

1. IN BRIEF

Drier than normal conditions prevailed, with most of the rainfall recording stations observing *below average* to *well below average* rainfall. Koronivia, Navua, Seaqqa, Labasa Airport and Savusavu Airfield, were the only exceptions, which recorded *average* rainfall.

Overall, out of the 25 rainfall monitoring stations that reported in, in time for the compilation of bulletin, 5 recorded *average*, 10 below average and 10 stations with *well below average* rainfall (Table 2, Figures 1-5).

The highest monthly rainfall of 446.6mm was observed at Monasavu, followed by Seaqqa with 313.5mm, Navua with 304.5mm, Vaturekuka (Labasa) with 291.0mm, Labasa Airport with 273.9mm, Wainikoro with 250.0mm, RKS Lodonu with 240.0mm, Lomaivuna with 236.0mm and Savusavu Airfield with 234.1mm (Table 2).

On the 17th, an active trough of low pressure gradually moved over Fiji from the north and affected the country till the 20th. The highest 24-hour rainfall amounts recorded for this period was at Vaturekuka (Labasa) with 170.5mm, followed by Wainikoro with 109.5mm and Labasa Airfield with 108.2mm, all on the 17th and Navua with 102.0mm on the 18th. This led to flash flooding across the Central and Northern Divisions.

On temperatures, the highest day-time temperature was

observed at Rarawai Mill (Ba) with 36.2°C on the 19th, followed by Yaqara with 35.8°C on the 29th, both RKS Lodonu and Momi with 35.2°C on the 12th and 30th, respectively. Rotuma, Viwa and Lautoka Mill recorded their highest monthly average maximum temperatures of 32.5°C, 33.4°C and 33.3°C since observations began in 1932, 1978 and 1905, respectively (Table 1).

The lowest night-time temperature of 11.5°C was recorded at Nadarivatu on the 11th, followed by Monasavu with 13.8°C on the 13th, Lomaivuna with 15.8°C on the 11th, Penang Mill, Korolevu and Seaqqa all with 16.8°C on the 12th, 11th and 12th, respectively, and Sigatoka with 17.1°C on the 11th.

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

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

Flash flooding and landslides were reported across the Central and Northern Divisions during 17th to 18th December (Figure 12a-12d and Figure 13a).

2. WEATHER PATTERNS

The weather in December was dominated by the moist easterlies as well as the southeast trades and a series of troughs of low pressure systems.

From the 1st to the 8th, an east to southeast wind flow prevailed over the country producing trade showers. The highest 24-hour rainfall amounts recorded for this period was in Nadarivatu with 70.5mm on the 7th and 89.0mm recorded by RKS AWS on the 8th.

The southeast trades were enhanced by a high pressure system to the far southwest of the country over the Tasman Sea which generated strong south to southeast winds over Fiji waters from the 9th to the 12th. The strong trades although dominant, gradually weakened over Fiji waters from the 13th to the 16th as the high to the far south of the country continued moving eastwards.

On the 17th, an active trough of low pressure gradually moved over Fiji from the north and affected the country till the 20th where it dissipated to the west of the group. Occasional rain was experienced and heavy falls were observed in some centres in the northern and central divisions. This was coupled by strong easterly winds over Fiji waters directed by another high pressure system to the south of the country till the 23rd. The southeast trades prevailed again over the group from the 24th to the 31st. This was again enhanced by a third high pressure system to the far south of the country which generated strong southeast winds over Fiji waters till the end of the month.

Rotuma's weather was also affected by a series of troughs of low pressure systems and the moist easterlies for the month of December .

3. RAINFALL

Below average to well below average rainfall was observed at most of the rainfall recording stations during the month. Koronivia, Navua, Seaqaqa, Labasa Airport and Savusavu Airfield, were the only exceptions, which recorded *average* rainfall.

Overall, out of the 25 rainfall monitoring stations that reported in, in time for the compilation of bulletin, 5 recorded *average*, 10 *below average* and 10 stations with *well below average* rainfall (Table 2, Figures 1-5).

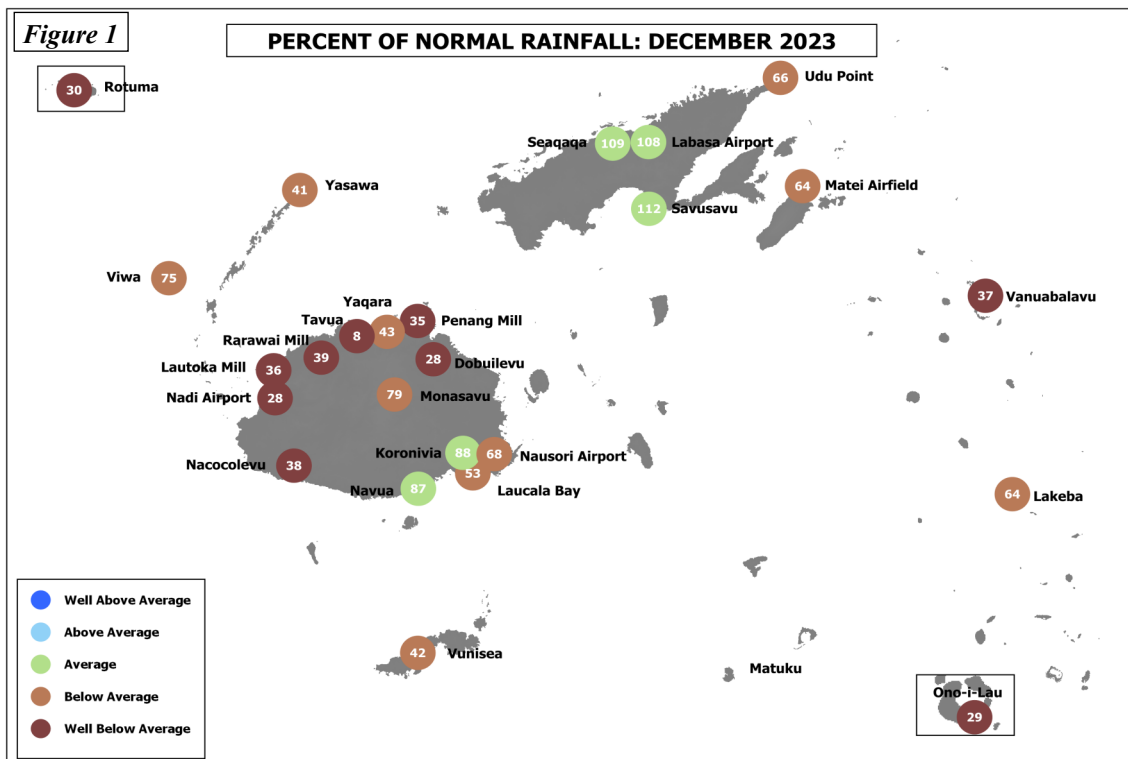
The highest monthly rainfall of 446.6mm was observed at Monasavu, followed by Seaqaqa with 313.5mm, Navua with 304.5mm, Vaturekuka (Labasa) with 291.0mm, Labasa Airport with 273.9mm, Wainikoro with 250.0mm, RKS Lodonu with 240.0mm, Lomaivuna with 236.0mm and Savusavu Airfield with 234.1mm. On the other hand, Tavua recorded the month's lowest total monthly rainfall of 14.5mm, followed by Momi with 19.0mm, Ono-i-Lau with 37.8mm, Sigatoka with 49.0mm, Nadi Airport with 57.7mm, Yasawa-i-Rara with 59.0mm, Nacocolevu with 67.3mm, Vanuabalavu with 69.6mm and Lautoka Mill with 71.0mm (Table 2).

On the 17th, an active trough of low pressure gradually moved over Fiji from the north and affected the country till the 20th. The highest 24-hour rainfall amounts recorded for this period was at Vaturekuka (Labasa) with 170.5mm, followed by Wainikoro with 109.5mm and

Labasa Airfield with 108.2mm, all on the 17th and Navua with 102.0mm on the 18th. This led to flash flooding across the Central and Northern Divisions.

Monasavu recorded the highest number of rain days (rainfall ≥ 0.1 mm) with 25 days, followed by Nasinu and Lomaivuna with 23 days, Matei Airfield with 22 days, RKS Lodonu, Koronivia and Nausori Airport all with 21 days, Savusavu Airfield with 20 days, Levuka with 19 days and both Navua and Seaqaqa with 18 days. Consequently, Yaqara recorded the least number of rain days with 6 days, followed by Tavua, Sigatoka and Yasawa-i-Rara, all with 7 days, both Momi and Vunisea with 8 days, Viwa with 9 days and both Nacocolevu and Lautoka Mill with 10 days.

There were no new rainfall observations recorded during the month.



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 20 climate stations that reported in time for the analysis of data, 17 recorded anomalies $\geq +0.5^{\circ}\text{C}$, and 3 within $\pm 0.5^{\circ}\text{C}$.

The warmest days on average were recorded at Rarawai Mill (Ba) with 33.7°C , followed by Yaqara with 33.5°C , Viwa with 33.4°C , Lautoka Mill and RKS Lodonni both with 33.3°C , Seaqaqa with 33.2°C , Yasawa-i-Rara with 33.0°C , Saqani with 32.8°C , both Nadi Airport and Momi with 32.6°C , Rotuma with 32.5°C , Penang Mill with 32.2°C and both Vaturekuka (Labasa) and Wainikoro with 32.0°C . Consequently, Monasavu recorded the coolest days on average with 26.0°C , followed by Nadarivatu with 26.8°C , Vunisea with 29.9°C , Ono-i-Lau with 30.1°C , Vanuabalavu with 30.2°C , Savusavu Airfield with 30.4°C , and Matei Airfield with 30.5°C .

The highest day-time temperature was observed at Rarawai Mill (Ba) with 36.2°C on the 19th, followed by Yaqara with 35.8°C on the 29th, both RKS Lodonni and Momi with 35.2°C on the 12th and 30th, respectively, both Seaqaqa and Yasawa-i-Rara with 35.1°C on the 30th and 31st, respectively, and Penang Mill with 35.0°C on the 6th. On the other hand, the coolest day-time temperature of 20.9°C was at Monasavu on the 11th, followed by Nadarivatu with 24.3°C on the 22nd, both Nacocolevu and Lomaivuna with 27.4°C on the 10th, and Koronivia with 27.8°C on the 10th.

Rotuma, Viwa and Lautoka Mill recorded their highest monthly average maximum temperatures of 32.5°C , 33.4°C and 33.3°C since observations began in 1932, 1978 and 1905, respectively (Table 1).

B. Minimum Night-time Air Temperatures

Generally *average to above average night-time* temperatures were recorded over most parts of the country during the month. Of the 21 stations, 9 recorded anomalies $\geq +0.5^{\circ}\text{C}$, 8 within $\pm 0.5^{\circ}\text{C}$, and 4 with anomaly $\leq -0.5^{\circ}\text{C}$.

The coolest days on average was at Nadarivatu with 18.2°C , followed by Monasavu with 19.1°C , Lomaivuna with 21.3°C , Rarawai Mill (Ba) with 21.5°C , Korolevu with 21.9°C , Nacocolevu and Labasa Airfield with 22.2°C , Keiyasi, Sigatoka and Vaturekuka (Labasa) all with 22.3°C , Vunisea, Ono-i-Lau and Seaqaqa all with 22.7°C , Nadi Airport and Matei Airfield both with 22.8°C , and Vanuabalvu with 22.9°C . Consequently, on average, the warmest night-time temperatures were observed at RKS Lodonni with 25.8°C , followed by Viwa with 25.5°C , Saqani and Laucala Bay (Suva) both with 24.8°C , Yaqara with 24.6°C , Rotuma with 24.5°C , Lakeba with 24.3°C , Yasawa-i-Rara with 24.2°C and, Penang Mill and Savusavu Airfield both with 24.1°C .

The coolest daily night-time temperatures were recorded mostly during the second week of the month. The lowest night-time temperature of 11.5°C was recorded at Nadarivatu on the 11th, followed by Monasavu with 13.8°C on the 13th, Lomaivuna with 15.8°C on the 11th, Penang Mill, Korolevu and Seaqaqa all with 16.8°C on the 12th, 11th and 12th, respectively, Sigatoka with 17.1°C on the 11th, Nacocolevu and Labasa Airfield both with 17.2°C on the 11th and 12th, respectively, Rarawai Mill (Ba) with 17.3°C on the 12th and Navua and Vaturekuka (Labasa) both with 17.4°C on the 11th and 12th, respectively. On the other hand, the warmest night-time temperature of 28.8°C was recorded at RKS Lodonni on the 21st, followed by Viwa with 27.0°C on the 31st, Laucala Bay (Suva) and Koronivia both with 26.9°C on the 8th and 25th, respectively, Yaqara with 26.7°C on the 21st, and Saqani with 26.5°C on the 30th.

TABLE 1. CLIMATE RECORDS ESTABLISHED IN DECEMBER 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>
Average Maximum Temperature	Rotuma	32.5°C	-	New High	31.9°C	1995 2001	1932
Average Maximum Temperature	Viwa	33.4°C	-	New High	32.9°C	1994	1978
Average Maximum Temperature	Lautoka Mill	33.3°C	-	New High	32.6°C	2019	1905

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 DECEMBER 2023

	RAINFALL				AIR TEMPERATURES								SUNSHINE		
	TOTAL	RAIN		MAX. FALL		AVERAGE DAILY				EXTREME				TOTAL	*
	MM	%	+	MM	ON	C	C	C	C	C	ON	C	ON	HRS	%
NADI AIRPORT	57.7	28	11	17	17	32.6	1.2	22.8	0.1	34.1	21	19.1	13	268	122
LAUCALA BAY	144.4	53	17	56	18	30.7	0.2	24.8	0.8	32.5	4	21.5	12	238	127
NACOCOLEVU RESEARCH	67.3	38	10	21	31	31.5	0.2	22.2	0.3	34.5	8	17.2	11	173	110
ROTUMA ISLAND	88.1	29	16	30	1	32.5	1.5	24.5	-0.3	33.6	23	22.5	31	217	125
VIWA ISLAND	110.5	75	9	46	16	33.4	2.0	25.5	0.5	34.7	16	23.0	11		
YASAWA-I-RARA (AWS)	59.0	41	7	28	31	33.0	2.1	24.2	-0.2	35.1	31	22.1	12		
UDU POINT WEATHER	208.3	66	17	45	22	31.2	0.5	23.4	-0.9	32.6	5	20.3	12		
NABOUWALU	STATION TEMPORARILY CLOSED														
LABASA AIRFIELD	273.9	108	15	108	17	U/S	U/S	22.2	0.0	U/S	U/S	17.2	12		
SAVUSAVU AIRFIELD	234.1	112	20	79	17	30.4	0.3	24.1	0.8	31.6	2	19.5	12		
KORONIVIA RESEARCH	226.5	88	21	89	18	30.7	0.7	23.9	1.1	32.0	4	18.7	11		
NAUSORI AIRPORT	181.0	68	21	80	18	31.2	1.5	23.3	0.5	33.0	2	18.0	11		
NAVUA (AWS)	304.5	87	18	102	18	31.0	1.3	23.3	1.4	33.7	17	17.4	11		
MONASAVU HYDRO DAM	446.6	79	25	80	31	26.0	1.1	19.1	0.6	29.5	1	13.8	13		
FSC LAUTOKA MILL	71.0	36	10	23	22	33.3	2.0	23.1	-0.3	34.9	7	18.2	11		
FSC RARAWAI MILL	101.3	40	11	36	5	33.7	1.3	21.5	-0.4	36.2	19	17.3	12		
FSC PENANG MILL	91.3	35	13	26	18	32.2	1.4	24.1	0.5	35.0	6	16.8	12		
MATEI AIRFIELD	189.2	64	22	58	31	30.5	0.8	22.8	-1.1	31.4	30	18.6	12		
VANUABALAVU	69.6	40	15	17	15	30.2	0.5	22.9	-1.3	31.1	1	20.4	11		
LAKEBA	130.2	64	14	70	17	30.7	0.9	24.3	0.5	31.6	7	18.8	12		
VUNISEA	77.8	42	8	31	15	29.9	0.5	22.7	-0.5	31.5	1	18.5	10		
MATUKU	MISSING OBSERVATIONS														
ONO-I-LAU	37.8	29	12	12	25	30.1	1.0	22.7	-0.8	32.5	6	19.8	24		
YAQARA AWS	74.0	43	6	45	7	33.5		24.6		35.8	29	17.7	12		
LEVUKA AWS	143.0		19	30	9	U/S		U/S		U/S		U/S			
KEIYASI AWS	106.0		14	31	31	U/S		22.3		U/S		18.0	11		
LOMAIVUNA AWS	236.0		23	60	29	31.3		21.3		33.5	6	15.8	11		
NADARIVATU AWS	217.5		16	71	7	26.8		18.2		29.5	2	11.5	11		
RKS LODONI AWS	240.0		21	89	8	33.8		25.8		35.2	12	21.0	12		
MOMI AWS	19.0		8	10	15	32.6		23.5		35.2	30	20.6	12		
SIGATOKA AWS	49.0		7	24	16	31.0		22.3		32.4	5	17.1	11		
VATUREKUKA AWS	291.0		12	171	17	32.0		22.3		34.6	1	17.4	12		
KOROLEVU AWS	113.0		16	52	16	30.6		21.9		32.7	5	16.8	11		
WAINIKORO AWS	250.0		15	110	17	32.0		23.0		33.9	1	17.7	12		
SAQANI AWS	180.5		15	58	17	32.8		24.8		34.2	7	22.1	12		
SEAQAQA AWS	313.5	109	18	56	17	33.2		22.7		35.1	30	16.8	12		
DOBUILEVU TB3	74.0		28	15	16	18									
NASINU TB3	190.5		23	76	18										
TAVUA TB3	14.5		8	7	4	9									
TEMPERATURE(C) HUMIDITY WIND															
DRY WET RH% VP															
MEAN (AVERAGE AT 9AM) KT															
NADI AIRPORT	27.7	29.7	24.0	60	31.2	8.3									
LAUCALA BAY	27.7	28.4	25.4	78	28.9										
NACOCOLEVU RESEARC	26.8	29.6	25.4	71	31.0										
ROTUMA ISLAND	28.5	30.5	26.7	74	32.7										
VIWA ISLAND	29.4	30.8	26.5	72	33.2										
YASAWA-I-RARA(AWS)	28.6														
UDU POINT WEATHER	27.3	29.1	25.6	76	30.1										
NABOUWALU	STATION TEMPORARILY CLOSED														
LABASA AIRFIELD	U/S	30.0	25.3	68	31.7	10.0									
SAVUSAVU AIRFIELD	27.3	28.8	25.4	76	29.6	9.2									
KORONIVIA RESEARCH	27.3	28.5	26.9	89	29.1										
NAUSORI AIRPORT	27.3	28.3	25.0	76	28.8	6.8									
NAVUA (AWS)	27.2														
MONASAVU HYDRO DAM	22.6	22.4	22.0	96	20.3										
FSC LAUTOKA MILL	28.2	28.6	26.9	88	29.3										
FSC RARAWAI MILL	27.6	30.1	24.9	66	31.9										
FSC PENANG MILL	28.2	29.1	24.9	71	30.1										
MATEI AIRFIELD	26.6	28.9	25.7	77	29.8	12.6									
VANUABALAVU	26.6	28.5	26.0	82	29.1										
LAKEBA	27.5	29.1	25.4	74	30.1										
VUNISEA	26.3	28.1	24.7	76	28.4										
MATUKU	U/S														
ONO-I-LAU	26.4	28.4	24.7	74	28.9										

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 (December 2022 - December 2023)

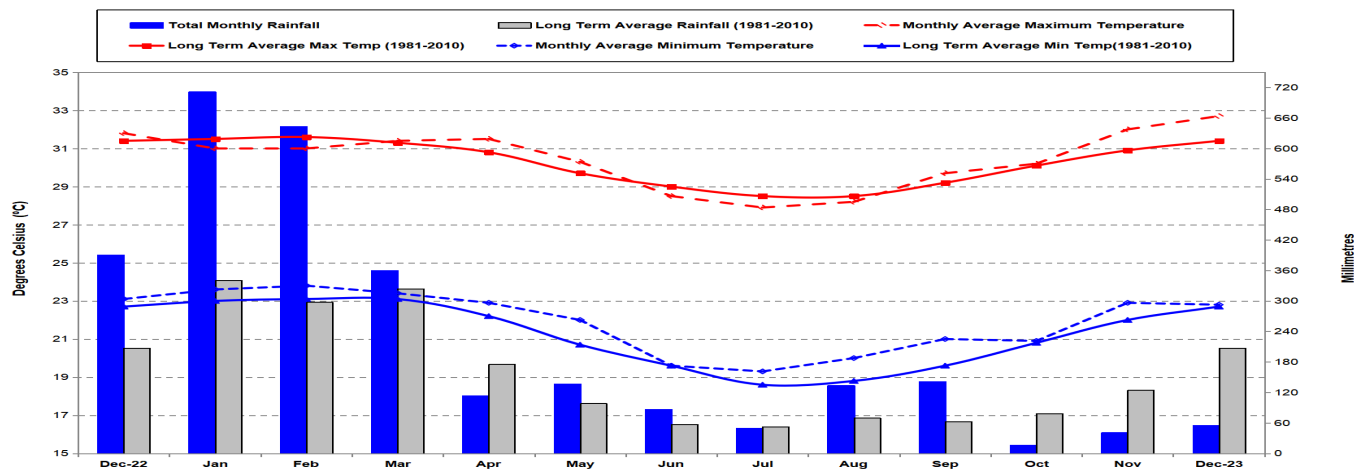


Figure 3

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

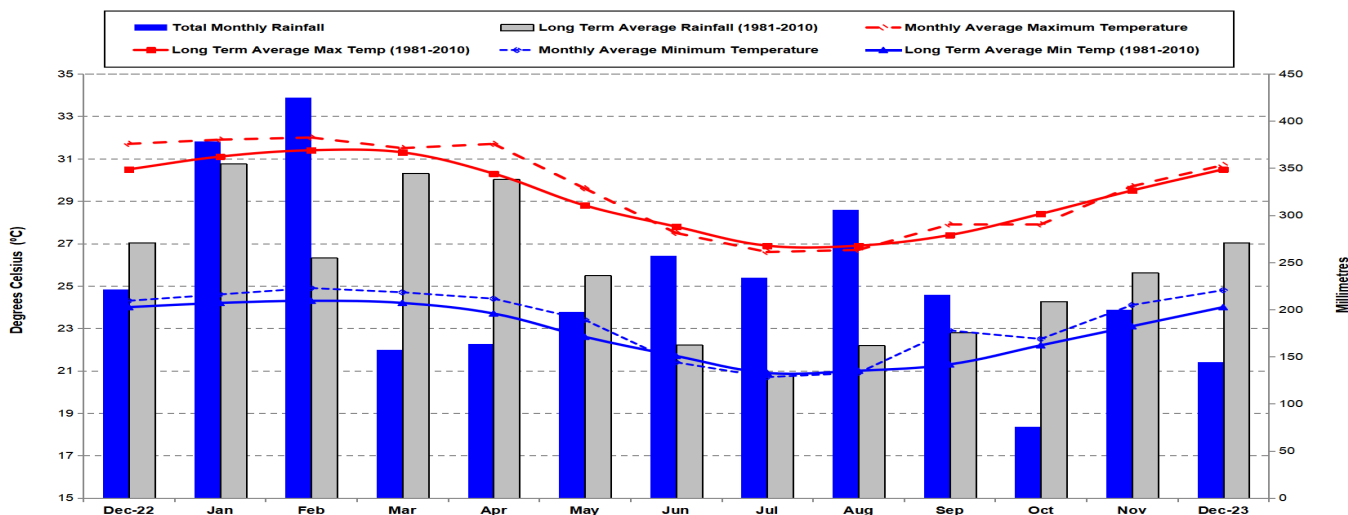


Figure 4

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

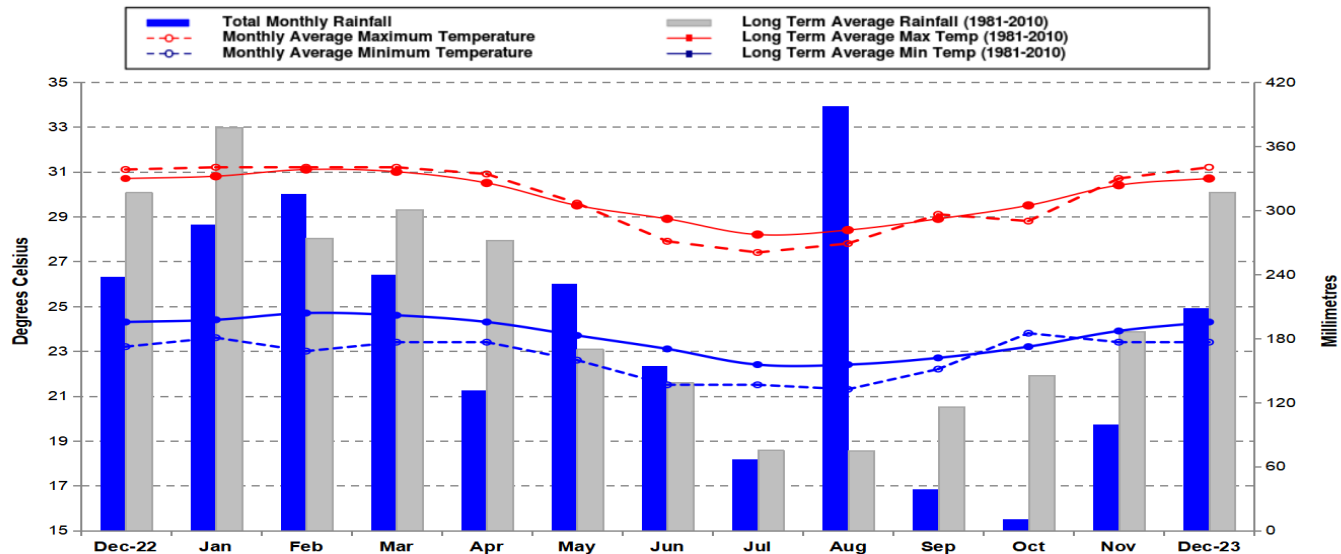
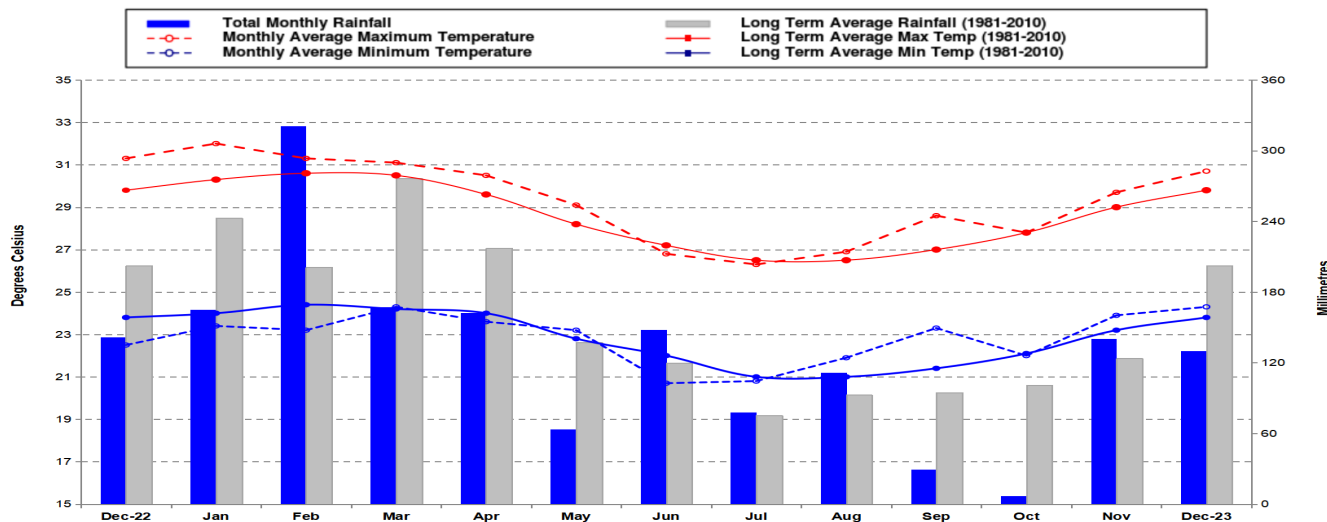


Figure 5

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



5. DAILY RAISED PAN EVAPORATION

Figure 6

Daily Evaporation for December 2023

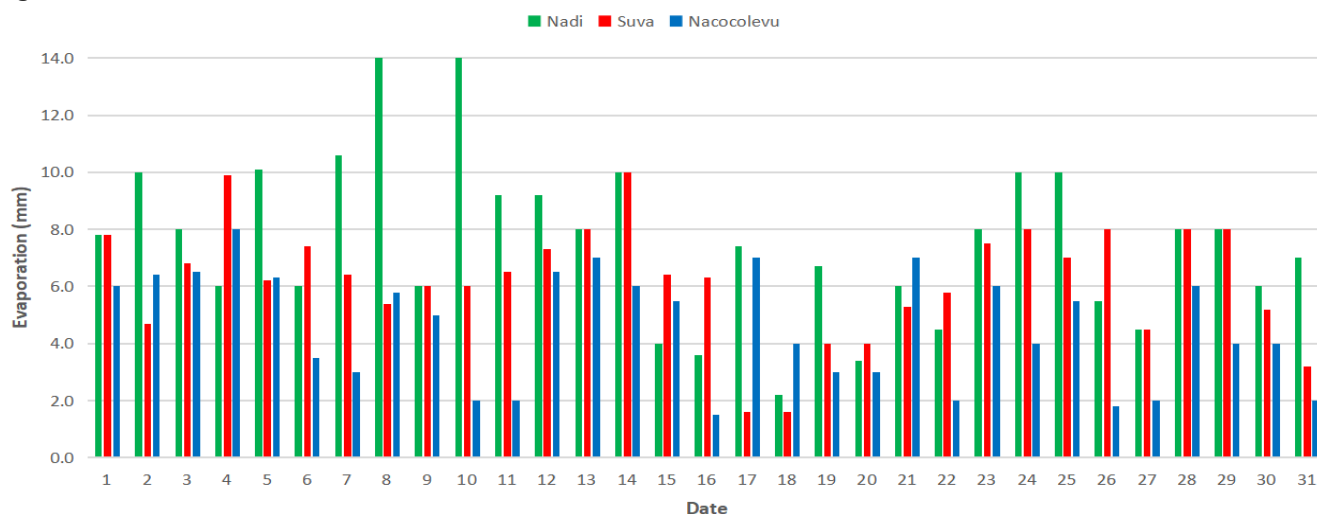


Figure 6: The total monthly raised pan evaporation at Nadi Airport, Laucala Bay (Suva) and Nacocolevu (Sigatoka) were 233.7mm, 192.8mm and 142.3mm, respectively. Nadi’s highest daily evaporation was 14.0mm on the 8th and 10th, with Suva’s highest daily evaporation of 10.0mm on 14th, and Nacocolevu (Sigatoka) recorded its highest of 8.0mm on 4th.

6. SOLAR RADIATION

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

7. WIND SUMMARY

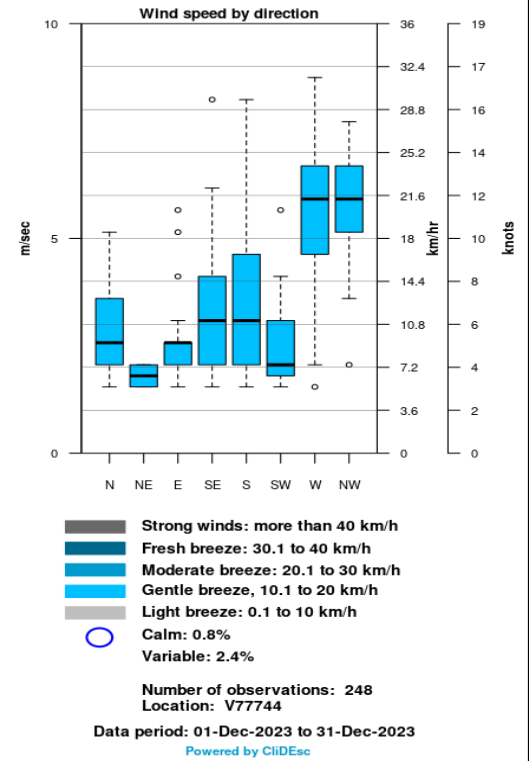
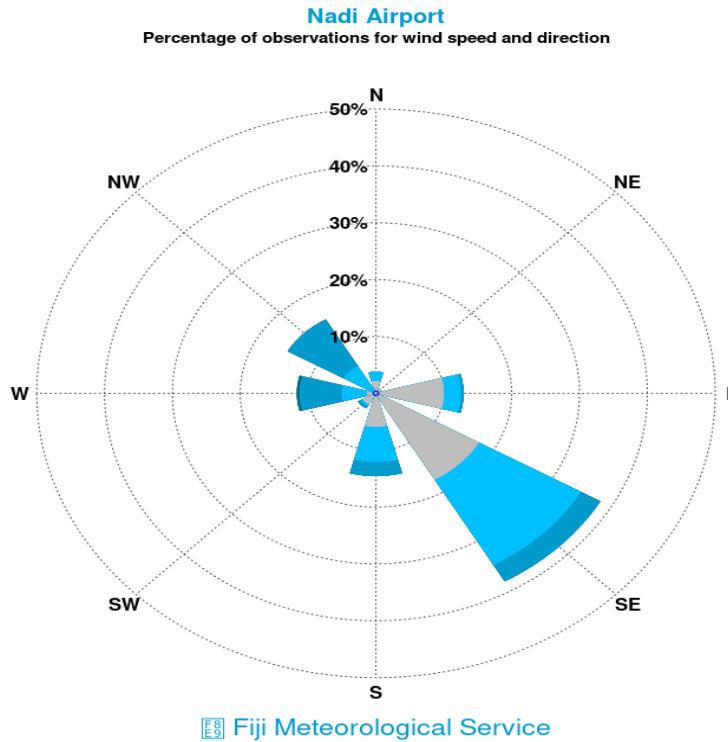


Figure 7a: Looking at Nadi’s 3 hourly observations, southeasterly winds were most dominant during the month, followed by northwesterly and then southerly winds. Wind strength ranged from light to fresh winds, while 0.8% observations accounted for calm winds.

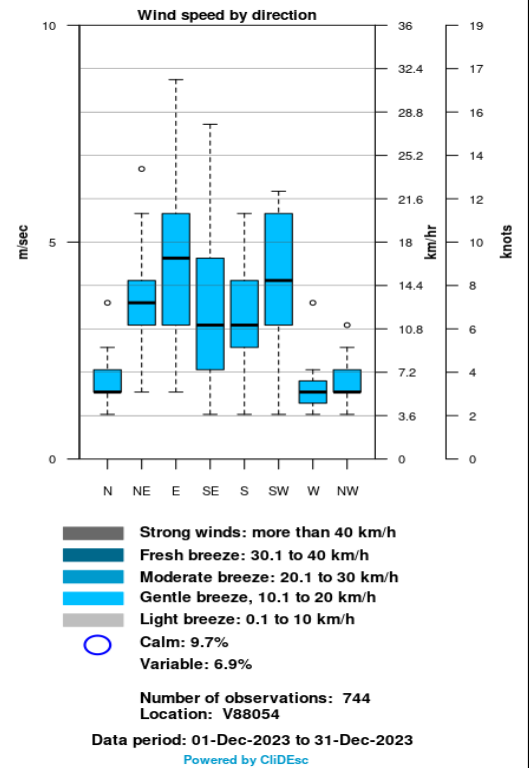
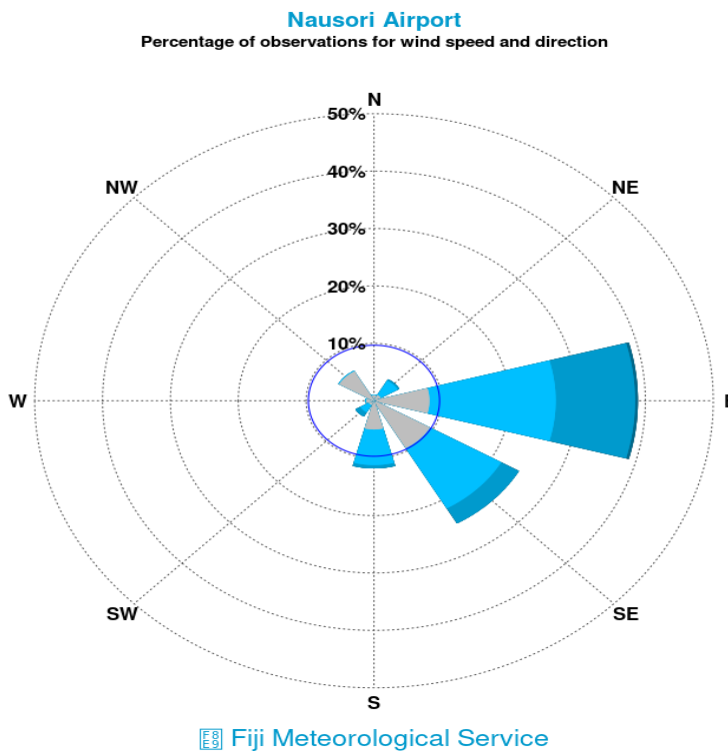


Figure 7b: For Nausori Airport’s hourly wind observations, easterly winds were dominant followed by southeasterly and then southerly winds. Wind strength ranged from light to fresh breeze, while 9.7% of observations accounted for calm winds.

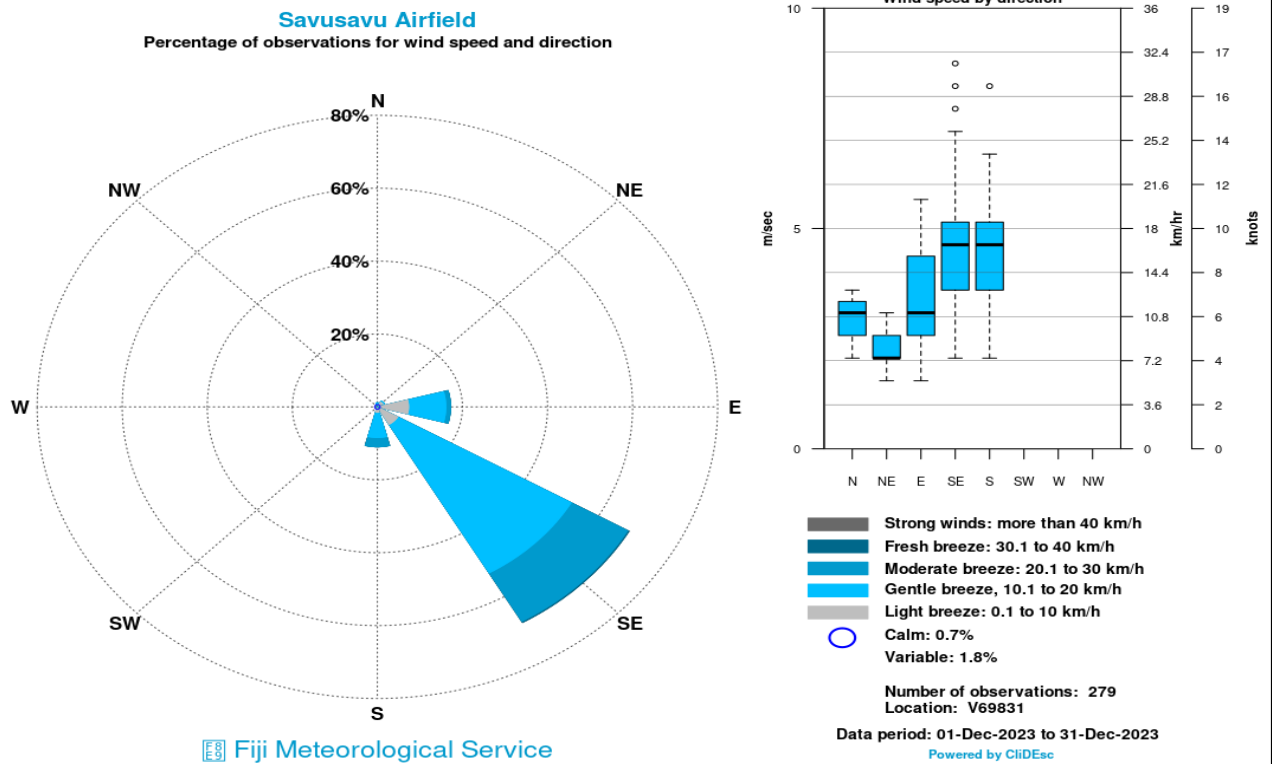


Figure 7c: For Savusavu Airfield’s hourly observations (0800hrs to 1600hrs), southeasterly winds were most dominant during the month, followed by easterly and then southerly winds. Wind strength ranged from light to moderate breeze, with calm winds observed during 0.7% of the time.

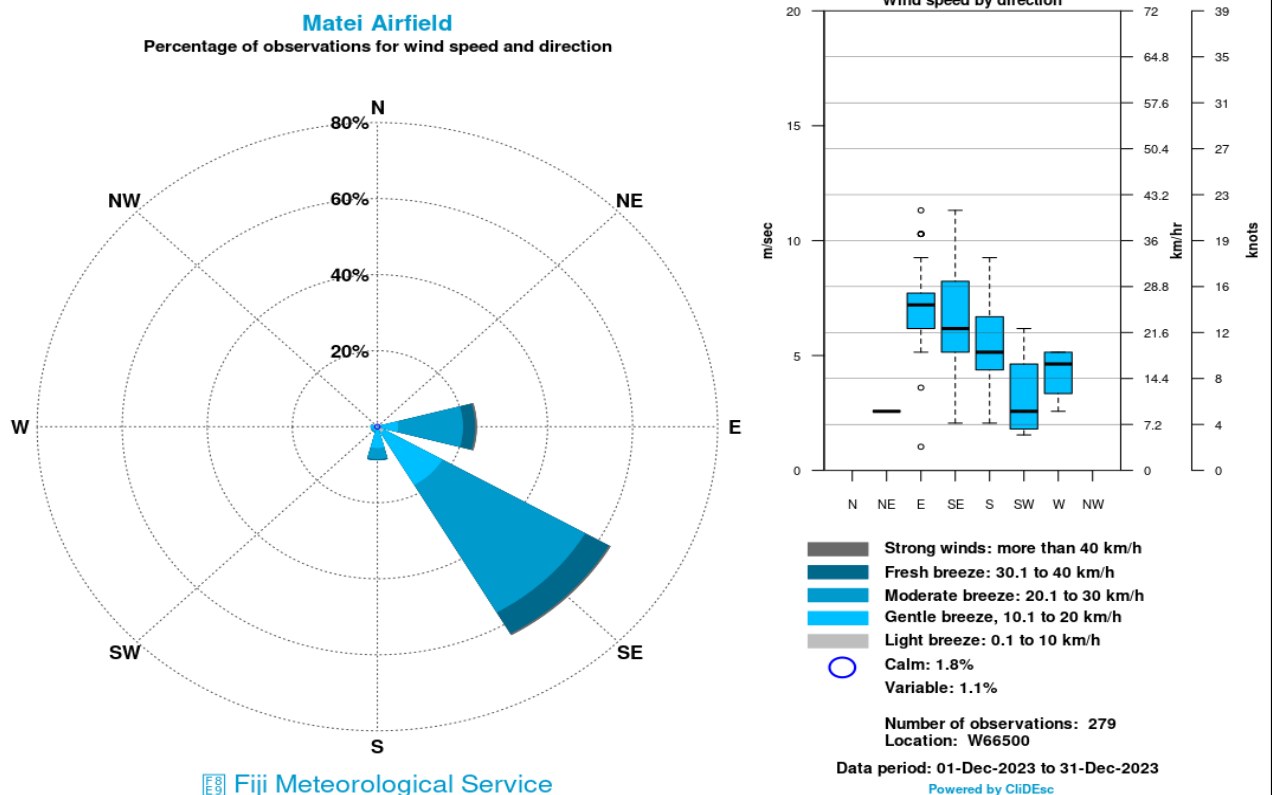


Figure 7d: For Matei Airfield’s hourly wind observations (0800hrs to 1600hrs), southeasterly winds were dominant followed by easterly and then southerly winds. Wind strength ranged from light to strong breeze, with calm winds observed during 1.8% of the time.

8. SEA SURFACE TEMPERATURE (SST)

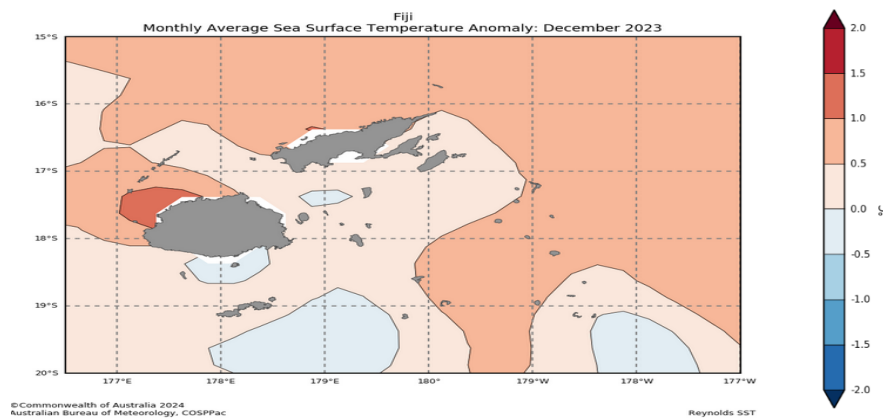


Figure 8: Warmer than normal sea surface temperature anomalies were observed across most of the Fiji Waters, with anomalies 1.0-1.5°C, west of Viti Levu and north west of Vanua Levu. Near normal SST anomalies were observed near Levuka, Beqa, southern Kadavu and some parts of the southern Lau Group with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

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

9. CLOUD COVER

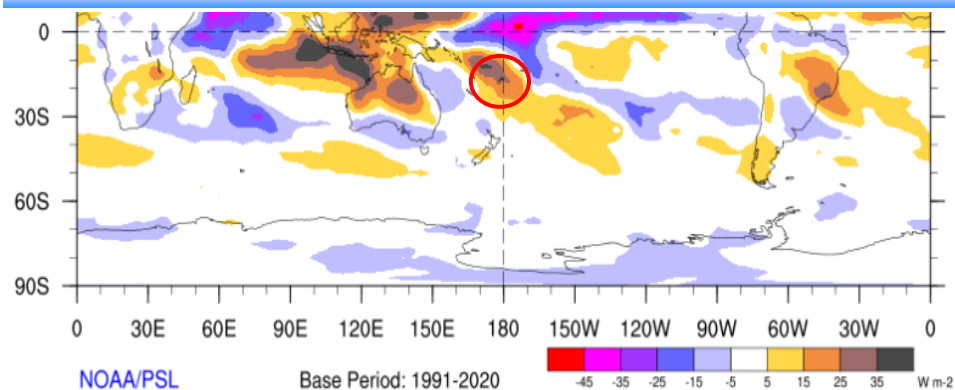


Figure 9: Below normal cloud cover was present over the Fiji Group during December (Fiji in red circle).

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

10. SEA LEVEL

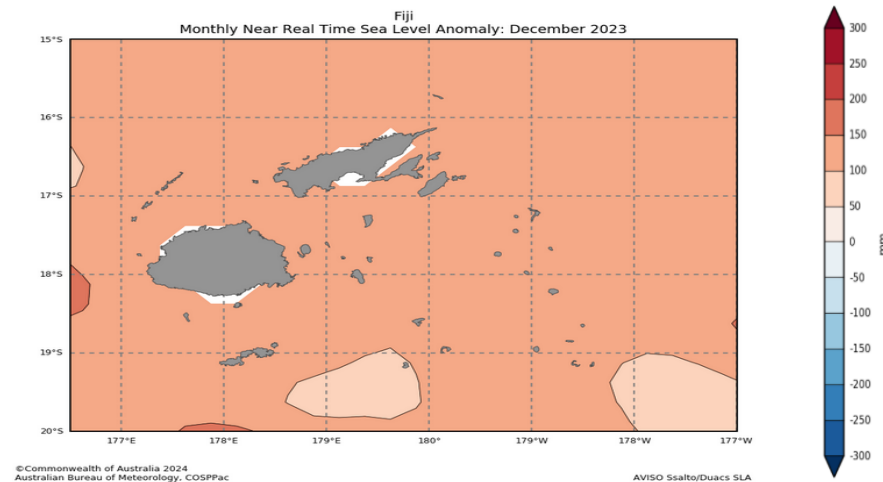


Figure 10: Above normal sea level anomalies persisted across most of the Fiji Waters during December.

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

11. WIND ANOMALIES

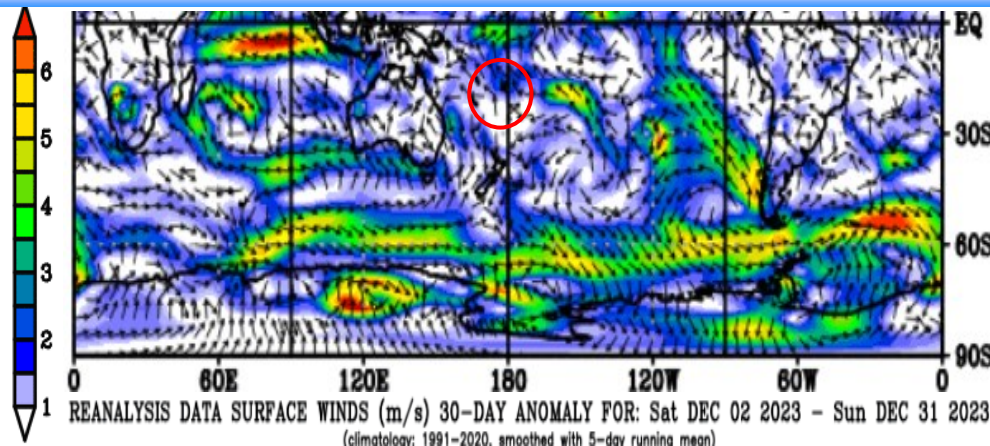


Figure 11: Southeasterly wind anomalies were observed over the Fiji Group during the month (base period: 1981-2010) (Fiji in red circle).

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

12. FLASH FLOODING: 17th and 18th

Flash flooding of low-lying areas occurred over the Central and Northern Divisions due to heavy rainfall on the 17th and 18th. The highest 24-hour rainfall was recorded at Vaturekuka (Labasa) with 170.5mm, followed by Wainikoro with 109.5mm and Labasa Airfield with 108.2mm, all on the 17th and Navua with 102.0mm on the 18th. Flash flooding caused road closure and inaccessibility in these areas (Figure 12a-12d).



Figure 12a: Vehicle queued up at Galoa Bridge on the 18th December. Source: National Disaster Management Office



Figure 12b: Flash flooding in Galoa on the 18th December. Source: National Disaster Management Office



Figure 12c: Nakorovou Village Road inundated with flood waters on the 18th December. Source: Fiji Roads Authority



Figure 12d: Waivunu Road closed to all traffic due to flash flooding on the 18th December. Source: Fiji Roads Authority

13. LANDSLIDE: 18th



Figure 13a: Landslide along Queens after Nakorovou on the 18th December. Source: Fiji Roads Authority

The heavy downpour that occurred on the 18th of December led to landslide along the Queens Highway (Figure 13a). This caused accessibility issues along the main road.

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.