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Fiji Climate Summary

December 2018



**ISO 9001:2015
certified Climate
Services**

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1. IN BRIEF

While the status of the El Niño Southern Oscillation was neutral during December 2018, conditions in the tropical Pacific Ocean was leaning towards an El Niño.

Rainfall during the month varied significantly across the country ranging from *well below average* to *well above average*. Out of the 25 stations, 3 recorded *well below average*, 9 *below average*, 5 *average*, 6 *above average* and 2 *well above average*.

Majority of the Western Division, parts of the Northern Division and Southern Lau Group experienced drier than *normal* conditions. In contrast, Central Division recorded significantly wet conditions.

A record high 24-hour rainfall for December was registered at Vanuabalavu during the month.

Both the mean monthly maximum and mean monthly minimum air temperatures were *normal* to *above normal* in most parts of the country.

Significantly hot condition was experienced in parts of Fiji on the Christmas Day, especially in the Western Division. The highest daily maximum air temperature was recorded at Rarawai Mill with 36.0°C, followed by Nadi Airport with 35.6°C, and Momi and Lautoka Mill with both 35.5°C. All of the above temperatures were recorded on the 25th.

A period of significantly warm night-time condition was experienced from the 23rd to the 26th. Yasawa-i-Rara recorded the highest daily minimum air temperature with 27.7°C on the 25th, followed by Lakeba with 27.5°C on the 25th and Nabouwalu with 27.4°C on the 24th.

New high mean monthly air temperature records for December were set at Viwa and Tokotoko with observations at these stations beginning in 1978 and 1992, respectively. Additionally, new high daily minimum air temperature records for December were set at Nabouwalu and Nausori Airport in 63 years of record at both stations.

2. WEATHER PATTERNS

The month of December began with easterly wind flow over Fiji as trade showers were experienced over the eastern parts of the group while a trough was located to the north of Vanua Levu.

A trough developed on the 4th to the west of Fiji and drifted over the group and affected until the 8th. Thereafter, southeast wind flow prevailed over the Fiji region.

Another trough developed to the north of Vanua Levu with an embedded low pressure near Rotuma on the 12th. The low passed close to Vanua Levu with associated trough and rain bands affecting Fiji.

The trough further intensified on the 18th and drifted south of Fiji. Meanwhile a trough lying over Rotuma established itself, drifted south and affected the northern parts of Fiji till the 21st before drifting north again.

The trough to the north, which extended towards the Solomon's, further developed with an embedded low pres-

sure system just to the south of Solomon Islands. This system further intensified to a tropical disturbance (TD03F) on the 29th. As TD03F approached the group, associated trough and rain affected parts of Fiji, especially the northern division. TD03F was further classified into a tropical depression on the 31st. TD03F affected Rotuma on 31st and produced 24-hour rainfall of 119mm.

Rotuma had 9 days with rainfall greater than 20mm due to series of troughs that affected the area.

3. RAINFALL

Rainfall during December varied significantly across the country ranging from well below average to well above average. Out of the 25 stations, 3 recorded well below average, 9 below average, 5 average, 6 above average and 2 well above average.

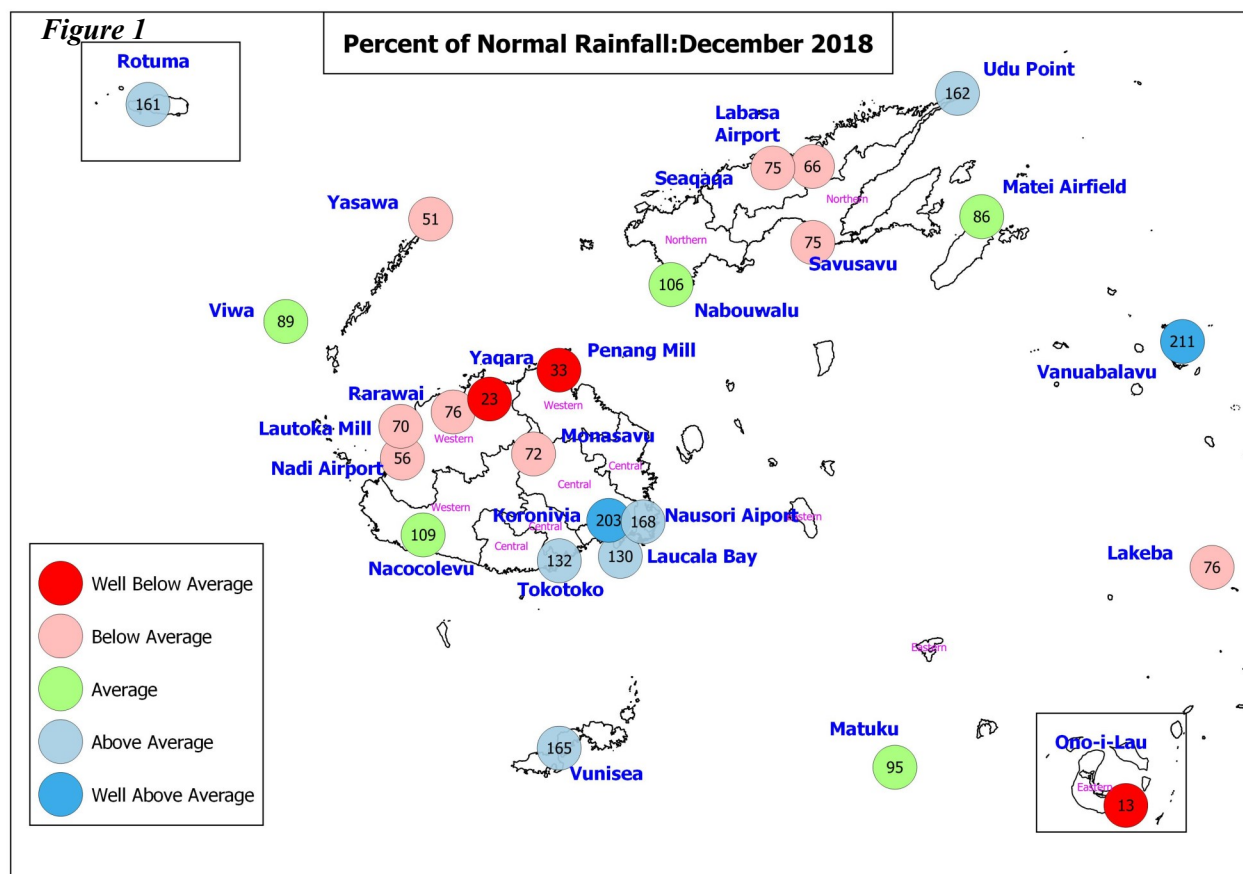
Rotuma registered the highest number of rain days ($\geq 0.1\text{mm}$) with 28 days, followed by Koronivia and Monasavu with both 27 days and Matei Arifield with 26 days. On the other hand, Yaqara recorded only 4 rain days, followed by Ono-i-Lau with 5, and Lautoka Mill and Labasa Airport with both 8.

Majority of the Western Division, parts of the Northern Division and Sothern Lau Group experienced drier than normal conditions during the month. In contrast, Central Division recorded wetter than normal conditions.

Lomaivuna recorded the highest total monthly rainfall during the month with 631mm, followed by Koronivia with 532mm and RKS with 475mm. On the other hand, the lowest total monthly rainfall was registered at Ono-i-Lau with 20mm, followed by Yaqara with 43mm and Penang Mill with 86mm.

The most significant 24-hour rainfall was recorded at RKS with 134mm on the 3rd, followed by Lomaivuna with 130mm on the 28th and Rotuma with 119mm on the 31st.

A record high 24-hour rainfall for December was registered at Vanuabalavu (Table 1).



Normal: Long term average from 1971 to 2000
Well Below Average: Rainfall less than 40% of normal
Below Average: Rainfall between 40 to 79%
Rain Day: Rainfall $\geq 0.1\text{mm}$

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 Daytime Air Temperatures

The mean monthly maximum air temperatures were generally *normal* to *above normal* during the month with 13 out of the 23 stations registering anomalies $\geq 0.5^{\circ}\text{C}$, 8 within $\pm 0.5^{\circ}\text{C}$, while Rotuma and Udu Point were the only two stations that recorded departures $\leq -0.5^{\circ}\text{C}$ (Table 2 & Figures 2-5).

The warmest day-time temperatures on average was at Rarawai Mill with 33.0°C , followed by Viwa and Yasawa-i-Rara with both 33.0°C . On the other hand, the coolest day-time temperatures on average was at Monasavu with 25.3°C , followed by Nadarivatu with 26.5°C and Ono-i-Lau with 29.5°C .

Most of the stations recorded their highest daily maximum temperature during the first and the last weeks of the month (table 2). The highest daily maximum air temperature was recorded at Rarawai Mill with 36.0°C , followed by Nadi Airport with 35.6°C , and Momi and Lautoka Mill with both 35.5°C . All of the above temperatures were recorded on the 25th. On the other hand, the lowest daily maximum air temperature was recorded at Monasavu with 21.3°C on the 30th, followed by Nadarivatu with 22.3°C on the 30th and Udu Point with 26.7°C on the 13th.

New high mean monthly air temperature records for December were set at Viwa and Tokotoko with observations at these stations beginning in 1978 and 1992, respectively (Table 1).

B. Minimum Night-time Air Temperatures

Generally *normal* to *above normal* night-time temperatures were recorded during the month. Out of the 23 stations, 11 registered anomalies $\geq +0.5^{\circ}\text{C}$, 8 within $\pm 0.5^{\circ}\text{C}$ and 4 $\leq -0.5^{\circ}\text{C}$ (Table 2 & Figures 2-5).

The coolest nights on average during the month was at Nadarivatu with 18.8°C , followed by Monasavu with 19.4°C , and Koronivia with 20.7°C . On the other hand, Yasawa-i-Rara recorded warmest nights on average with 25.6°C , followed by Nabouwalu with 24.9°C and Yaqara with 24.7°C .

Majority of the stations recorded their coolest night of the month between the period 8th to the 12th. Nadarivatu recorded the lowest daily night-time temperature with 14.2°C on the 12th, followed by Monasavu with 16.0°C on the 10th and Koronivia with 17.1°C on the 10th. On the other hand, most of the stations registered their highest night-time temperature for the month during the period 23rd to the 26th. Yasawa-i-Rara recorded the highest daily minimum air temperature with 27.7°C on the 25th, followed by Lakeba with 27.5°C on the 25th and Nabouwalu with 27.4°C on the 24th.

The air temperature at Nabouwalu on the 24th was a new record high minimum temperature for December at the station since observations began in 1956. Additionally, a new record high daily minimum air temperature for December was also set at Nausori Airport since observations began in 1956 (Table 1).

TABLE 1. CLIMATE RECORDS ESTABLISHED IN DECEMBER 2018

<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 Rainfall	Vanuabalavu	101.1mm	14 th	New High	100.4mm	1986	1986
Daily Minimum Temperature	Nabouwalu	27.4°C	24 th	New High	27.2°C	1998	1956
Daily Minimum Temperature	Nausori Airport	26.4°C	24 th	New High	26.1°C	1966	1956
Mean Monthly Maximum Temperature	Viwa	33.0°C	-	New High	32.9°C	1994	1978
Mean Monthly Maximum Temperature	Tokotoko	31.2°C	-	New High	31.0°C	1998	1992

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 1971-2000 period as its "climatic normal" period, unless otherwise stated.

TABLE 2. DAILY CLIMATE REPORTING SITES: SUMMARY FOR DECEMBER 2018

	RAINFALL				AIR TEMPERATURES						SUNSHINE				
	TOTAL	RAIN	MAX.	FALL	AVERAGE DAILY			EXTREME			TOTAL	*			
	MM	%	+		MAX.	#	MIN.	#	MAX.	MIN.	HRS	%			
NADI AIRPORT	100	56	13	31	28	31.8	0.3	23.5	1.1	35.6	25	20.9	10	221	97
SUVA/LAUCALA BAY	361	130	21	72	19	30.5	0.2	24.3	0.8	32.5	1	22.4	16	159	82
NACOCOLEVU	196	109	18	43	7	32.3	1.4	22.0	0.4	35.0	23	18.0	11	192	105
ROTUMA	460	161	28	119	31	30.1	-0.6	24.3	-0.4	31.5	18	23.0	11	108	59
VIWA	128	89	10	53	7	33.0	2.1	24.3	-0.7	34.7	25	21.5	8		
UDU POINT	425	162	25	112	31	29.9	-0.6	24.6	0.5	31.9	26	21.9	10		
SAVUSAVU AIRFIELD	194	75	14	72	3	30.0	-0.2	23.9	0.9	31.5	2	22.5	12		
LABASA AIRFIELD	159	66	8	35	8	32.2	0.5	21.4	-0.3	34.0	6	20.0	6		
NABOUWALU	271	106	22	49	31	30.6	1.0	24.9	0.9	32.9	3	22.8	5		
KORONIVIA	532	203	27	80	15	30.4	0.6	20.7	-1.7	32.9	2	17.1	10		
NAUSORI AIRPORT	450	168	20	59	15	30.2	0.5	23.4	0.8	32.2	2	18.9	10		
NAVUA/TOKOTOKO	460	132	23	87	6	31.2	0.9	U/S		34.7	24	U/S			
MONASAVU	388	72	27	39	15	25.3	0.3	19.4	0.9	28.5	18	16.0	10		
LAUTOKA AES	136	70	8	82	28	32.0	1.0	22.6	-0.7	35.5	25	20.5	11		
BA/RARAWAI MILL	172	76	9	77	20	33.1	0.8	22.1	0.4	36.0	25	18.0	9		
PENANG MILL	86	33	15	19	14	31.7	1.4	23.9	0.4	33.4	3	20.0	20		
MATEI AIRFIELD	256	86	26	37	28	30.0	0.4	24.4	1.5	31.6	19	22.4	11		
VANUABALAVU	390	211	20	101	14	29.6	-0.1	22.7	-1.7	32.4	2	20.5	9		
LAKEBA	136	76	20	27	29	30.4	0.7	24.4	0.7	32.6	2	19.8	12		
YASAWA	127	51	10	56	7	33.0	3.2	25.6	1.8	35.2	21	22.1	8		
VUNISEA	304	165	20	63	4	29.7	0.3	24.1	1.2	32.0	2	21.9	14		
MATUKU	147	95	15	67	7	29.6	-0.1	24.0	0.2	32.6	18	21.0	1		
ONO-I-LAU	20	13	5	15	8	29.5	0.8	23.4	-0.1	32.6	18	21.1	12		
LEVUKA AWS	U/S					U/S		23.4	-0.3	U/S		21.7	11		
YAQARA AWS	43	23	4	28	8	32.9		24.7		35.2	26	22.0	17		
KEIYASI AWS	109		13	45	15	32.7		21.8		35.4	1	17.2	10		
LOMAIVUNA AWS	631		23	130	28	U/S									
NADARIVATU AWS	241		15	83	8	26.5		18.8		29.0	26	14.2	12		
RKS LODONI AWS	475		19	134	3	30.7		23.0		33.4	2	20.2	10		
MOMI AWS	121		10	55	7	32.0		24.0		35.5	25	21.3	10		
KOROLEVU AWS	257		18	89	15	31.7		23.1		34.7	23	20.8	1		
KORO ISLAND AWS	U/S					30.1		24.1		32.4	2	22.3	10		
SIGATOKA AWS	134		15	44	28	30.6		22.5		33.4	2	18.7	12		
RAKIRAKI AWS	154		14	34	4	30.7		24.5		32.8	3	22.1	11		
WAINIKORO AWS	U/S														
SAQANI AWS	U/S					U/S									
VATUREKUKA AWS	U/S					U/S									
KUBULAU AWS	U/S														
SEAQAQA TB3	229	75	21	54	20										
NASINU TB3	413		18	59	3										
TAVUA TB3	U/S														

	TEMPERATURE (C)		HUMIDITY		WIND	SUN RAD	
	MEAN	DRY WET	RH%	VP		POS	%OF MJ/ SQ.M
NADI AIRPORT	27.7	29.3 24.6	67	27.2	6.5	56	19.2
SUVA/LAUCALA BAY	27.4	28.5 25.4	77	30.0		42	20\$
NACOCOLEVU	27.1	28.7 26.0	81	31.7		49	21\$
ROTUMA	27.2	27.6 25.2	81	30.2		28	17\$
VIWA	28.6	30.1 26.1	73	30.8			
UDU POINT	27.3	27.0 25.8	105	32.2			
SAVUSAVU AIRFIELD	27.0	28.4 25.6	79	30.6			
LABASA AIRFIELD	26.8	28.8 25.1	74	29.0			
NABOUWALU	27.8	28.2 25.2	82	31.7			
KORONIVIA	25.6	27.5 25.1	88	30.1			
NAUSORI AIRPORT	26.8	28.0 25.0	78	29.3	4.5		
NAVUA/TOKOTOKO	U/S	27.3					
MONASAVU	22.3	22.6 20.8	85	23.1			
LAUTOKA AES	27.3	29.9 24.3	66	27.9			
BA/RARAWAI MILL	27.6	29.6 25.4	72	29.4			
PENANG MILL	27.8	28.8 24.3	73	28.7			
MATEI AIRFIELD	27.2	27.9 25.3	81	30.3			
VANUABALAVU	26.2	27.8 24.9	79	29.4			
LAKEBA	27.4	28.5					
YASAWA	29.3	29.8					
VUNISEA	26.9	27.4 24.5	78	28.4			
MATUKU	26.8	27.4					
ONO-I-LAU	26.4	27.6 24.2	75	27.7			

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 (1971-2000). + :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 - Temperature & Rainfall for the last 13 Months
(December, 2017 - December, 2018)**

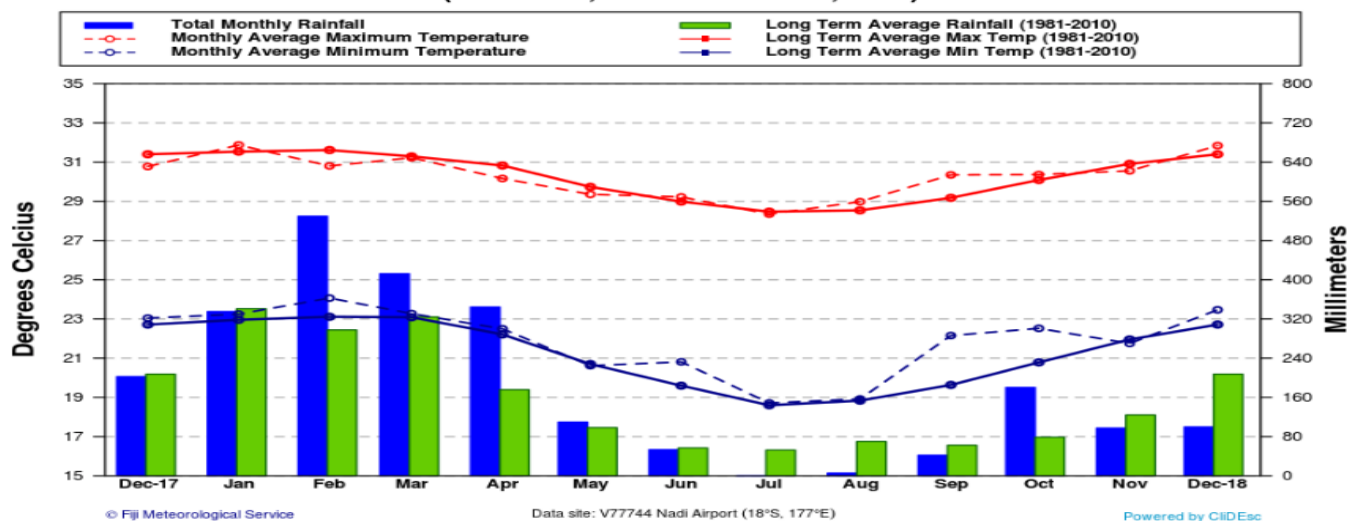


Figure 3

**Laucala Bay - Temperature & Rainfall for the last 13 Months
(December, 2017 - December, 2018)**

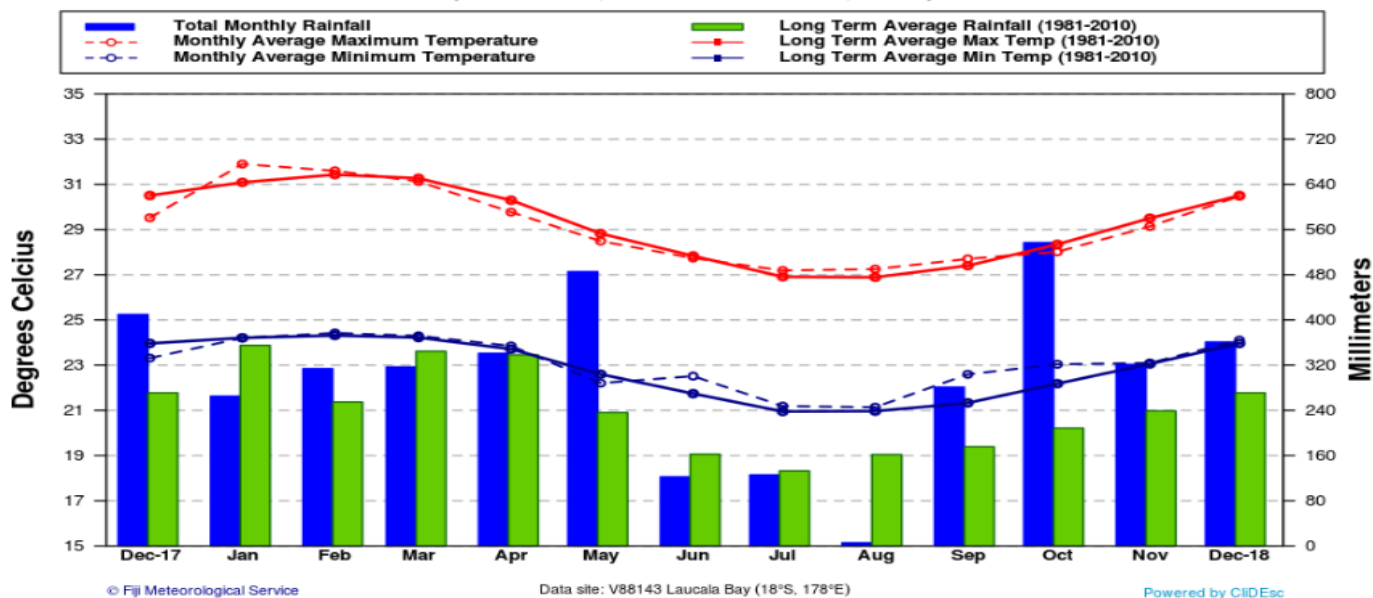


Figure 4

**Labasa Airfield - Temperature & Rainfall for the last 13 Months
(December, 2017 - December, 2018)**

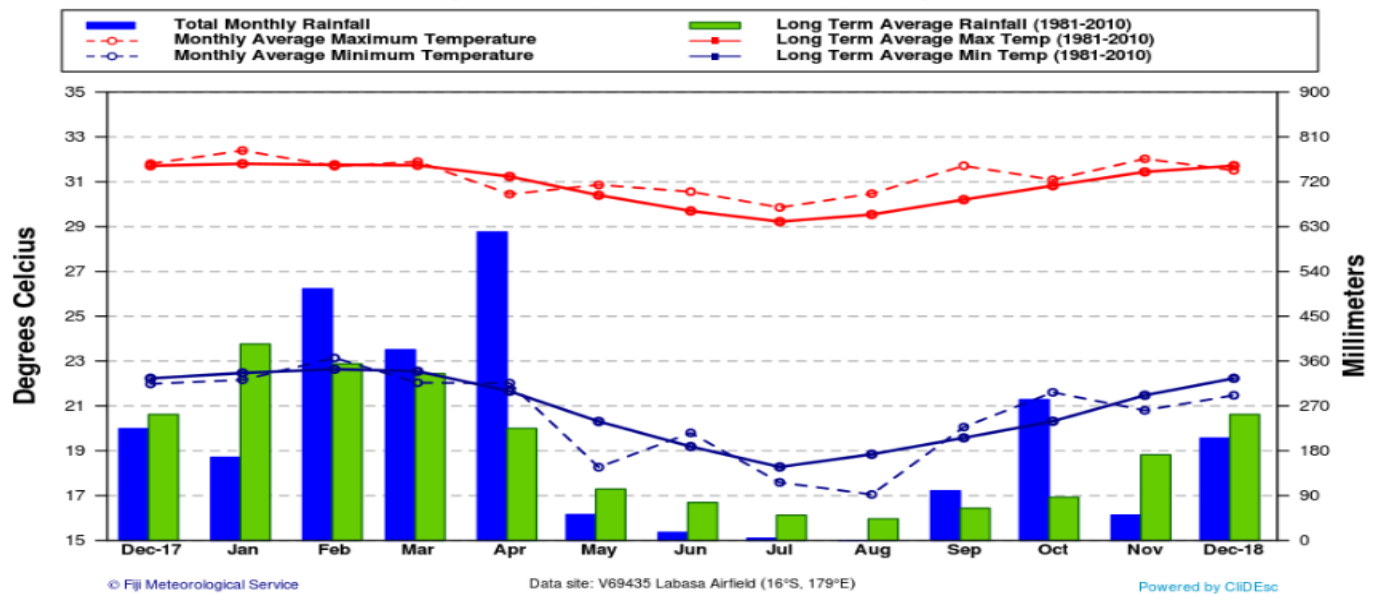
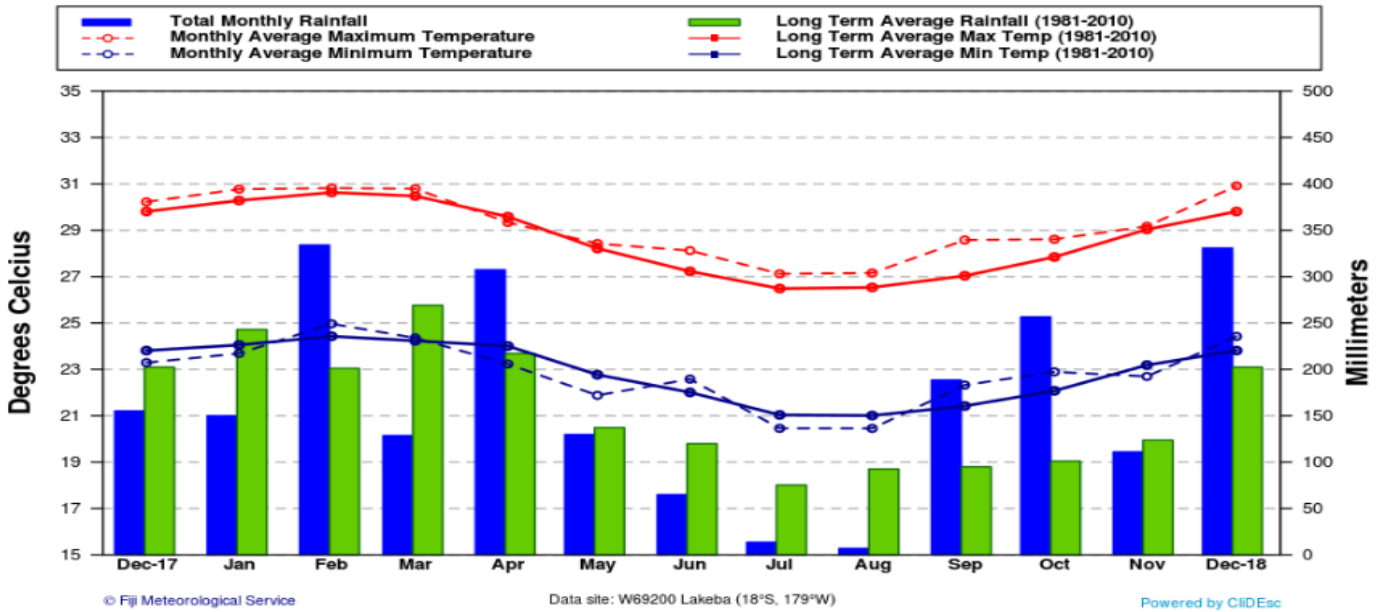


Figure 5

Lakeba - Temperature & Rainfall for the last 13 Months
(December, 2017 - December, 2018)



5. DAILY RAISED PAN EVAPORATION

Figure 6

Daily Evaporation for December 2018

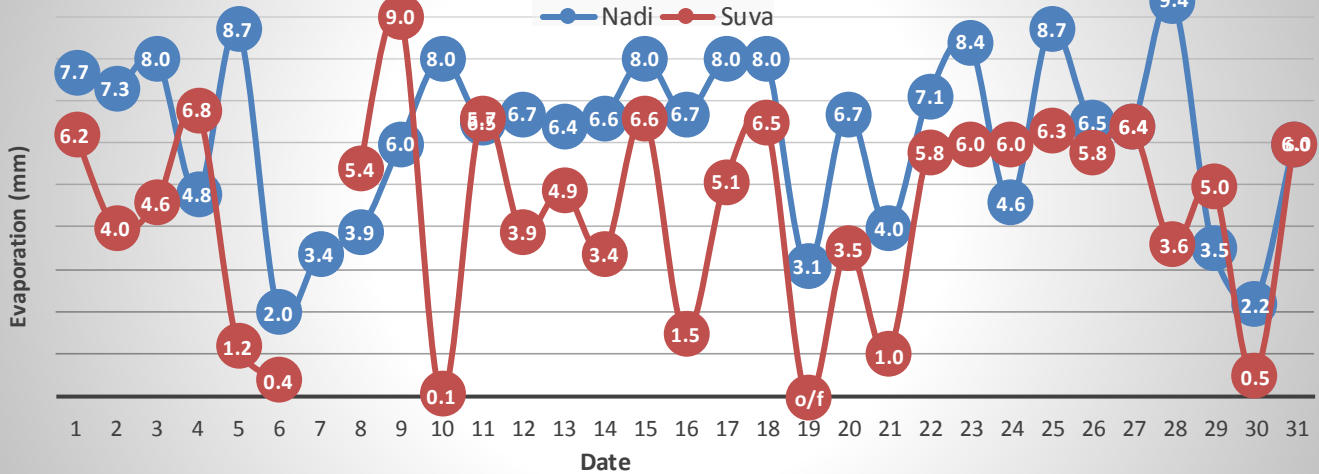


Figure 6: The total monthly raised pan evaporation at Nadi Airport was 193.3mm, with the highest of 9.4mm recorded on the 28th. Laucala Bay recorded total monthly evaporation of 132.1mm, with the highest daily evaporation of 9.0mm on the 9th.

6. SOLAR RADIATION

Daily Solar Radiation (MJ/m²) - December 2018

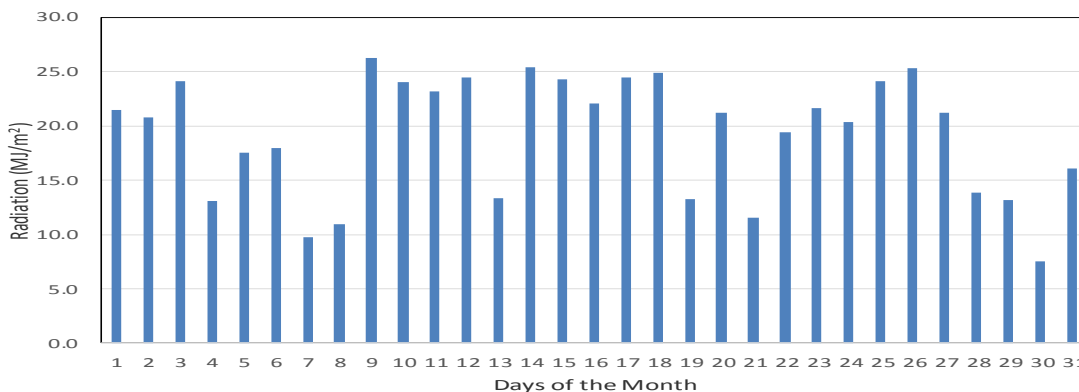


Figure 7:

The mean daily solar radiation at Nadi Airport during December 2018 was 19.2MJ/m² compared to 22.3MJ/m² over 30 year average (1971-2000).

7. WIND SUMMARY

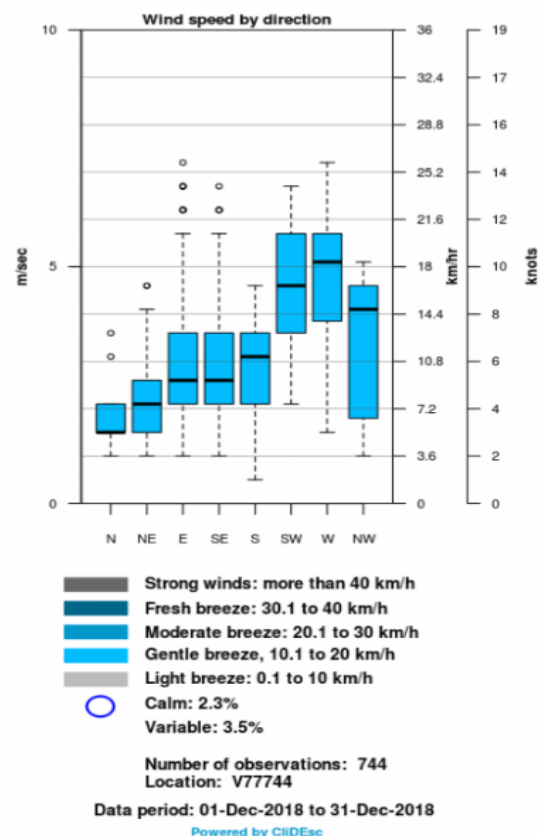
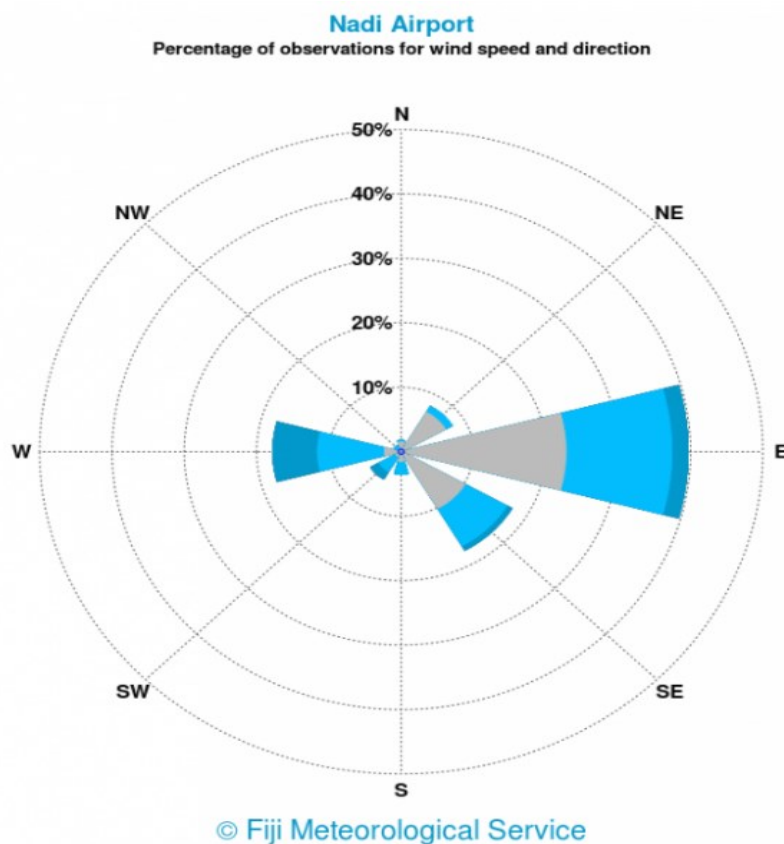


Figure 8a: The hourly wind observations at Nadi Airport during the month shows easterly winds as the most dominant, followed by westerly and then south-easterly winds. Wind strengths varied from light to moderate.

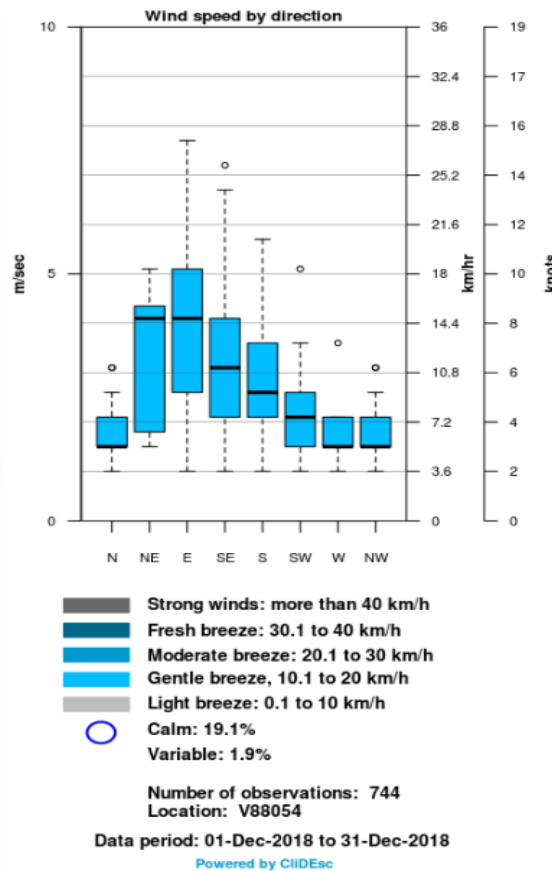
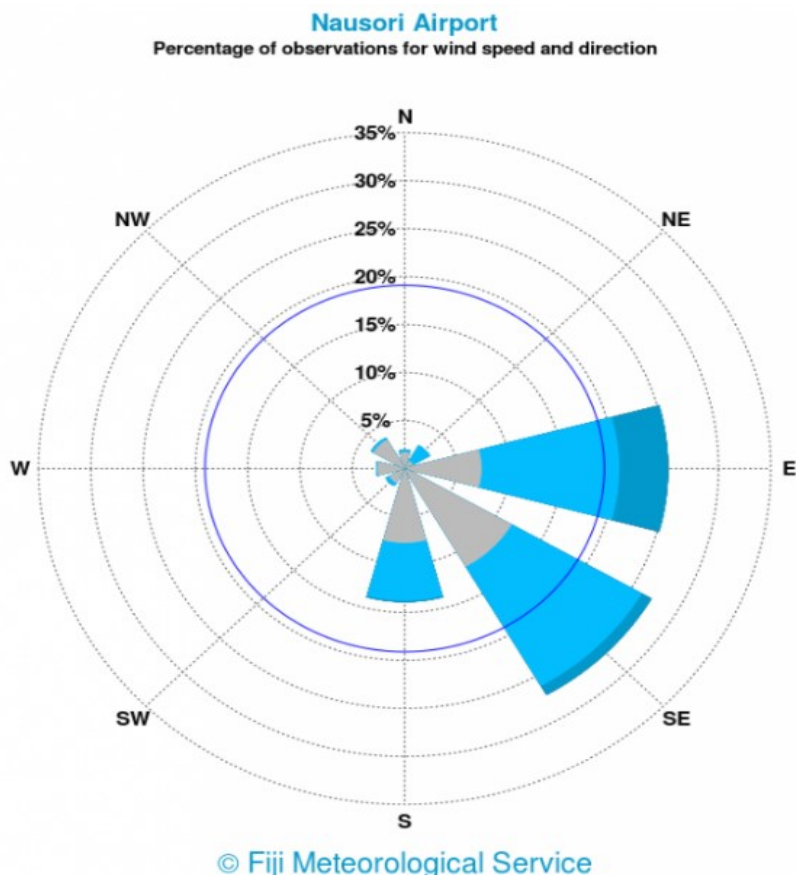


Figure 8b: The hourly wind observations at Nausori Airport during the month shows that south-easterly winds were dominant, followed by easterly and southerly winds. Wind speeds ranged from light to moderate in strength.

8. SEA SURFACE TEMPERATURE (SST)

Average SST Anomalies
2 DEC 2018 – 29 DEC 2018

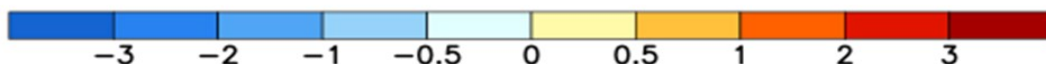
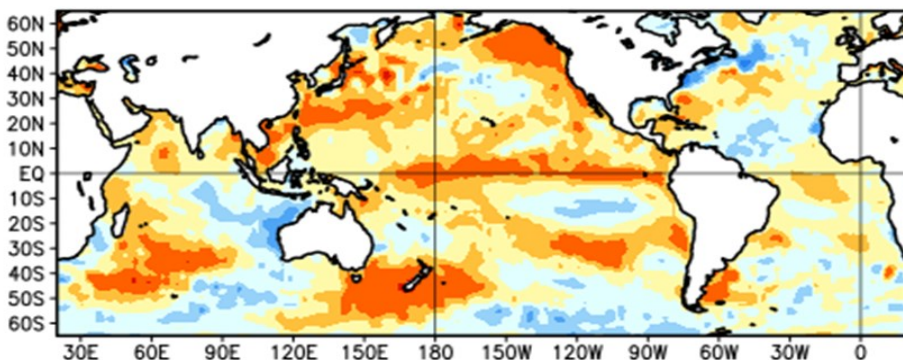


Figure 9: Warm sea surface temperature anomalies between 0.5oC and 1oC was present in the northern Fiji waters (base period: 1981-2010).

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

9. SEA LEVEL

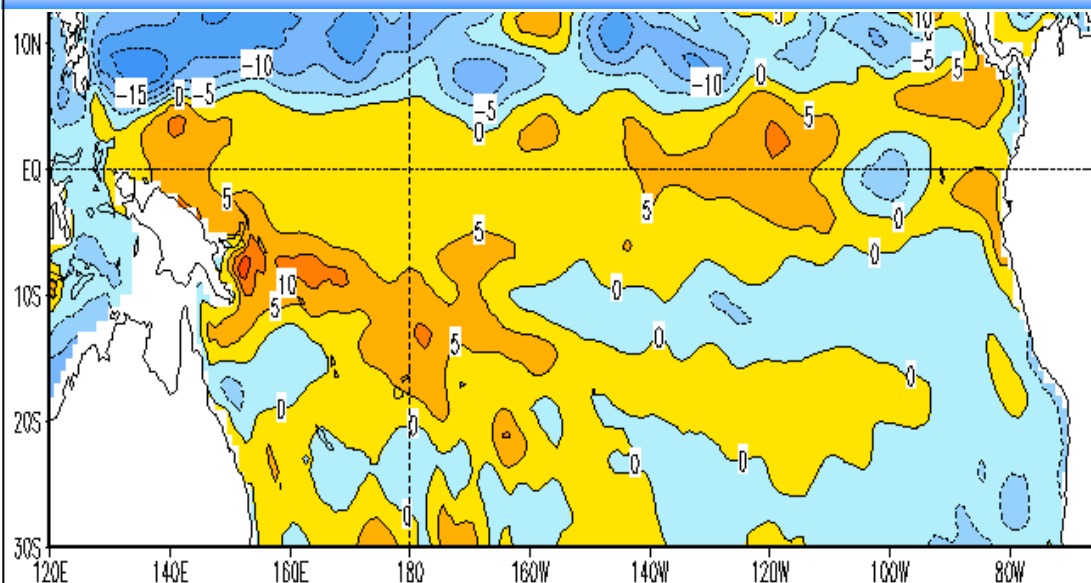


Figure 9: Sea level anomalies of 0-10cm were present in the Fiji Waters (base period: 1981-2010).

Source: http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ocean/weeklyenso_clim_81-10/wksl_anm.gif

10. CLOUD COVER

OLR Anomalies : Average of 6 Dec 2018 : 5 Jan 2019

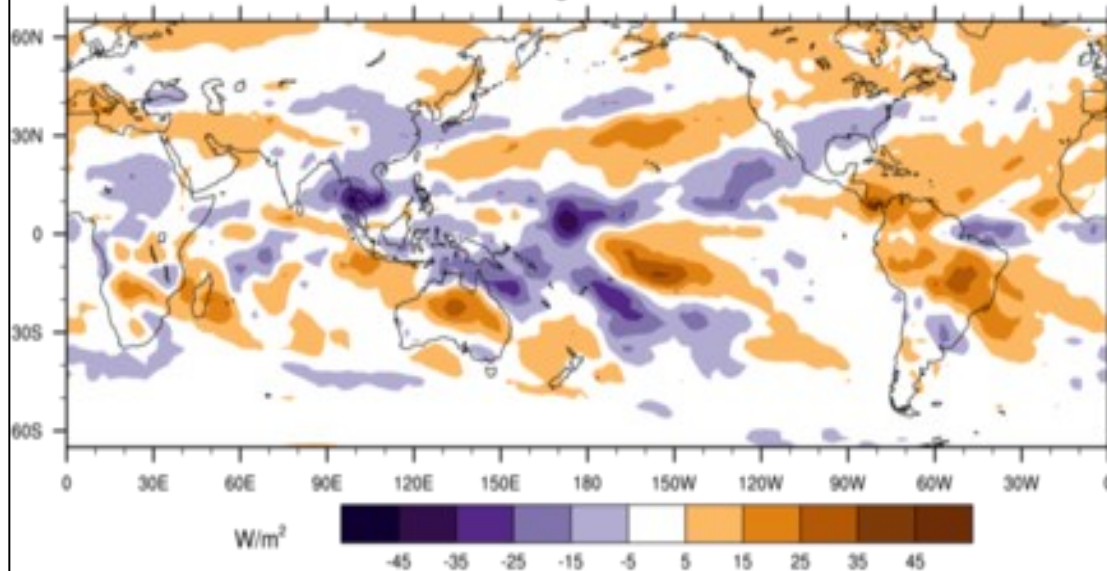


Figure 10: OLR anomalies indicate presence of above normal cloud cover in the Fiji region (Fiji: ~17°S, 180°) (base period: 1981-2010).

<http://www.bom.gov.au/climate/mjo/#tabs=Cloudiness>