

1. IN BRIEF

Drier than normal conditions prevailed, with most of the rainfall recording stations observing *below average* to *well below average* rainfall. The only exceptions were at most parts of the Central Division, Dobuilevu, Yasawa-i-Rara, and Lakeba, which experienced normal rainfall. Meanwhile, Viwa, Vanuabalavu, Rotuma, Seaqqa, and Navua experienced wetter than normal conditions.

Overall, out of the 26 rainfall monitoring stations that reported in, in time for the compilation of bulletin, 2 recorded *well above average* rainfall, 3 *above average*, 7 *average*, 11 *below average* and 3 stations with *well below average* rainfall (Table 2, Figures 1-5).

The highest monthly rainfall of 763.0mm was observed at Navua, followed by Monasavu with 513.3mm, Rotuma with 332.1mm, RKS Lodonu with 307.5mm, Nasinu with 257.0mm, Nausori Airport with 254.7mm, Koronivia with 234.0mm, Seaqqa with 223.5mm, Lomaivuna with 221.5mm, and Vanuabalavu with 210.3mm (Table 1).

Navua (AWS) recorded its new highest daily November rainfall of 422.0mm since observations began in 2010 (Table 1).

A trough brought heavy rainfall on the 12th and 13th, causing flash flooding in parts of the Central and Eastern Divisions. On the 12th, RKS Lodonu, Nausori Airport, Koronivia, and Levuka recorded their highest 24-hour rainfall: 178mm, 144mm, 116mm, and 105mm, respectively. Another significant heavy rain event occurred on the 27th,

leading to flash flooding in parts of Navua. On this day, 27th, Navua Iso recorded its highest one day (24-hour) rainfall of 442mm.

On temperatures, the highest day-time temperature of 35.3°C was observed at Lautoka Mill on the 20th, followed by Rarawai Mill (Ba) and Yaqara both with 35.2°C on the 20th and 28, respectively, and Nadi, Seaqqa and Viwa all with 35.0°C on the 1st, 6th, and 7th, respectively.

The lowest night-time temperature, during the month, of 12.2°C was recorded at Nadarivatu on the 22nd, followed by Vunisea with 14.5°C on the 18th, Monasavu with 15.2°C on the 23rd, Keiyasi with 16.5°C on the 21st, Lomaivuna with 16.8°C on the 21st, and Sigatoka with 18.0°C on the 21st.

Southeasterly winds were dominant at Nadi Airport, Nausori Airport, Savusavu Airfield and Matei Airfield (Figure 7).

During the month, warmer than normal sea surface temperature anomalies were observed across most of the country (Figure 8). *Above normal* sea level anomalies persisted across most of the Fiji Waters during November 2023 (Figure 10).

Road closures, power shutdowns, and landslides were reported during Tropical Cyclone Mal (Figure 13e-13r).

2. WEATHER PATTERNS

November in Fiji unfolded with dynamic weather patterns, featuring shifts in wind directions and the influence of various troughs. The month began with east to southeast winds and a weak trough. Subsequent days saw the dominance of easterly winds, providing a stable atmosphere until significant developments on the 9th.

A trough to the southwest brought rainfall to the southern parts of the country, while another trough from the north approached the group on the 11th, coinciding with the naming of a low-pressure system to the far northwest of Fiji as Tropical Disturbance (TD02F) on the same day. On the 13th, TD02F had intensified into a Tropical Cyclone named Mal, impacting Fiji on the 14th and eventually clearing Fiji from rain, storm, and gale-force winds.

Post-cyclone, west to northwest winds marked a shift in weather, followed by southeast winds fostering a recovery

period. A weak trough formed over eastern parts on the 20th and affected the northern and eastern regions from the 25th to the 27th with east to southeast winds. A significant precipitation event was recorded on November 27th, due to severe afternoon convection on the highlands and southern side of Navua. Rainfall observation at Tokotoko Navua AWS reached 388.0mm in 12 hours, contributing enormously to the upsurge in water level downstream of the catchment.

On the day of the event, a weak trough of low pressure affected the eastern parts of the Fiji group, bringing cloud periods with brief showers and isolated thunderstorms, especially in the afternoon or evening. The month concluded with a return to southeast trade winds, highlighting the dynamic and resilient nature of Fiji's tropical climate

3. RAINFALL

Well below average to below average rainfall was observed at most of the rainfall recording stations during the month. Dobuilevu, Monasavu, Nausori Airport, Koronivia, Laucala Bay (Suva), Yasawa-i-Rara and Lakeba, were the only exceptions, which recorded average rainfall.

Rotuma, Viwa, and Vanuabalavu recorded above average rainfall, while Navua and Seaqaqa recorded well above average rainfall. Notably, Navua and Seaqaqa experienced more than twice their normal monthly rainfall.

Overall, out of the 26 rainfall monitoring stations that reported in, in time for the compilation of bulletin, 2 recorded well above average rainfall, 3 above average, 7 average, 11 below average and 3 stations with well below average rainfall (Table 2, Figures 1-5).

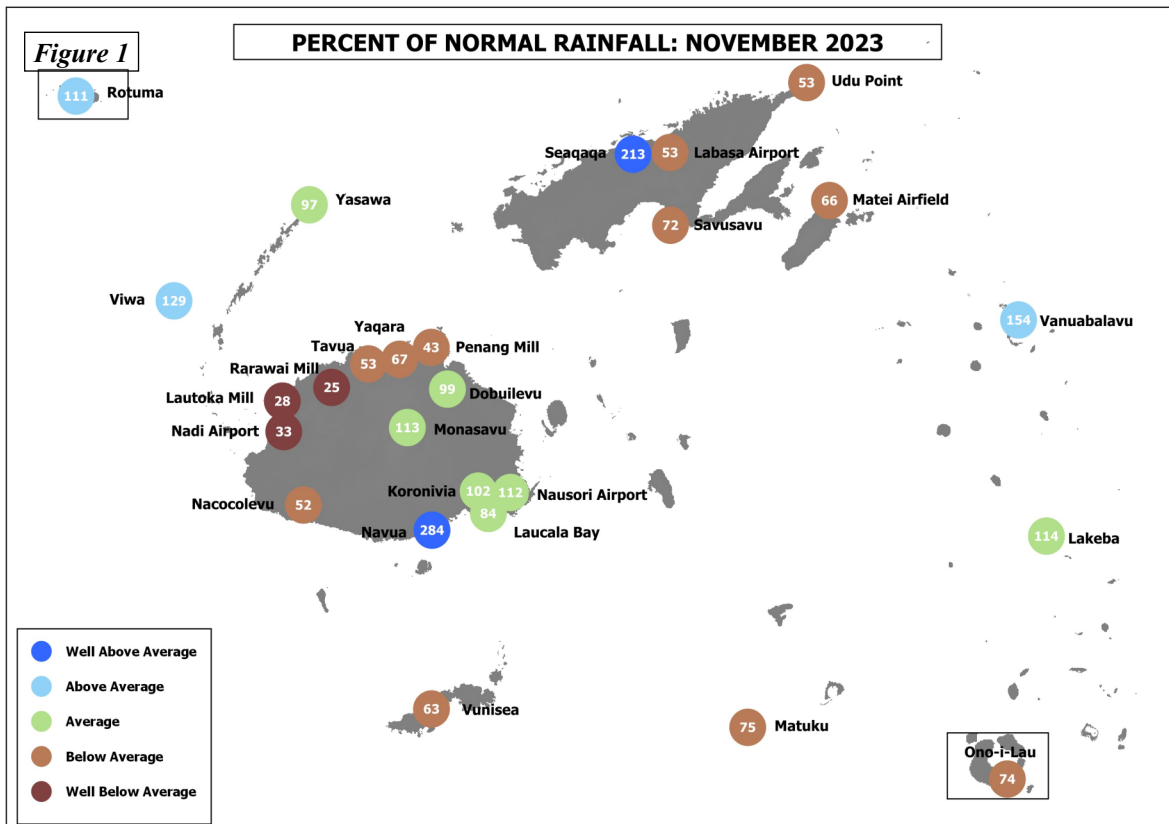
The highest monthly rainfall of 763.0mm was observed at Navua, followed by Monasavu with 513.3mm, Rotuma with 332.1mm, RKS Lodon with 307.5mm, Nasinu with 257.0mm, Nausori Airport with 254.7mm, Koronivia with 234.0mm, Seaqaqa with 223.5mm, Lomaivuna with 221.5mm, and Vanuabalavu with 210.3mm. On the other hand, Tavua recorded the month's lowest total monthly rainfall of 30.5mm, followed by Lautoka Mill with 35.4mm, Rarawai Mill (Ba) with 37.6mm, Yaqara with 38.5mm, Nadi Airport with 41.1mm, Nacocolevu with 64.5mm, Penang Mill with 64.6mm, Momi with 68.0mm, Yasawa-i-Rara with 72.5mm, and Ono-i-Lau with 79.4mm (Table 2).

A trough to the southwest brought heavy rainfall, resulting in flash flooding, especially in parts of the Central and Eastern Divisions on the 12th and 13th.

On the 12th, RKS Lodon, Nausori Airport, Koronivia and Levuka recorded their highest 24-hour rainfall of 178mm, 144mm, 116mm and 105mm, respectively. Another significant precipitation event occurred on the 27th, caused by severe afternoon convection on the highlands and southern side of Navua, resulting in flash flooding in parts of Navua on the 27th and 28th. Navua recorded its highest 24-hour rainfall of 442mm on the 27th.

Monasavu, Rotuma and Koronivia recorded the highest number of rain days (rainfall ≥ 0.1 mm) with 21 days, followed by Navua with 18 days, Savusavu with 17 days, Nausori Airport, Nadarivatu, Matei and Ono-i-Lau all with 16 days, RKS Lodon, Lomaivuna, Saqani all with 15 days, and Nasinu, Laucala Bay (Suva) and Dobuilevu all with 14 days. Consequently, Yasawa-i-Rara recorded the least number of rain days with 4 days, followed by Lautoka Mill and Yaqara both with 5 days, Tavua, Nadi Airport, Nacocolevu and Viwa all with 6 days, and Rarawai Mill (Ba) and Momi both with 7 days.

Navua (AWS) recorded its new highest daily November rainfall of 422.0mm since observations began in 2010 (Table 1).



Normal: Long term average from 1981 to 2010
 Well Below Average: Rainfall less than 40% of normal
 Below Average: Rainfall between 40 to 79%
 Rain Day: Rainfall ≥ 0.1 mm

Average: Rainfall between 80 to 119%
 Above Average: Rainfall between 120 to 199%
 Well Above Average: Rainfall greater than or equal to 200% of normal

4. AIR TEMPERATURES

A. Maximum Day-time Air Temperatures

Generally *above normal* day-time air temperatures were observed at most parts of the country during the month. Out of the 21 climate stations that reported in time for the analysis of data, 16 recorded anomalies $\geq +0.5^{\circ}\text{C}$, 4 within $\pm 0.5^{\circ}\text{C}$, and 1 with anomaly within $\pm 0.5^{\circ}\text{C}$.

The warmest days on average were recorded at Rarawai Mill (Ba) with 33.1°C , followed by Seaqaqa with 32.8°C , Yaqara with 32.6°C , Viwa and RKS Lodonu both with 32.5°C , Lautoka Mill, Wainikoro and Saqani all with 32.1°C , Nadi Airport with 32.0°C , and Penang Mill and Vaturekuka (Labasa) both with 31.6°C . Consequently, Monasavu recorded the coolest days on average with 25.7°C , followed by Nadarivatu with 26.3°C , Matuku with 29.0°C , Korolevu, Navua and Ono-i-Lau all with 29.2°C and Sigatoka and Vanuabalavu both with 29.5°C .

The highest day-time temperature was observed at Lautoka Mill with 35.3°C on the 20th, followed by Rarawai Mill (Ba) and Yaqara both with 35.2°C on the 20th and 28, respectively, Nadi, Seaqaqa and Viwa all with 35.0°C on the 1st, 6th, and 7th, respectively, and RKS Lodonu, Vaturekuka and Yasawa-i-Rara all with 34.3°C on the 30th. On the other hand, the coolest day-time temperature of 21.4°C was at Nadarivatu on the 15th, followed by Monsavu with 21.5°C on the 13th, Korolevu with 23.7°C on the 13th, and Ono-i-Lau with 24.5°C on the 12th.

Nausori Airport and Monasavu recorded their highest daily maximum temperatures of 33.6°C and 29.8°C since observations began in 1956 and 1980, respectively (Table 1).

B. Minimum Night-time Air Temperatures

Generally *above average night-time* temperatures were recorded over most parts of the country during the month. Of the 22 stations, 16 recorded anomalies $\geq +0.5^{\circ}\text{C}$, 4 within $\pm 0.5^{\circ}\text{C}$, and 2 with anomaly $\leq -0.5^{\circ}\text{C}$.

The coolest days on average was at Nadarivatu with 17.3°C , followed by Monasavu with 18.7°C , Keiyasi with 21.1°C , Lomaivuna and Korolevu with 21.2°C , Ono-i-Lau with 21.6°C , Sigatoka with 21.7°C , Rarawai Mill (Ba) with 21.8°C , Nacocolevu and Vunisea both with 22.1°C , Navua with 22.3°C , and Vanuabalavu with 22.5°C . Consequently, on average, the warmest night-time temperatures were observed at with 25.4°C , followed by Viwa with 24.9°C , Saqani with 24.7°C , Rotuma with 24.6°C , Yaqara with 24.2°C , Laucala Bay (Suva) with 24.1°C , Lakeba with 23.9°C and Savusavu with 23.8°C .

The coolest daily night-time temperatures were recorded mostly during the second and third week of the month. The lowest night-time temperature of 12.2°C was recorded at Nadarivatu on the 22nd, followed by Vunisea with 14.5°C on the 18th, Monasavu with 15.2°C on the 23rd, Keiyasi with 16.5°C on the 21st, Lomaivuna with 16.8°C on the 21st, Sigatoka with 18.0°C on the 21st, Ono-i-lau with 18.3°C on the 14th and Rarawai Mill (Ba) and Korolevu both with 18.4°C on the 21st and 22nd, respectively. On the other hand, the warmest night-time temperature of 28.5°C was recorded at RKS on the 15th, followed by Seaqaqa with 27.6°C on the 15th, Saqani with 26.8°C on the 15th, Rotuma with 26.6°C on the 30th, and Viwa with 26.4°C on the 4th.

There were no new night-time temperature records established during the month.

TABLE 1. CLIMATE RECORDS ESTABLISHED IN NOVEMBER 2023

<u>Element</u>	<u>Station</u>	<u>Observed (record)</u>	<u>On</u>	<u>Rank</u>	<u>Previous (record)</u>	<u>Year</u>	<u>Records Began</u>
Daily Maximum Temperature	Nausori Airport	33.6°C	16 th	New High	33.4°C	1967	1956
Daily Maximum Temperature	Monasavu	29.8°C	18 th	New High	29.7°C	1993	1980
Daily Rainfall	Navua (AWS)	422.0mm	27 th	New High	290.0	2013	2010

Note: All comparisons in this summary are with respect to “Climatic Normals”. This is defined to be the average climate condition over a 30-year period. Fiji uses 1981-2010 period as its “climatic normal” period.

TABLE 2. DAILY CLIMATE REPORTING SITES: SUMMARY FOR NOVEMBER 2023

	RAINFALL				AIR TEMPERATURES								SUNSHINE		
	TOTAL	RAIN		MAX. FALL	AVERAGE DAILY				EXTREME				TOTAL	*	
	MM	%	+ DAYS	MM ON	MAX. C	# C	MIN. C	# C	MAX. C	ON C	MIN. C	ON C	HRS	%	
NADI AIRPORT	41.1	33	6	20	13	32.0	1.1	22.9	1.0	35.0	1	20.6	22	240	110
LAUCALA BAY	200.1	84	14	70	12	29.7	0.2	24.1	1.1	31.5	4	21.4	22	164	103
NACOCOLEVU RESEARCH	64.5	52	6	38	14	30.0	-0.5	22.1	1.3	32.4	2	18.7	21	202	130
ROTUMA ISLAND	332.1	111	21	86	7	31.2	0.6	24.6	-0.1	32.5	18	21.6	8	210	111
VIWA ISLAND	152.4	129	6	84	13	32.5	1.9	24.9	0.5	35.0	7	20.8	3		
YASAWA-I-RARA (AWS)	72.5	97	4	56	12	31.5	2.0	23.6	0.7	34.3	30	22.3	23		
UDU POINT WEATHER	99.5	53	13	25	12	30.7	0.3	23.4	-0.4	32.2	30	21.4	23		
NABOUWALU	STATION TEMPORARILY CLOSED														
LABASA AIRFIELD	91.5	53	9	42	13	U/S		22.8	1.3	U/S		19.9	8		
SAVUSAVU AIRFIELD	131.2	72	17	34	13	29.9	0.5	23.8	1.1	33.0	16	22.0	5		
KORONIVIA RESEARCH	234.0	102	21	116	12	29.8	0.8	22.8	0.9	32.5	30	19.5	21		
NAUSORI AIRPORT	254.7	112	16	144	12	30.3	1.5	22.6	0.5	33.6	16	19.4	21		
NAVUA (AWS)	763.0	284	18	442	27	29.2	1.4	22.3	2.4	31.6	30	18.7	21		
MONASAVU HYDRO DAM	513.3	113	21	182	14	25.7	1.6	18.7	1.1	29.8	18	15.2	23		
FSC LAUTOKA MILL	35.4	28	5	22	13	32.1	1.4	23.2	0.5	35.3	20	20.6	19		
FSC RARAWAI MILL	37.6	25	7	18	13	33.1	1.1	21.8	0.8	35.2	28	18.4	21		
FSC PENANG MILL	64.6	43	10	25	12	31.6	1.4	23.7	0.7	34.0	30	21.5	17		
MATEI AIRFIELD	146.8	66	16	43	1	29.8	0.9	22.8	-0.2	31.4	1	21.1	25		
VANUABALAVU	210.3	154	10	57	1	29.5	0.4	22.5	-1.4	31.4	17	20.6	2		
LAKEBA	140.5	114	12	62	12	29.7	0.7	23.9	0.7	31.5	16	21.6	24		
VUNISEA	92.2	63	8	30	14	29.7	1.2	22.1	1.1	33.5	4	14.5	18		
MATUKU	92.5	75	8	35	12	29.0	0.1	22.7	-0.3	32.4	6	20.2	13		
ONO-I-LAU	79.4	74	16	32	13	29.2	1.2	21.6	-0.9	33.0	7	18.3	14		
YAQARA AWS	38.5	67	5	17	14	32.6		24.2		35.2	5	31.6	22		
LEVUKA AWS	170.5		10	105	12	U/S		U/S		U/S		U/S			
KEIYASI AWS	167.5		13	68	28	U/S		21.1		U/S		16.5	21		
LOMAIVUNA AWS	221.5		15	64	12	30.4		21.2		33.6	16	16.8	21		
NADARIVATU AWS	174.0		16	82	14	26.3		17.3		23.4	4	12.2	22		
RKS LODONI AWS	307.5		15	178	12	32.5		25.4		34.3	30	21.7	22		
MOMI AWS	68.0		7	35	14	30.8		23.1		33.0	19	21.6	21		
SIGATOKA AWS	87.5		9	39	14	29.5		21.7		32.2	2	18.0	21		
VATUREKUKA AWS	128.5		10	44	12	31.6		22.8		34.3	30	20.1	8		
KOROLEVU AWS	111.0		11	39	13	29.2		21.2		32.9	30	18.4	22		
WAINIKORO AWS	94.5		11	40	13	32.1		23.2		34.0	30	21.3	8		
SAQANI AWS	89.0		15	24	12	32.1		24.7		33.8	30	22.7	23		
SEAQAQA AWS	223.5	213	8	56	26	32.8		23.4		35.0	6	20.2	8		
DOBUILEVU TB3	133.0	99	14	39	14										
NASINU TB3	257.0		14	101	12										
TAVUA TB3	30.5	53	6	10	13										

	TEMPERATURE(C)				HUMIDITY		WIND	
	MEAN	DRY	WET	RH%	VP	(AVERAGE AT 9AM)	KT	
NADI AIRPORT	27.4	28.8	24.0	66	29.6	8.4		
LAUCALA BAY	26.9	27.2	24.7	81	27.0			
NACOCOLEVU RESEARC	26.1	28.7	24.8	73	29.4			
ROTUMA ISLAND	27.9	29.5	27.5	86	30.8			
VIWA ISLAND	28.7	29.9	26.0	73	31.6			
YASAWA-I-RARA(AWS)	27.6							
UDU POINT WEATHER	27.1	28.5	25.5	79	29.1			
NABOUWALU	STATION TEMPORARILY CLOSED							
LABASA AIRFIELD	U/S	29.6	25.3	71	31.0	10.9		
SAVUSAVU AIRFIELD	26.8	28.0	25.2	80	28.3	8.8		
KORONIVIA RESEARCH	26.3	27.6	26.4	91	27.6			
NAUSORI AIRPORT	26.4	27.4	24.4	78	27.3	6.1		
NAVUA (AWS)	25.8							
MONASAVU HYDRO DAM	22.2	22.3	21.9	96	20.1			
FSC LAUTOKA MILL	27.7	27.1	25.6	88	26.8			
FSC RARAWAI MILL	27.5	29.5	24.6	67	30.8			
FSC PENANG MILL	27.6	28.5	24.7	74	29.1			
MATEI AIRFIELD	26.3	28.2	25.8	83	28.6	11.4		
VANUABALAVU	26.0	27.5	25.2	83	27.5			
LAKEBA	26.8	28.1	25.5	81	28.4			
VUNISEA	29.4	27.4	24.1	76	27.3			
MATUKU	25.9	26.3	23.3	78	25.6			
ONO-I-LAU	25.4	27.2	23.9	77	27.0			

MEAN TEMPERATURE IS (MAX+MIN)/2; WIND IS MEAN SPEED AT 06,12,18,24 HOURS.
 \$:SOLAR RADIATION CALCULATED FROM SUNSHINE DURATION. # :DEPARTURE FROM LONG-TERM AVERAGES (1981-2010). + :NUMBER OF DAYS WITH 0.1 MM OR MORE RAIN. * :PERCENT OF LONG-TERM AVERAGES.
BLUE FONT: MISSING RECORDS OF LESS THAN OR EQUAL(≤) TO 5 DAYS. U/S: UNSERVICEABLE

Figure 2

Nadi Airport (Western Division) - Temperature & Rainfall Records for the last 13 Months (November 2022 - November 2023)

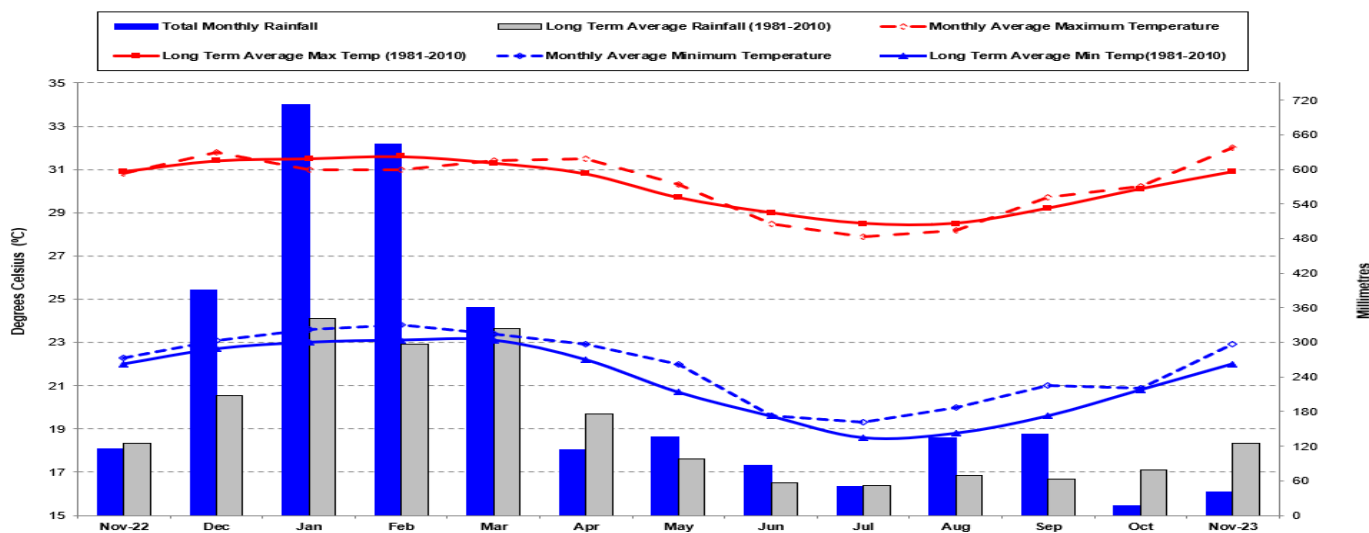


Figure 3

Laulaca Bay - (Suva) (Central Division) - Temperature & Rainfall Records for the last 13 Months (November 2022 - November 2023)

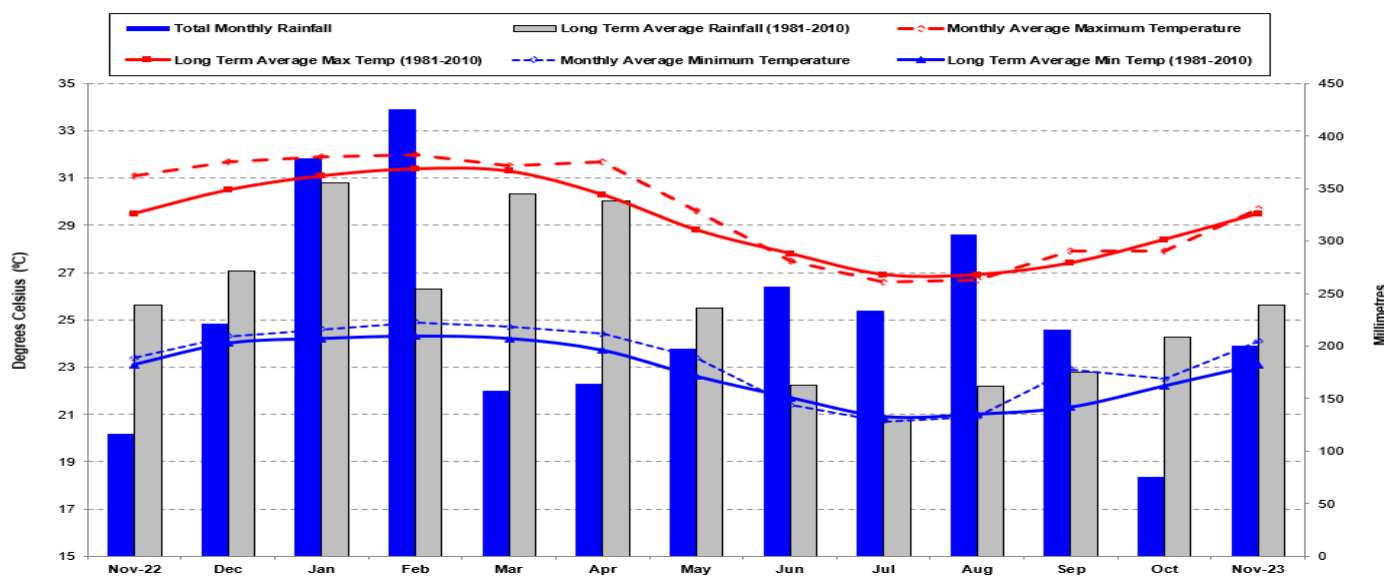


Figure 4

Udu Point (Eastern Division) - Temperature & Rainfall Records for the last 13 Months (November 2022 - November 2023)

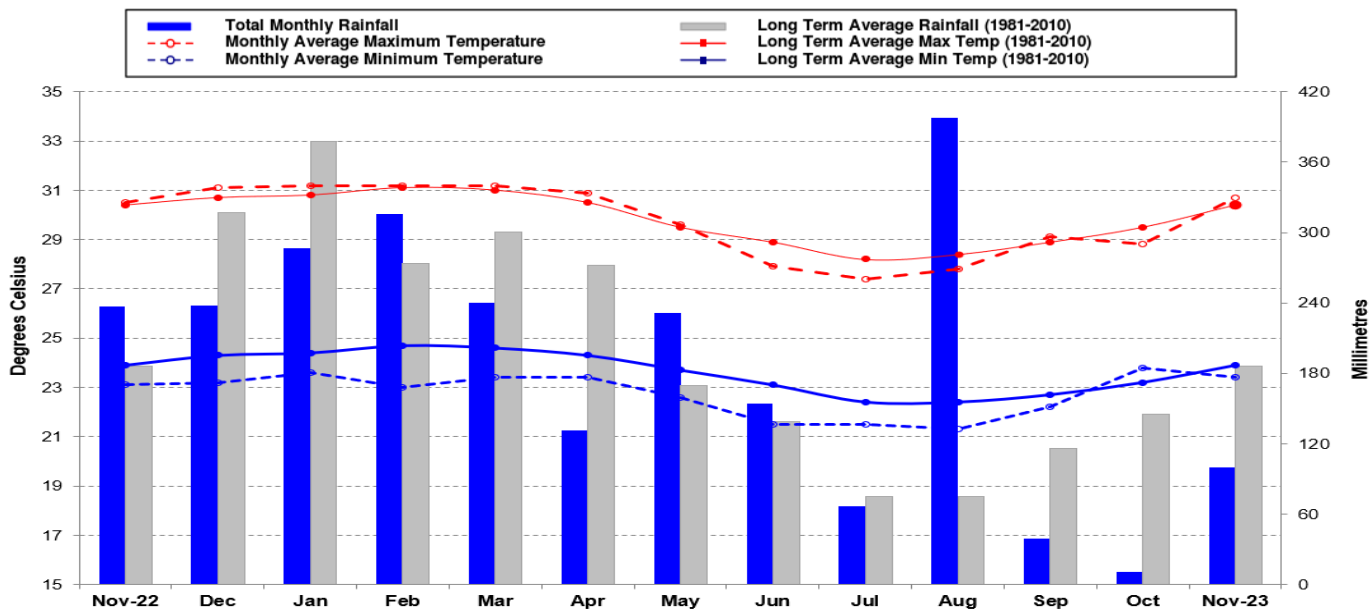
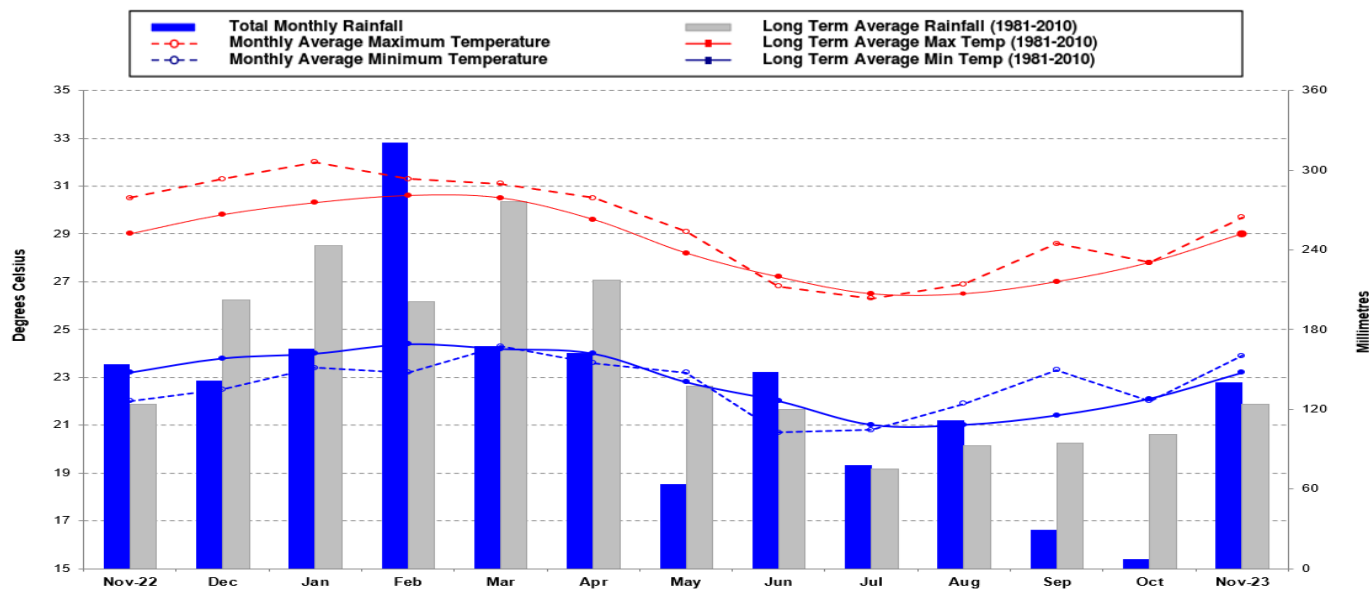


Figure 5

Lakeba (Eastern Division) - Temperature & Rainfall Records for the last 13 Months (November 2022 - November 2023)



5. DAILY RAISED PAN EVAPORATION

Daily Evaporation for November 2023

Figure 6

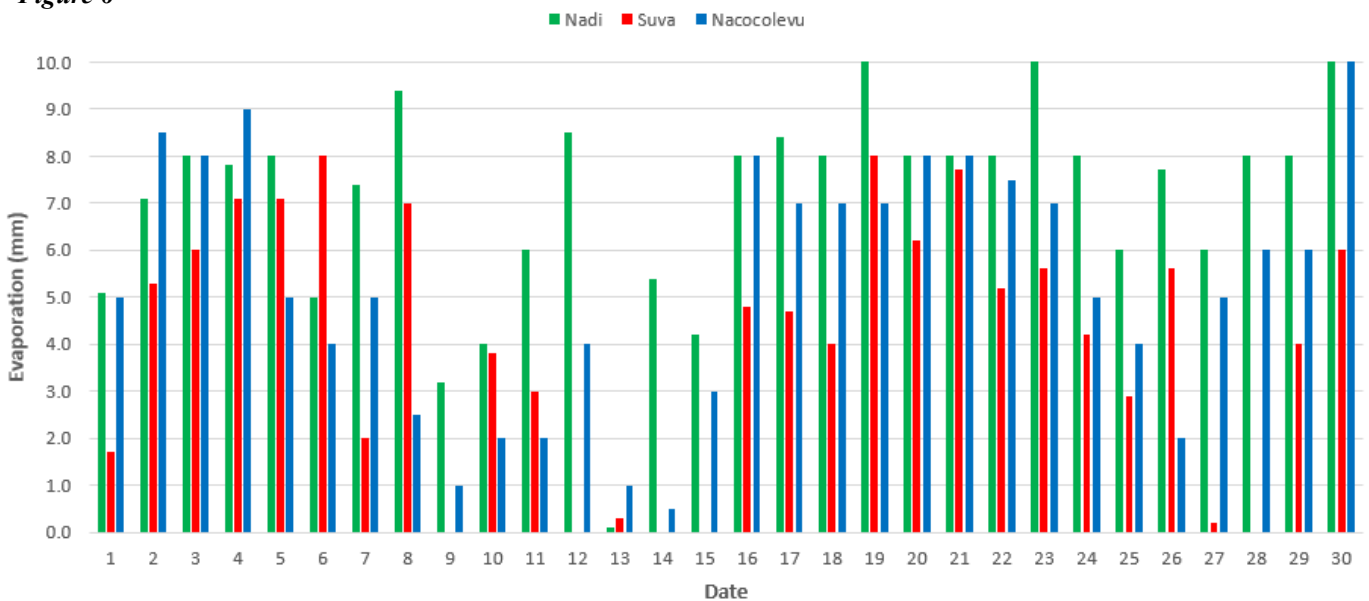


Figure 6: The total monthly raised pan evaporation at Nadi Airport, Laucala Bay (Suva) and Nacocolevu (Sigatoka) were 265.3mm, 120.4mm and 158.0mm, respectively. Nadi’s highest daily evaporation was 10.0mm on the 19th, 23rd and 30th, with Suva’s highest daily evaporation of 8.0mm on 6th and 19th, and Nacocolevu (Sigatoka) recorded its highest of 10.0mm on 30th.

6. SOLAR RADIATION

The Nadi solar radiation instrument was unserviceable during the month of November 2023.

7. WIND SUMMARY

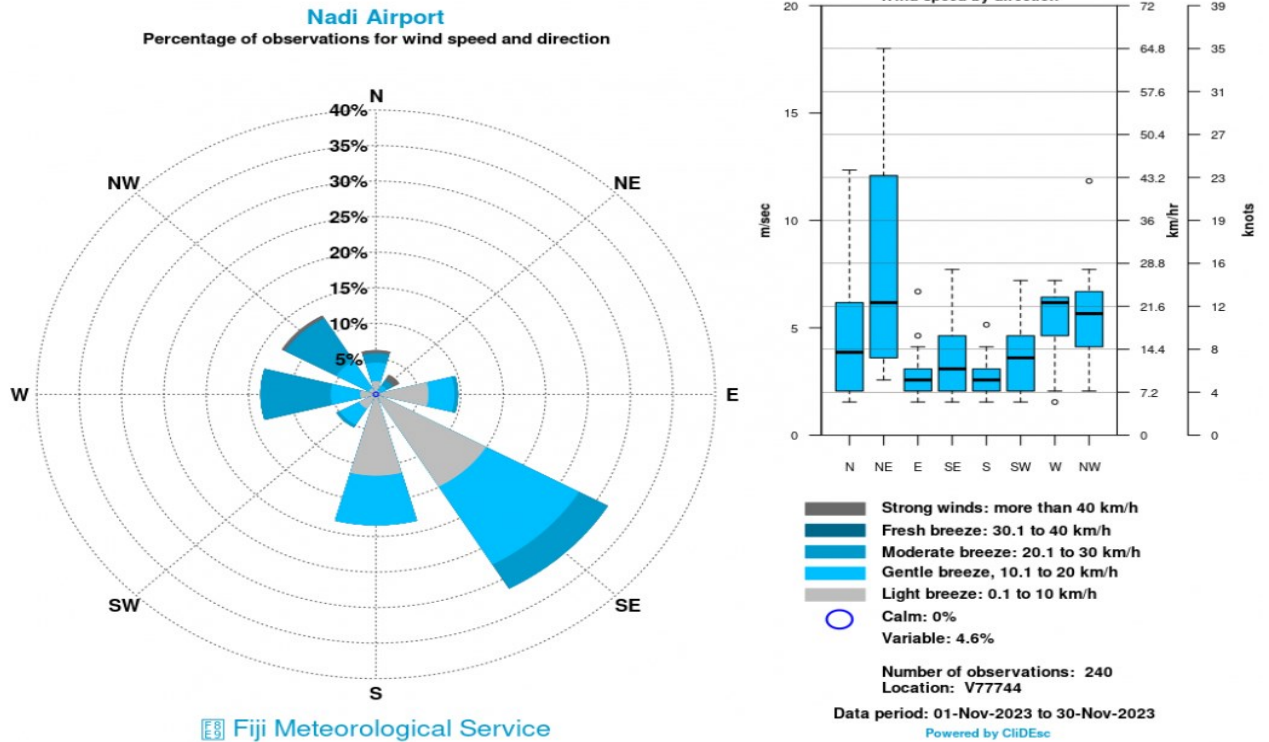


Figure 7a: Looking at Nadi’s 3 hourly observations, southeasterly winds were most dominant during the month, followed by southerly and then westerly winds. Wind strength ranged from light to strong winds, while none of the observations accounted for calm winds.

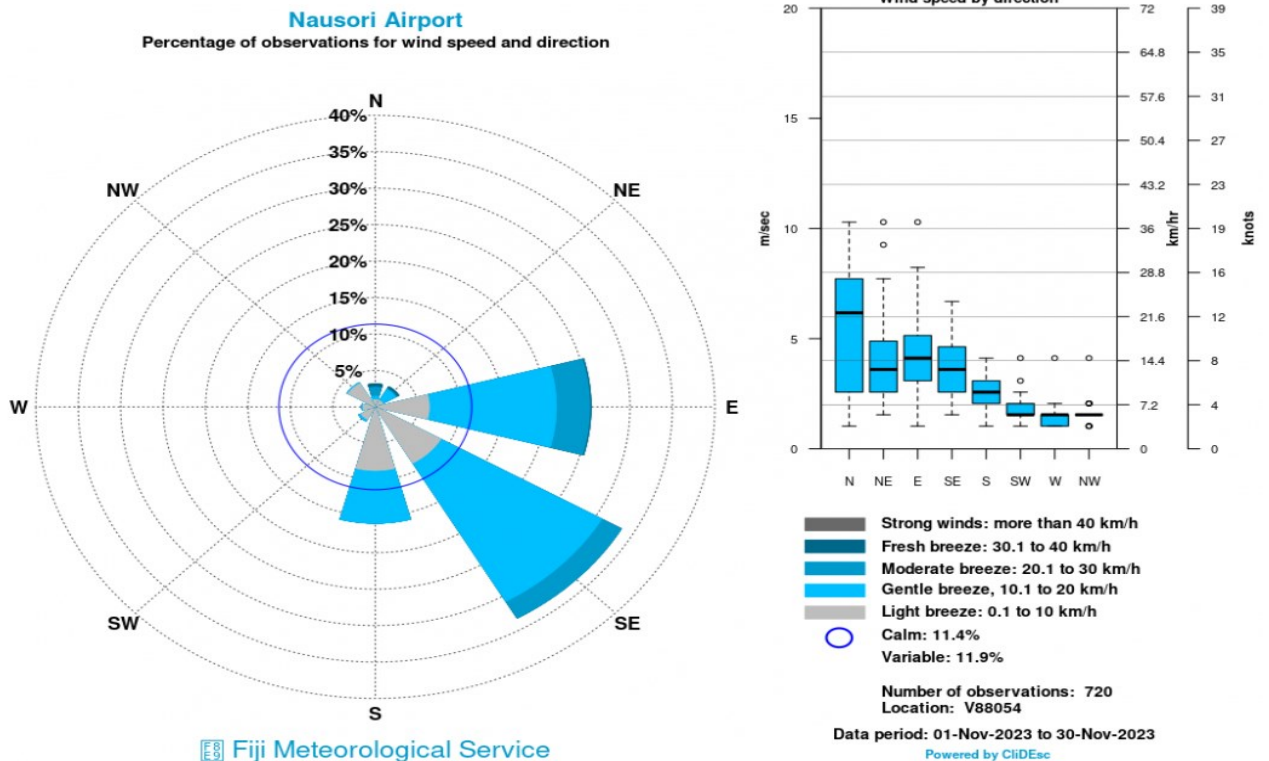


Figure 7b: For Nausori Airport’s hourly wind observations, southeasterly winds were dominant followed by easterly and then southerly winds. Wind strength ranged from light to moderate breeze, while 11.4% of observations accounted for calm winds.

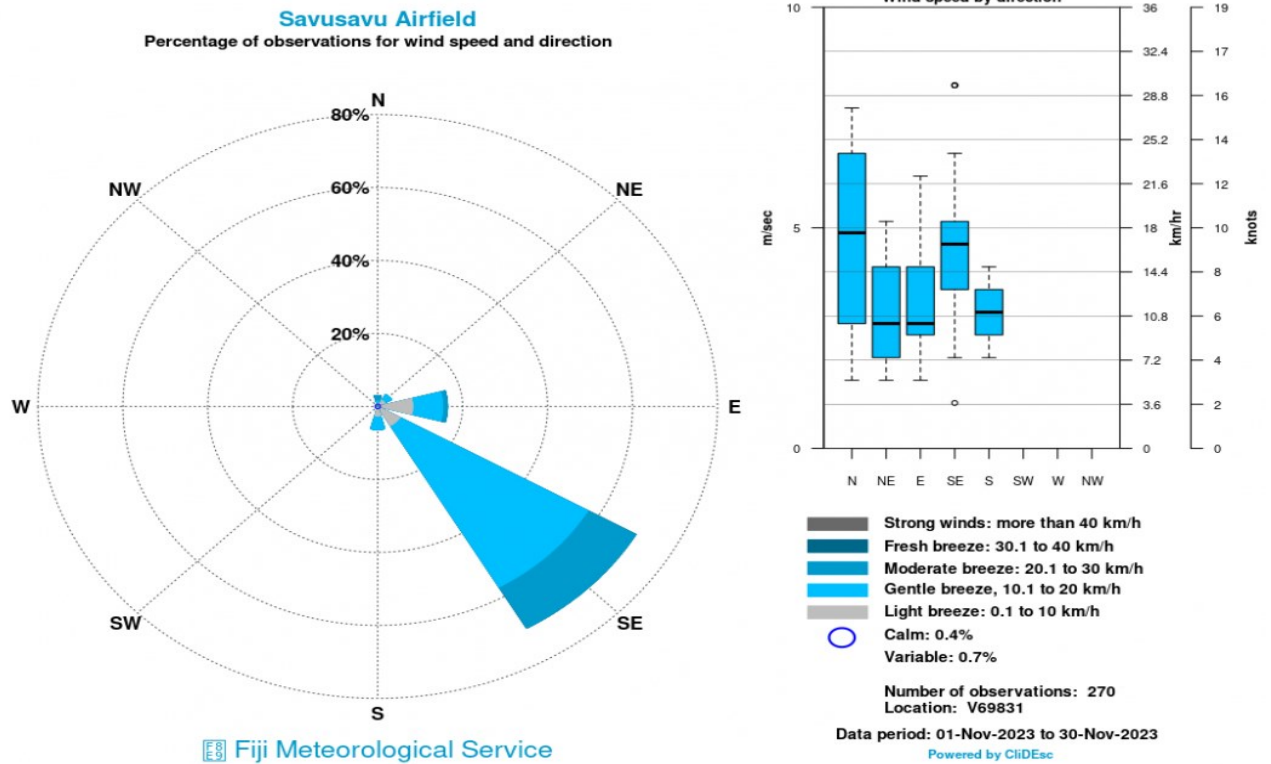


Figure 7c: For Savusavu Airfield’s hourly observations (0800hrs to 1600hrs), southeasterly winds were most dominant during the month, followed by easterly and then southerly winds. Wind strength ranged from light to moderate breeze, with calm winds observed during 0.4% of the time.

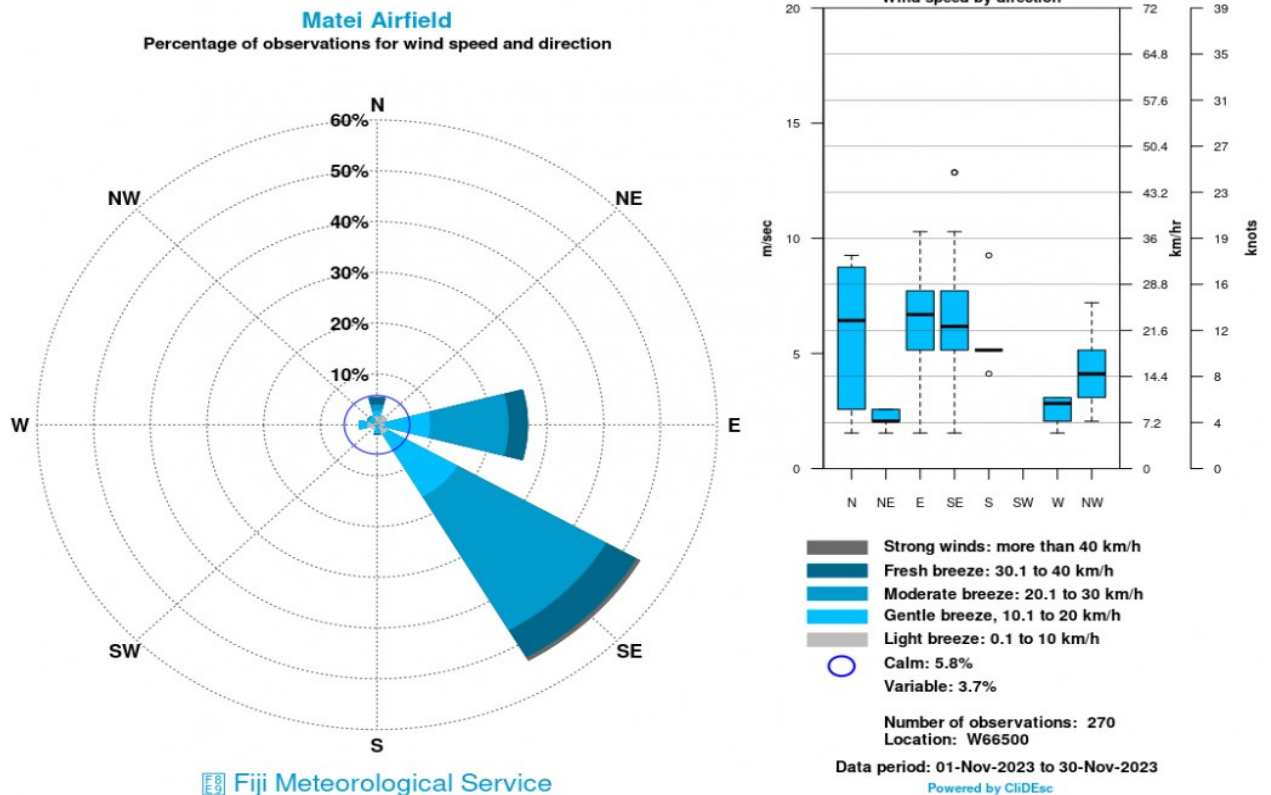


Figure 7d: For Matei Airfield’s hourly wind observations (0800hrs to 1600hrs), southeasterly winds were dominant followed by easterly and then northerly winds. Wind strength ranged from light to fresh breeze, with calm winds observed during 5.8% of the time.

8. SEA SURFACE TEMPERATURE (SST)

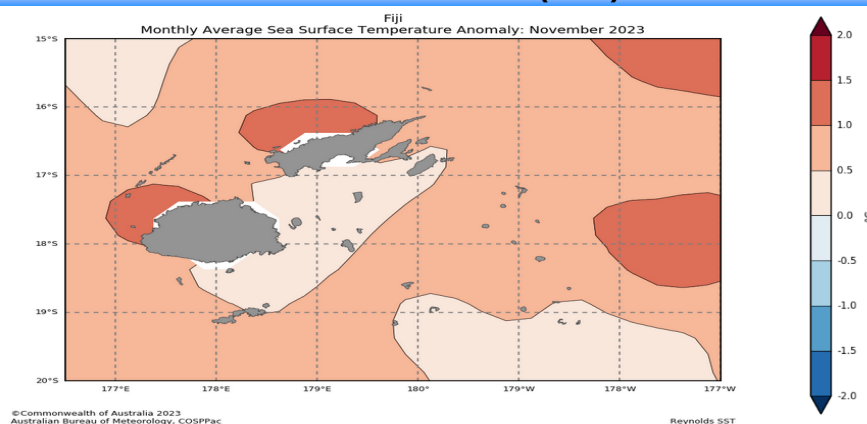


Figure 8: Warmer than normal sea surface temperature anomalies were observed across most of the Fiji Waters, with anomalies 1.0-1.5°C, west of Viti Levu and north west of Vanua Levu. Near normal SST anomalies were observed across the Lomaiviti Group, Taveuni Beqa, southern Kadavu and some parts of the southern Lau Group with anomalies of 0.0- 0.5°C .

Source: <http://oceanportal.spc.int/portal/app.html#climate>

9. CLOUD COVER

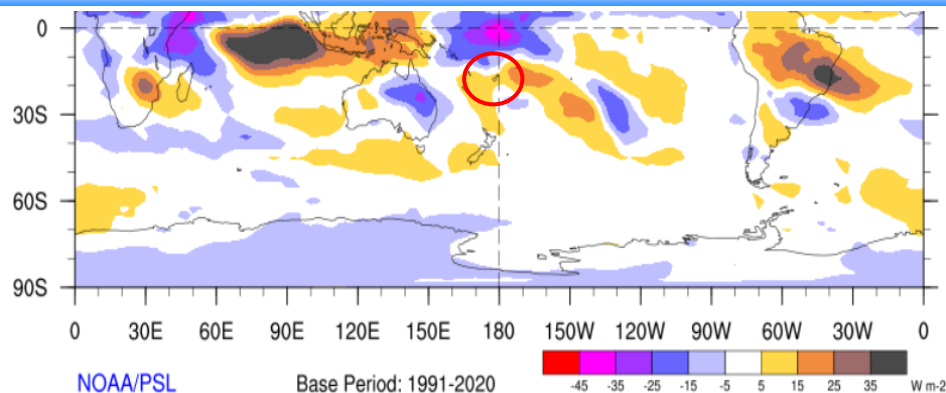


Figure 9: Slightly below normal cloud cover was present over the Fiji Group during November (Fiji in red circle).

Source: <http://www.esrl.noaa.gov/psd/map/clim/olr.shtml>

10. SEA LEVEL

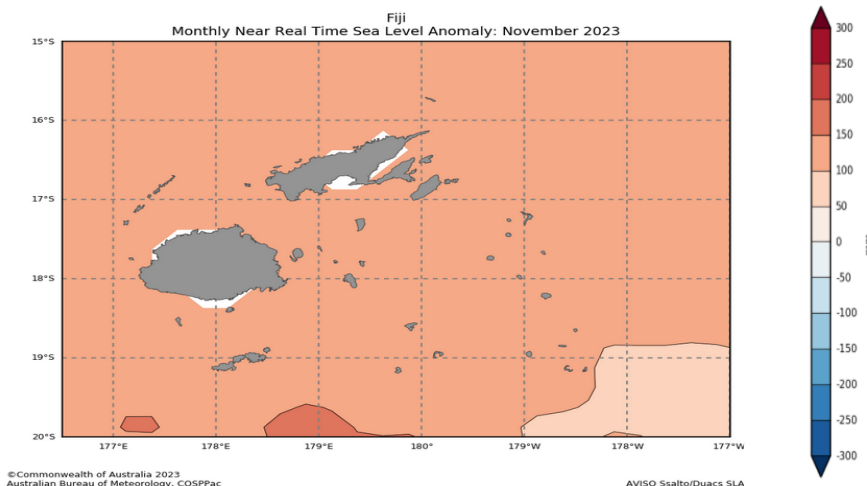


Figure 10: Above normal sea level anomalies persisted across most of the Fiji Waters during December.

Source: <http://oceanportal.spc.int/portal/app.html#sealevel>

11. WIND ANOMALIES

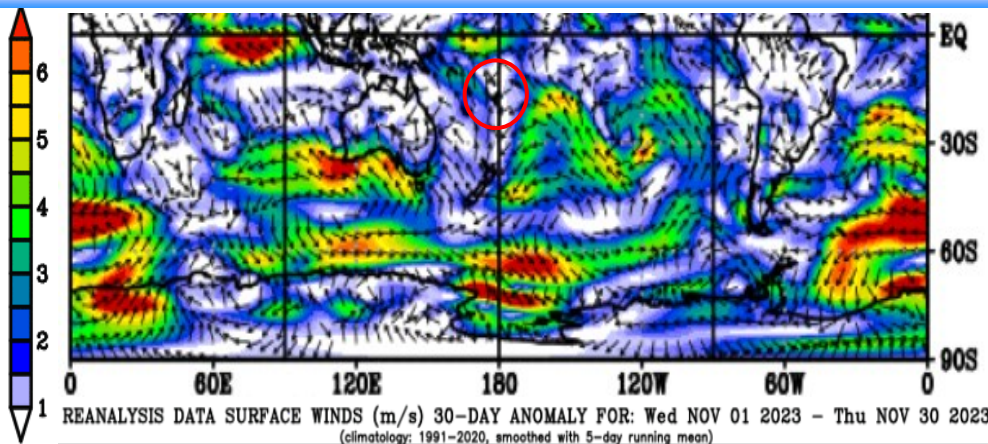


Figure 11: Southeasterly wind anomalies were observed over the Fiji Group during the month (base period: 1981-2010) (Fiji in red circle).

Source: https://www.esrl.noaa.gov/psd/map/images/rnl/sfcwnd_30b.rnl.html

12. FLASH FLOODING: 13TH AND 27TH

Two episodes of flash flooding were recorded over the country during the month, especially in parts of the Central and Eastern Divisions.

The first episode of flash flooding of low-lying areas, especially over Central and Eastern Divisions occurred due to heavy rainfall on the 12th and 13th. On the 12th, RKS Lodonu, Nausori Airport, Koronivia and Levuka recorded their highest 24-hour rainfall of 178mm, 144mm, 116mm and 105mm, respectively. Several bridges and crossings were closed and inaccessible in these areas.

The second episode of flash flooding occurred on the 28th in parts of Navua in the Central Division due to heavy rainfall from severe to afternoon convection on the highlands and southern side of Navua. Navua recorded its highest 24-hour rainfall of 442mm on the 27th. Flash flooding caused road closure and inaccessibility in this area. Landslide on Queens Road near Nakorovou Hill was also reported.



Figure 12a: Fallen tree at Moala Street, Samabula on the 13th November. Source: Fiji Roads Authority.



Figure 12b: Vatuwaqa Crossing, Sereva on the 13th November. Source: National Disaster Management Office



Figure 12c: Nakorovou Crossing, Tailevu. Source: National Disaster Management Office



Figure 12d: Bureta Bridge in Ovalau on the 13th November. Source: National Disaster Management Office



Figure 12e: Qauia, Lami on the 13th November. Source: National Disaster Management Office



Figure 12f: Lovoni Village on Ovalau on the 13th November. Source: National Disaster Management Office



Figure 12g: Marata Village, Wailoku on the 13th November. Source: Fijivillage



Figure 12h: Waiyanitu crossing 1 in Navua on the 28th November. Source: Fiji Roads Authority



Figure 12i: Vakabalea Road in Navua on the 28th November. Source: Fiji Roads Authority



Figure 12j: Landslide on Queens Road near Nakorovou Hill on the 28th November. Source: Fiji Roads Authority



Figure 12k: Tokotoko back road, Navua on the 28th November. Source: Fijivillage



Figure 12l: Waidradra road, Navua on the 28th November. Source: Fijivillage

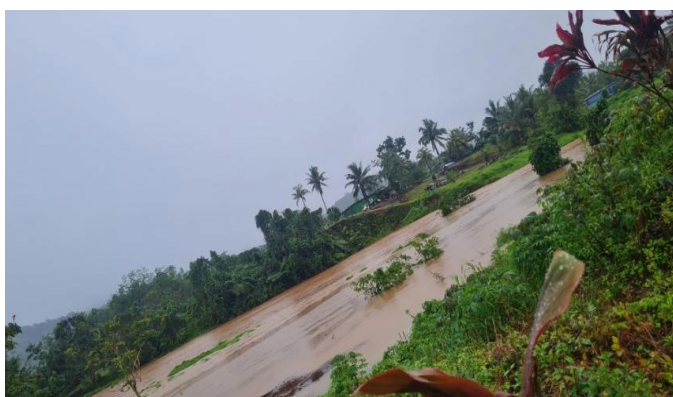


Figure 12m: Wainadoi, Navua on the 28th November. Source: Fijivillage



Figure 12n: Calia, Navua on the 28th November. Source: Fijivillage

13. Tropical Cyclone Mal: 13TH-16TH

Tropical Cyclone Mal was the second named tropical cyclone of the 2023/24 tropical cyclone season. Severe Tropical Cyclone Mal quickly moved through Fiji's waters and maintained itself as a category 3 system for about 9 hours. Significant damages occurred in both land and coastal communities, especially in Yasawa-i-rara, Mamanuca group, Western Viti Levu, Kadavu, and other parts of Viti Levu. Heavy rain was experienced in some areas before the arrival of gale force winds, causing flash flooding in low-lying areas. Weakly structured properties and infrastructures, livestock, and agriculture suffered significant damages. There were isolated disruptions in communication networks, power shutdowns, closed closures, and a landslide reported at Vataleka in Wailoku (Figure 13e-13r).

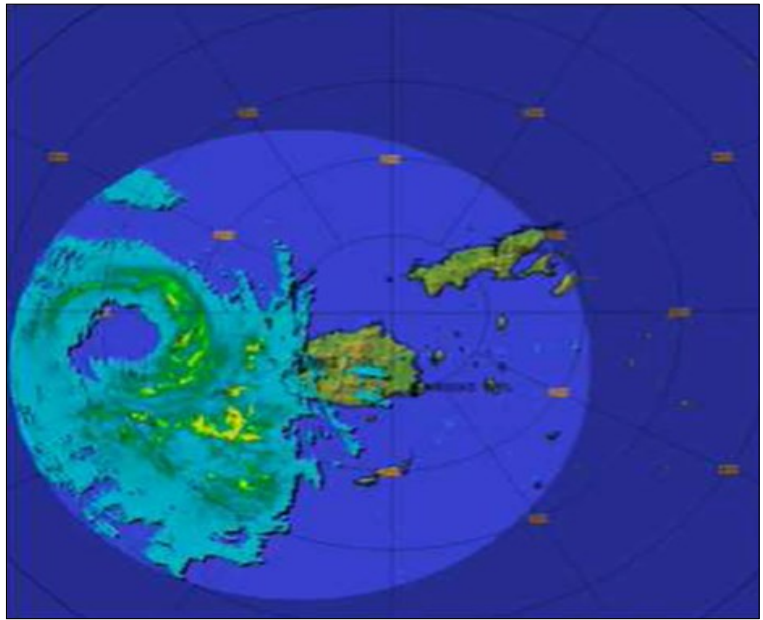


Figure 13a: Tropical cyclone Mal on the RADAR network in Fiji at 12am on the 15th.

Tropical Cyclone Mal developed from an active trough just east of the Solomon Island group, evolving from a tropical low-pressure system. Initially monitored as a tropical low west of 160E, it later became the second numbered tropical disturbance, TD02F, at 9am on the 11th. Thirty-nine hours thereafter, it intensified further, transforming into a tropical depression. The tropical depression, named Tropical Cyclone Mal, reached category 1 status around 6pm on the 13th while situated over open waters, approximately 650 kilometers northwest of Rotuma.

At around 6am on the 14th, rapidly drifting south-southeastwards at about 27 km/hr, Tropical Cyclone Mal was upgraded to a category 2 system with estimated sustained winds of 95 km/hr near its center. On this day, Tropical Cyclone Mal seemingly made a rapid southeastwards track due to the interaction between the southwestern periphery of the steering subtropical ridge to the east of the system.

Tropical Cyclone Mal further intensified into a severe category 3 tropical cyclone at 12pm on the 14th as it commenced a south-southeastwards track of about 30 km/hr towards a slightly favourable environment approximately 180 kilometers west of Nadi in the Fiji group. Severe Tropical Cyclone Mal reached peak intensity after six hours while located about 170 kilometers west of Kadavu or 140 kilometers southwest of Nadi, with estimated sustained wind speeds of up to 130 km/hr and momentary gusts of 185 km/hr.

Thereafter, Severe Tropical Cyclone Mal gradually weakened into a category 2 system at 12pm on the 15th while situated to the far south of Kadavu. It further weakened to category 1, 18 hours later, while located about 410 kilometers to the south-southwest of Ono-I-Lau. Tropical Cyclone Warning Centre Wellington eventually continued monitoring Tropical Cyclone Mal at 12pm on the 16th, as the system was anticipated to move out of the RSMC Nadi AOR.

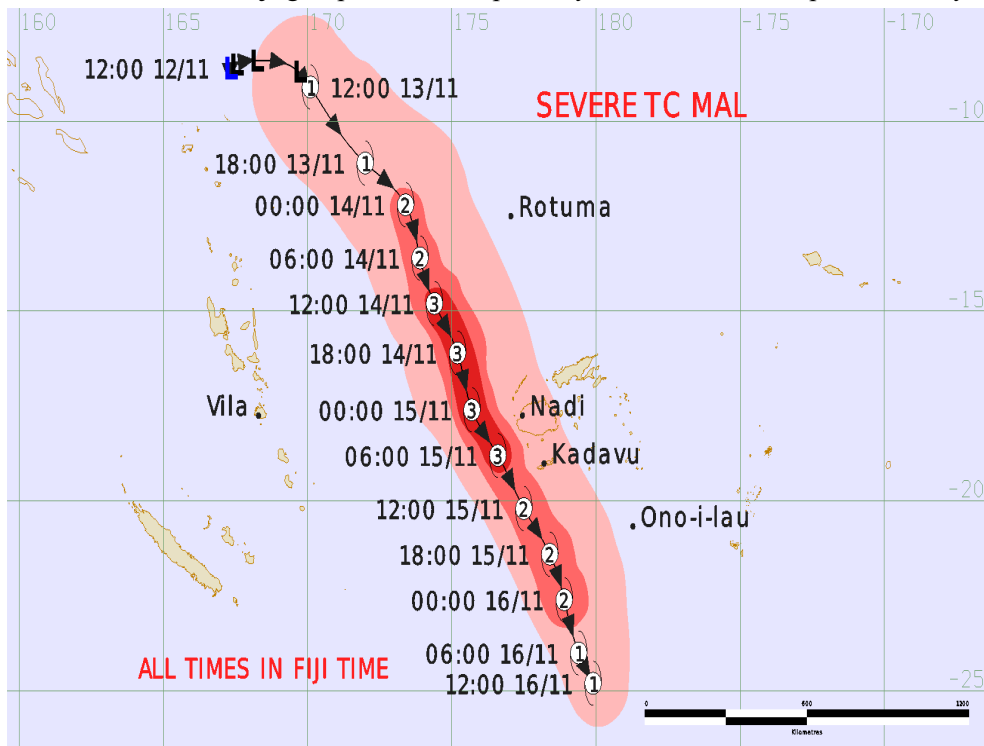


Figure 13b: Best track map of tropical cyclone Mal. Pink, dark pink and red colours indicate extent of gale, storm and hurricane force winds.

While Tropical Cyclone Mal reached the maximum intensity of a Category 3 system, the land areas of Fiji were spared from strong force winds. However, fresh to strong winds affected most parts of the country, near gale force winds impacted some areas of western Viti Levu and the Lomaiviti Group, and gale force winds affected parts of Yasawa-i-Ra and the Mamanuca Group. The highest recorded sustained wind speeds were 73km/hr in Momi, followed by 64 km/hr in Yasawa-i-Rara, 56 km/hr at Nadi, and 53 km/hr in Nadarivatu (Figure 13c).

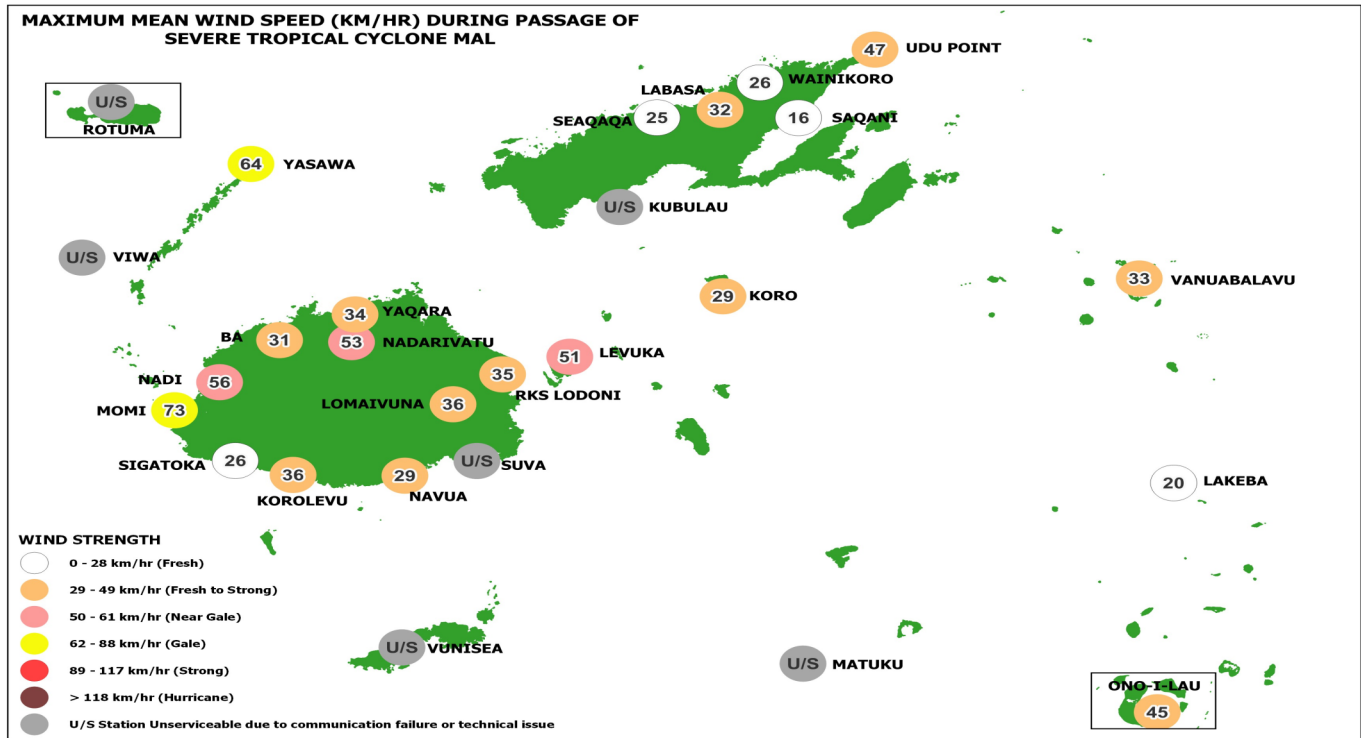


Figure 13c: Maximum recorded sustained winds during the passage of Tropical Cyclone Mal.

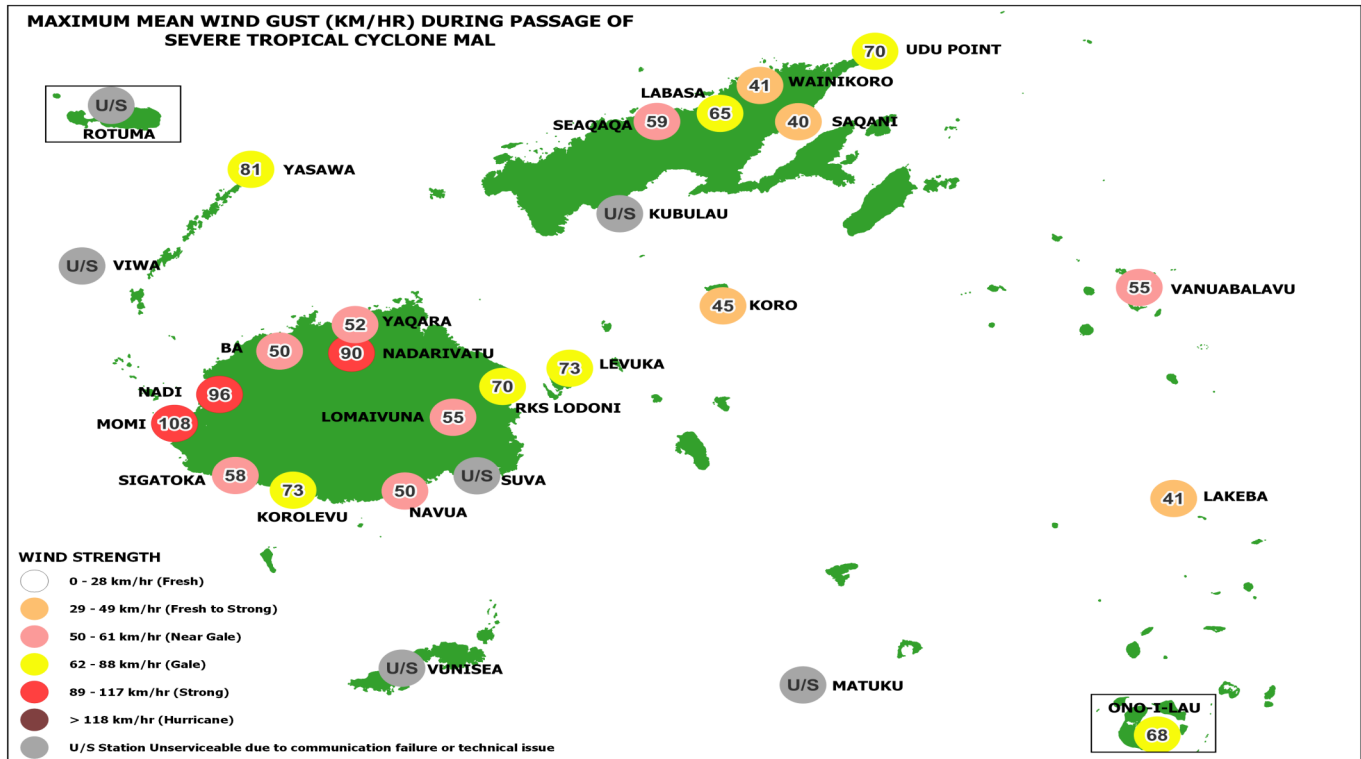


Figure 13d: Maximum recorded Wind gusts during the passage of Tropical Cyclone Mal.

The highest observed wind gust was at Momi with 108km/h, followed by Nadi with 96km/h, Nadarivatu with 90km/h, Yasawa-i-Rara with 81km/h, Korolevu and Levuka both with 73km/h and RKS Lodoni and Udu Point both with 70km/h (Figure 13d).



Figure 13e: Nawau, Queens Road. Source: Fiji Roads Authority.



Figure 13f: Main Road at Barotu Primary School. Source: Fiji Roads Authority.



Figure 13g: Kind road after Naiborebore. Source: Fiji Roads Authority.



Figure 13h: Nabukaluka Delailasakau Road, Central Division. Source: Fiji Roads Authority.



Figure 13i: Wainibokasi Road, Central Division. Source: Fiji Roads Authority.



Figure 13j: Verata Road in Tailevu. Source: National Disaster Management Office.



Figure 13k: Prince Road, near Colo-I-Suva. Source: Fiji Roads Authority.



Figure 13l: Kings road Rakiraki near Rokovuaka. Source: Fiji Roads Authority.



Figure 13m: Korovuto Road, Ba. Source: Fiji Roads Authority.



Figure 13n: Balabala Crescent Road. Source: Fiji Roads Authority.



Figure 13o: Vaivai Road, Lautoka CH6005. Source: Fiji Roads Authority.



Figure 13p: Pender Street, Suva. Source: Fiji Roads Authority.



Figure 13q: Landslide at Vataleka in Wailoku. Source: National Disaster Management Office.



Figure 13r: Landslide at Vataleka in Wailoku. Source: National Disaster Management Office.

EXPLANATORY NOTES

Anomalies - denote the departure of an element (rainfall, temperature, sea surface temperature, cloud cover, sea level and wind) from its long-period average value for a particular location.

Trough - an elongated area of low atmospheric pressure that is associated with a cyclone, or low. Sometimes referred to as a 'trough of low pressure'.

Rain - Liquid precipitation in the form of water droplets. Rain falls from dense, continuous clouds, called 'stratiform' clouds.

Shower - precipitation from individual clouds, often characterised by the sudden beginning or ending. Showers fall from 'lumpy looking', 'cauliflower' clouds, called 'cumuloform' clouds.

Trade Winds - the trade winds are the east to southeasterly winds (in the Southern Hemisphere) which affect tropical and subtropical regions.

High pressure systems or anticyclones are atmospheric circulations that rotate anti-clockwise in the Southern Hemisphere. Anticyclones are areas of higher pressure and are generally associated with lighter winds and fine and settled conditions.

Low pressure systems or mid-latitude cyclones are atmospheric circulations that rotate clockwise in the Southern Hemisphere (anti-clockwise in the Northern Hemisphere). Cyclones are areas of lower pressure and generally associated with stronger winds, unsettled conditions, cloudiness and rainfall.

Sea Surface Temperature (SST) - the temperature of the water's surface. It is usually measured using buoys, ship data, and satellites.