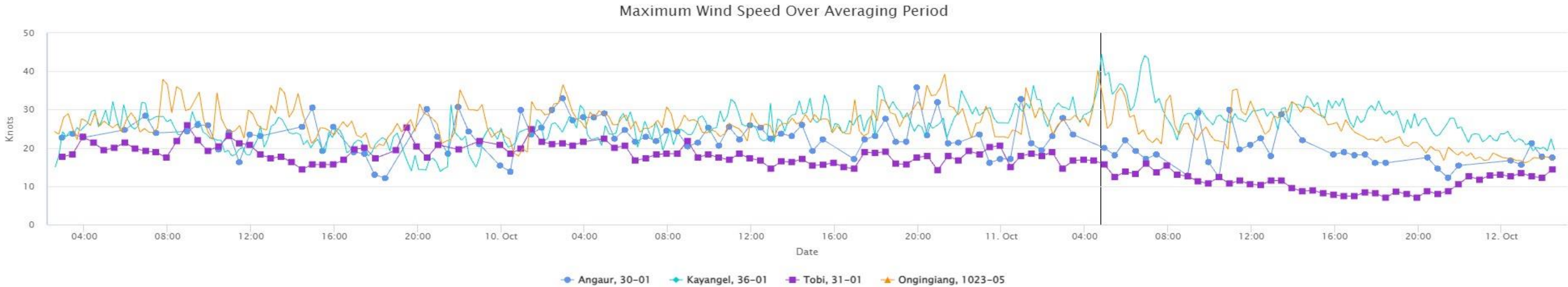
# October 11, 2023: Monsoon Surge



Ob Time: 23/10/11 02:13:51		PTKR		KOROR, PALAU	
SP 25 kts	WD 256	AT 28.8/83.8			
GU 40 kts	WC VRBL	DP 24.8/76.6			
PK 40 * kts	ERR BIT: 0	RH 78%			
Last Barometer Update      Barometer Ob Time: Wed Oct 11 01:31:00 2023 UTC					
Sensor Pressure		1004.2380			
Altimeter Setting		1007.8030			
24 Hour Max/Min LST			Six Hour Max/Min UTC		
Today		Yesterday		Max	
PKWS: 40 kts	100 kts			LST Mid 00Z To 01Z	29.3
WG: 40 kts	00 kts			00 Z	27.6
MAX: 29.0/84	100 C 100 F			06 Z	29.3
MIN: 27.4/81	100 C 100 F			12 Z	28.3
Local Time: Wed Oct 11 01:30:58 2023					18 Z
UTC Time: Wed Oct 11 01:30:58 2023					28.3



Zoom.Earth: Visible Satellite images for Oct. 11, 2023 at 10:30am and 2:00pm ROPST.  
Scatterometer Ocean Surface Wind data from ASCAT Descending B and C at 25 and 50KM  
over western Pacific. WSO Palau RSOIS observation recording southwest winds at 25kt  
gusting to 40kt. Maximum Wind Speed Over Averaging Period for Oct. 10 and 11.

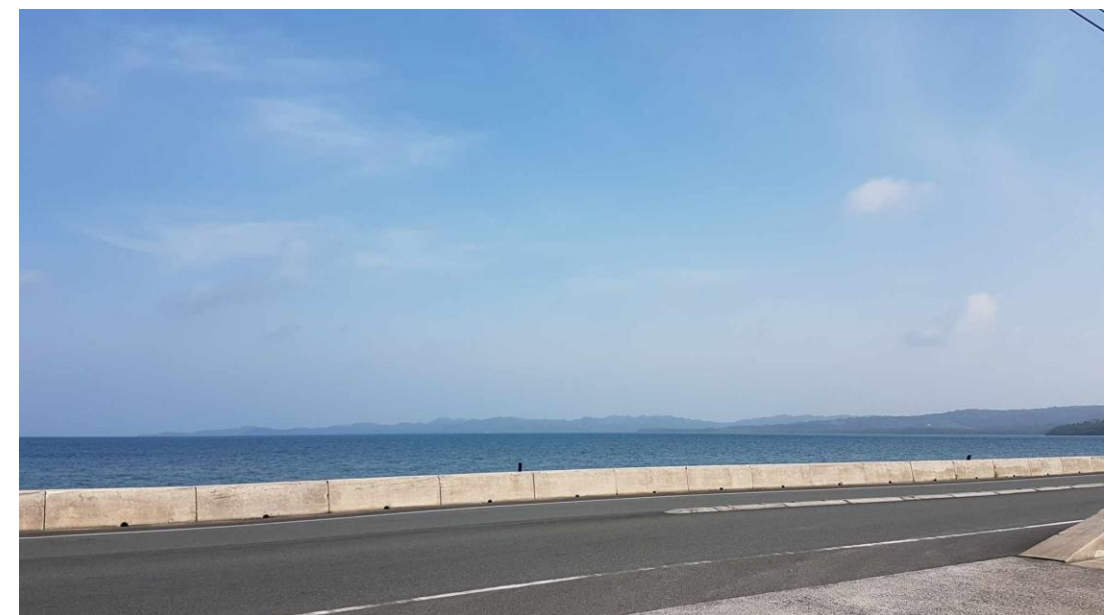




October 12, 2023, Obscuration: Thick Haze, a day after the Monsoon Surge, prevailing winds still coming from the southwest.



Haze observed across Palau. Photos taken of Southeast and Southwest of Babeldaob from Koror's Causeway





# Summary

## Monsoon Troughs with Embedded...

- Circulations
- Tropical Disturbances (Invest Areas)
- Tropical Cyclones

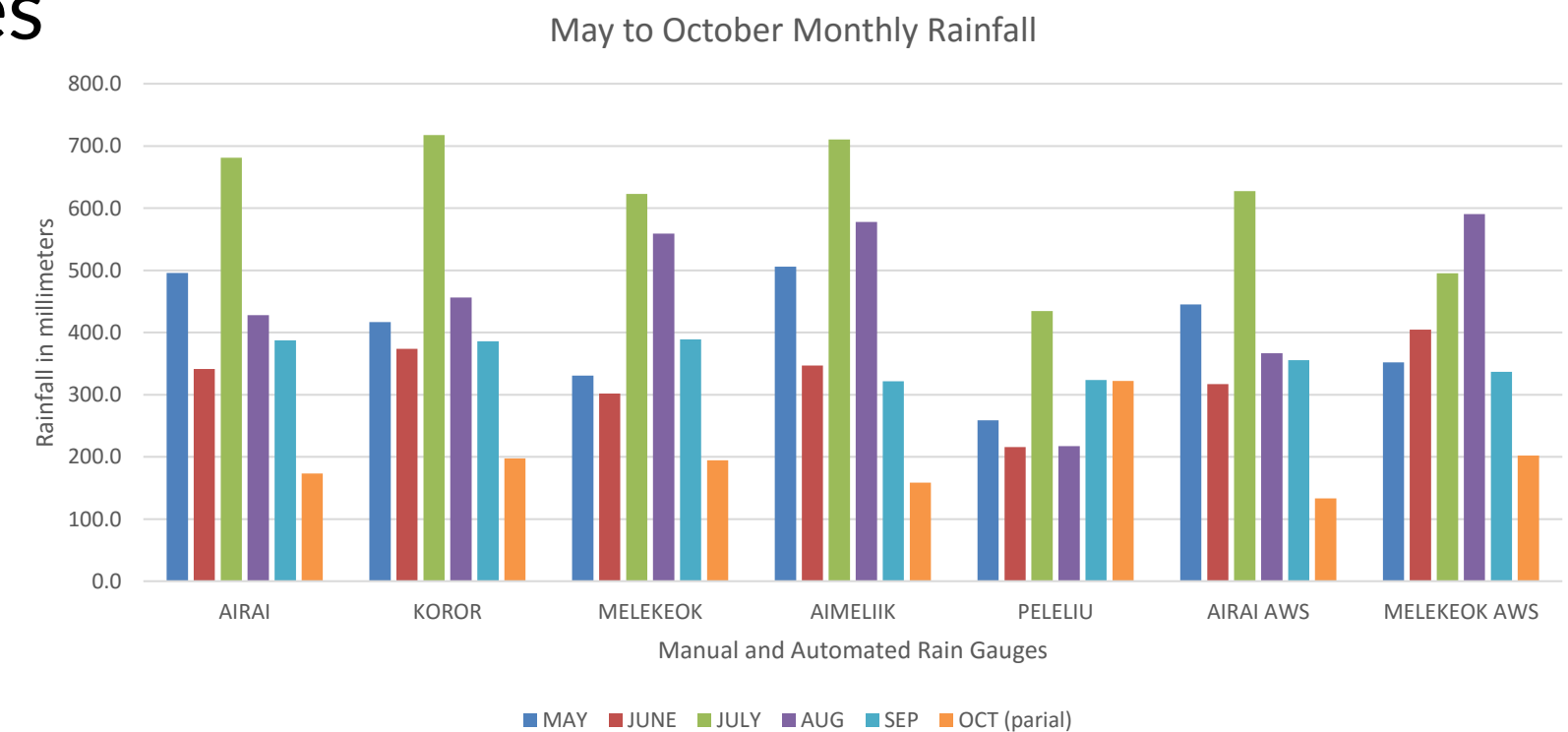
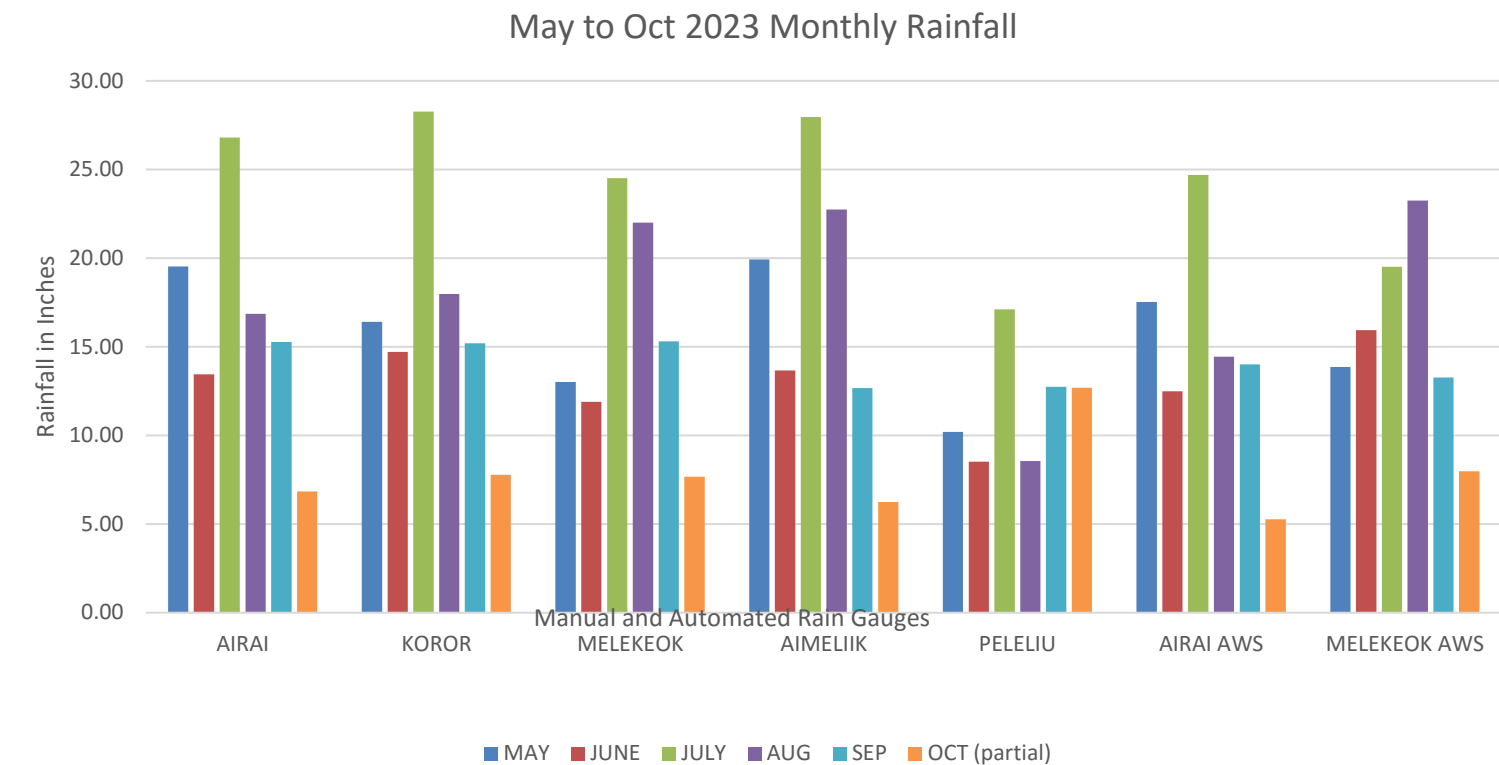
## Monsoon Surges

- Hazardous Winds:
  - Fresh to Strong Prevailing Westerlies
  - Near-gale to Gale force gusts
- Torrential Rainfall
- Continuous Rainfall
- Hazardous Seas and Surf

## Obscuration

- Haze

## Weak Trade-winds





# Extreme events in Kiribati since May 2023

Source:

- Strong winds reported from Nikunau on 29<sup>th</sup> September 2023.
- Strong winds on South Tarawa reported on 24-25<sup>th</sup> September 2023
- Heavy rainfall
- Extreme spring tide
- **Impacts:** damaging land-spout, gradual improvement of groundwater salinity, dengue fever outbreak, reef fish aggregates, land erosion, seawater inundation and agricultural pest's outbreak.



**Top image:** Fishermen casting nets over aggregating reef fish.

**Top image:** strong wind reported from Nikunau. **Bottom image:** damaging landspout reported from Abarao on South Tarawa.



# Impacts Summary

Since May 2023, there are records of **extreme weather events** observable around Kiribati especially in the main capital city of Tarawa. These includes the followings:

- strong winds from active convergences around Kiribati.
- heavy rain.
- extreme spring tides

**Impacts** associated with such extremes includes but not limited to the followings:

- gradual improvement of groundwater salinity,
- pests outbreak
- dengue fever outbreak
- seawater inundation
- reef fish aggregates.
- land erosion.
- damaging landspout.





# Extreme events in Nauru since May 2023



- Increase windy conditions.



Top image: strong wind



Top image: fallen trees



# Extreme events in Chuuk (FSM) since May 2023



- Impacts on plants: soil erosion and nutrient loss, oxygen deprivation, disease and fungal issues leading to rotting of sweet potato, eggplant, cucumber, cabbage, yam, sakau. Farmers had to harvest prematurely to sell what they had.
- Flooding and Landslides
- Water contamination of wells, rivers and streams.
- Marine and land transportation difficulties e.g. increased cancellation of flights, risk for fisherman, increase in pot holes and unsafe to drive.
- Increase in disease outbreak e.g. diarrhea, typhoid.
- Ocean sedimentation.



Prolonged periods of very wet conditions can have positive



# Extreme events in Pohnpei and Kosrae since May 2023

**Above average Rainfall for  
Pohnpei and Kosrae.**





# Above average rainfall for Pohnpei and Kosrae



Flooding in Kosrae

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Flash flood in Pohnpei

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Road erosion in Pohnpei



# **Country specific Impacts – Melanesian countries**



# Extreme events in PNG since May 2023

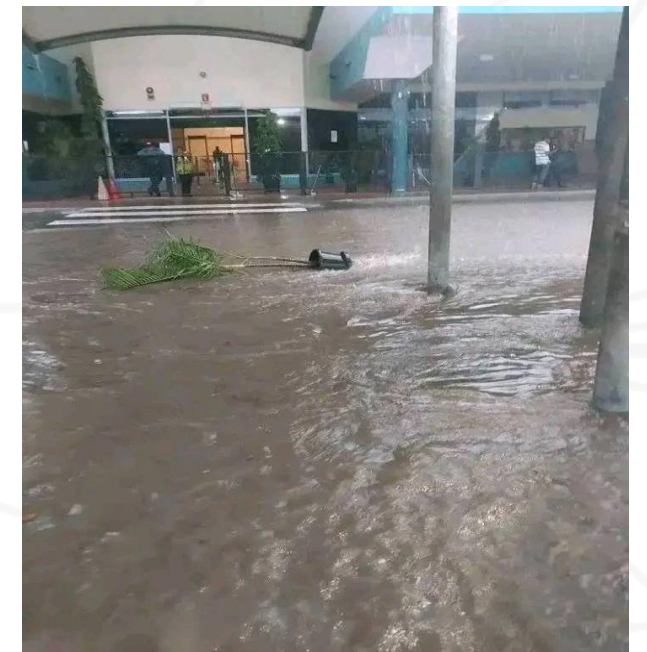


Heavy rains caused extensive flooding across NCD -April 2nd 2023



Areas affected

- a. 4 Mile
- b. Jacksons Airport
- c. Jacksons Air[port
- d. 8 Mile
- e. Gerehu





# CAUSES OF FLOODING

Source: Mr Ravu Frank, City Manager, National Capital District Commission.



Mr Ravu Frank, City Manager, NCDC

- High-intensity downpours occurred over 2 hours, so the impact was massive & unprecedented.
- No well-designed drainage system could have stood that volume of water. The pit openings could not capture the amount of surface flow.
- Attributed to climate change. “Rainfall intensities are getting higher”
- Poor community behavior, sanitation & hygiene causing blockage of the drainage system. The fridge, washing machine, tires, and other household items were found to be thrown into the drainage, including uncollected wastes.

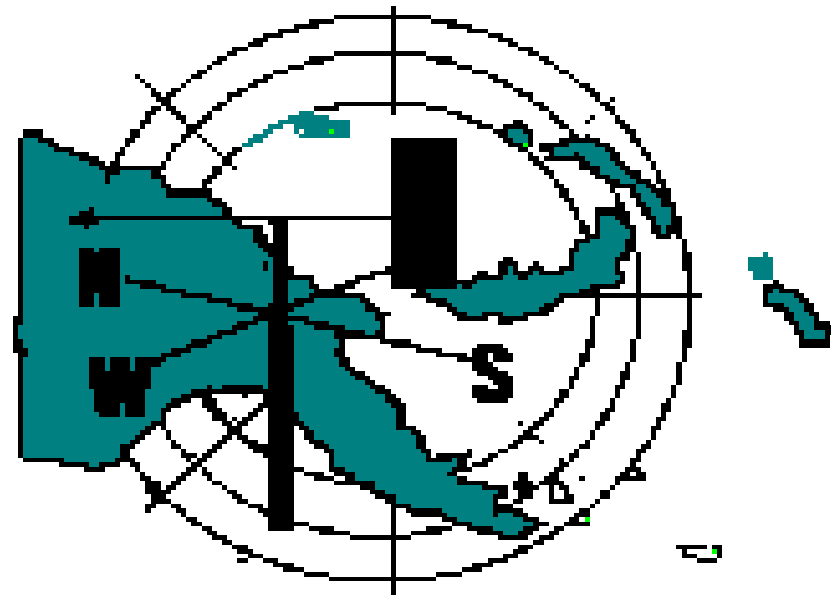


Blockage of drainage with household wastes and debris



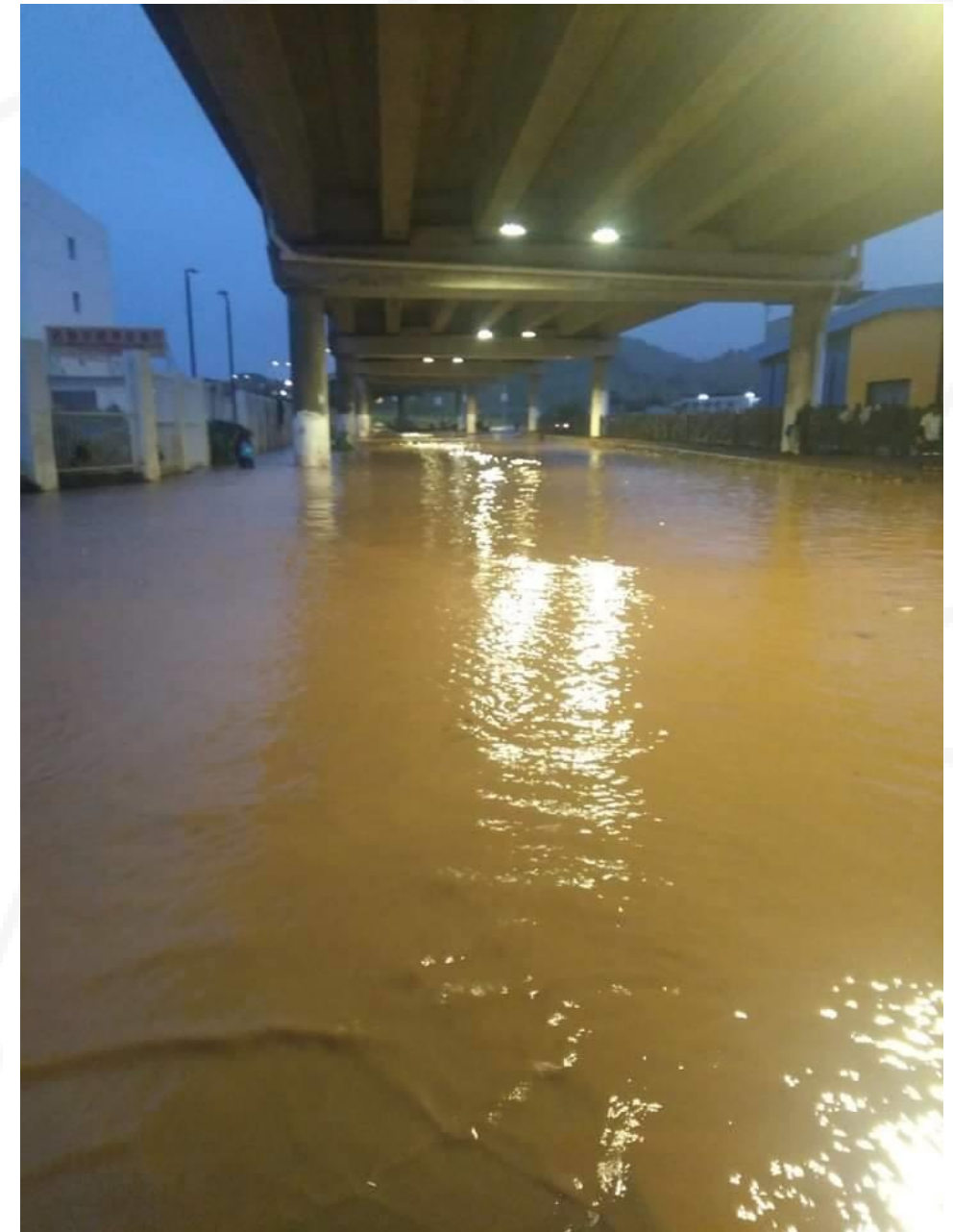
# CAUSES OF FLOODING

Source: PNG National Weather Service.



PNG National Weather Service

- Mr Peter Warupi, a forecaster with PNG National Weather Service confirmed “the intensity of the rain was the main reason for the flooding”.
- He further added that “ yesterday’s rainfall data was 145.8mm over 3 hours”. It was above the average rainfall.
- According to climatological records, it was the 6<sup>th</sup> highest rainfall recorded in a single day. The highest daily accumulated rainfall ever recorded is 305.4mm in 1994.



Flooded road making it difficult for vehicles to cross at Erima overhead bypass. *Picture courtesy of Facebook.*



# Damages & Casualties

- Although the flood affected major parts of the city, the most affected included Jackson International Airport, Hohola, 8 Mile, and Malolo Estate.
- Several vehicles were submerged under the water with one even swept right off the road.
- “A man allegedly drowned in the flash floods in Port Moresby on Saturday evening during the heavy downpour”. (Post Courier).



Vehicles being submerged as a result of the extensive flooding event.  
*Source: Facebook*



Flooding at Jackson's International Airport  
*Source: Facebook*



# Lessons Learnt & Way Forward

- City Manager Mr Ravu Frank said he would engage experts to do the hydrology, audit the drainage network, and develop and propose solutions to recurring flooding problems in the city.
- Engineers from City Hall will be working very closely with the National Airports Corporation (NAC) to resolve the issue of the collapsed bridge at the airport.
- NCDC to work closely with the PNG National Weather Service to alert residents on the possibility of flash flood events through “Rain Preparedness”.
  - NCDC would like to remind its city residents to exercise caution when driving on wet roads
  - Plan your journey ahead of time.
  - Allow extra travel time and adhere to all signs etc.



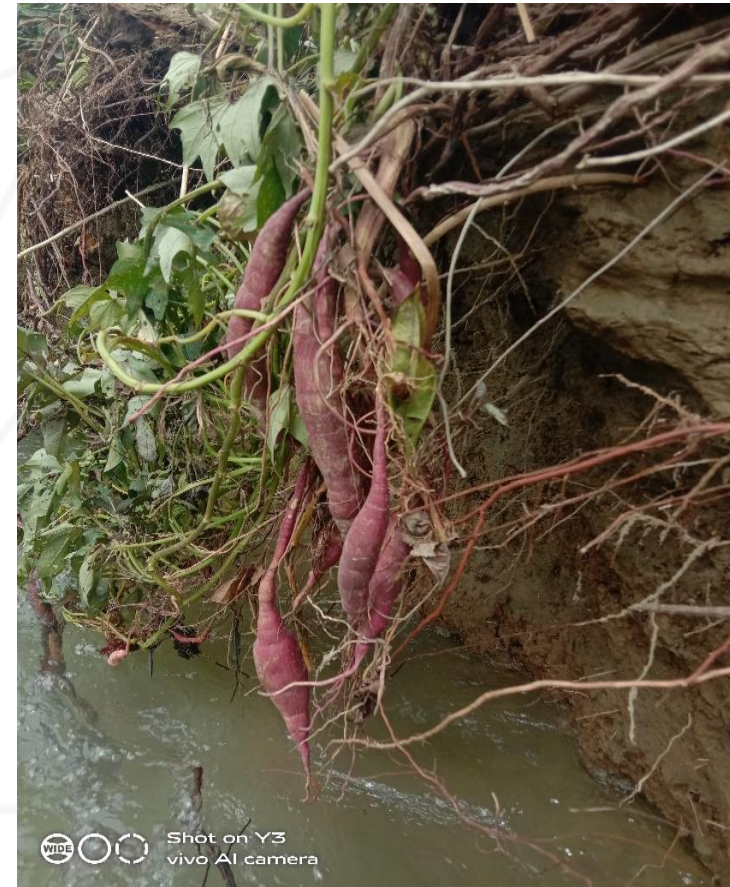


# Extreme events in Solomon Islands since May 2023



Logu river in South East Guadalcanal - overflooded its banks destroying food gardens including sweet potato, cassava and banana plantain

Source: (Photo taken 1st Sept 2023 ( Photos by Agriculture Extension divisions , Guadalcanal province.



Sweet potato (Ipomoea batatas) garden completely

*Photo taken 1st week of September 2023*



Surface flooding destroying mealy planted sweet potato



Taro patches shocking in pool of water after two weeks of heavy downfall

Source: Guadalcanal Agriculture Extension @ 2023



# Effect of El Nino

- Dry conditions were observed in parts of Guadalcanal during the month of September 2023. e.g. report from Selwyn college and Betikama College.



Dear good parents/guardians: (19/9/2023)  
Due to the experiences of dry session through the past weeks, our drinking tank waters have run out. The School will try to arrange to collect water from nearby villages. On the same, parents, if you wish to send ctns of drinking water to your children, do so and that the school truck will come to town today.  
Truck to leave Honiara back to school at 4.00pm.  
Tagio





# Extreme events in Vanuatu since May 2023



Food Distribution on Futuna Island – Sep 2023

- Serious shortage of local food after twin cyclones TC Judy & Kevin has led to hunger across the island of Futuna. Many boarding schools are forced to close down. Replanting of local crops still not ready and going off season.
- In October 2023, NDMO received complains from the islands in the Shephards group that most of their crops in the garden are not growing well after the two Cyclones TC Judy & Kevin



Food Shortage in the Shepherds Islands





# Drought related Impacts

Teouma Lake, EFATE



Middle Bush, TANNA  
August 2023





# Extreme events in Fiji since May 2023

## Landslides



Massive rocks, soil and debris lying on the roadside due to the landslide at Tamavua, Central Division on 3rd June, 2023. Source: FBC News



Trees falling over the power pole in Tamavua, Central Division due to the landslide on 3rd June, 2023. Source: FBC News



Massive rocks, soil and debris lying on the roadside due to the landslide at Wailoku Road, Central Division on 27th July, 2023. Source: Fiji Roads Authority



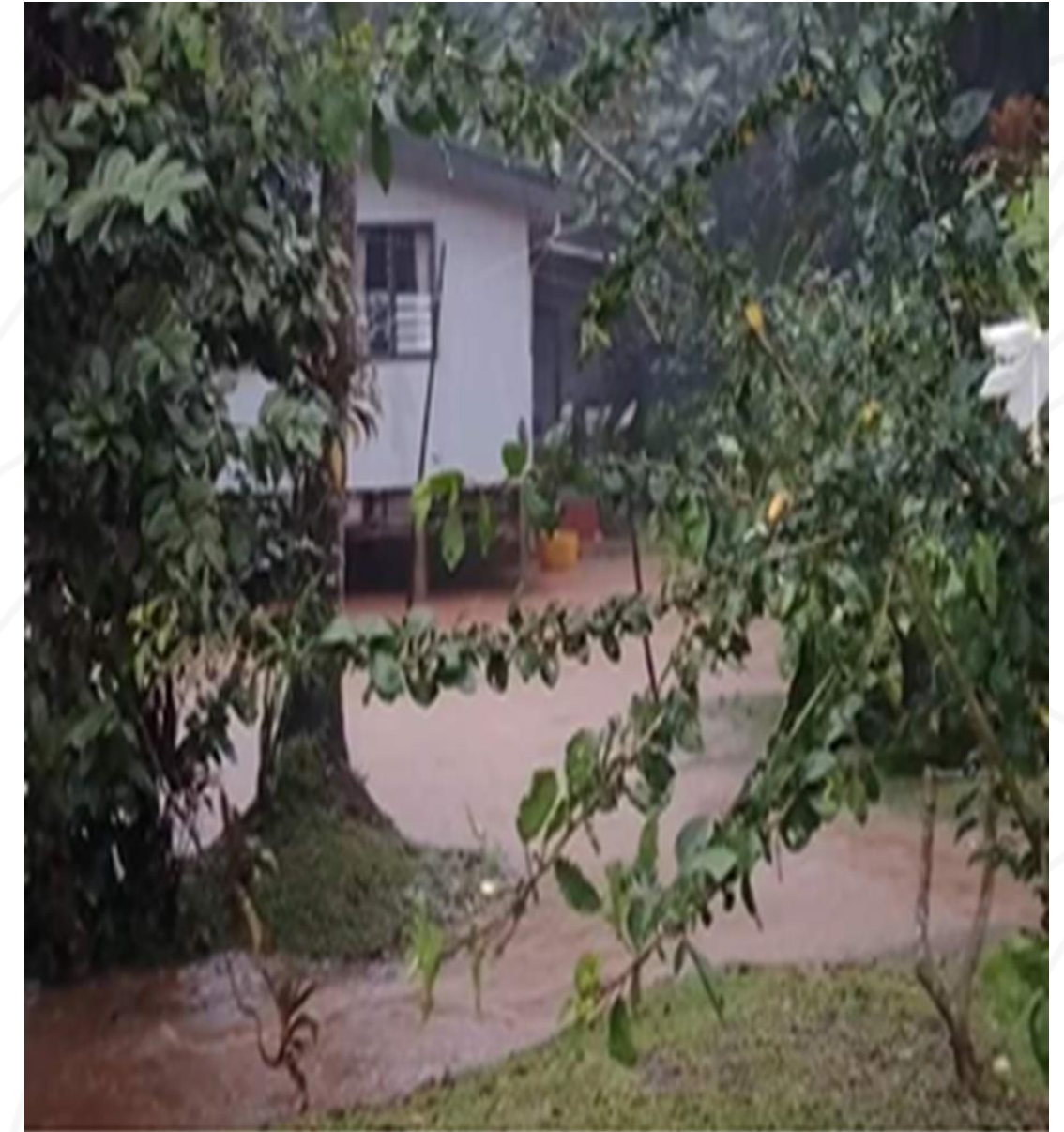
# Flash Flooding



Flash flooding in Rewa, Central Division on 15th August, 2023. Source: Fiji Roads Authority



Traffic congestion due to flash flooding in Suva, Central Division on 15th August, 2023. Source: Fiji Roads Authority.



Flash flooding in Wainadoi Village on 14th September, 2023. Source: National Disaster Management Office



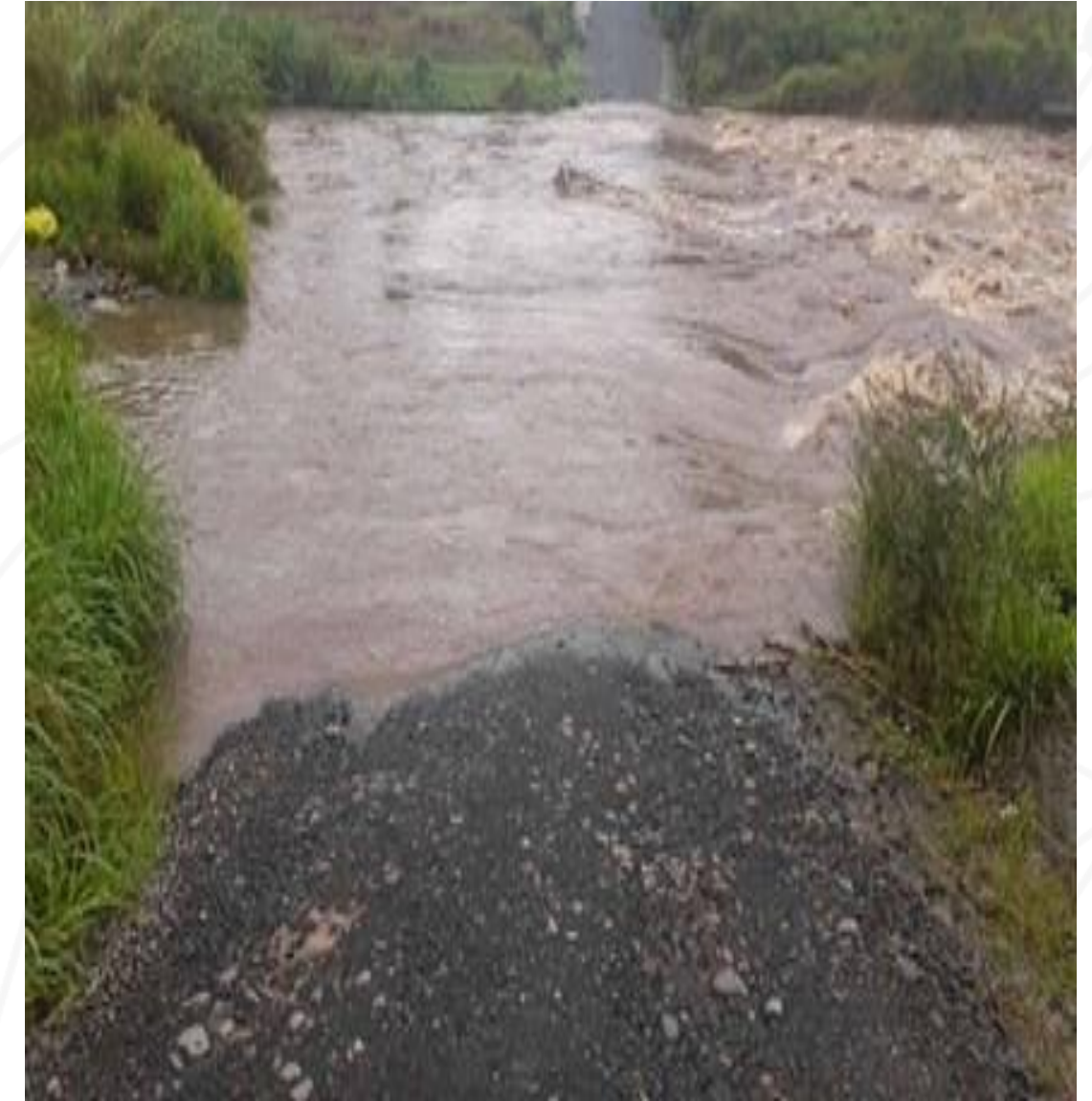
# Flash Flooding



Flash flooding in Wainadoi, Central Division on 14th September, 2023. Source: National Disaster Management Office



Vuda Back Road 1st crossing, Lautoka, Western Division on 26th September, 2023. Source: Fiji Roads Authority.



Vaivai Road 1st Crossing, Ba, Western Division on 26 September, 2023. Source: Fiji Roads Authority



# Extreme events in New Caledonia since May 2023

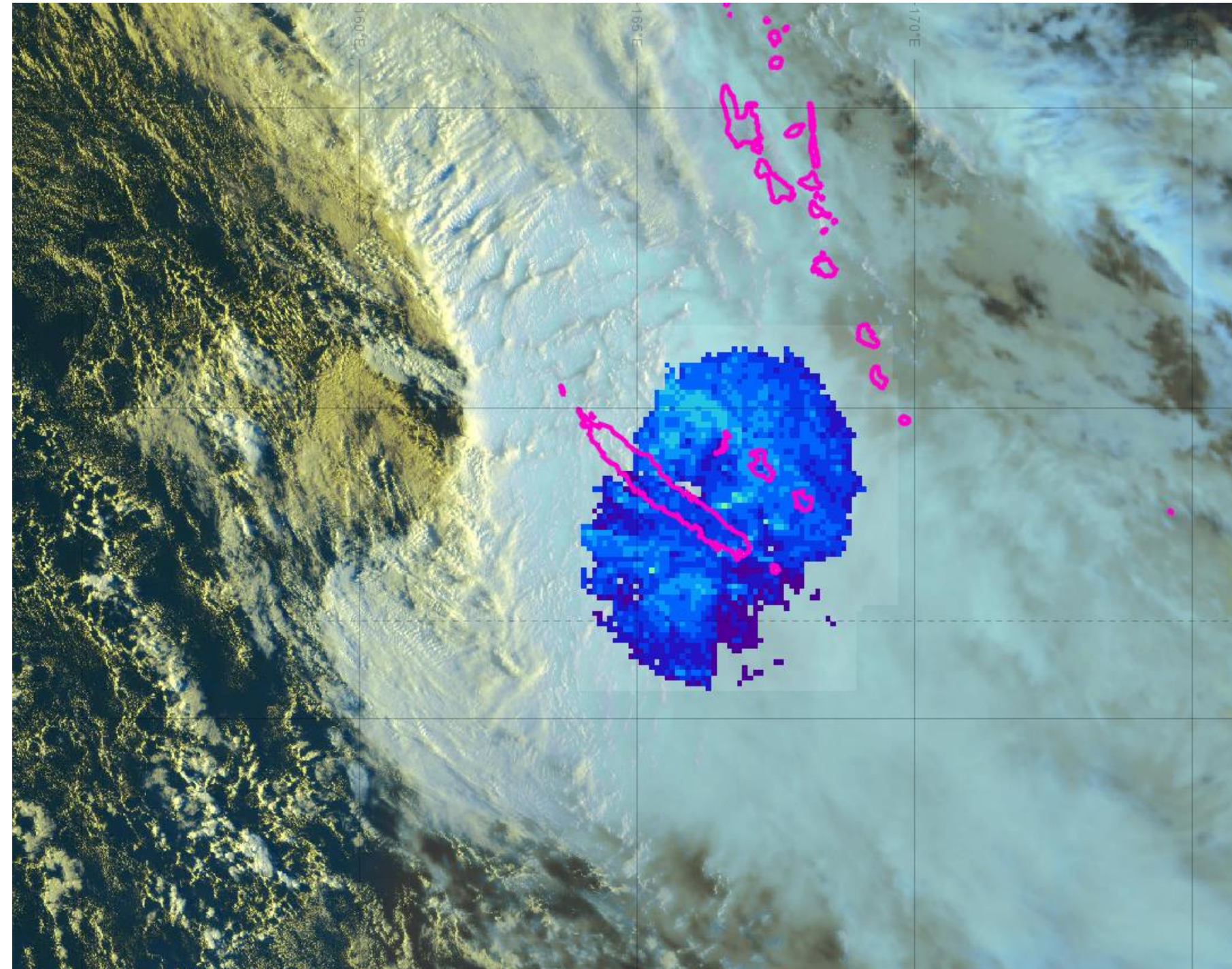
- **Extreme drought from May to July 2023** : -74% precipitation deficit, placing the May-June-July 2023 quarter in the 2<sup>e</sup> rank of driest May-June-July quarters after that of 1957. Dryness of the plant cover was amplified by the trade winds, which blew more often than usual : 82 days of presence instead of the usual 62.
- Consequences : an upsurge in bushfires, agriculture in difficulty...



Numerous fires broke out on the outskirts of Thio  
©Coralie Cochin / NC la 1ère. July 2023



- **From 30 to 31 August** : between 200 and 300 mm in 1 and a half days were recorded in the east and extreme south of the country, equivalent to 1 to 2 months' rain.
- Consequences : floodings, part of the potato harvest at La Foa was lost.
- **From 13 to 16 September** : between 200 and 300 mm in 3 days were recorded in the east and extreme south of the country. Everywhere except the Loyalty Islands, rainfall amounts were equivalent to 1 to 3 months of rain.
- Consequences : events cancelled, maritime transport affected, closed boarding schools



Satellite image + radar image of  
14/09/2023.



# **Country specific Impacts – Polynesian countries**



# Extreme events in Samoa since May 2023

## Early Dry Season



Work done after infrastructure damage in the 08<sup>th</sup> June 2023 heavy rain, Lano Ford, Savaii



Roads heavily impacted by rainfall, Vaiaata, Savaii





**Lano, Savaii, 08<sup>th</sup> June 2023**



**Saipipi, Savaii, 08<sup>th</sup> June 2023**





## **Rainfall overflowing on Satupaitea Uta roads**

Source: LTA, Samoa

## **Damage done to highland cross cutting road, Vaia'ata, Savaii**

Source: LTA, Samoa





**Sapapalii, Savaii, 08<sup>th</sup> June 2023**

Source: LTA, Samoa

**Tapueleele, 08<sup>th</sup> June 2023**





05<sup>th</sup> May 2023, Sapapalii Ford, Savaii

Source: LTA



## Late Dry Season



Grass seen to be dry for most of the northern parts of Upolu, Motootua, Upolu. *Source: KF*



Tuana'imato, Upolu.  
*Source: Samoa Fire and Emergency Services*





Dry shrubs vulnerable to fire, Tuana'imato area, Upolu.  
*Source: Samoa Fire and Emergency Services, 04<sup>th</sup> October 2023*



Northern coast, Upolu.  
*Source: Samoa Fire and Emergency Services, 04<sup>th</sup> October 2023*



# Social Media posts



Land Transport Authority - Samoa

4 May · 🌐

FAASILASILAGA TAUA: Eleele Solo i Le Mafa  
IMPORTANT NOTICE: Land Slide at Le Mafa

O loo galulue le tatou Aufaigaluega mo le auai atu ma Konekarate mo le aveesea o lea eleele Solo mai luga o le auala.

Fautuaina le atunuu ina ia tautuana le saogalemū pe a latalata atu i lea vaega.

Faafetai

Pulega o Felauaiga i Le Laueleele.

We have been informed and we are working t... See more



95

3 comments 27 shares



Like



Comment



Share

Facebook Post by Land Transport Authority for awareness and preparedness of communities



Samoa Fire and Emergency Services  
Authority

4 Oct · 🌐

📷 Team Operation Maota & Asau (Savaii)

❌🔥🚒 FAASILASILAGA FAALAUATELE

Ua maitauina e le Pulega le fa'atuputupulaia o MU FALE faapea le susunuina o Lاپisi i lenei vaitau o mugalā, aemaise ai foi le va'aia o tulaga ile matutū poo le mago ai o le Vao.

O lea e fautuaina le mamalu o si o tatou Atunuu ina ia:

- ❌ Tāofi nei loa le susunuina o lapisi.
- ❌ Tāofi le toe susunuina o nisi o vāega o lo'o galueaina i fa'atoaga.
- ❌ Tāofi le ulaula tapa'a ma tauai solo muli sikareti. Tāofi le lāfoa'i o tapa'a i vaega mamago o le si'osi'omaga.
- ❌ Tāofi le fa'atupuina o se afi e ono a'afia ai se soifua atoa ai ma le fa'aleagaina o meatotino. Teu malu lelei mea faigaluega i se nofoaga saogalemu.

🚒 O le solitulafono lou faatupuina o se AFI e ono aafia ai se soifua ma meatotino.

🚒 FA'AMOLEMOLE UTAGIA FAUTUAGA MA LAPATAIGA MAI LE OFISA O VAAITAU.. [Samoa Meteorological Service](#)

Facebook Post by Samoa Fire and Emergency for awareness and preparedness of communities



# Extreme events in Cook Islands since May 2023

## Heavy/Continuous Rain

Source: Cook Islands News, Cook Islands Meteorological Office

### Persistent rain pounds Rarotonga

Wednesday 10 May 2023 | Written by [Losirene Lacanivalu](#) | Published in [National](#), [Weather](#)

Share [Twitter](#) [Facebook](#) [Email](#) [LinkedIn](#)

**A nasty weather system affecting New Zealand is indirectly affecting the Cook Islands.**

And more of it is expected throughout this week.

Cook Islands Meteorological Services weather man Arona Ngari said New Zealand and Cook Islands weather is indirectly affected by the same system.

“While rain is generated in New Zealand, the high pressure (blocking high) is reluctant to move eastwards, thus generating all that wind onto the Southern Cooks.”

Ngari said the trough line to the north of the Southern Group is not moving that fast past the group, thus generating more moisture to fall as rain.

This pattern is forecast to continue until tomorrow and relax a bit, although passing showers will be on the menu for more days to come.

Rainfall measured on Monday was 4.4 millimetres and 17.9 millimetres for yesterday.

Ngari said there could be another 15 millimetres over the next few days.


The weather office has forecast a high pressure system to the far south of Southern Cook Islands which will generate and direct damaging heavy swells and easterly winds over the group.



*Garth Allan enjoys a swim with his daughters at the Nikao Social Centre yesterday despite rough weather conditions. LOSIRENE LACANIVALU / 23050923*

- More than one event  
(nothing notable compared to previous years)
- Poor Performance of certain crops (eg. Watermelons in Aitutaki, *September*)
- Road erosion (potholes)

*Heavy Rain Warning CIN*

 **Cook Islands Meteorological Service**  
May 9 • 🌐

Northern and Southern Cooks  
Weather Bulletin issued from CIMS 09th MAY 06.20pm.

A DAMAGING HEAVY SWELL WARNING REMAINS IN FORCE FOR THE SOUTHERN PARTS OF SOUTHERN COOKS WATERS.

A COASTAL FLOODING WARNING REMAINS IN FORCE FOR THE COASTAL AREAS OF THE SOUTHERN PARTS OF SOUTHERN COOKS.

A STRONG WIND WARNING REMAINS IN FORCE FOR THE LAND AREAS AND WATERS OF SOUTHERN COOKS.

**Situation:**  
A high pressure system to the far south of Southern Cooks generates and directs damaging heavy swells and easterly winds over the country. Meanwhile, a trough of low pressure continues to affect the group.

A weak trough of low pressure affects Northern Cooks.

**Forecast to midnight tomorrow for the Southern Cooks:**  
Over Coastal areas: Expect sea flooding of coastal areas over the southern parts of the group especially during high tides.  
Over open waters: Damaging heavy swells with heights of upto 4.0m.  
Over land: Easterly winds 20 to 25 knots, gusting upto 35 knots.  
Over waters: Easterly winds 20 to 25 knots. Rough to very rough seas.

Occasional rain and isolated thunderstorms over most places.

**Further outlook:** Strong winds, rain and thunderstorms continuing.

**For Rarotonga:**  
Expect sea flooding of coastal areas especially during high tides.  
Occasional rain and isolated thunderstorms. Rain clearing tomorrow.  
**Further outlook:** Strong winds continuing. Partly cloudy with brief showers.

**For the Northern Cooks:**  
Some showers and isolated thunderstorms.  
Moderate to fresh easterly winds.  
Moderate to rough seas.  
**Further outlook:** Cloudy periods with some showers and isolated thunderstorms.

Moon Phases (Arapo) & Tides  
Korekore Tai

*Strong Winds, Heavy Rain Warning CIMS*



# Heavy Rain

*impacts*

- Soil/road erosion
- Poor performance/yield of certain crops (e.g. Watermelon)



*Muri pothole post heavy downpour 2023*



# Heavy Swells

Source: Cook Islands News

## Residents bracing for 'heavy swells'

Friday 28 April 2023 | Written by [Matthew Littlewood](#) | Published in [National](#), [Weather](#)

Share [Twitter](#) [Facebook](#) [Email](#) [LinkedIn](#)

**Rarotonga residents are bracing themselves for high swells this weekend, after a warning from the Met Service.**

Climate Change Cook Islands programme manager Matt Blacka said Cook Islands Meteorological Service and Emergency Management Cook Islands is monitoring an intensifying low-pressure system to the east of New Zealand, which is expected to send heavy ocean swell conditions to our Southern Group islands from Friday evening through until Saturday evening.

In New Zealand, heavy rain and strong wind watches are in place for Auckland and the surrounding regions from late Saturday through until Monday (NZ time).

Blacka said: "While the weather may be fine, people with beachfront properties or those planning beach, lagoon or ocean activities on the south side of Rarotonga should be cautious of the conditions on Saturday."

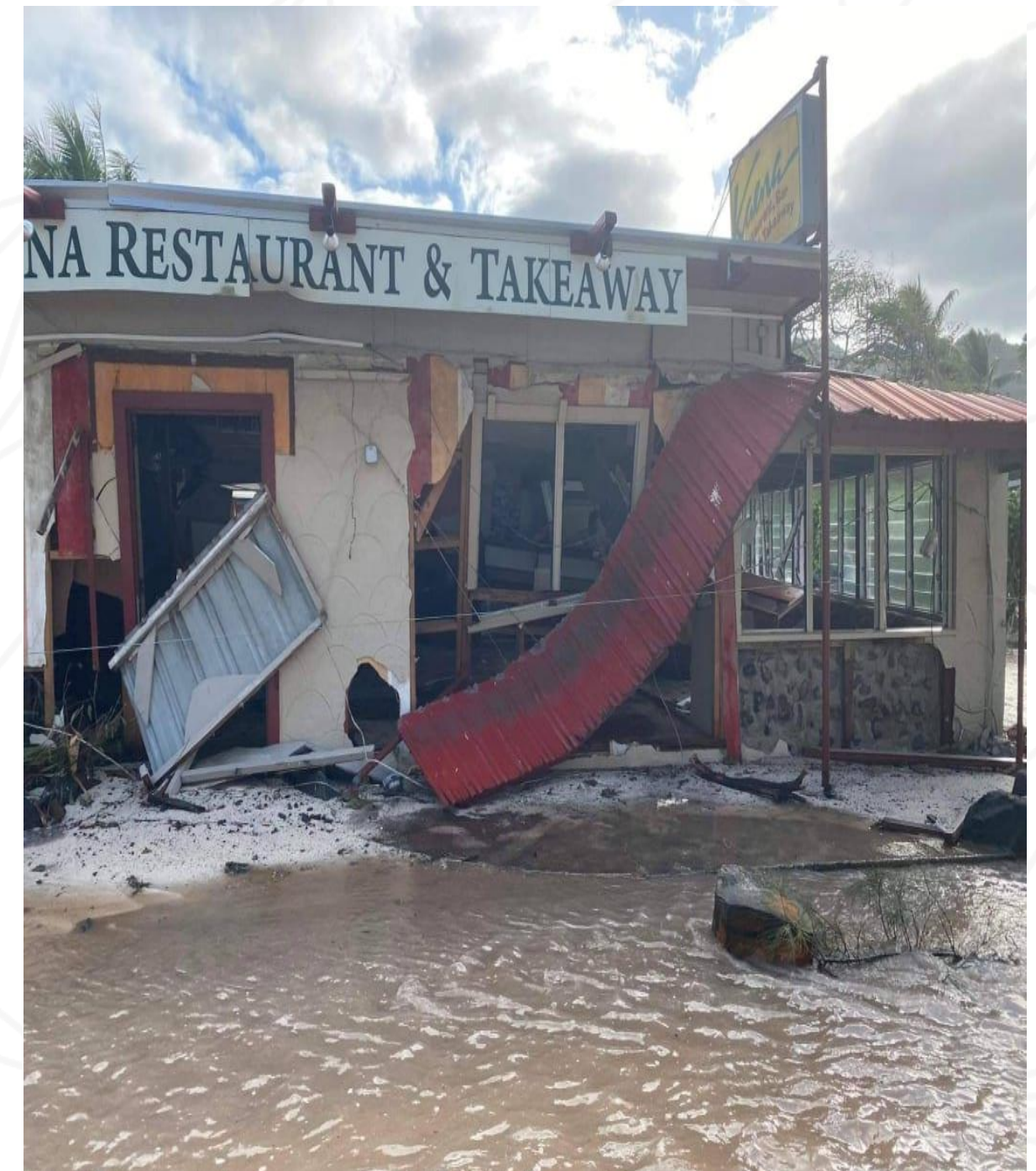
"From Tikioki to Kavera we can expect strong lagoon currents and high wave runup on the beaches, with potential for wave overwash to exceed the beach during high tide. Strong currents will also move through Muri lagoon towards Avana during this period of heavy swell."



*Items and building materials are discarded or have been swept away by the heavy swells and damaged.*  
Photo: SIAN SOLOMON/22071369

*Swell Warning April 2023*

- Effects not notable compared to 2022 event.
- Shoreline up to height of an extreme high tide.



*Heavy Swells aftermath July 2022*



# Tonga - Climate impacts on Crops May – Oct 2023



Source: Photograph by Met Officer from Niuatoputapu, Tonga.



# Eastern Site Community Water Pump Overflow.

Source: Tonga Geological Service Officer- Benji Vailea.

## Observation:

- Geology observe data indicating an overflow at the community water pump on the eastern site of Tonga, Nununuku village.

## Awareness of drought:

- Despite this overflow its crucial to raise awareness on ongoing drought condition.

## Message:

- Encourage the community to use the water wisely, whether from the pump or water tanks to ensure sustainable water usage during drought period.



Data Collection



Collecting overflow water



# Drought



**A lake at the island of Niuatoputapu at the North of Tonga highlighted the visual impact of drought at local ecosystem and emphasize the important of water conservation.**

Source: Lake on Niuatoputapu Island, captured by a Niuatoputapu Meterology Officer, serves as the habitat for ava fish.





# Water Deficit and Drought Stress.

Grasses and plant experience environmental stress/ drought stress exhibit the growth.

---



The longer the drought and water stress turn the grasses to brown.

---

Need to emphasize how the changing color of the grass reflect the severity and duration of the drought.



# Soil impact

- **Crop failure**

- Highlight how prolonged drought has led to crop failures affecting local farmers and productivity.

- **Livelihood disruption**

- Discuss the broader impact on livelihood, emphasizing the challenges faced by the community due to reduced agricultural output.

- **Community Resilience**

- Discuss any community led initiative or resilience strategies being employed to mitigate the impact on agriculture and livelihood.





# Extreme events in Tokelau since May 2023

*2 to 3 weeks without rain resulted in water stress across the nation*

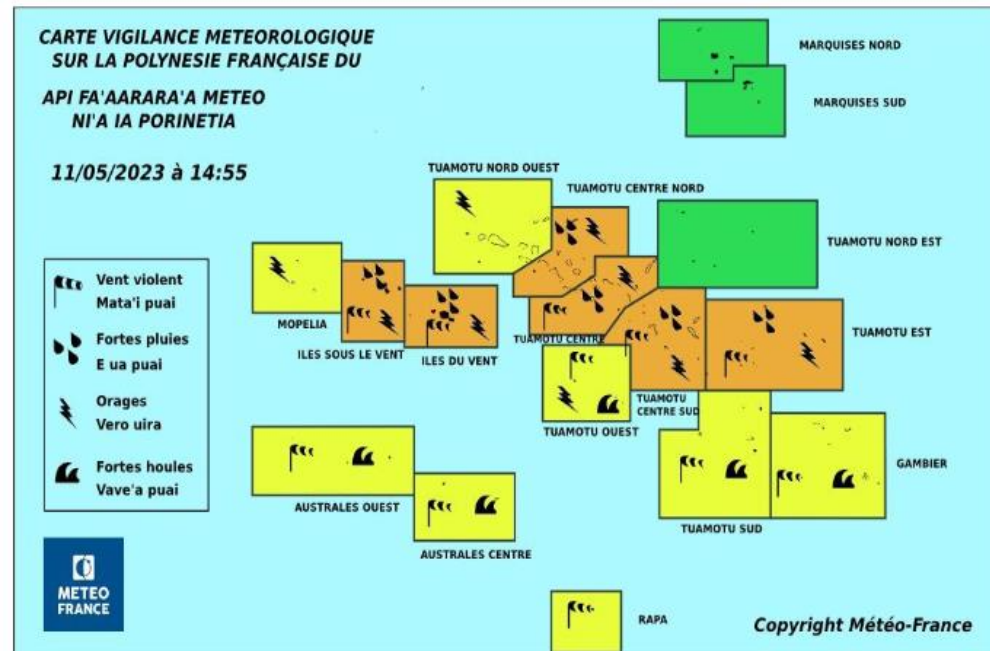


- May to July have been very dry for Atafu and Fakaofu.
- Some families ran out of water and refilled from community hall tanks.
- Severe dusty roads in which Atafu and Nukunonu to ban all vehicles from running on the roads.
- Severe influenzas outbreak which might been a result of the extreme heat.
- Vegetations hedges turned brown. E.g Germinated coconut are very dried.



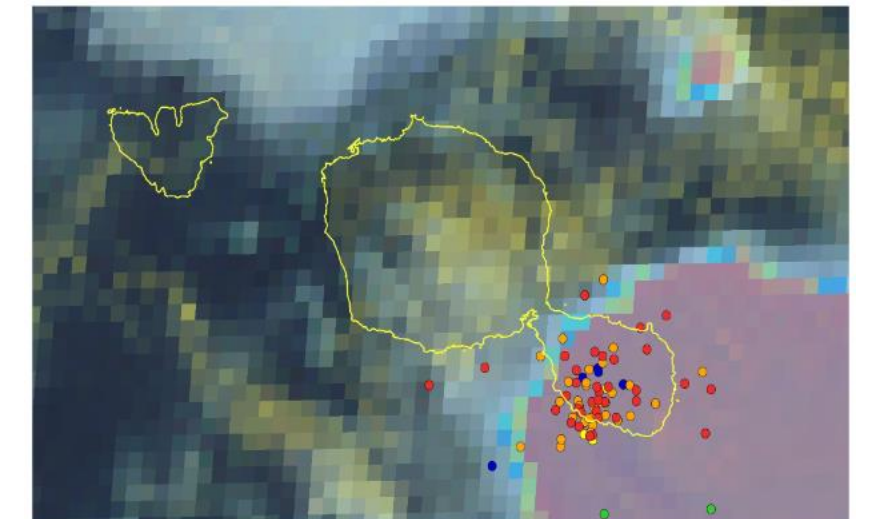
# Extreme events in Cook Islands since May 2023

## Heavy rainfall in May



A rather disturbed month of May, requiring several warnings. From May 09 to 13, a heavy rainy thunderstorm affected the Tuamotu and Society Islands (area in orange).

On May 1, at Teahupo'o southeast of Tahiti, heavy rainfall (200 mm in 3 hours) combined with thunderstorms and a strong southerly swell caused significant material damage.



Satellite image of May 1<sup>st</sup> showing impacts of the thunderstorm over southeast Tahiti.



Aerial view of the mouth of the Fauoro River at Teahupo'o during the heavy rainfall of May 1, with notable floods.



# Presentation Summary

- Active Monsoon over Micronesia; Palau
- Strong wind and above normal rainfall for Micronesian countries
- Flooding in Melanesian countries
- Vanuatu still facing the aftermath of TC Judy & Kevin and with the transition to El Nino, impacts are severe - Water and food shortage is a major issue currently affecting some of the outer islands in Vanuatu after twin cyclones
- Flooding in Samoa and French Polynesia
- Prolong drought in Tonga
- Heavy swells in Cook Islands
- Sectors affect
  - Agriculture
  - Water
  - Health
  - Infrastructure
  - Transport





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My Website

<https://www.sprep.org/>

<https://www.weather.gov/gum/Palau>

<http://www.samet.gov.ws/>

<https://www.pngmet.gov.pg/>



# Thank You

