

1. IN BRIEF

A weak El Niño was established in the tropical Pacific during March 2019.

Rainfall pattern varied across the country during the month, with drier than *normal* conditions experienced over most parts of the Western Division and at Labasa Airport and Savusavu Airfield in the Northern Divisions. On the other hand, *near normal* rainfall was registered in most of the Central and Eastern Divisions.

A period of widespread rainfall was experienced across the country from the 23rd to the 31st. Heavy rainfall was at first confined to the Central, Northern and Eastern Divisions, with Koronivia recording the highest 24-hour rainfall during this rainfall episode with 214mm on the 26th, followed by Matei Airfield with 167mm on the 25th and a record breaking daily rainfall at Vanuabalavu with 164mm on the 24th. There were reports of flooding in Taveuni on the 25th. Then later on the 31st, widespread and heavy rainfall was experienced in the Western Division. Tavua and Yaqara registered 121mm and 103mm of rainfall on the 31st, respectively. Consequently, flash floods were reported in many parts of the Nadi to Rakiraki corridor.

The maximum air temperatures were generally *normal* to *above normal* during the month, with 7 out of the 23 sta-

tions recording anomalies $\geq 0.5^{\circ}\text{C}$, 13 within $\pm 0.5^{\circ}\text{C}$ and 3 $\leq -0.5^{\circ}\text{C}$. The minimum air temperatures were *normal* to *below normal* at most of the stations, with 7 out of the 23 stations recording anomalies $\leq -0.5^{\circ}\text{C}$, 15 within $\pm 0.5^{\circ}\text{C}$, while Navua was the lone station with anomaly $\geq +0.5^{\circ}\text{C}$.

The mean maximum air temperatures during the month ranged from 29.1°C to 32.5°C in the coastal areas of Fiji, while Monasavu and Nadarivatu in the highlands recorded 25.3°C and 25.5°C , respectively. A period of hot condition was experienced from the 1st to the 3rd with more than half of the stations recording the highest daily maximum temperature for the month during this period. The highest daily maximum temperature was registered at Keiyasi with 35.6°C on the 3rd, followed by Yasawa-i-Rara with 34.9°C on the 3rd.

The mean minimum air temperatures ranged from 21.0°C to 24.7°C in the coastal areas, whilst at Nadarivatu and Monasavu in the highlands, it was 18.5°C and 19.3°C , respectively. An episode of cool nights were experienced during the last two weeks of the month with Nadarivatu registering lowest night-time temperature of 15.1°C on the 21st, followed by Monasavu with 17.0°C on the 26th and Rarawai Mill with 18.0°C on the 18th.

2. WEATHER PATTERNS

The month began with Tropical Cyclone (TC) Pola located to the southeast of Fiji and a northwesterly wind flow dominant over the group. Occasional rain with isolated thunderstorms were experienced mainly over the western and northern parts of the group. This prevailed till the 3rd after which an east to southeast wind flow became dominant over the group and TC Pola drifted further southeast of Fiji.

Series of weak troughs developed in the vicinity of Fiji which continued to moisten the easterlies and enhanced the trade showers over the group. This prevailed till the 21st.

On the 22nd an active trough drifted towards the group from the north which further moistened the easterlies over the group producing significant rainfall over the eastern parts of the larger islands.

The trough drifted further onto the group on the 25th producing significant rainfall over the northern parts. Over a 24-hour period on the 24th, Vanuabalavu and Lakeba recorded 164mm and 102mm of rainfall, respectively. Matei Airfield and Udu Point recorded the 167mm and 109mm of rainfall

on the 25th, respectively.

The trough then drifted further south on the 27th and affected the rest of the group till the 29th. This again produced significant rainfall over other parts of Fiji. Koronivia and Nausori Airport registered 214mm and 123mm of rainfall on the 26th, respectively, while Ono-i-Lau recorded 218mm of rainfall over a 48-hour period on the 27th and 28th.

The trough drifted to the east of Fiji later on the 29th before gradually drifting back onto the group on the 30th. It drifted over the western parts on the 31st directing a moist northerly wind flow over the group before moving further west away from the group later on the day. Tavua and Yaqara received 121mm and 104mm of rainfall on the 31st, respectively.

Rotuma was mainly affected by series of troughs moving over the group which produced rain and thunderstorms during most of the days.

3. RAINFALL

The rainfall during the month generally ranged from *below average* to *average*. Out of the 27 stations, 9 recorded *below average* rainfall, 13 *near average* and 5 *above average* rainfall.

Koronivia recorded the highest total monthly rainfall with 628mm, followed by Udu Point with 541mm, Nadarivatu with 486mm and Lomaivuna with 463mm. On the other hand, Savusavu was driest during the month with a total monthly rainfall of 125mm, followed by Nacocolevu with 166mm, Penang Mill with 196mm and Yasawa-i-Rara with 206mm.

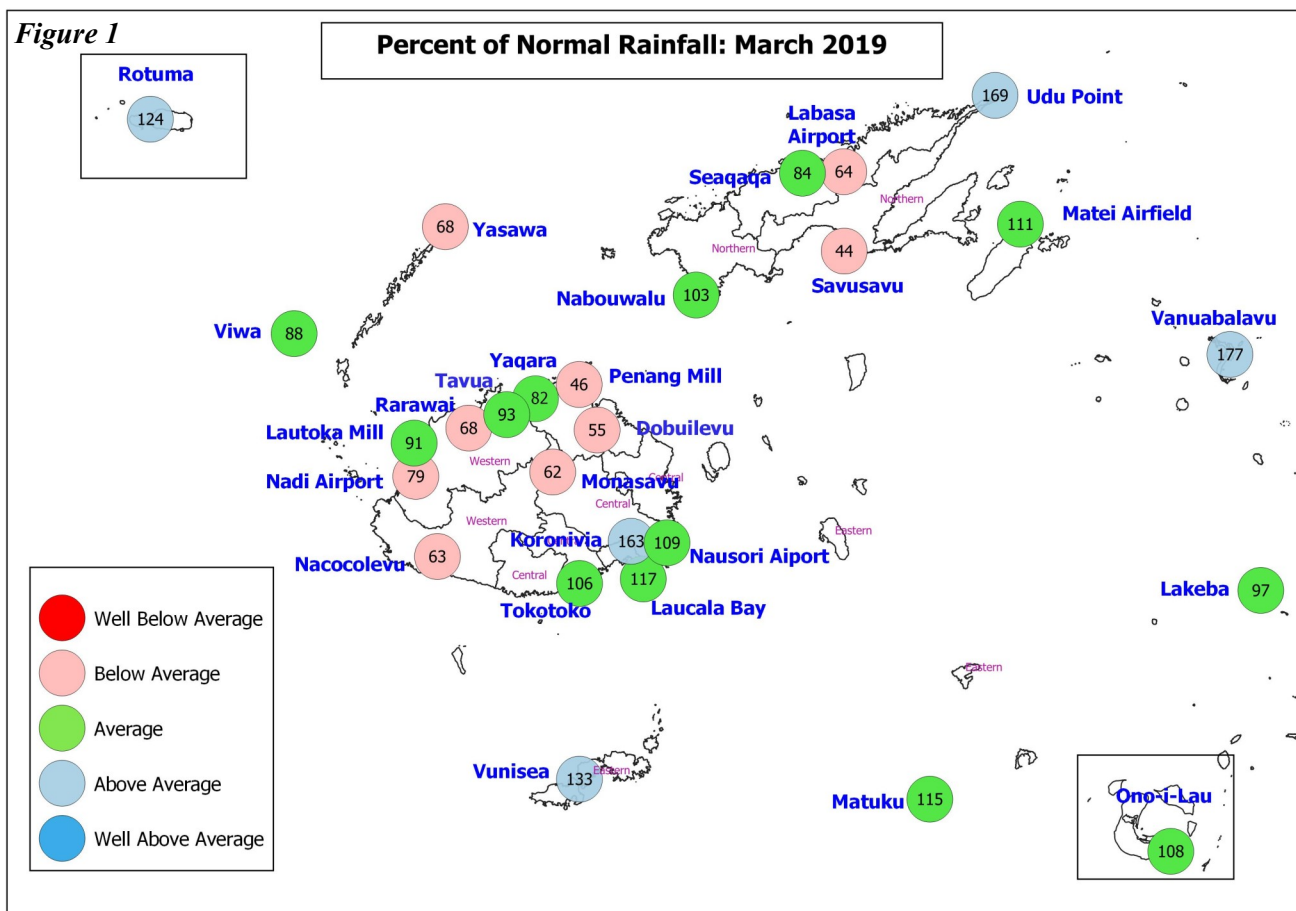
A very heavy localized downpour was experienced in the Nadroga area on the 4th, with Sigatoka registering 130mm of rainfall over a 24-hour period. Consequently, flash floods were experienced in parts of the District.

A period of widespread rainfall was experienced across the country from the 23rd to the 31st. Heavy rainfall was at first confined to the Central, Northern and Eastern Divisions, with Koronivia recording the highest 24-hour rainfall during this rainfall episode with 214mm on the 26th, followed by Matei Airfield with 167mm on the 25th and a record breaking daily rainfall at Vanuabalavu with 164mm on the 24th. There were reports of flooding in Taveuni on the 25th.

Then later on the 31st, widespread and heavy rainfall was experienced in the Western Division. Tavua and Yaqara registered 121mm and 103mm of rainfall on the 31st, respectively. Consequently, flash floods were reported in many parts of the Nadi to Rakiraki corridor.

Koronivia registered the highest number of rain days ($\geq 0.1\text{mm}$) with 29 days, followed by Seaqaqa, Laucala Bay, Vunisea and Rotuma with all 27, and Monasavu with 26. On the other hand, Sigatoka recorded the least number of rain days with 12 days, followed by Savusavu Airfield with 13 and Ono-i-Lau with 14.

Figure 1



Normal: Long term average from 1971 to 2000
Above Average: Rainfall between 120 to 199%

Average: Rainfall between 80 to 119%
Below Average: Rainfall between 40 to 79%
Rain Day: Rainfall $\geq 0.1\text{mm}$

Well Below Average: Rainfall less than 40% of normal
Well Above Average: Rainfall greater than or equal to 200% of normal

4. AIR TEMPERATURES

A. Maximum Daytime Air Temperatures

The maximum air temperatures were generally *normal* to *above normal* during the month, with 7 out of the 23 stations recording anomalies $\geq 0.5^{\circ}\text{C}$, 13 within $\pm 0.5^{\circ}\text{C}$ and 3 $\leq -0.5^{\circ}\text{C}$.

The warmest day-time temperatures on average was at Keiyasi with 32.5°C , followed by Yasawa-i-Rara with 32.3°C , and Labasa Airport and Seaqaqa with both 32.2°C . On the other hand, the coolest day-time temperatures on average was at Monasavu with 25.3°C , followed by Nadarivatu with 25.5°C and Momi with 29.1°C .

A period of hot condition was experienced from the 1st to the 3rd with more than half of the stations recording the highest daily maximum temperature for the month during this period. The highest daily maximum temperature was registered at Keiyasi with 35.6°C on the 3rd, followed by Yasawa-i-Rara with 34.9°C on the 3rd and Viwa with 34.7°C on the 1st. On the other hand, majority of the stations registered the lowest maximum air temperature between 24th and 26th. The lowest daily maximum air temperature was recorded at Monasavu with 20.5°C on the 25th, followed by Nadarivatu with 21.8°C on the 25th and Saqani with 24.7°C on the 25th.

There was no record breaking maximum air temperature during the month (Table 1).

B. Minimum Night-time Air Temperatures

Generally *normal* to *below normal* night time temperatures were recorded during the month, with 7 out of the 23 stations recording anomalies $\leq -0.5^{\circ}\text{C}$, 15 within $\pm 0.5^{\circ}\text{C}$, while Navua was the lone station with anomaly $\geq +0.5^{\circ}\text{C}$ (Table 2 & Figures 2-5).

The coolest nights on average during the month was at Nadarivatu with 18.5°C , followed by Monasavu with 19.3°C , and Nacocolevu with 21.0°C . On the other hand, Matuku recorded the warmest nights on average with 24.7°C , followed by Udu Point with 24.6°C , and Nabouwalu and Saqani with both 24.4°C .

An episode of cool nights were experienced during the last two weeks of the month with Nadarivatu registering lowest night-time temperature of 15.1°C on the 21st, followed by Monasavu with 17.0°C on the 26th and Rarawai Mill with 18.0°C on the 18th. On the other hand, Laucala Bay registered the warmest daily night-time temperature with 27.0°C on the 10th, followed by Lakeba and Matuku with both 26.5°C on the 10th, and Udu Point and Nabouwalu with both 26.4°C on the 3rd and 12th, respectively.

There was no record breaking minimum air temperature during the month (Table 1).

TABLE 1. CLIMATE RECORDS ESTABLISHED IN MARCH 2019

<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 Rainfall	Vanuabalavu	164.4mm	24 th	New High	120.2mm	1994	1985

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 MARCH 2019

	RAINFALL				AIR TEMPERATURES								SUNSHINE		
	TOTAL MM	RAIN		MAX. MM ON	AVERAGE DAILY				EXTREME		TOTAL				
		%	* DAYS		MAX.	#	MIN.	#	MAX.	MIN.	HRS	%			
NADI AIRPORT	268	79	20	73	31	31.3	-0.0	23.0	0.2	33.1	2	21.9	19	213	111
SUVA/LAUCALA BAY	437	117	27	82	23	30.4	-0.5	24.2	0.3	33.2	2	21.5	10	142	84
NACOCOLEVU	166	63	17	34	5	31.4	0.3	21.0	-1.5	34.0	2	20.0	19	145	96
ROTUMA	452	124	27	102	27	31.1	0.5	24.3	-0.4	32.3	16	23.0	6	141	85
VIWA	212	88	18	58	28	31.8	0.8	23.4	-1.8	34.7	1	21.0	11		
UDU POINT	541	169	21	109	25	30.2	-0.5	24.6	0.2	33.5	15	22.0	16		
SAVUSAVU AIRFIELD	125	44	13	44	10	30.4	-0.2	23.9	0.3	32.6	3	22.4	29		
LABASA AIRFIELD	240	64	19	33	26	32.2	0.7	21.4	-0.9	34.0	5	18.0	18		
NABOUWALU	344	103	21	72	31	30.8	0.7	24.4	0.1	33.1	3	22.1	11		
KORONIVIA	628	163	29	214	26	30.4	-0.1	21.8	-1.1	32.5	2	20.5	23		
NAUSORI AIRPORT	419	109	25	123	26	30.5	0.0	23.1	-0.1	32.9	1	21.6	25		
NAVUA/TOKOTOKO	437	106	22	87	22	30.8	-0.2	22.5	0.9	33.7	14	21.3	29		
MONASAVU	384	62	26	60	12	25.3	-0.1	19.3	0.1	28.0	1	17.0	26		
LAUTOKA AES	280	91	20	94	31	32.0	1.0	23.5	-0.3	33.5	1	22.0	26		
BA/RARAWAI MILL	246	68	19	77	6	31.9	-0.1	22.1	-0.2	33.8	8	20.1	18		
PENANG MILL	196	46	22	49	7	31.2	0.7	23.9	0.1	32.8	14	22.1	26		
MATEI AIRFIELD	423	111	24	167	25	30.1	-0.2	24.0	-0.2	31.6	5	20.6	25		
VANUABALAVU	382	177	20	164	24	30.2	-0.3	22.5	-2.3	32.0	2	20.1	25		
LAKEBA	286	97	21	102	24	30.5	0.2	24.2	0.2	32.5	1	21.8	26		
YASAWA	206	68	21	48	27	32.3	1.6	23.8	-0.7	34.9	3	21.3	28		
VUNISEA	403	133	27	37	25	29.9	-0.1	23.9	0.4	32.7	1	21.9	26		
MATUKU	292	115	22	82	19	29.9	-0.5	24.7	0.1	33.5	1	22.0	25		
ONO-I-LAU	273	108	14	109	27	29.7	0.4	23.7	-0.7	33.9	2	21.5	29		
LEVUKA AWS	U/S					U/S				U/S					
YAQARA AWS	290	82	18	103	31	32.1		23.8		34.4	17	21.3	26		
KEYIASI AWS	U/S					32.5		21.7		35.6	3	19.8	18		
LOMAIVUNA AWS	463		25	75	26	U/S		U/S							
NADARIVATU AWS	486		24	77	31	25.5		18.5		27.5	16	15.1	21		
RKS LODONI AWS	374		25	86	23	30.3		22.7		32.6	1	21.7	20		
MOMI AWS	211		21	41	31	29.1		23.6		32.9	18	21.9	26		
KOROLEVU AWS	U/S					U/S		U/S		U/S					
KORO ISLAND AWS	U/S					30.9		23.9		34.6	1	21.0	25		
SIGATOKA AWS	230		12	130	4	30.9		22.2		33.7	1	20.1	19		
RAKIRAKI AWS	262		20	58	7	U/S		U/S							
WAINIKORO AWS	311		23	56	30	31.2		22.7		33.2	14	21.0	7		
SAQANI AWS	219		24	57	25	30.7		24.4		33.0	16	22.6	25		
VATUREKUKA AWS	265		24	43	3	31.0		22.9		33.1	14	21.6	7		
KUBULAU AWS	U/S					U/S		U/S							
SEAQAQA AWS	336	84	27	36	31	32.2		23.6		34.2	5	21.8	7		
DOBUILEVU TB3	235	55	23	47	29										
NASINU TB3	456		25	78	23										
TAVUA TB3	309		19	121	31										

	TEMPERATURE (C)				HUMIDITY RH% VP	WIND KT	SUN RAD	
	MEAN	DRY WET		(AVERAGE AT 9AM)			POS	SQ.M
		DRY	WET					
NADI AIRPORT	27.1	27.9	24.9	77	29.1	7.0	54 16.7	
SUVA/LAUCALA BAY	27.3	27.9	25.2	80	30.0		36 18.8\$	
NACOCOLEVU	26.2	27.2	25.3	85	30.7		37 19.0\$	
ROTUMA	27.7	28.5	25.3	77	29.6		37 18.4\$	
VIWA	27.6	28.6	25.8	80	31.1			
UDU POINT	27.4	27.9	25.6	83	30.9			
SAVUSAVU AIRFIELD	27.2	28.4	25.6	79	30.5			
LABASA AIRFIELD	26.8	28.3	25.3	78	29.8			
NABOUWALU	27.6	28.5	25.6	79	30.6			
KORONIVIA	26.1	27.8	25.4	82	30.6			
NAUSORI AIRPORT	26.8	27.4	25.4	85	30.8	3.8		
NAVUA/TOKOTOKO	26.7	27.6	33.7	82	30.6			
MONASAVU	22.3	22.6	21.0	86	23.6			
LAUTOKA AES	27.8	29.2	25.8	76	30.6			
BA/RARAWAI MILL	27.0	26.9	24.5	82	29.0			
PENANG MILL	27.6	27.8	25.2	80	30.0			
MATEI AIRFIELD	27.1	28.4	25.8	81	31.3			
VANUABALAVU	26.4	28.4	25.4	78	30.1			
LAKEBA	27.3	28.6	25.6	78	30.5			
YASAWA	28.1	28.6	25.9	80	31.2			
VUNISEA	26.9	27.7	25.2	80	29.9			
MATUKU	27.3	27.7	25.0	80	29.5			
ONO-I-LAU	26.7	27.8	24.8	78	29.0			

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 (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 (March, 2018 - March, 2019)

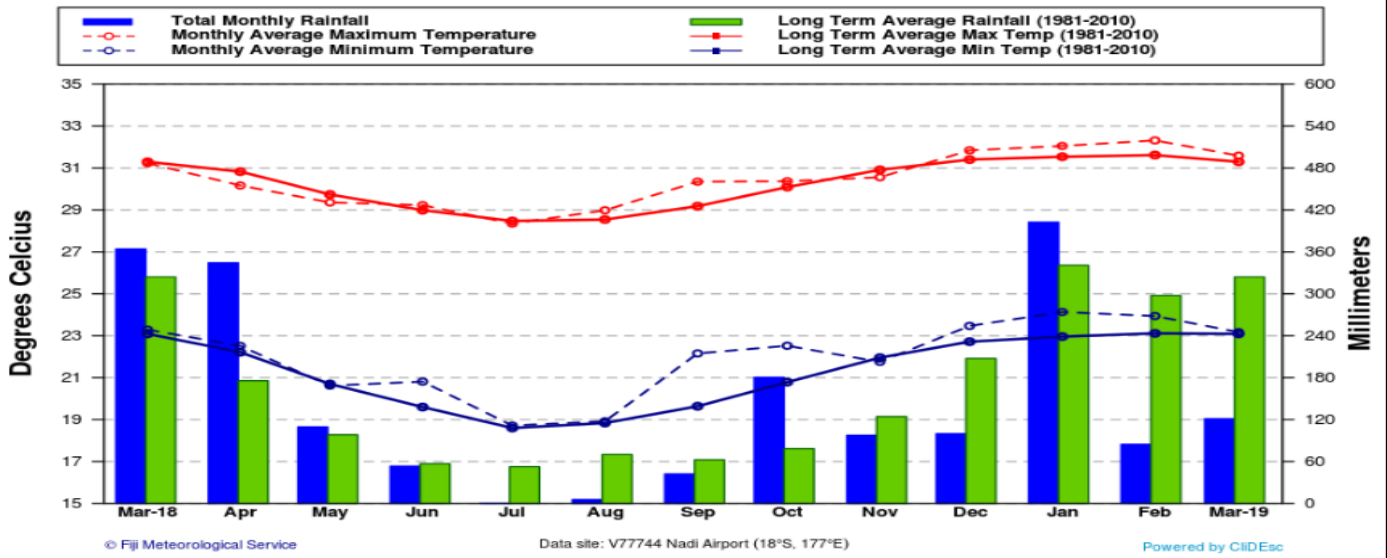


Figure 3 Laucala Bay - Temperature & Rainfall for the last 13 Months (March, 2018 - March, 2019)

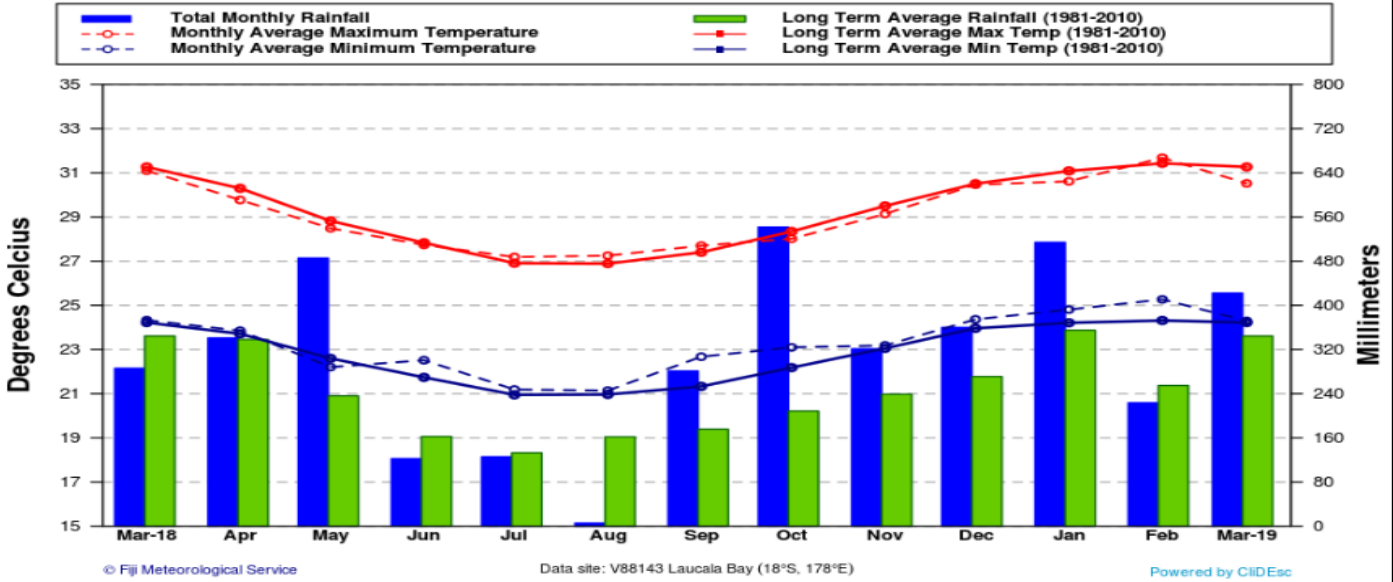


Figure 4 Labasa Airfield - Temperature & Rainfall for the last 13 Months (March, 2018 - March, 2019)

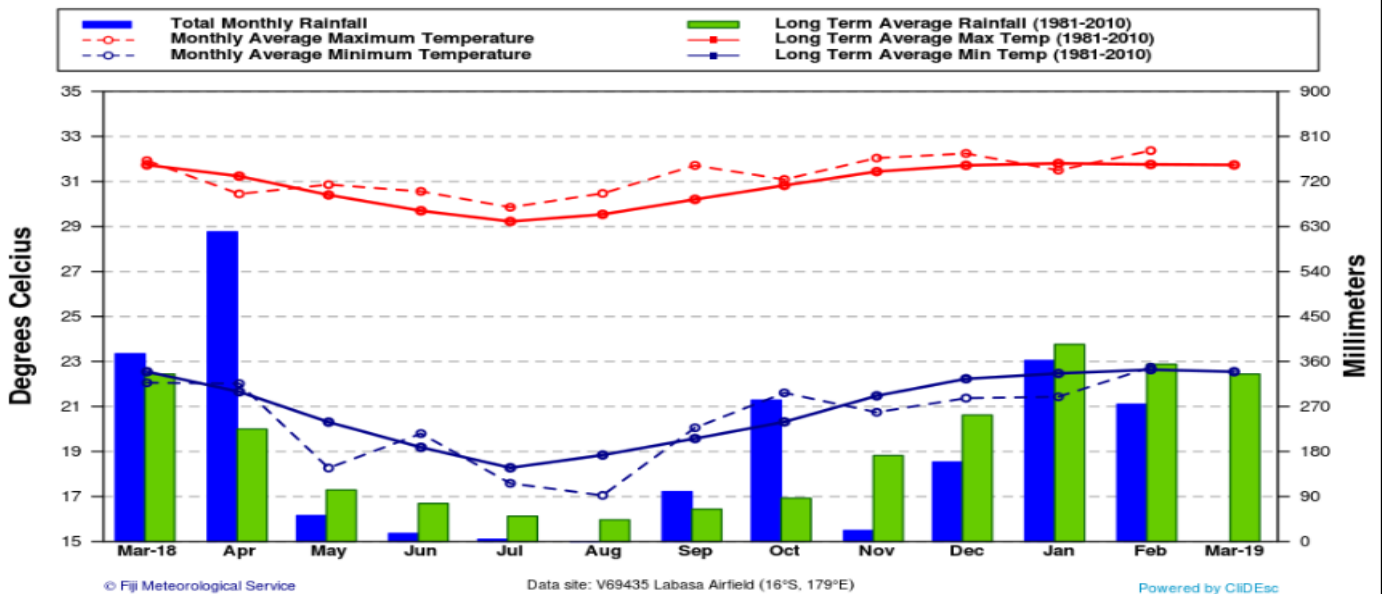
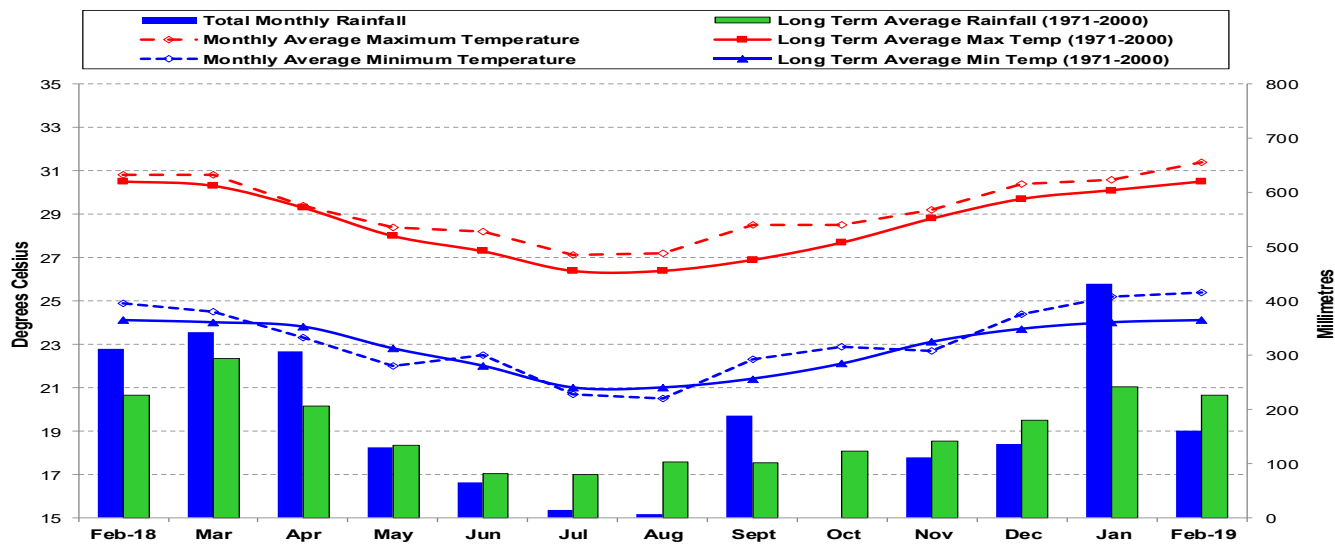


Figure 5

Lakeba (Eastern Division) - Temperature & Rainfall Records for the last 13 Months (February 2018 - February 2019)



5. DAILY RAISED PAN EVAPORATION

Figure 6

Daily Evaporation for March 2019

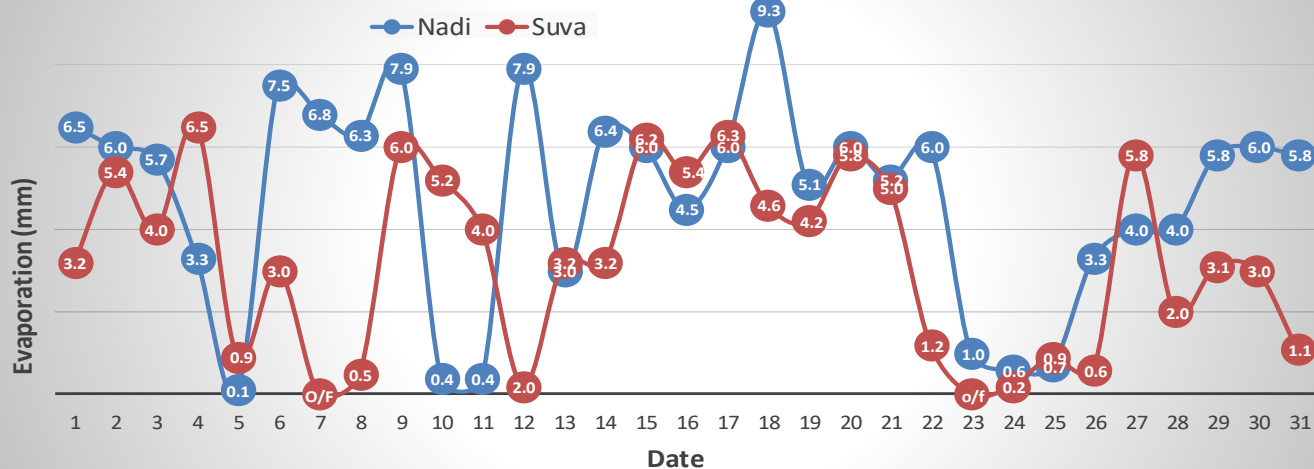


Figure 6: The total monthly raised pan evaporation at Nadi Airport was 147.5mm, with the highest of 9.3mm recorded on the 18th. Laucala Bay recorded total monthly evaporation of 100.7mm, with the highest daily evaporation of 6.5mm on the 4th.

6. SOLAR RADIATION

Figure 7

Daily Solar Radiation (MJ/m²) - March 2019

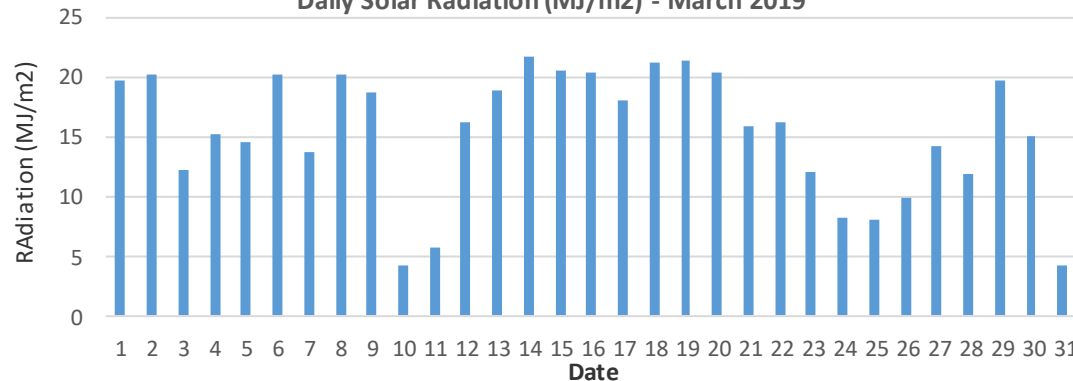


Figure 7:

The mean daily solar radiation at Nadi Airport during March 2019 was 15.4MJ/m² compared to 18.9MJ/m² over 30 year average (1971-2000).

7. WIND SUMMARY

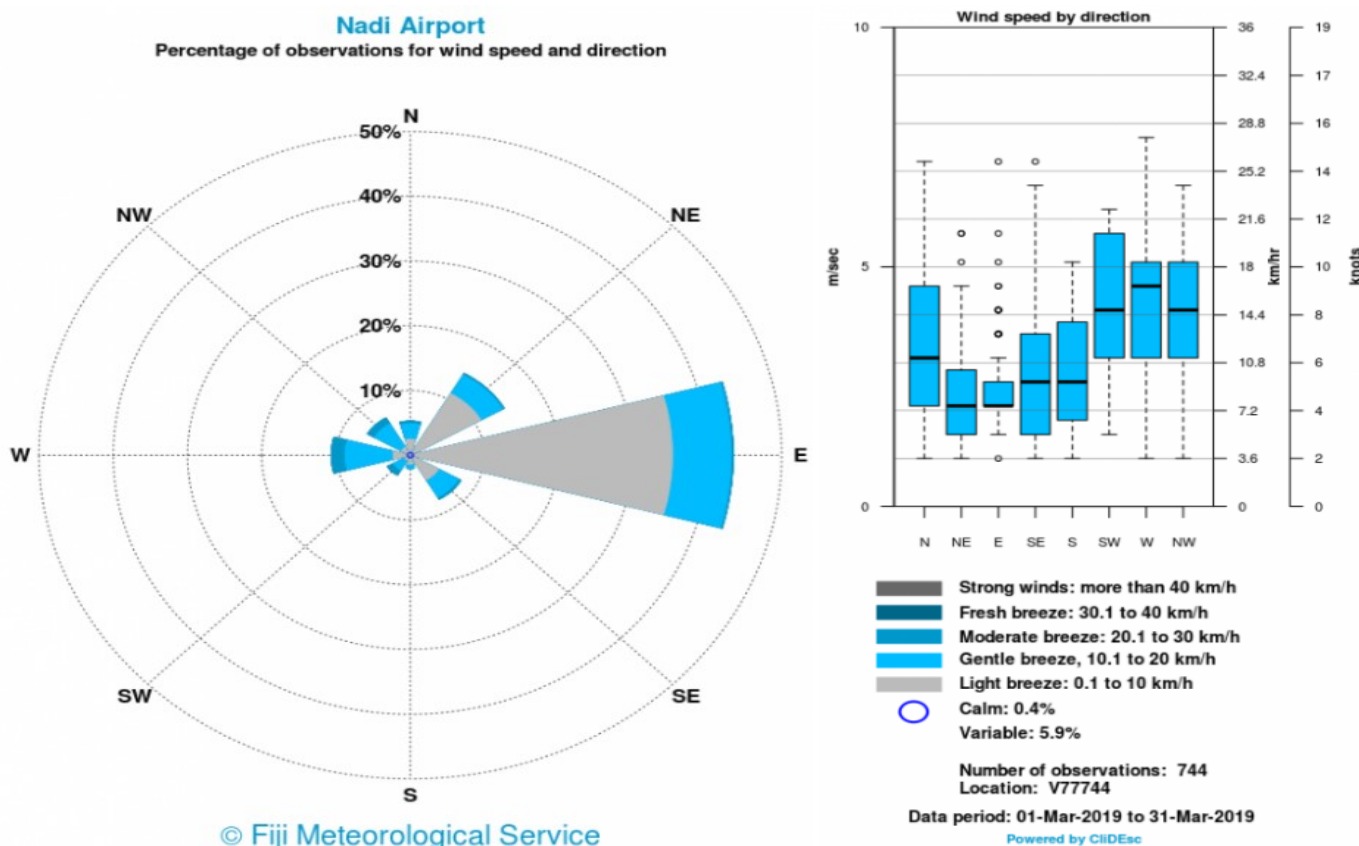


Figure 8a: Easterly winds were most dominant at the Nadi Airport during the month, followed by northeasterly then westerly winds. Wind strengths ranged from light to moderate.

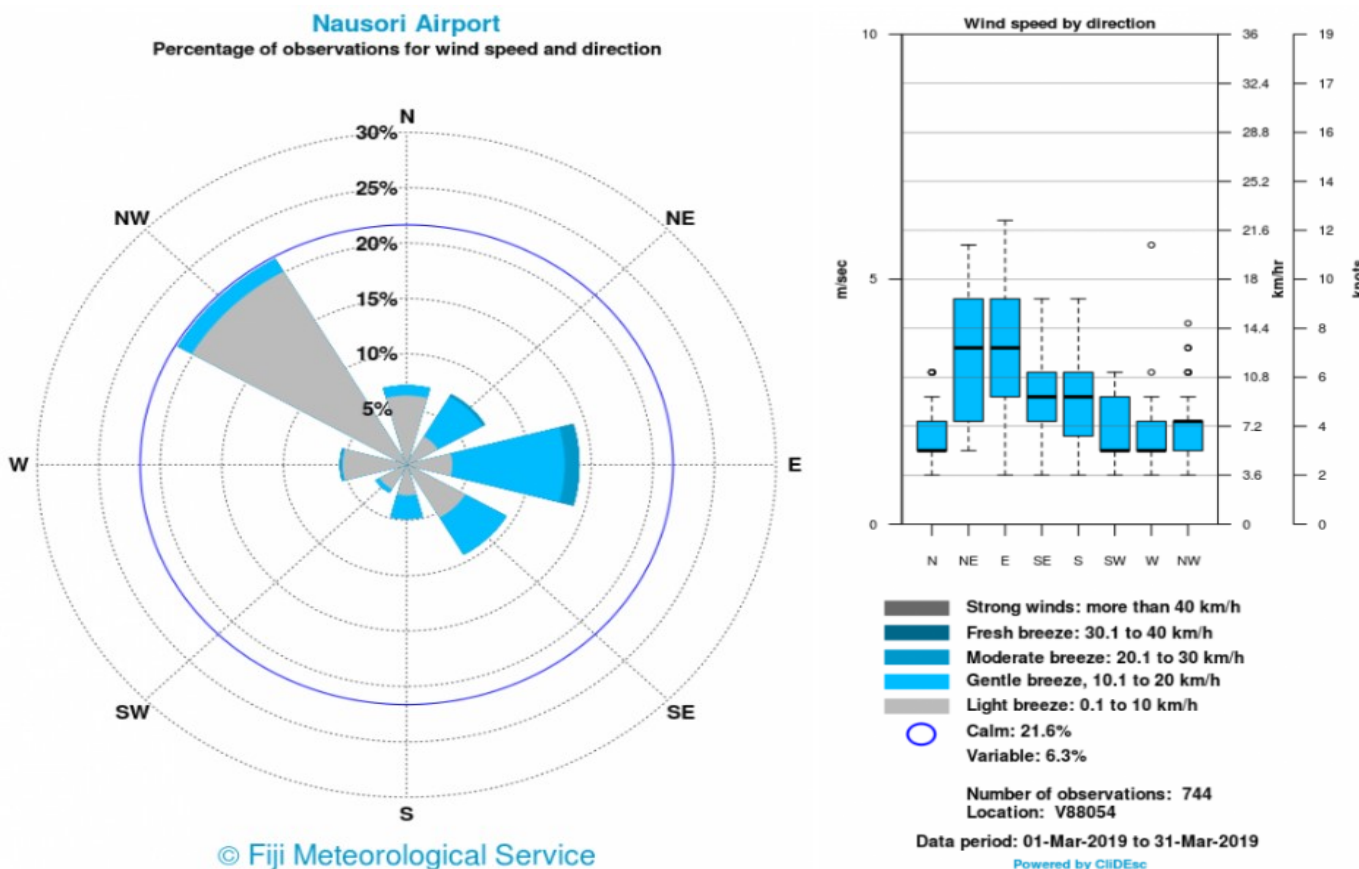


Figure 8b: Northwesterly winds were most dominant at the Nausori Airport during the month, followed by easterly, then southeasterly winds. Wind speeds ranged from light to moderate.

8. SEA SURFACE TEMPERATURE (SST)

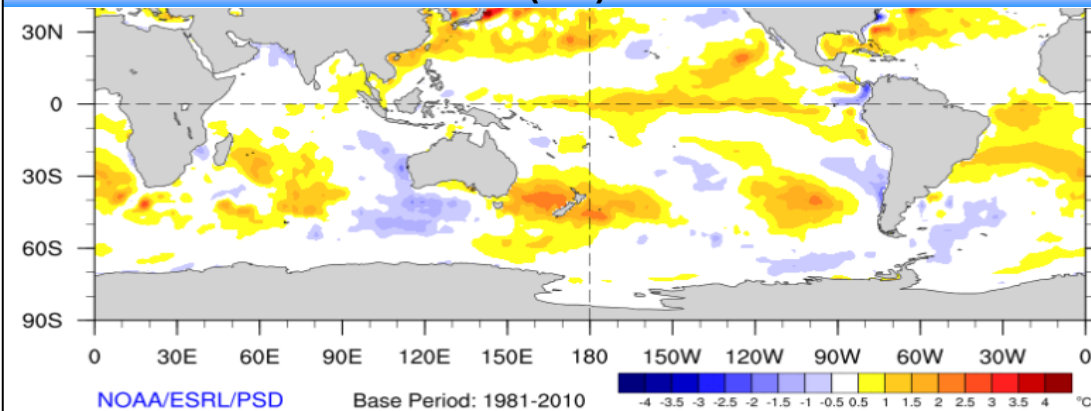


Figure 9: SSTs were above normal to the west of Viti Levu and Vanua Levu (base period: 1981-2010).

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

9. SEA LEVEL

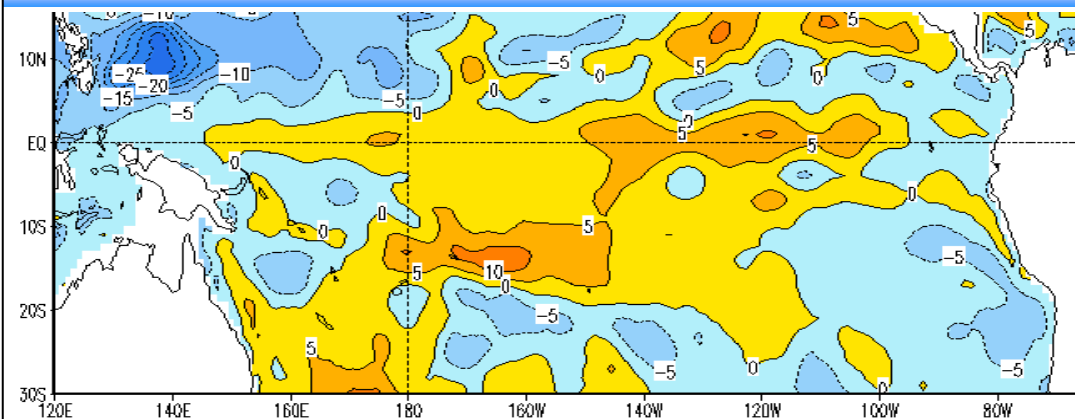


Figure 10: Sea level anomalies of -5cm to +5cm were present in the Fiji Waters (base period: 1981-2010).

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

10. CLOUD COVER

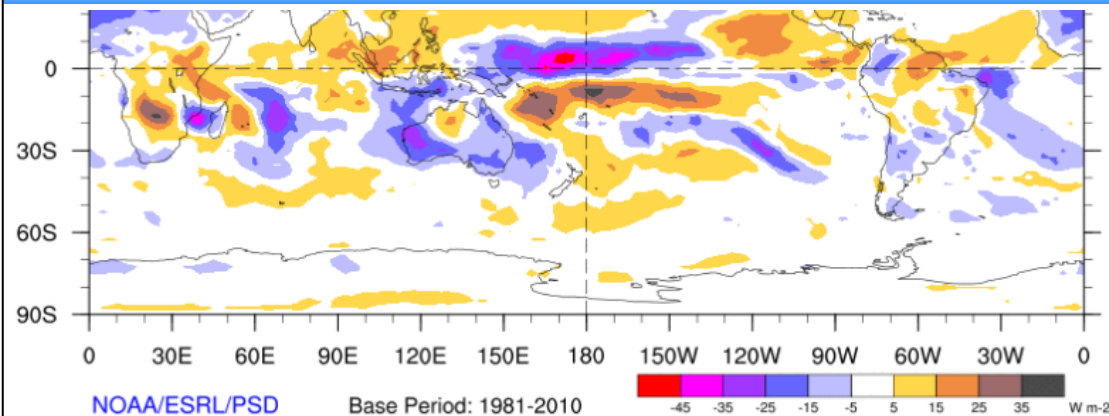


Figure 11: OLR anomalies indicate presence of near normal cloud cover in most of the Fiji region (Fiji: ~17°S, 180°) (base period: 1981-2010).

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

11. WIND ANOMALIES

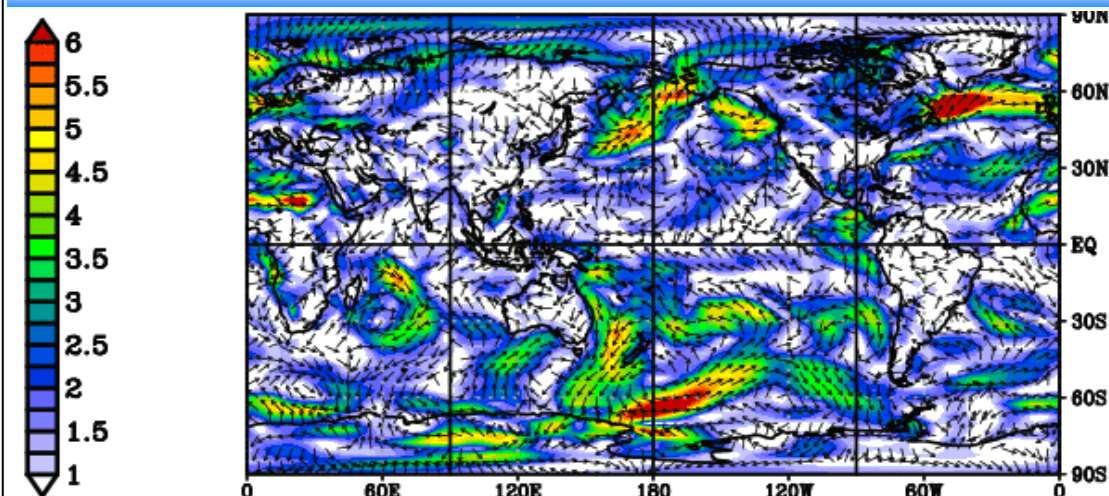


Figure 12: South-easterly wind anomalies of up to 2.5m/s were present in the Fiji region (Fiji: ~17°S, 180°) (base period: 1981-2010).

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