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Fiji Climate Summary January 2015

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1.0 IN BRIEF

January's weather was affected by troughs of low pressure system, moist easterly wind flow, a frontal system and semi-permanent ridges of high pressure.

With the exception of the Central Division, which received *average* amount of rainfall at most of the stations, all other Divisions were generally drier than *normal*. It was exceptionally dry at Udu Point, Labasa Airport, Matei Airfield (Taveuni), Penang Mill (Rakiraki) and Matuku, where less than half the *normal* rainfall was recorded. Out of the 27 rainfall monitoring stations, 5 received *well below average* rainfall, 15 *below average* and 7 *average*.

Normal to above normal daytime temperatures were recorded during the month, with 13 out of the 21 stations recording anomalies $\geq 0.5^{\circ}\text{C}$ and 8 within $\pm 0.5^{\circ}\text{C}$.

The night-time temperatures were also *normal to above normal*, with 11 out of the 20 stations recording anomalies $\geq 0.5^{\circ}\text{C}$, 8 within $\pm 0.5^{\circ}\text{C}$ and 1 $\leq -0.5^{\circ}\text{C}$.

The mean maximum air temperatures in January ranged from 30.0°C to 32.7°C in the coastal areas of Fiji, while

Monasavu recorded 26.7°C . However, daily day-time air temperature as high as 35.1°C was recorded at Nacocolevu (Sigatoka) on the 8th.

The mean minimum air temperatures ranged from 22.0°C to 25.5°C in the coastal areas, whilst at Monasavu, it was 19.0°C . However, daily night-time temperatures as low as 15.7°C and 17.0°C was recorded at Monasavu and Lautoka Mill on the 1st and 21st, respectively.

A total of four new high air temperature records were established during the month. Monasavu recorded 34.9°C on the 9th, breaking the 2000 record of 30.2°C , while Lakeba recorded 32.0°C on the 4th, breaking 1984 record of 33.5°C . A new high mean monthly maximum temperature of 31.7°C was also set at Lakeba. A new high daily minimum temperature record of 23.4°C was established at Monasavu on the 17th, breaking the 2001 record of 22.6°C .

RSMC-TCC Nadi named two cyclones during the month. Niko was the first cyclone of the season that formed near Tahiti on the 21st, while Ola formed to the northwest of New Caledonia on the 31st.

2.0 WEATHER PATTERNS

The weather in January was mainly influenced by troughs of low pressure system, moist easterly wind flow, a frontal system and semi-permanent ridges of high pressure.

A southeast wind flow prevailed over Fiji from the 1st to the 2nd. As a result, mainly fine conditions were experienced over the entire country. On the 3rd, a trough of low pressure to the northeast of Fiji moved closer to the group and remained till the 6th. Rain and thunderstorms were experienced over most places with Suva recording the highest 24-hour rainfall of 105mm on the 4th.

Later on the 7th, a ridge of high pressure extended over the country from the south and directed an easterly wind flow over the group till the 8th. This prevailing condition brought few showers mainly over the interior and eastern part of the main islands.

On the 9th, another slow moving trough remained to the west of Fiji. Associated cloud bands affected the group from time to time till the 12th. Later on the 13th, the above

trough gradually approached the country and eventually affected the group from the 15th to the 21st. Consequently, wide-spread rain and few thunderstorms were experienced over most places.

A ridge of high pressure extended onto the group from the south, displacing the trough northwards and away from the group on the 22nd and directed a southeast wind flow over Fiji which prevailed until the 25th.

A frontal system moved over the southern parts of the country on the 26th and remained till the 27th. This system brought occasional showers that were mostly experienced over the eastern and southern parts of the group. As the frontal system weakened and migrated eastwards, a south-east wind flow covered the group from the 28th and prevailed till the end of the month.

Rotuma's weather was mainly affected by the South Pacific Convergence Zone and trade easterly winds resulting in occasional showers.

*Previously known as the Fiji Islands Weather Summary and Monthly Weather Summary

3.0 RAINFALL

With the exception of the Central Division, which received *average* amount of rainfall at most of the stations, all other Divisions were generally drier than *normal*. It was exceptionally dry at Udu Point, Labasa Airport, Matei Airfield (Taveuni), Penang Mill (Rakiraki) and Matuku, where less than half the *normal* rainfall was recorded. Out of the 27 rainfall monitoring stations, 5 received *well below average* rainfall, 15 *below average* and 7 *average* (Table 2 and Figures 1-5).

A large number of stations continue to be in meteorological drought on a 3 month timescale. This includes Nadi Airport, Labasa Airport, Lakeba, Lautoka Mill, Matuku, Nacocolevu (Sigatoka), Ono-i-Lau, Rarawai Mill (Ba), Yasawa-i-Rara, Vatukoula and Doboilevu.

The majority of the stations are still in drought on a 6 month timescale. The exceptions to this are Penang Mill, and Seaqaqa which are currently in a warning stage for drought, while there is no alert for Koronivia, Monasavu, Nausori Airport, Tokotoko (Navua), Vunisea (Kadavu) and Vanuabalavu.

The 3 month timescale in this context refers to rainfall deficiency affecting shallow rooted crops and small creeks & streams; and 6 month timescale refers to rainfall deficiency affecting large fruit trees, young commercial forest, mature sugarcane and medium rivers.

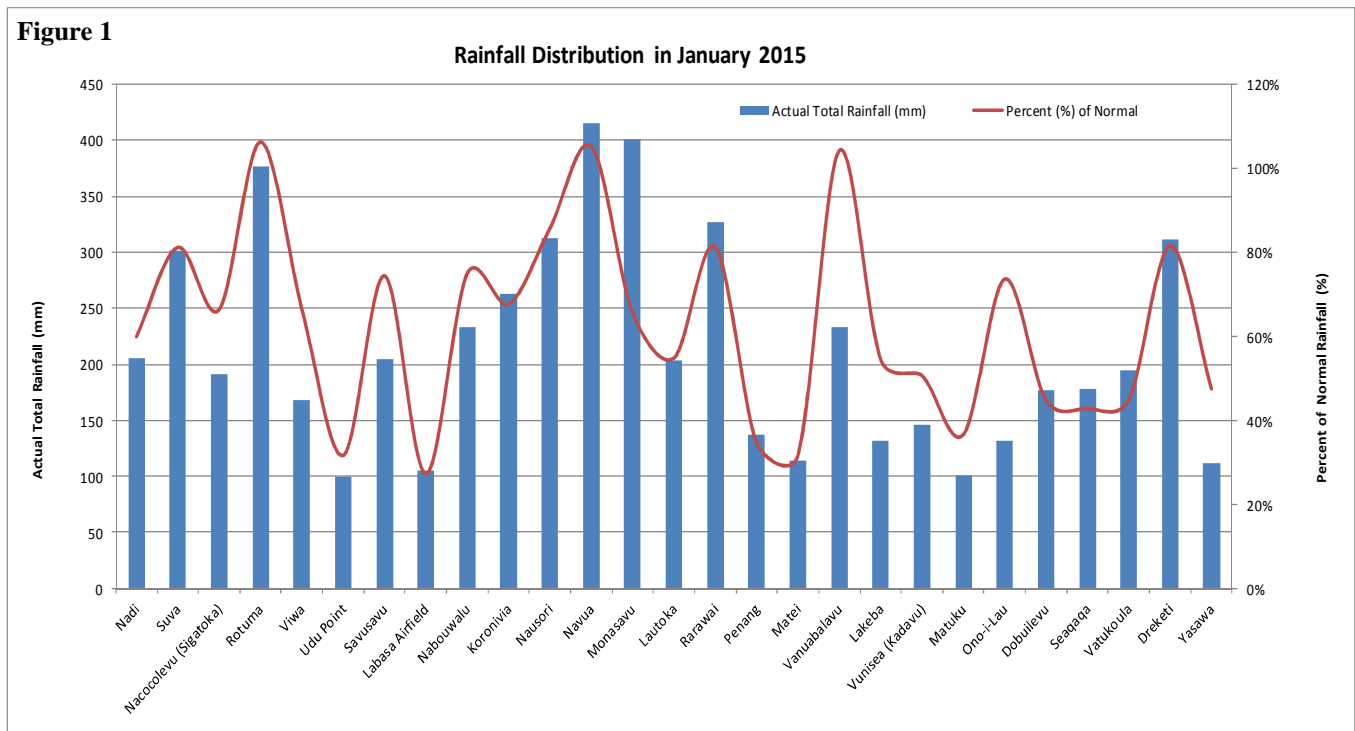
Some significant 24 hour rainfalls were recorded during the month. The highest of 109mm was recorded at Rotuma on the 2nd, followed 105mm at Laucala Bay (Suva) on the 4th and T92mm at Tokotoko (Navua) on the 19th.

Tokotoko (Navua) recorded the highest total monthly rainfall of 415mm, followed by Monasavu, 401mm, Rotuma, 377mm and Rarawai Mill (Ba) 327mm. On the other hand, the lowest total monthly rainfall was recorded at Udu Point with 99mm, followed by Matuku, 101mm, Labasa Airport, 105mm and Yasawa-i-Rara, 111mm (Figure 1).

Monasavu recorded the highest number of rain days (rainfall $\geq 0.1\text{mm}$) with 26, followed by Rotuma and Savusavu Airfield with both 22, and Nausori Airport, 21. At the same time, Yasawa-i-Rara recorded only 8 rain days, followed by Nacocolevu and Viwa with both 9 and Labasa Airport with 10.

No new rainfall record was established during the month.

Figure 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.

4.0 AIR TEMPERATURES

A. Maximum Daytime Air Temperatures

The average maximum air temperatures were generally *normal to above normal* during the month, with 13 out of the 21 stations recording anomalies $\geq 0.5^{\circ}\text{C}$ and 8 within $\pm 0.5^{\circ}\text{C}$ (Table 2 & Figures 2-5).

The highest monthly average maximum air temperature was recorded at Viwa with 32.7°C , followed by Rarawai Mill (Ba) and Labasa Airport with both 32.2°C . On the other hand, Monasavu registered the lowest with 26.7°C , followed by Matuku, 30.0°C and Vunisea (Kadavu), 30.4°C .

The highest daily maximum air temperature was observed at Nacocolevu (Sigatoka) with 35.1°C on the 8th, followed by Savusavu Airfield, 34.9°C on the 16th and Rarawai Mill (Ba), 33.5°C on the 8th. On the other hand, Monasavu recorded the lowest daily maximum air temperature of 23.4°C on the 2nd, followed by Ono-i-Lau with 26.2°C on the 10th.

Viwa, Ono-i-Lau, and Lakeba all recorded mean monthly maximum air temperature difference of $+1.6^{\circ}\text{C}$ from the *normal*. This was followed by an anomaly of $+1.3^{\circ}\text{C}$ at Nabouwalu. There was no significant negative mean monthly departure from the normal during the month.

Two new high daily maximum temperature records were set during the month. Monasavu recorded 34.9°C on the 9th, breaking the 2000 record of 30.2°C , while Lakeba recorded 32.0°C on the 4th, breaking 1984 record of 33.5°C . A new high mean monthly maximum air temperature of 31.7°C was also set at Lakeba (Table 1).

B. Minimum Night-time Air Temperatures

The average minimum air temperatures were also *normal to above normal* during the month, with 11 out of the 20 stations recording anomalies $\geq 0.5^{\circ}\text{C}$, 8 within $\pm 0.5^{\circ}\text{C}$ and 1 $\leq -0.5^{\circ}\text{C}$ (Table 2 & Figures 2-5).

The lowest monthly average minimum air temperature was recorded at Monasavu with 19.0°C , followed by Labasa Airport with 22.0°C and Tokotoko (Navua) with 22.8°C . On the other hand, the highest average minimum temperature was registered at Rotuma with 25.5°C , followed by Udu Point with 25.2°C and Viwa with 25.1°C .

The lowest daily minimum temperature was registered at Monasavu with 15.7°C on the 1st, followed by Lautoka Mill, 17.0°C on the 21st. On the other hand, the highest daily minimum temperature was observed at Rotuma with 27.5°C on the 15th, followed by Vanuabalavu, 27.3°C on the 17th.

The highest positive mean monthly minimum air temperature anomaly of $+1.4^{\circ}\text{C}$ was recorded at Tokotoko (Navua), followed by $+1.1^{\circ}\text{C}$ at Nacocolevu (Sigatoka). On the other hand, the only significant negative departure from the *normal* of -0.6°C was recorded at Matei Airfield (Taveuni).

A new high daily minimum temperature record of 23.4°C was established at Monasavu on the 17th, breaking the 2001 record of 22.6°C (Table 1).

TABLE 1. CLIMATE RECORDS ESTABLISHED IN JANUARY 2015

<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 Temp.	Monasavu	32.0°C	4 th	New High	30.2°C	2000	1981
Daily Maximum Temp.	Lakeba	33.7°C	20 th	New High	33.5°C	1984	1955
Mean Monthly Max. Temp.	Lakeba	31.7°C	-	New High	31.4°C	2014	1955
Daily Minimum Temp.	Monasavu	23.4°C	5 th	New High	22.6°C	2001	1981

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 JANUARY 2015

	RAINFALL					AIR TEMPERATURES								SUNSHINE		
	TOTAL	RAIN		MAX.		AVERAGE DAILY				EXTREME				TOTAL		
	MM	%	+	MM	ON	MAX.	#	MIN.	#	MAX.	C	ON	MIN.	C	ON	HRS
NADI AIRPORT	206	60	14	39	18	31.4	-0.1	23.5	0.7	32.7	6	22.0	2	237	112	
SUVA/LAUCALA BAY	301	81	19	105	4	30.7	-0.1	24.8	0.9	32.2	15	23.3	6	160	83	
NACOCOLEVU	191	66	9	60	15	32.1	0.9	23.4	1.1	35.1	8	20.0	2	156	87	
ROTUMA	377	106	22	109	2	31.6	1.0	25.5	0.8	32.6	23	24.1	3	210	124	
VIWA	168	67	9	68	11	32.7	1.6	25.1	0.1	34.4	9	22.1	13			
UDU POINT	99	32	14	38	5	31.7	1.2	25.2	0.9	33.0	10	22.5	10			
SAVUSAVU AIRFIELD	205	74	22	31	10	31.0	0.4	23.2	-0.3	34.9	16	20.9	23			
LABASA AIRFIELD	105	27	10	60	21	32.2	0.5	22.0	-0.2	33.8	9	20.0	7			
NABOUWALU	234	75	14	37	17	31.5	1.3	24.7	0.5	33.5	9	22.0	27			
KORONIVIA	263	68	17	54	5	31.0	0.6			33.6	8					
NAUSORI AIRPORT	313	86	21	61	5	30.5	0.1	23.0	-0.2	33.0	8	19.7	1			
NAVUA/TOKOTOKO	415	105	16	92	19	30.5	0.0	22.8	1.4	33.8	14	17.5	26			
MONASAVU	401	66	26	76	29	26.7	1.2	19.0	0.0	32.0	4	15.7	1			
LAUTOKA AES	203	55	13	71	11	31.3	0.3	23.9	0.2	33.5	22	17.0	21			
BA/RARAWAI MILL	327	81	15	54	11	32.2	0.1	22.9	0.8	34.5	8	20.4	1			
PENANG MILL	137	35	15	37	5	NO OBSERVATION										
MATEI AIRFIELD	114	32	16	21	21	31.0	0.9	23.5	-0.6	32.4	16	20.8	26			
VANUABALAVU	234	104	14	58	18	30.8	0.7	24.9	0.5	32.0	17	22.1	4			
LAKEBA	132	54	14	39	27	31.7	1.6	24.5	0.5	33.7	20	21.1	28			
VUNISEA	146	51	13	25	3	30.4	0.5	24.0	0.6	32.2	8	20.6	23			
MATUKU	101	37	12	55	10	30.0	-0.2	24.6	0.2	31.8	7	21.4	24			
ONO-I-LAU	132	75	14	42	9	30.8	1.6	23.9	-0.3	33.7	8	21.7	23			
SEAQAQA	178	43	19	33	5											
DREKETI	312	82	15	75	18											
DOBUILEVU	177	45	19	30	21											
YASAWA-I-RARA	111	48	8	45	5											
VATUKOULA	195	45	17	41	11											

	TEMPERATURE (C)		HUMIDITY		WIND	SUN RAD		
	MEAN		DRY	WET		RH%	VP	%OF MJ/ POS SQ.M
	(AVERAGE AT 9AM)							
NADI AIRPORT	27.4	28.6	25.1	75	29.1	6.2	61 23.3\$	
SUVA/LAUCALA BAY	27.7	28.2	25.4	79	30.2		41 19.6\$	
NACOCOLEVU	27.8	28.9	25.1	74	29.0		49 21.2\$	
ROTUMA	28.6	29.5	26.6	79	32.6		55 22.7\$	
VIWA	28.9	29.8	26.6	77	32.4			
UDU POINT	28.5	29.8	26.3	76	31.6			
SAVUSAVU AIRFIELD	27.1	28.6	25.6	78	30.6			
LABASA AIRFIELD	27.1	28.7	25.0	73	28.7			
NABOUWALU	28.1	29.0	26.3	80	32.0			
KORONIVIA	26.1	27.9	25.4	82	30.6			
NAUSORI AIRPORT	26.8	27.4	25.2	83	30.2	2.7		
NAVUA/TOKOTOKO	26.7	26.0	24.5	88	29.7			
MONASAVU	22.8	23.3	21.6	86	24.6			
LAUTOKA AES	27.6	28.7	25.6	77	30.4			
BA/RARAWAI MILL	27.6	28.5	25.3	77	29.8			
PENANG MILL	NO OBSERVATION							
MATEI AIRFIELD	27.2	28.8	25.8	78	30.8			
VANUABALAVU	27.8	28.9	26.1	79	31.6			
LAKEBA	28.1	28.8						
VUNISEA	27.2	27.6	24.9	81	29.5			
MATUKU	27.3	27.8	24.7	77	28.7			
ONO-I-LAU	27.4	27.8						

MEAN TEMPERATURE IS (MAX+MIN)/2; WIND IS MEAN SPEED AT 06,12,18,24HOURS; \$: 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; U/S: UNSERVICEABLE; **DATA MISSING ON ONE OR MORE DAYS.**

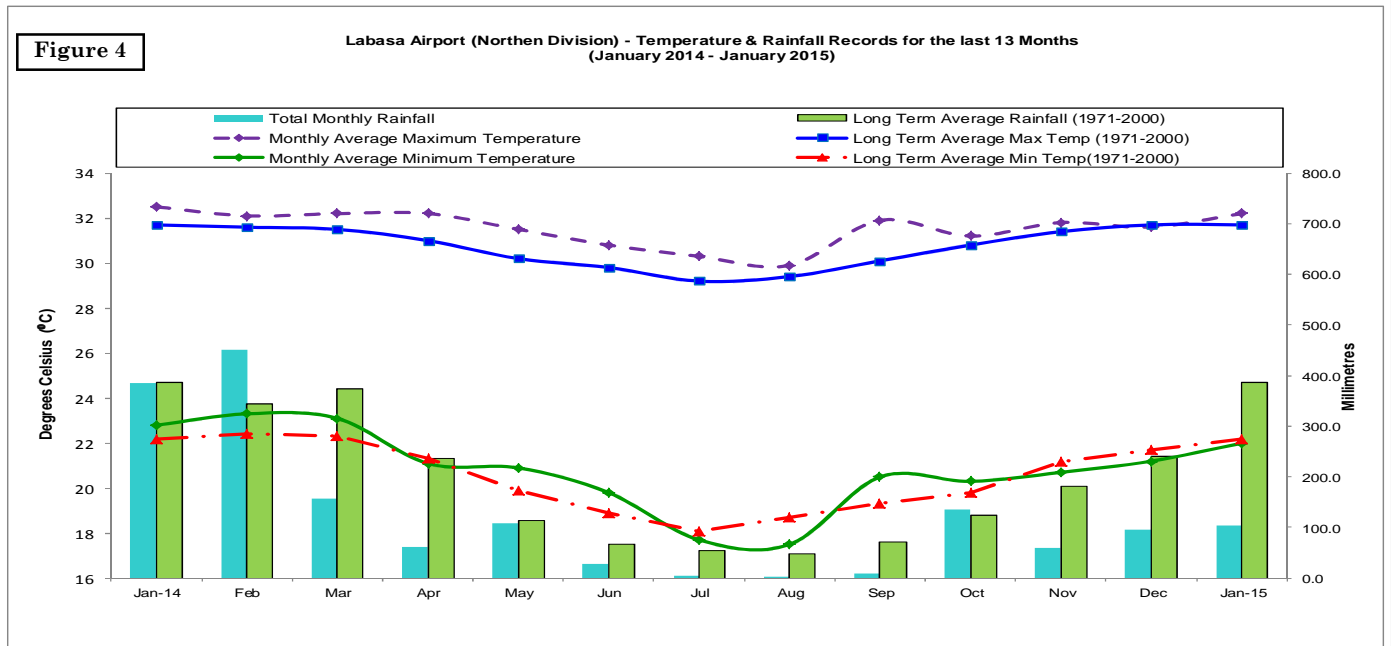
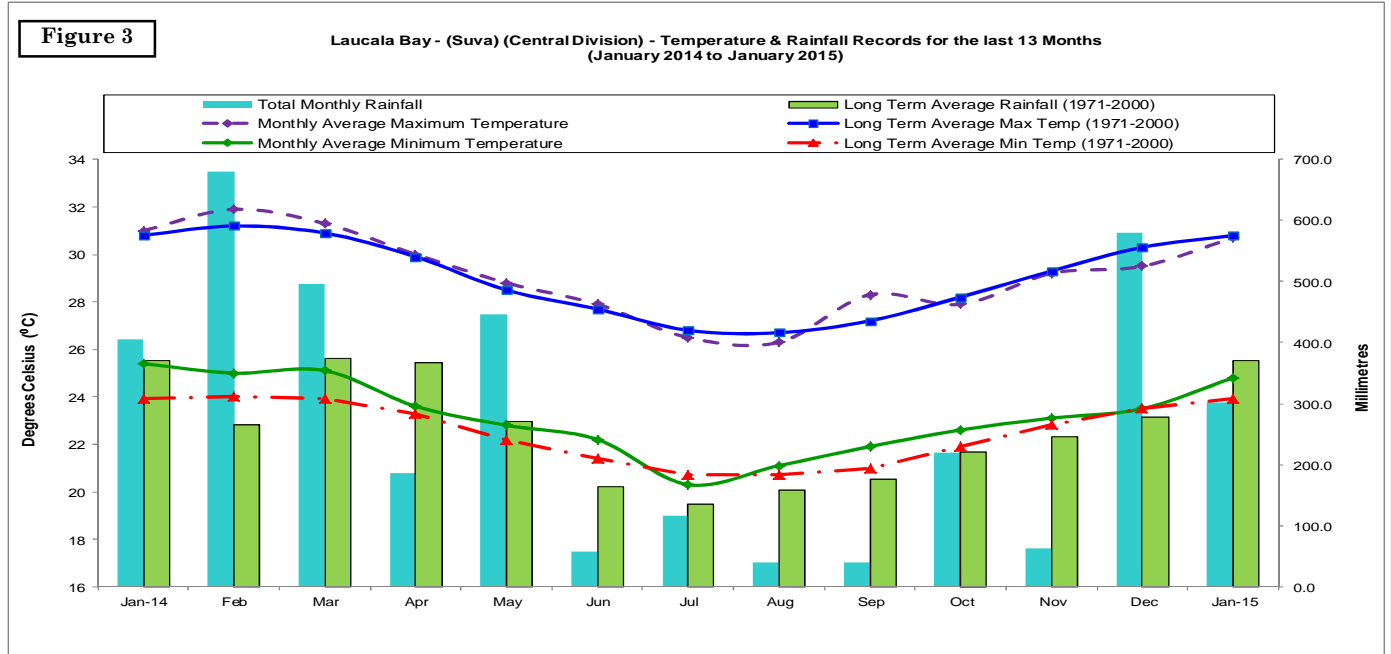
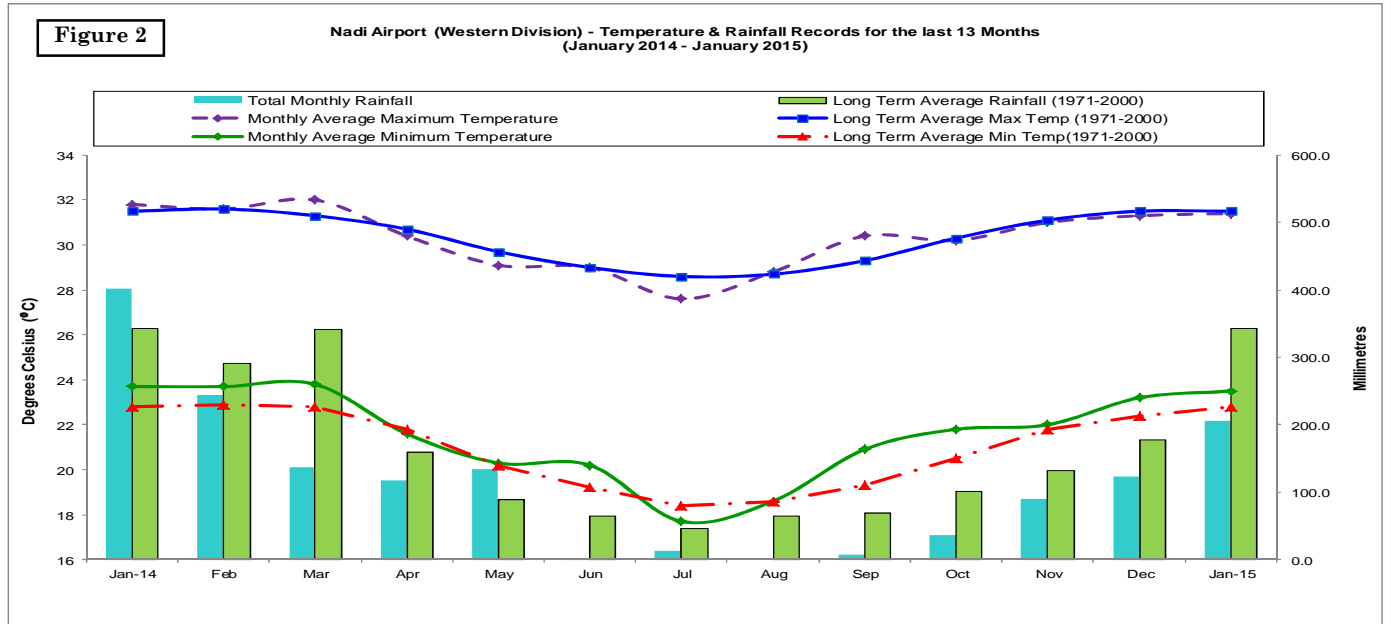
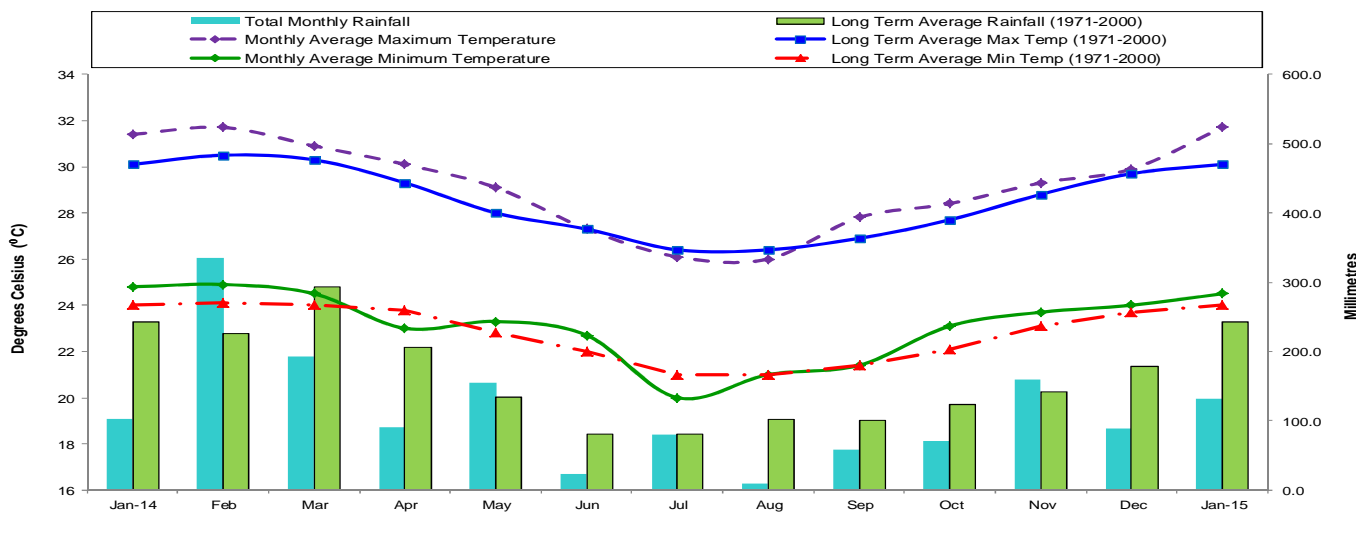


Figure 5

Lakeba (Eastern Division) - Temperature & Rainfall Records for the last 13 Months (January 2014 - January 2015)



5.0 RELATIVE HUMIDITY AT 0900HOURS

The 9am average relative humidity (RH) varied between 73% and 88% (Table 2) with the daily values expanding from 51% to 99%.

The Western Division stations recorded daily average RH values between 74% and 77%. Nadi Airport and Lautoka Mill recorded positive mean monthly RH departures of +3.2% and +2.0% from the *normal*, respectively. On the other hand, Nacocolevu (Sigatoka), Viwa and Rarawai Mill (Ba) recorded negative anomalies of -5.4%, -0.3% and -0.2%, respectively.

The Central Division stations recorded daily average RH values between 79% and 88%. Majority of the stations recorded positive mean monthly RH departures from the *normal*, with the greatest anomaly of +5.2% observed at Tokotoko (Navua). On the other hand, Laucala Bay (Suva)

was the lone station to record a negative anomaly (-1.9%).

The daily average RH in the Northern Division ranged from 73% to 80%. Negative anomalies were observed at majority of the stations, with the greatest departure of -4.9% recorded at Labasa Airport. On the other hand, Nabouwalu was the lone station to record a positive anomaly (+1.4%).

The stations in the Eastern Division registered daily average RH between 77% to 81%. Vunisea (Kadavu) and Vanuabalavu recorded positive anomalies of +2.0% and +1.0%, respectively. On the other hand, Matuku recorded negative anomaly of -0.2%.

The daily average RH at Monasavu was 86% and 79% AT Rotuma.

6.0 SUNSHINE

Rotuma, Nadi Airport and Laucala Bay (Suva) recorded 124%, 112% and 83% of the *normal* bright sunshine hours, respectively, during the month (Table 2).

Nadi Airport recorded 236.7 hours of bright sunshine, with a mean of 7.6 hours/day. More than 10 hours of bright sunshine was recorded on a number of days, with the highest of 12.2 hours recorded on the 29th. In contrast, 12th and 15th were overcast days with no bright sunshine hours recorded.

Laucala Bay (Suva) recorded 159.5 hours of bright sunshine during the month, with a mean of 5.1 hours/day. Its highest daily sunshine of 10.3 hours was recorded on the 25th, followed by 10.2 hours on the 24th and 31st. There was no overcast day at Laucala Bay.

Rotuma recorded 210.1 hours of bright sunshine, with a mean of 6.8 hours/day. The station's longest duration of bright sunshine of 11.0 hours was recorded on the 9th, followed by 10.6 hours on the 7th. On the other hand, 5th was overcast with no bright sunshine hours recorded.

Nacocolevu's analysis for January is not available due to missing observations.

7.0 WIND SUMMARY

The 10-minute average wind statistics recorded every three hours at Nadi Airport in January showed that easterly winds were dominant, accounting for 27.8% of the total observations, followed by westerlies with 20.6% and south easterlies, 16.9% (Figure 6(a)). Calm conditions were recorded on only 3.2% of the occasions. The 10-minute average wind speeds were light to moderate in strength (Figure 6(b)). The three-hourly mean wind speed at the station was 5.9 knots.

At Nausori Airport, calm conditions dominated on more than half of the occasions, accounting for 57.7% of the total three-hourly observations. Otherwise, south easterly winds were dominant, accounting for 16.1% of the observations, followed by southerly winds with 9.3% (Figure 7 (a)). The 10-minute average wind speeds were light to

moderate in strength (Figure 7(b)). The three-hourly mean wind speed at Nausori Airport was 2.8 knots.

Incidentally, the wind anomalies map on the NOAA website shows south westerly wind anomalies of 1-2m/s persisted in the Fiji region during the month (Figure 12).

Note:

light air: 1-3 knots, light breeze: 4-6 knots, gentle breeze: 7-10 knots, moderate breeze: 11-16 knots, fresh breeze: 17-21 knots, strong breeze: 22-27 knots, near gale: 28-33 knots; gale: 34-40 knots; strong gale: 41-47 knots

Figure 6(a) Surface Wind Direction for Nadi Airport, Fiji. (WMO 91680 Lat 17°45'35"South Long 177°26'42"East Height above MSL 22m)

Figure 6(b) Surface Wind Speed for Nadi Airport, Fiji. (WMO 91680 Lat 17°45'35"South Long 177°26'42"East Height above MSL 22m)

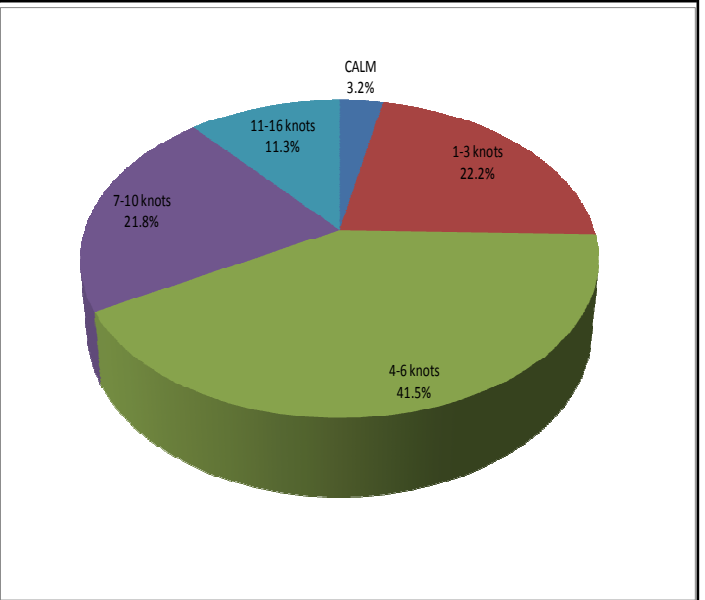
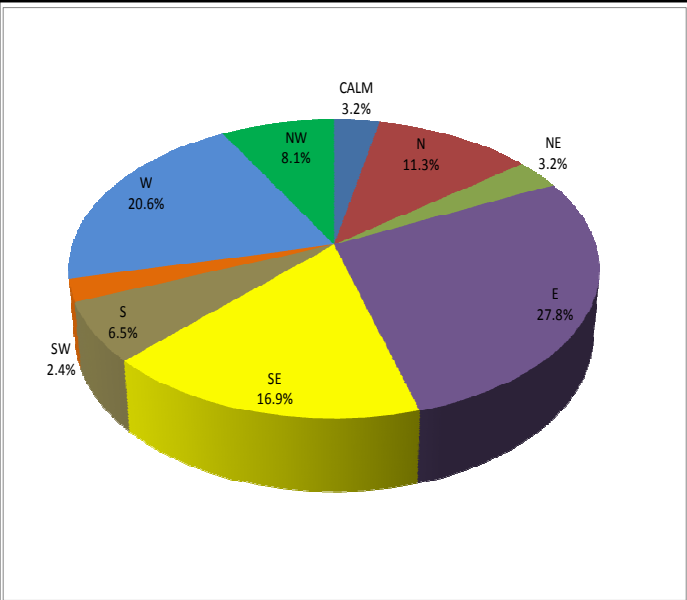
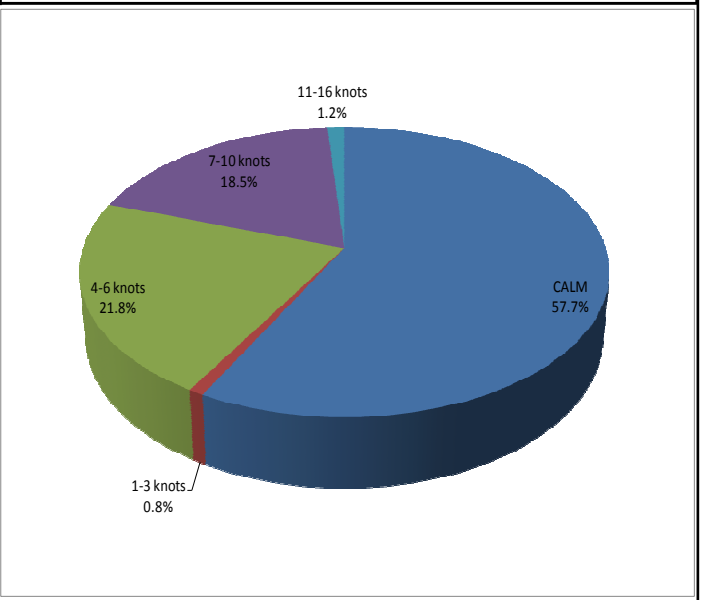
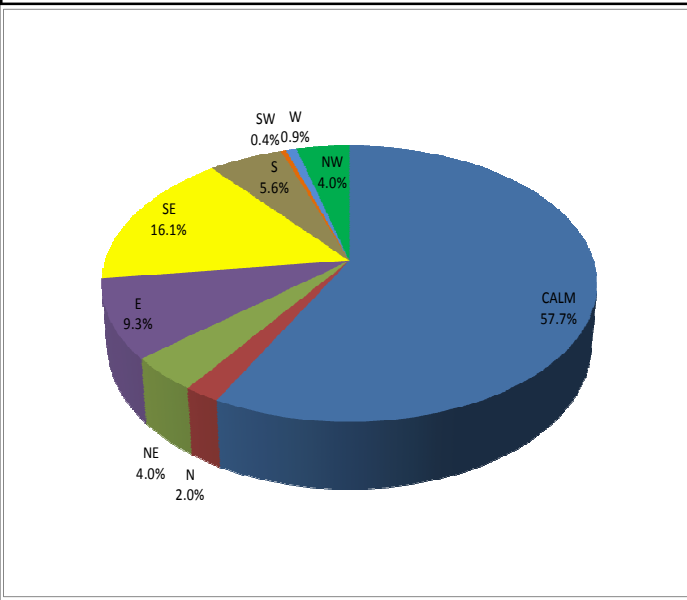


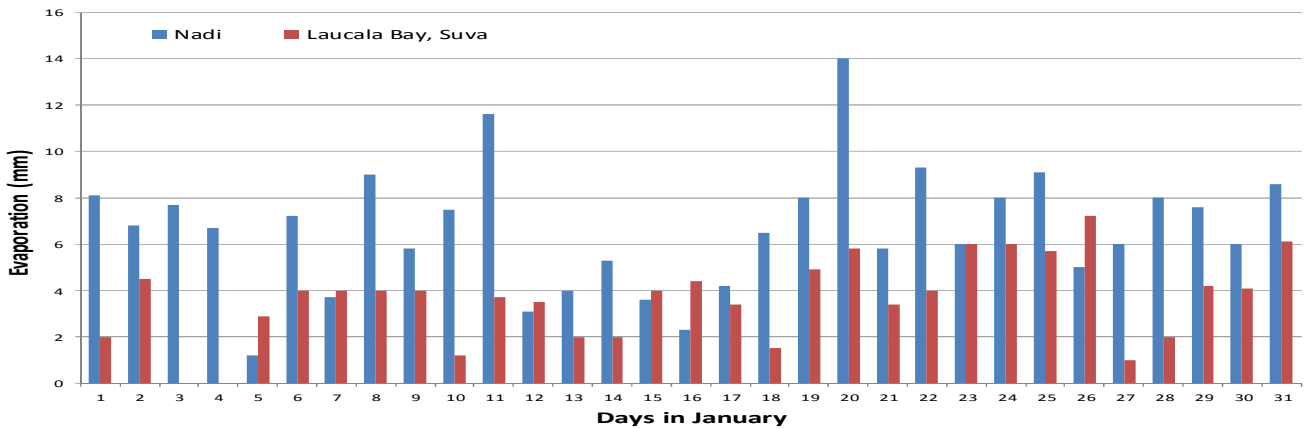
Figure 7(a) Surface Wind Direction for Nausori Airport, Fiji. (WMO 91683 Lat 18°02'47"South Long 178°33'33"East Height above MSL 3m)

Figure 7(b) Surface Wind Speed for Nausori Airport, Fiji. (WMO 91683 Lat 18°02'47"South Long 178°33'33"East Height above MSL 3m)



8.0 EVAPORATION

Figure 8 Daily Evaporation for January 2015



The total monthly raised pan evaporation at Nadi Airport was 205.7mm, while Laucala Bay recorded 111.5mm. Nadi Airport's highest daily evaporation was 14.0mm on the 20th, with Laucala Bay (Suva) recording the highest of 7.2mm on the 26th.

9.0 RADIATION

Due to a technical fault with the Nadi Airport Solar Radiation Recorder, no analysis is provided for January.

SEA SURFACE TEMPERATURE (SST)

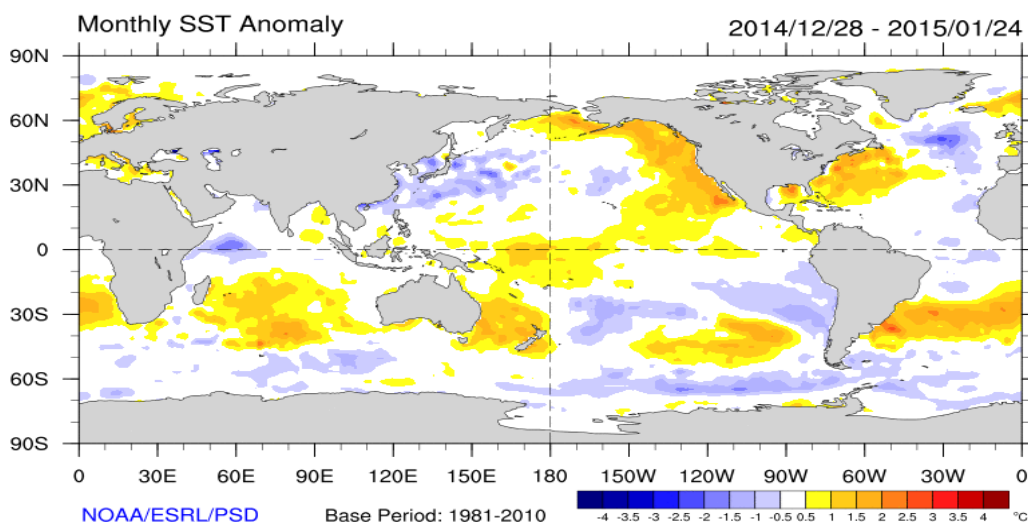


Figure 9:

SST anomalies (°C) for the period 28th December, 2014 to 24th January, 2015.

SST was above normal north of Viti Levu, while it was near normal on the south of this region (base period: 1981-2010).

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

CLOUD COVER

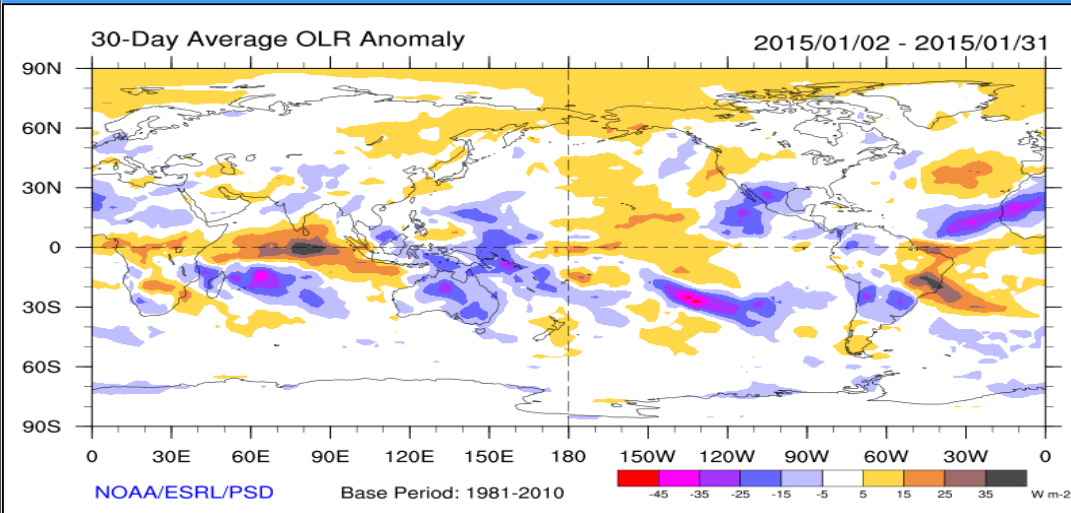


Figure 10:

Outgoing Longwave anomalies (Wm^{-2}) from 2nd to 31st January, 2015. Cloudiness was near *normal* in the Northern Division, while slightly *above normal* cloudiness was observed over rest of the Divisions (base period: 1981-2010).

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

SEA LEVEL

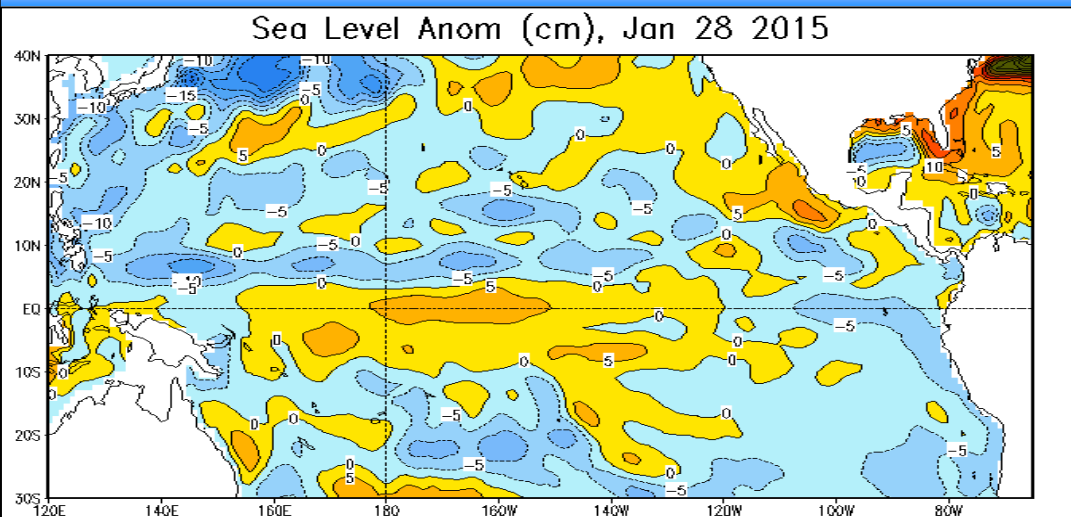


Figure 11:

Sea Level *normal* to slightly *above normal* in the Fiji region (Fiji: ~17°S, 180°) during the month (base period: 1981-2010).

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

WIND ANOMALIES

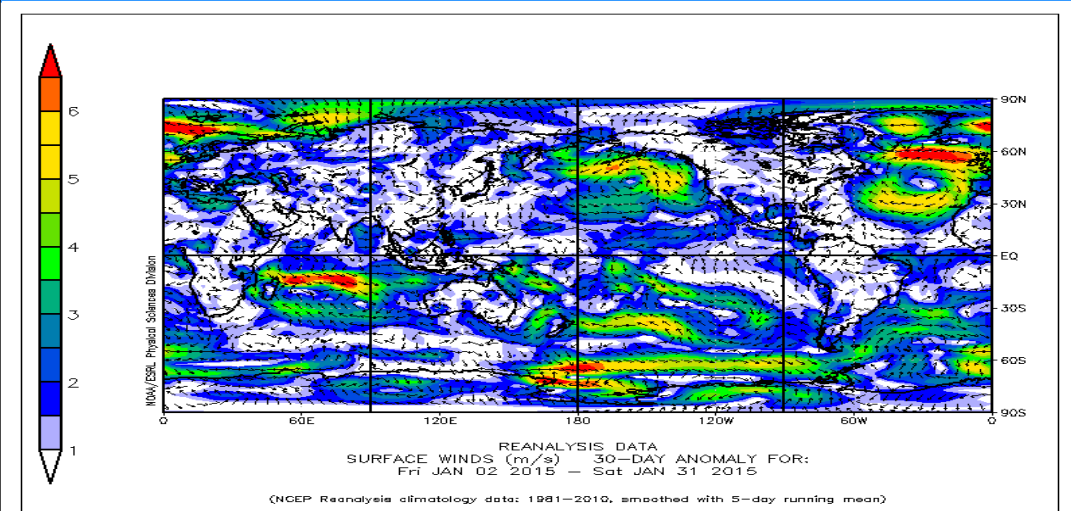


Figure 12:

The map shows south westerly wind anomalies of 1-2m/s in the Fiji region (Fiji: ~17°S, 180°) during the past 30 days (base period: 1981-2010).

http://www.esrl.noaa.gov/psd/map/images/rnl/sfcwnd_30a.ml.gif

This Summary is prepared as soon as ENSO, climate and oceanographic data is received from recording stations around Fiji and Meteorological Agencies around the World. Delays in data collection, communication and processing occasionally arise. While every effort is made to verify observational data, the Fiji Meteorological Service does not guarantee the accuracy and reliability of the analyses presented, and accepts no liability for any losses incurred through the use of this information and its contents. The information may be freely disseminated provided the source is acknowledged.

For further information, contact: The Director of Meteorology, Fiji Meteorological Service, Private Mail Bag NAP0351, Nadi Airport, Fiji. Phone: (679) 6724888, Fax: (679) 6720430, E-mail: fms@met.gov.fj or climate@met.gov.fj. URL: <http://www.met.gov.fj>