

1. IN BRIEF

Typical La Niña event rainfall pattern continued to be observed at most parts of the country during the month.

During December, troughs of low pressure, broad north-west and easterly winds were dominant, contributing to wetter than normal conditions observed. Generally *above average to well above average* rainfall was recorded during the month. There were two (2) episodes of flash flooding recorded during the month.

Overall, out of the 24 rainfall monitoring stations that reported in, in time for the compilation of bulletin, 7 stations recorded *below average* rainfall, 4 *average*, 7 *above average*, and 6 recorded *well above average* rainfall (Table 2, Figures 1-5).

The highest monthly rainfall of 754.5mm was observed at Nadarivatu, followed by Penang Mill with 509.6mm, Ono-i-Lau with 506.2mm, Rarawai Mill with 500.8mm, Yaqara with 475.5mm, Monasavu with 470.9mm, Sigatoka with 470.5mm, Tavua with 453.5mm, Lomaivuna with

426.0mm, Nacocolevu with 424.8mm and Keiyasi with 419.0mm.

On temperatures, the highest day-time temperature of 37.2°C was recorded at Yasawa-i-Rara on the 4th, followed by RKS Lodoni with 36.0°C on the 2nd, Keiyasi with 35.5°C on the 20th and Korolevu with 35.4°C on the 21st.

The coolest night-time temperature of 14.3°C was recorded at Nadarivatu on the 17th, followed by Monasavu with 16.8°C on the 18th, Keiyasi with 19.0°C on the 16th and Labasa Airport with 19.5°C on the 10th.

South-easterly winds were dominant at Nadi Airport while north-westerly winds were the most observed winds at Nausori Airport during December (Figure 8).

Warmer than normal sea surface temperature anomalies were observed across most of the Fiji Group during the month (Figure 9).

2. WEATHER PATTERNS

The weather in December was mostly influenced by troughs of low pressure, broad northwest and easterly winds.

A moist northerly wind flow prevailed over the country on the 1st day of the month bringing some showers over the interior and northern parts of the larger islands. Some showers continued to prevail over the interior and northern parts of the larger islands. Winds became predominantly southerly thereafter and became southeast on 5th bringing some showers over the interior and eastern parts of the larger islands. A trough of low pressure affected the southern parts of the country from the south on the 6th and gradually spread to the rest of Fiji till the 7th with occasional showers over most places. Another trough of low pressure affected the country from the southwest of Fiji on the 8th moving over the country till the 10th with occasional rain and isolated heavy falls over northern and eastern parts of Fiji.

TD01F also developed over southern Lau waters on the 10th and later dissipated to the south on the same day. The associated trough of low pressure brought occasional rain over most places on the 11th and 12th with isolated thunderstorms with heavy falls. Rain cleared from the west mid-morning on the 13th and clearing the rest of the country by the afternoon with fine weather.

A south to southwest wind flow prevailed over the country on the 14th with isolated showers experienced over the interior and southern parts of the larger islands with fine weather prevailing elsewhere. A southeast wind flow prevailed over Fiji from the 15th till the 19th with mostly fine weather across the country apart from brief showers over the interior and eastern parts of the larger islands. Winds turned easterly on 20th and became predominantly northeast on 21st and 22nd resulting in some showers over the interior and eastern parts of the larger islands. Active rain bands from a trough of low pressure to the west of Fiji affected the country from the west on the 23rd with occasional rain over most places with isolated heavy falls till the 25th. A moist north to northeast wind flow prevailed over Fiji on the 26th and 27th bringing some showers over the interior and eastern parts of the larger islands. Active rain bands from a trough of low pressure to the west of Fiji accompanied by the moist northwest winds affected the country from the west on the 28th till the 31st with occasional rain over most places with isolated heavy falls mostly over the Western Division. The weather for Rotuma was affected by a series of troughs of low pressure which brought occasional showers and few thunderstorms. The southeast trades and moist easterlies also dominated the island.

3. RAINFALL

Typical wet season rainfall continued to be experienced at most parts of the country during the month. There were generally *above average* to *well above average* rainfall recorded across the country. The exceptions were at Navua, Nausori Airport, Koronivia, Udu Point, Matei Airfield, Lakeba and Rotuma which recorded *below average* rainfall. On the other hand, Viwa, Nacocolevu, Tavua, Yaqara, Matuku and Ono-i-Lau recorded twice their normal monthly rainfall.

Overall, out of the 24 rainfall monitoring stations that recorded in, in time for the compilation of bulletin, 7 recorded *below average* rainfall, 4 *average*, 7 *above average*, and 6 recorded *well above average* rainfall (Table 2, Figures 1-5).

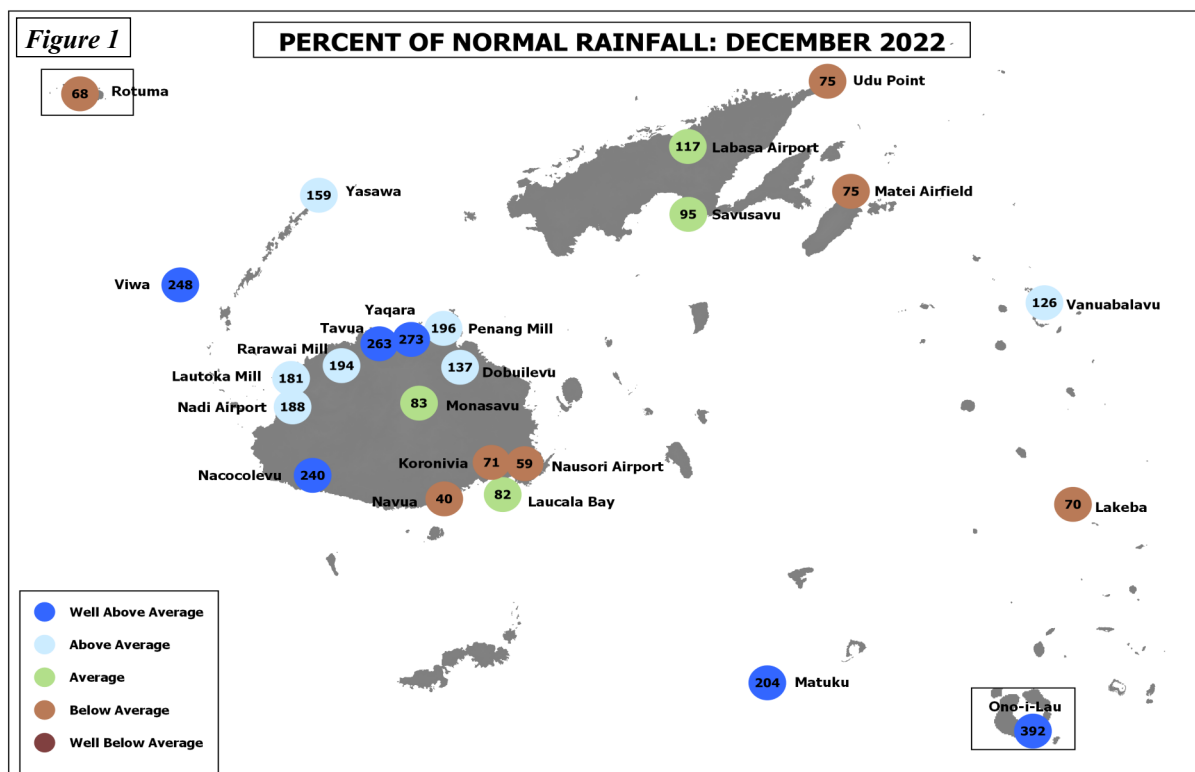
The highest monthly rainfall of 754.5mm was observed at Nadarivatu, followed by Penang Mill with 509.6mm, Ono-i-Lau with 506.2mm, Rarawai Mill with 500.8mm, Yaqara with 475.5mm, Monasavu with 470.9mm, Sigatoka with 470.5mm, Tavua with 453.5mm, Lomaivuna with 426.0mm, Nacocolevu with 424.8mm and Keiyasi with 419.0mm. On the other hand, Saqani recorded the month's lowest total monthly rainfall of 63.5mm, followed by Navua with 139.0mm, Lakeba with 141.7mm, Nausori Airport with 157.7mm, Koronivia with 181.8mm, Savusavu Airfield with 198.9mm, Rotuma with 206.9mm, Korolevu with 218.5mm and Matei Airfield with 221.1mm (Table 2).

A trough of low pressure brought occasional rain and isolated thunderstorms with heavy falls from the 11th to 13th, which resulted in Ono-i-Lau recording its highest 24-hour rainfall of 131.9mm on the 11th, Rarawai Mill, Nadarivatu and Toge recording 120.0mm, 130.5mm and 165.5mm on the 12th, respectively. During this period, flash floods occurred along the Sigatoka to Rakiraki corridor low-lying and flood prone areas.

Active rain bands from a trough of low pressure to the west of Fiji accompanied by moist northwesterly winds affected the country from 28th till the 31st, which resulted in significant 24-hour rainfall of 131.5mm at Tavua, 110.5mm at Lautoka Mill, 101.5mm at Rarawai Mill and 101.0mm at Nadarivatu, all on the 29th. This led to flash flooding across the Western Division.

Nadarivatu recorded the highest number of rain days (rainfall ≥ 0.1 mm) with 27 days, followed by Yasawa-i-Rara, Labasa Airport and Monasavu, with 25 days, Keiyasi, Korolevu and Wainikoro, with 24 days, Nacocolevu and Matuku both with 23 days. Consequently, Lautoka Mill recorded the least number of rain days with 13 days, followed by Momi with 14 days, Saqani with 16 days and Udu Point with 17 days.

Tavua TB3 rain gauge recorded its highest December total monthly rainfall since observations began in 2009.



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

Above normal day-time air temperatures were observed at most parts of the country during the month. Out of the 22 climate stations that reported in time for the analysis of data, 16 recorded anomalies at around $\geq +0.5^{\circ}\text{C}$ and 6 with anomaly within $\pm 0.5^{\circ}\text{C}$.

The warmest days on average were recorded at Viwa with 34.7°C , followed by RKS Lodonu with 33.9°C , Yasawa-i-Rara with 33.0°C , Korolevu with 32.8°C , Keiyasi with 32.7°C , Saqani with 32.6°C , Labasa Airport with 32.5°C and Savusavu Airfield with 32.1°C . Consequently, Nadarivatu recorded the coolest days on average with 25.6°C , followed by Monasavu with 26.3°C , Matuku with 30.3°C , Vaturekuka (Labasa) with 30.8°C , Ono-i-Lau with 30.9°C , and Nacocolevu with 31.0°C .

Warm and humid temperatures were experienced during the first week of the month. The highest day-time temperature observed during the month was recorded at Yasawa-i-Rara with 37.2°C on the 4th, followed by RKS Lodonu with 36.0°C on the 2nd, Keiyasi with 35.5°C on the 20th, Korolevu with 35.4°C on the 21st, Sigatoka with 34.8°C on the 2nd, Ono-i-Lau with 34.5°C on the 27th, Vunisea with 34.4°C on the 21st and Navua with 34.3°C on the 21st. On the other hand, the coolest day-time temperature of 21.9°C was observed at Nadarivatu on the 31st, followed by Monasavu with 22.1°C on the 18th, Ono-i-Lau with 25.7°C on the 11th, Keiyasi with 25.9°C on the 31st, Sigatoka with 26.0°C on the 31st and Nacocolevu with 26.9°C on the 11th.

Savusavu Airfield recorded its highest December monthly average day time temperature since observations began in 1956 (Table 1).

B. Minimum Night-time Air Temperatures

Near normal to above normal night-time temperatures were recorded over most parts of the country during the month. Of the 21 stations, 5 recorded anomalies $\geq +0.5^{\circ}\text{C}$, 8 within $\pm 0.5^{\circ}\text{C}$, and 8 with anomaly $\leq -0.5^{\circ}\text{C}$.

The coolest days on average was at Nadarivatu with 18.0°C , followed by Monasavu with 19.0°C , Vaturekuka (Labasa) with 22.0°C , Keiyasi and Wainikoro both with 22.1°C , Navua with 22.3°C , Labasa Airport, Savusavu Airfield, Lakeba and Sigatoka all with 22.5°C . Consequently, on average, the warmest night-time temperatures were observed at Viwa with 25.6°C , followed by Lomaivuna with 25.1°C , RKS Lodonu with 25.0°C , Ono-i-Lau and Lautoka Mill both with 24.4°C and Saqani and Laucala Bay (Suva) both with 24.3°C .

On daily temperatures, there were couple of days at Nadarivatu that temperatures went below 17.0°C , with the lowest of 14.3°C recorded on the 17th. Monasavu followed with 16.8°C on the 18th, Keiyasi with 19.0°C on the 16th, Labasa Airport with 19.5°C on the 10th, Nacocolevu and Sigatoka both with 19.7°C on the 11th and 16th, respectively and Navua with 19.9°C on the 17th. On the other hand, the warmest night-time temperature of 30.5°C was recorded at Lomaivuna on the 19th, followed by Vunisea with 27.3°C , on the 4th, Ono-i-Lau and RKS Lodonu both with 26.8°C on the 27th, and 26th, respectively, Levuka with 26.3°C on the 21st, Viwa with 26.2°C on the 5th, Rotuma with 26.1°C on the 20th and Udu Point with 25.7°C on the 6th.

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

TABLE 1. CLIMATE RECORDS ESTABLISHED IN DECEMBER 2022

<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>
Monthly Rainfall	Tavua	453.5mm	-	New High	334.0mm	2016	2009
Monthly Average Max Temperature	Savusavu Airfield	32.1°C	-	New High	31.4°C	1998	1956

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 2022

	RAINFALL					AIR TEMPERATURES								SUNSHINE	
	TOTAL	RAIN	MAX.	FALL		AVERAGE DAILY				EXTREME				TOTAL	*
	MM	%	DAYS			MM	ON	MAX.	#	MIN.	#	MAX.	ON	MIN.	
NADI AIRPORT	390.5	188	19	92	31	31.8	0.4	23.1	0.4	33.8	22	20.2	12	204	93
LAUCALA BAY	221.3	82	18	60	29	31.7	1.2	24.3	0.3	33.5	19	22.5	11	153	82
NACOCOLEVU RESEARCH	424.8	240	23	63	29	31.0	-0.3	22.6	0.7	34.0	2	19.7	11	202	110
ROTUMA ISLAND	206.9	68	20	44	12	31.3	1.0	23.6	-1.1	32.1	20	21.8	23		
VIWA (AWS)	363.5	248	19	64	10	34.7	1.4	25.6	0.6	34.0	5	22.2	23		
YASAWA-I-RARA	227.7	159	25	35	23	33.0	2.1	22.8	-1.6	37.2	4	20.0	23		
UDU POINT	237.9	75	17	50	23	31.1	0.4	23.2	-1.1	32.2	6	21.0	9		
NABOUWALU	STATION TEMPORARILY CLOSED														
LABASA AIRFIELD	296.8	117	25	45	27	32.5	0.8	22.5	0.3	34.0	20	19.5	10		
SAVUSAVU AIRFIELD	198.9	95	21	54	12	32.1	2.0	22.5	-0.8	34.0	8	21.5	13		
KORONIVIA RESEARCH	181.8	71	21	36	9	31.7	1.7	22.9	0.2	33.8	2	20.0	12		
NAUSORI AIRPORT	157.7	59	21	21	29	31.8	2.0	23.2	0.3	33.1	6	20.0	31		
NAVUA (AWS)	139.0	40	18	29	5	31.6	1.9	22.3	0.5	34.3	21	19.9	17		
MONASAVU HYDRO DAM	470.9	83	25	61	12	26.3	1.4	19.0	0.4	28.3	8	16.8	18		
FSC LAUTOKA MILL	362.6	181	13	111	29	31.8	0.5	24.4	1.0	33.1	26	20.5	31		
FSC RARAWAI MILL	500.8	194	21	120	12	31.9	-0.5	U/S		33.4	20	U/S			
FSC PENANG MILL	509.6	196	18	134	14	31.9	1.1	22.6	-1.0	33.2	5	20.5	31		
MATEI AIRFIELD	221.1	75	20	40	23	31.1	1.4	22.8	-1.1	32.4	31	20.9	13		
VANUABALAVU	233.7	126	19	82	9	31.4	1.7	22.6	-1.7	32.7	5	21.0	10		
LAKEBA	141.7	70	19	36	13	31.3	1.5	22.5	-1.3	33.0	19	20.0	10		
VUNISEA	U/S					32.0	2.6	23.9	0.7	34.4	21	21.0	17		
MATUKU	291.8	204	23	63	11	30.3	0.5	24.2	0.2	31.5	21	22.5	30		
ONO-I-LAU	506.2	392	22	132	11	30.9	1.8	24.4	0.8	34.5	27	21.0	11		
YAQARA AWS	475.5	273	21	89	29	31.5		22.9		33.5	5	21.1	14		
LEVUKA AWS	338.5		20	67	10	31.6		24.2		34.2	27	21.9	24		
KEIYASI AWS	419.0		24	73	5	32.7		22.1		35.5	20	19.0	16		
LOMAIVUNA AWS	426.0		22	88	8	U/S		25.1		U/S		20.7	6		
NADARIVATU AWS	754.5		27	131	12	25.6		18.0		29.0	7	14.3	17		
RKS LODONI AWS	222.5		22	47	12	33.9		25.0		36.0	2	23.2	16		
MOMI AWS	349.5		14	77	12	31.4		23.8		33.3	5	21.0	13		
SIGATOKA AWS	470.5		21	69	29	31.3		22.5		34.8	2	19.7	16		
VATUREKUKA AWS	296.0		19	58	27	30.8		22.0		33.0	5	20.3	4		
KOROLEVU AWS	218.5		24	33	29	32.8		22.6		35.4	21	20.1	16		
WAINIKORO AWS	244.0		24	36	23	32.0		22.1		33.5	14	20.1	4		
SAQANI AWS	63.5		16	13	10	32.6		24.3		34.2	7	22.5	24		
SEAQAQA TB3	U/S														
DOBUILEVU TB3	356.5	137	20	62	7										
NASINU TB3	255.0		19	46	27										
TAVUA TB3	453.5	263	18	99	30										

	TEMPERATURE(C)				HUMIDITY		WIND
	MEAN	DRY	WET	RH%	VP	KT	
		(AVERAGE		AT	9AM)		
NADI AIRPORT	27.5	28.2	24.7	75	28.5	5.4	
LAUCALA BAY	28.0	28.9	25.5	76	30.3		
NACOCOLEVU RESEARC	26.8	28.9	26.0	80	31.9		
ROTUMA ISLAND	27.5	29.5	26.1	77	31.8		
VIWA AWS	30.2						
YASAWA-I-RARA	27.9	29.0	26.3	81	32.5		
UDU POINT	27.2	29.2	25.8	76	30.8		
NABOUWALU	MISSING OBSERVATIONS						
LABASA AIRFIELD	27.5	29.5	25.6	73	30.1		
SAVUSAVU AIRFIELD	27.3	29.2	25.8	77	31.2		
KORONIVIA RESEARCH	27.3	28.4	25.5	80	31.0		
NAUSORI AIRPORT	27.5	28.3	25.3	78	34.1	4.3	
NAVUA (AWS)	27.0						
MONASAVU HYDRO DAM	22.7	23.7	23.3	97	28.5		
FSC LAUTOKA MILL	27.1	28.7	25.5	78	30.7		
FSC RARAWAI MILL	U/S	28.7	24.9	74	29.2		
FSC PENANG MILL	27.3	28.5	25.3	78	30.4		
MATEI AIRFIELD	27.0	28.9	25.7	79	31.5		
VANUABALAVU	27.0	28.9	25.7	78	31.1		
LAKEBA	26.9	29.2	25.7	78	31.6		
VUNISEA	28.0						
MATUKU	27.3	28.3	25.2	78	30.0		
ONO-I-LAU	27.7	29.0	26.1	80	32.1		

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 2021 - December 2022)

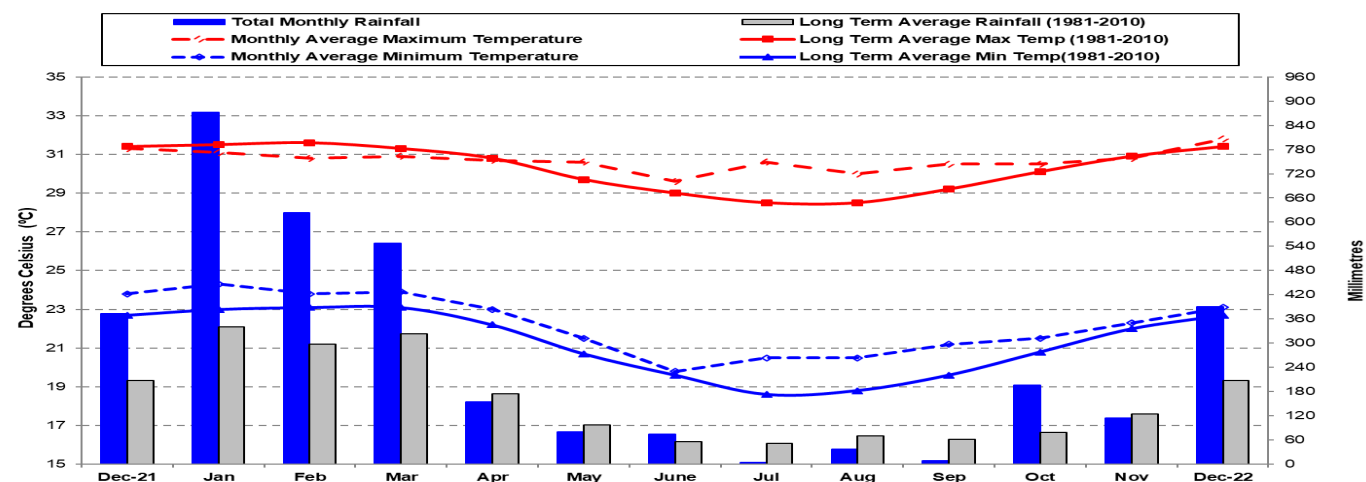


Figure 3

Laucala Bay - (Suva) (Central Division) - Temperature & Rainfall Records for the last 13 Months
(December 2021 - December 2022)

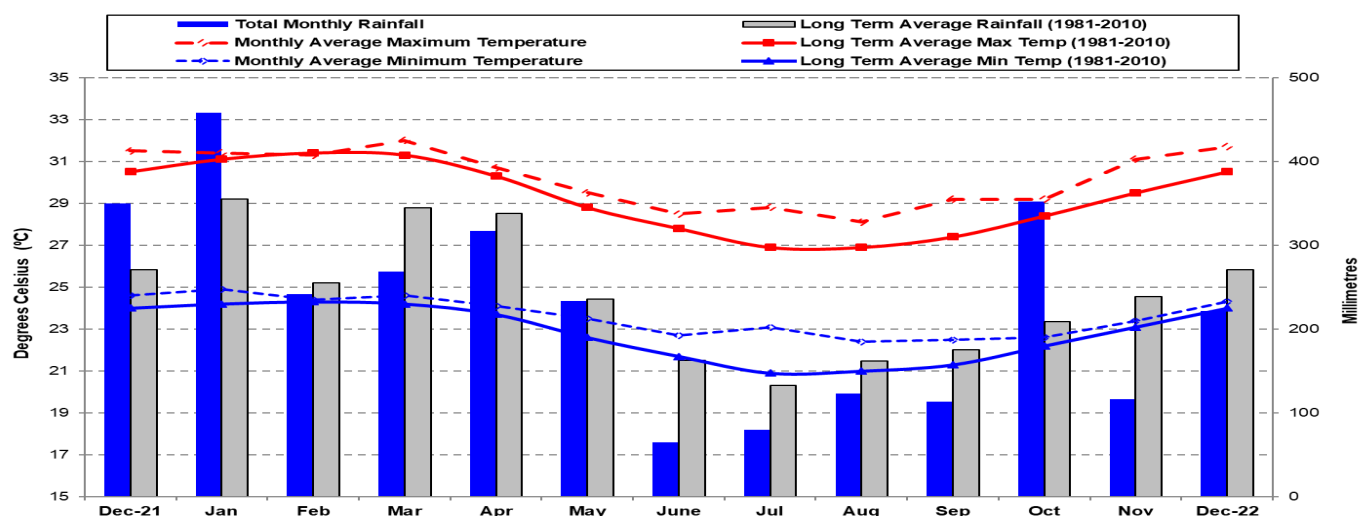


Figure 4

Udu Point (Eastern Division) - Temperature & Rainfall Records for the last 13 Months
(December 2021 - December 2022)

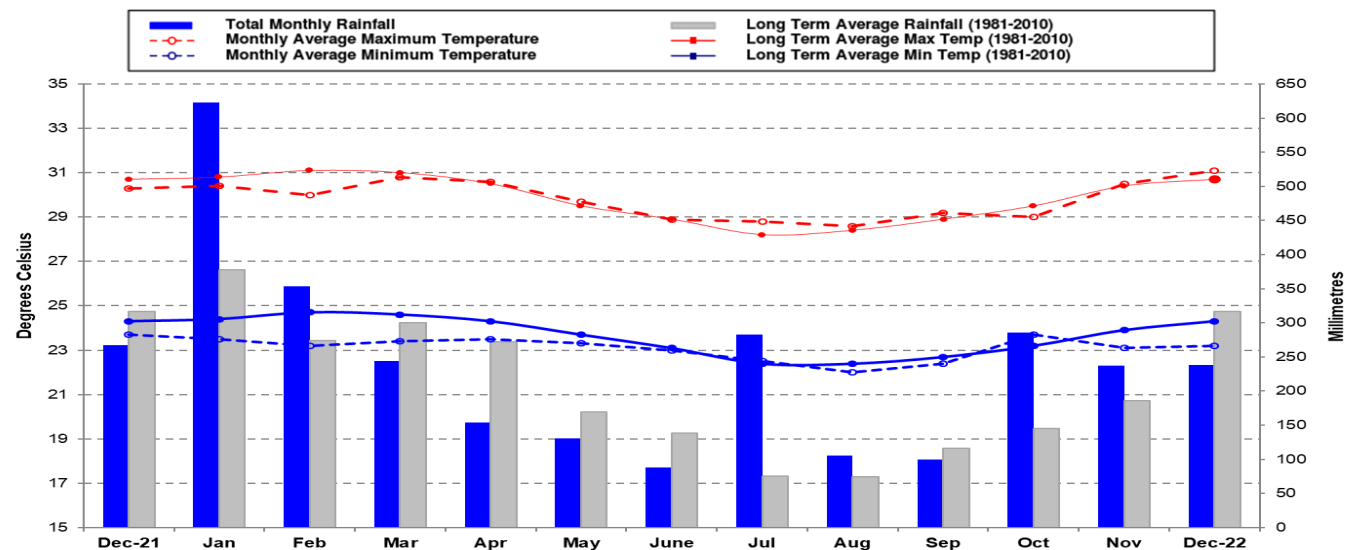
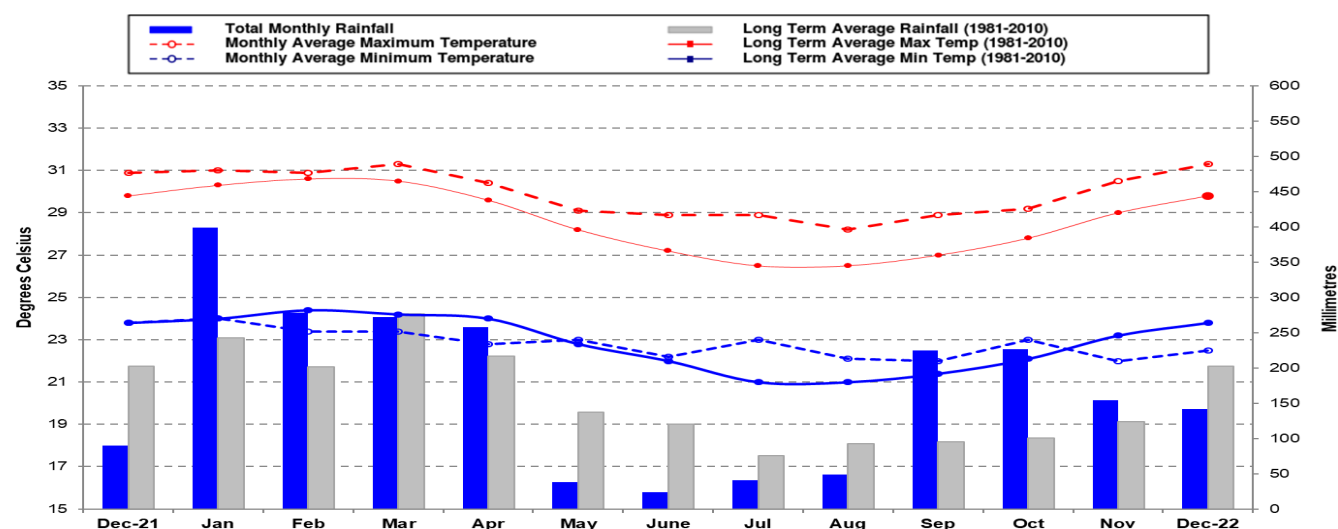


Figure 5

Lakeba (Eastern Division) - Temperature & Rainfall Records for the last 13 Months
(December 2021 - December 2022)



5. DAILY RAISED PAN EVAPORATION

Figure 6

Daily Evaporation for December 2022

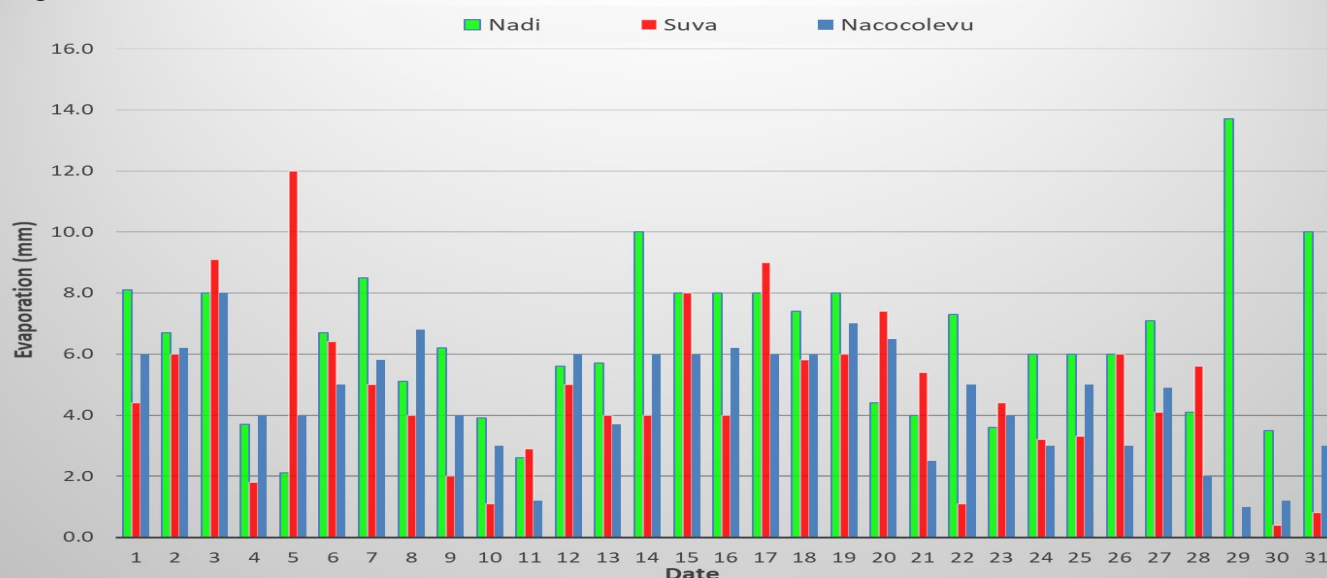


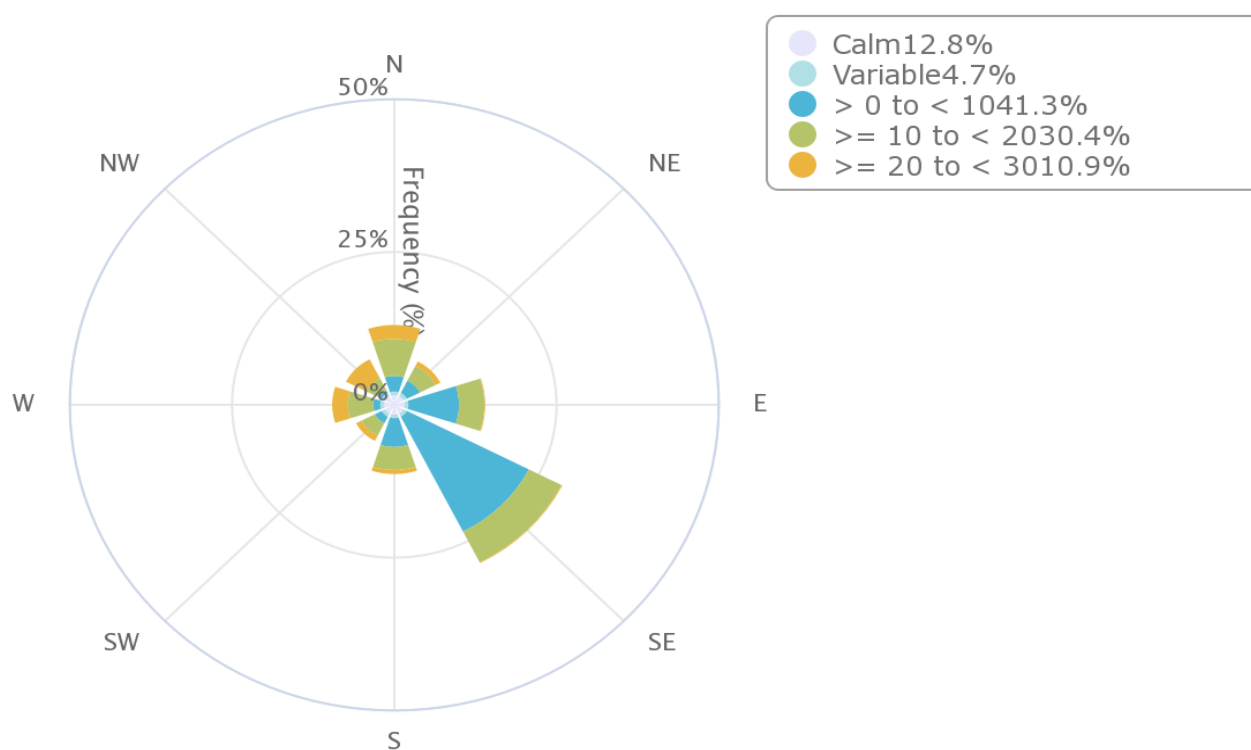
Figure 6: The total monthly raised pan evaporation at Nadi Airport, Laucala Bay (Suva) and Nacocolevu (Sigatoka) were 198.0mm, 142.2mm and 142.0, respectively. Nadi's highest daily evaporation was 13.7mm on the 29th, with Suva's highest daily evaporation of 12.0mm on 5th and Nacocolevu (Sigatoka) recorded its highest of 8.0mm on the 3rd.

6. SOLAR RADIATION

The Nadi solar radiation instrument became unserviceable during the month of December 2022.

7. WIND SUMMARY

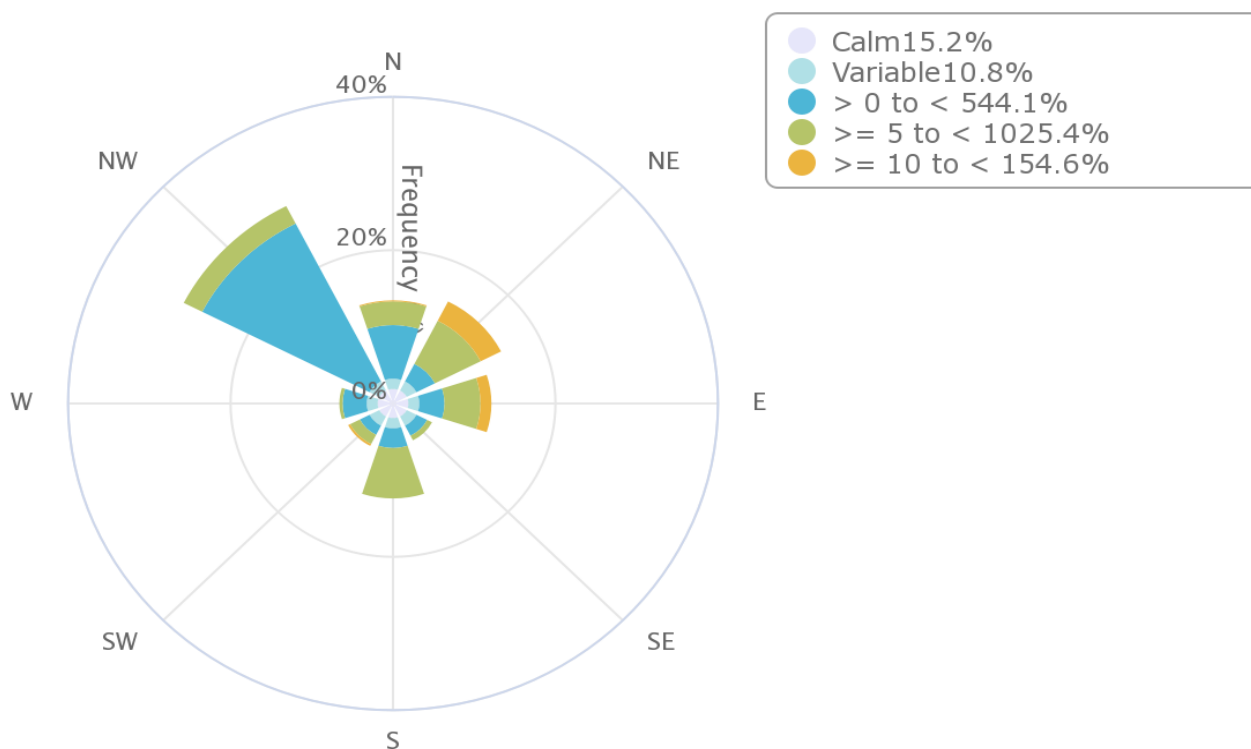
December



Highcharts.com

Figure 8a: Southeasterly winds were most dominant at Nadi Airport during the month, followed by easterly and northerly winds.

December



Highcharts.com

Figure 8b: Northwesterly winds were dominant at Nausori Airport, followed by northeasterly, then northerly winds.

8. SEA SURFACE TEMPERATURE (SST)

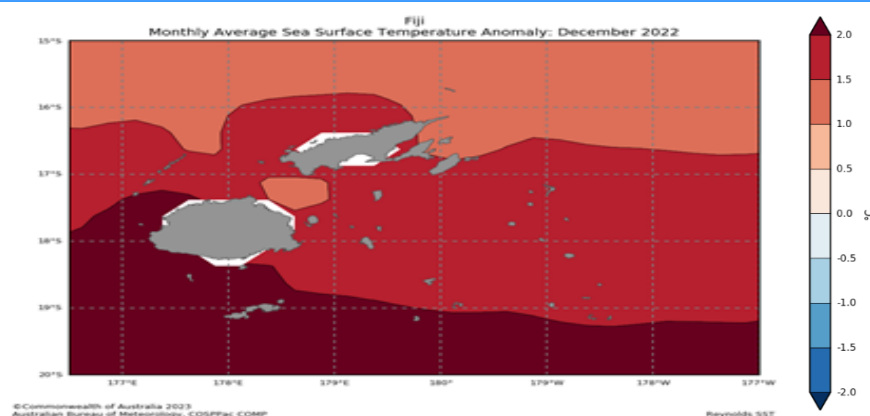


Figure 9:

Warmer than normal sea surface temperature anomalies were observed across most of the Fiji Waters, especially around Beqa, Vatulele, Kadavu and west of Viti Levu, extending to the Mamanuca Group.

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

9. CLOUD COVER

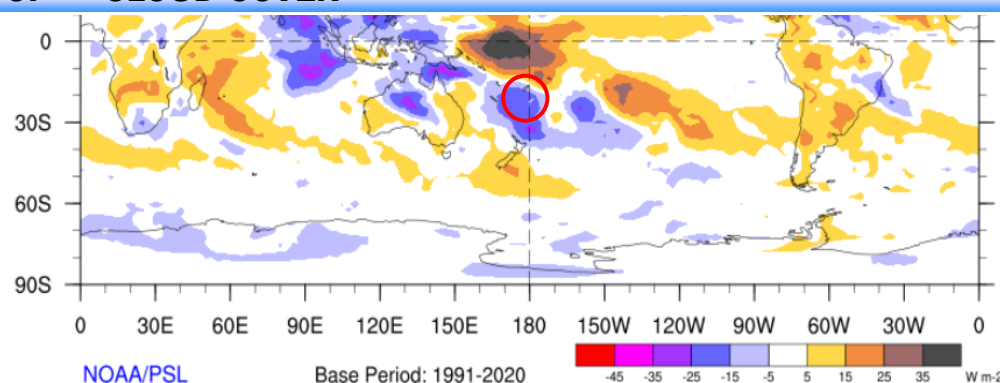


Figure 10:

Above 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

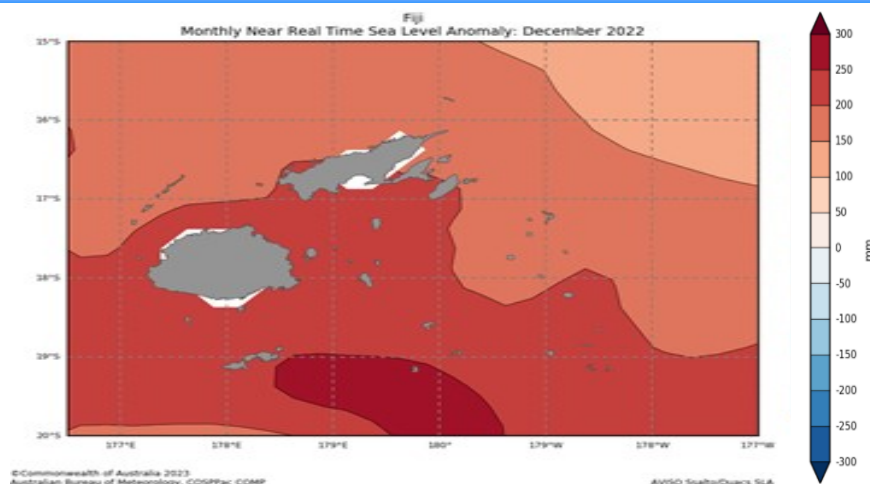


Figure 11:

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

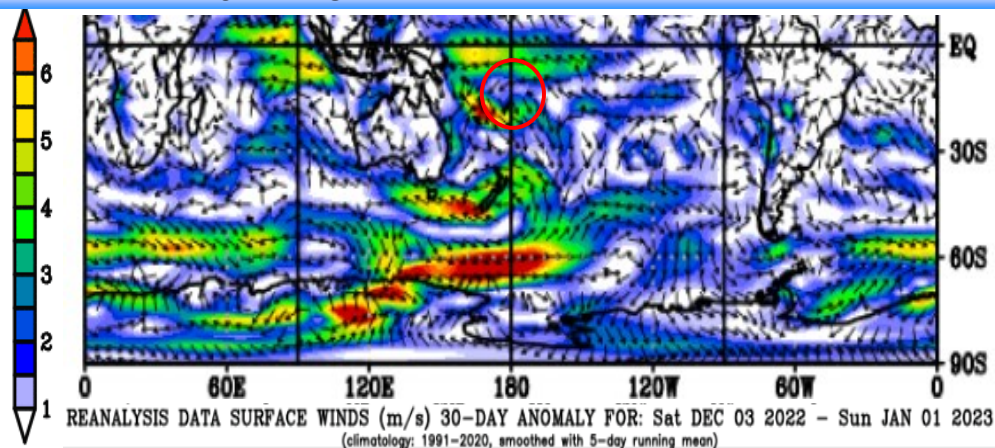


Figure 12:

Northerly wind anomalies were generally 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

Two episodes of flash flooding were recorded over the country during the month, in particular the Western Division.

The second episode of flash flooding occurred from 28th to 31st when active rain bands from a trough of low pressure to the west of Fiji, accompanied by moist northwesterly winds affected the country. Localized heavy falls led to flash flooding in the Western Division, especially Ba, Sigatoka, Lautoka and Nadi areas on the 30th and 31st.

Over a 72-hour period, from 9am on the 29th December 2022 until 9am on the 1st January 2023, Toge recorded 245mm of rainfall, followed by Nadarivatu with 223mm, Rarawai Mill with 199mm, Nadi Airport with 197mm, Tavua with 195mm, Lautoka Mill with 179mm and Yaqara with 169mm (Figure 15).

In Nadi, Legalega, Nadi town, and parts of Korovuto were inundated with flash floods, while in Ba some of the Irish crossings and areas around Ba market were flooded on the 30th and 31st.

There was a reported drowning victim when a 6 year old boy drowned while trying to cross a flooded culvert at Togomasi in Nadi on the 31st



Figure 13: Marinitawa Crossing in Ba on 30th December, 2022. Source: Fiji Roads Authority



Figure 14: Rising flood waters at the Navo Bridge in Nadi on 31st December, 2022. Source: fijivillage.

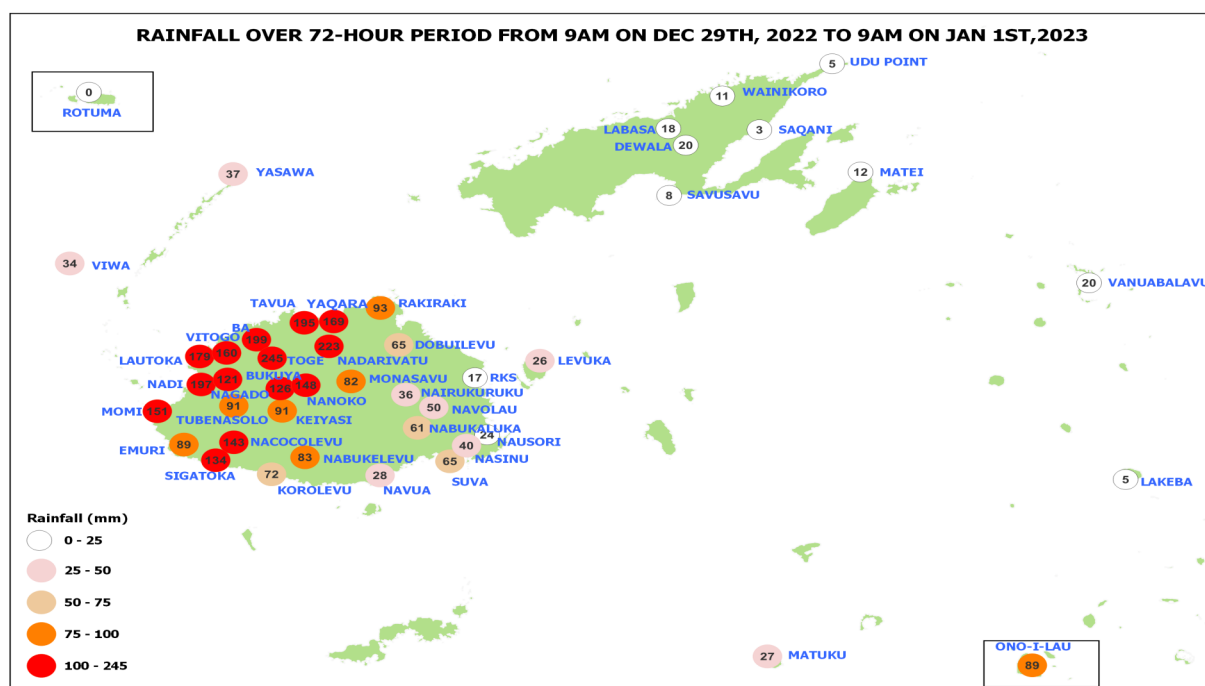


Figure 15: Rainfall across the country over 72-hour period from 29th December, 2022 to 1st January, 2023.