

Fiji Islands Climate Summary

February 2009

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IN BRIEF

Following on from a very wet January, February rainfall was generally near normal across Fiji's main islands. The ocean and atmospheric pattern experienced in the Fiji region was typical of a weak *La Niña* ENSO period with a dominant northerly to easterly wind flow, more active than normal afternoon thunderstorms, warmer than normal sea surface temperatures to the south of the Group and higher than normal sea levels.

Above average rainfall (>119% of normal) was received at Nacocolevu and Vunisea and *below average* rainfall (<80% of normal) across most of the Lomaviti, Lau, Yasawa and Mamanuca Groups, Matei, Monasavu and Yaqara.

Rainfall over the December 2008 to February 2009 period was predicted to be *average to above average*. *Above average* rainfall was received at 18 sites and *average* rainfall at five sites.

A significant rainfall deficiency on a 3- and 6-month scale exists at Rotuma. This is due to the South Pacific Convergence Zone (SPCZ) being displaced southwest of normal its normal position due to the *La Niña* conditions. Rainfall is expected to return to normal over the coming months

as the SPCZ moves northward.

Maximum and minimum air temperatures were *near average* across most of the country in February. A new monthly mean air temperature of 31.6°C was recorded at Ono-i-Lau during the month. Sunshine hours were also *near average*.

The El Niño-Southern Oscillation (ENSO) status is *La Niña* as of the end of February. For the *March to May* 2009 period, *above average* rainfall is favoured across the Western and Eastern Divisions, *average* or *above average* rainfall across the Northern Division and Rotuma and equal chances of *below average*, *average* and *above average* rainfall in the Central Division.

The 2008/09 Southwest Pacific tropical cyclone (TC) season commenced on November 1, 2008 and will continue until April 30. At least one TC may pass through Fiji's EEZ during the remaining two months of the season. Tropical cyclones activity in May and June is unlikely as *El Niño* conditions do not exist at the present time.

WEATHER PATTERNS

There was no tropical cyclone activity in the Fiji region in February. Moist northerly winds were dominant during the first half of the month while troughs dominated during the second half of February which brought in further rain over the country. Afternoon showers and thunderstorms were a common phenomena for most of the month especially about the main islands.

From 1 to 7 February, moist northwesterly winds prevailed over the country. A trough to the southwest moved east over the southern parts of the Group during this period resulting in most parts of the country receiving significant rainfall. Penang and Vunisea receiving 114 and 64 mm respectively on 3 February. A weak ridge of high pressure developed over Fiji on 8 and 9 February which directed southeasterly winds over the country.

From 10 to 16 February, moist northerly winds dominated the weather pattern together with a trough lying to the southwest of the country. Rainfall was received across most of Fiji during this period. The same trough

moved east then retrogressed across the country from 18 to 24 February. Navua and Ba received 52 and 47mm on 19 and 20 February respectively. Two more troughs traversed west across the country from 25 to 27 February further contributing to February rainfall. A ridge of high pressure to the far southeast began directing southeasterlies over the country on 28 February.

Rainfall was recorded at Rotuma on 21 of the 28 days of the month and this was mainly due to the moist northeasterly flow over the island. The highest 24 hour rainfall recorded during the month was 64mm on 12 February.

The SPCZ was divided into two parts in February. A component to the west of Fiji extending through Vanuatu towards Fiji and the another located to the north of Fiji extending towards the Southern Cook Islands.

RAINFALL IN RECENT MONTHS

Rainfall in February

Rainfall ranged from *below average* to *above average* across the country. *Average* rainfall was received across the Central Division except in the Tamavua-Lami region where rainfall was *below average*. Most of the Western and Northern Division received *average* rainfall, with the only exceptions being the Yasawa and Mamanuca Groups, northern Taveuni, interior of Viti Levu and around Yaqara where rainfall was *below average*. Nacocolevu received *above average* rainfall. In the Eastern Division rainfall was *below average* except at Matuku and Rotuma where rainfall was *average* and Vunisea where rainfall was *above average* (Table 1, Figures 1-4).

Rainfall in the last three months

Rainfall over the December 2008 to February 2009 period was favoured to be *average to above average* across the country. The confidence level of the prediction was *moderate*.

Of the 23 stations that reported in time for this summary, 18 stations received *above average* rainfall, while the rest recorded *average* rainfall (Table 2). Rainfall in excess of 1500mm was recorded at Penang, Monasavu, Nacocolevu, Lautoka, Nadi, Navua and Nabouwalu.

TABLE 1. PRELIMINARY CLIMATOLOGICAL SUMMARY FOR FEBRUARY 2009

	TOTAL MM	RAINFALL				AIR TEMPERATURES								SUNSHINE	
		* %	RAIN DAYS +	MAX. FALL MM	ON	AVERAGE DAILY				EXTREME				TOTAL HRS	* %
						MAX. C	# C	MIN. C	# C	MAX. C	ON	MIN. C	ON		
NADI AIRPORT	243	83	24	41	16	31.0	-0.6	22.9	0.0	32.5	7	21.6	22	174	93
SUVA/LAUCALA BAY	283	107	22	57	2	31.9	0.7	24.4	0.4	33.8	18	23.0	3	196	112
NACOCOLEVU	321	141	16	65	2	31.8	0.3	22.8	0.2	33.5	7	20.9	22	132	81
ROTUMA	263	82	21	64	12	30.7	0.1	24.6	-0.1	32.5	9	22.6	13	169	105
VIWA	169	70	17	48	11	31.6	0.3	24.7	-0.6	33.2	24	22.8	1		
UDU POINT	247	99	22	48	2	31.2	0.4	24.7	0.2	32.6	6	21.6	25		
SAVUSAVU AIRFIELD	258	106	21	40	21	30.6	-0.1	22.0	-1.8	33.0	27	20.9	13		
LABASA AIRFIELD	282	82	17	52	1	31.7	0.1	22.7	0.3	34.4	8	20.4	18		
NABOUWALU	284	103	19	63	1	31.0	0.6	24.0	-0.4	33.1	13	22.3	3		
KORONI VIA	268	90	20	100	4	31.1	0.3	23.4	0.5	33.0	13	22.3	1		
NAUSORI AIRPORT	255	95	19	47	4	31.1	0.3	23.0	-0.3	33.1	13	21.7	1		
NAVUA/TOKOTOKO	335	118	21	69	2	31.3	0.3	22.8	1.2	32.5	7	21.5	6		
MONASAVU	339	65	22	56	10	26.5	0.8	19.3	-0.1	28.5	16	18.2	15		
LAUTOKA AES	260	86	22	47	3	30.9	-0.2	23.5	-0.4	32.1	8	20.8	22		
BA/RARAWAI MILL	357	103	19	73	11	31.6	-0.4	22.5	0.2	33.1	8	20.2	23		
PENANG MILL	296	88	19	114	3	31.6	1.1	23.4	-0.5	33.4	19	21.9	15		
MATEI AIRFIELD	160	56	23	30	2	30.5	0.1	24.2	0.0	31.6	18	22.2	3		
VANUABALAVU	123	60	17	22	2	30.9	0.2	25.0	0.3	31.8	18	21.8	3		
LAKEBA	170	75	13	57	2	30.9	0.4	23.9	-0.2	32.5	15	22.0	11		
ST. JOHNS COLLEGE	115	43	23	21	24	30.8	0.2	24.4	-0.0	32.3	19	23.0	3		
VUNI SEA	288	125	20	71	26	31.0	0.6	24.2	0.6	32.5	7	23.1	12		
MATUKU	221	119	14	54	2	29.5	-1.2	23.6	-1.1	31.5	27	20.5	1		
ONO-I-LAU	108	55	9	37	26	31.6	1.8	25.1	0.5	33.5	7	22.6	1		
DREKETI	338	112	21	62	28										
SEAQAQA AGRI.	359	92	19	59	20										
LAMI	191	60	14	43	2										
TAMAVUA	239	73	20	44	2										
YASAWA-I-RARA	179	74	16	36	3										
YAQARA	190	58	8	47	1										
VATUKOULA	317	82	20	54	11										
DOBUI LEVU	349	104	22	54	26										

ENSO STATUS and RAINFALL OUTLOOK - MARCH TO MAY 2009

The warming exhibited at the surface of the eastern to central equatorial Pacific Ocean during January has not been sustained into February, with current sea surface temperatures in the far-eastern Pacific remaining on the cool side of Neutral. Trade Winds, which had weakened during January, are now stronger than normal in the western half of the basin, though remain weaker in the east. Likewise, the SOI shows stronger positive value, with a 30-day value of +14.8.

Computer models show mixed predictions with 11 out of 15 models favouring *Neutral* conditions while the rest favour *La Niña* conditions. For the *March to May 2009* period, *above average* rainfall is favoured across the Western and Eastern Divisions, *average* or *above average* rainfall across the Northern Division and Rotuma and equal chances of *below average*, *average* and *above average* rainfall in the Central Division. The confidence level of this prediction ranges from very low in the Central Division to good in the Northern and Eastern Division.

(More detailed climate predictions will follow in the 'Fiji Islands Climate Outlook' to be released in mid March)

Normal - Long term average from 1971 to 2000.

Well Below Average - Rainfall less than 39%.

Below Average - Rainfall between 40 to 79%.

Average - Rainfall between 80 to 119%.

Above Average - Rainfall between 120 to 199%.

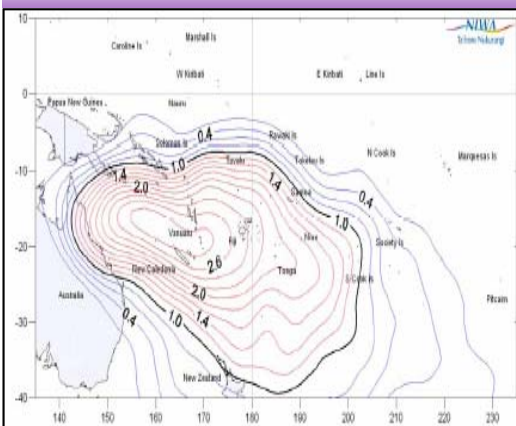
Well Above Average - Rainfall more than 200%.

TABLE 2. THREE MONTH RAINFALL : DECEMBER 2008 TO FEBRUARY 2009

<u>Station</u>	<u>Actual Rainfall (mm)</u>	<u>Rainfall in the last three months (Below average, average or above average)</u>	<u>No. of Rain days in December 08 (% of total rain)</u>	<u>No. of Rain days in January 09 (% of total rain)</u>	<u>No. of Rain days in February 09 (% of total rain)</u>
Penang Mill, Rakiraki	1765.8	Above Average	20 (14)	24 (69)	19 (17)
Monasavu Dam	2301.9	Above Average	26 (18)	29 (67)	22 (15)
*Rarawai Mill, Ba	1261.7	Above Average	16 (15)	19 (57)	19 (28)
*Nacocolevu	1671.3	Above Average	16 (17)	25 (64)	16 (19)
Viwa Island	1273.4	Above Average	13 (12)	24(75)	17 (13)
Lautoka (FSC Res.)	1667.6	Above Average	14 (7)	24 (77)	22 (16)
Nadi Airport	1693.9	Above Average	19 (16)	25 (70)	24 (14)
Tokotoko, Navua	1593.5	Above Average	19 (29)	29 (50)	21 (21)
Laucala Bay, Suva	1177.4	Above Average	23 (14)	25 (62)	22 (24)
Koronivia	1169.0	Above Average	21 (21)	23 (56)	20 (23)
Nausori Airport	1145.4	Above Average	21 (21)	25 (57)	19 (22)
Nabouwalu	1877.0	Above Average	22 (11)	26 (74)	19 (15)
Labasa Airport	1455.1	Above Average	21 (19)	22(62)	17 (19)
Savusavu Airport	1106.4	Above Average	11 (8)	24 (69)	21 (23)
Udu Point	1255.4	Above Average	23 (24)	21 (56)	22 (20)
Matei Airport	911.2	Average	20 (23)	28 (59)	23 (18)
Vanuabalavu, Lau	623.7	Average	20 (25)	15 (55)	17 (20)
Lakeba, Lau	746.0	Above Average	13 (17)	21 (61)	13 (22)
Matuku, Lau	570.9	Average	7 (13)	14 (48)	14 (39)
*Ono-I-Lau, Lau	474.3	Average	7 (23)	(54)	9 (23)
Levuka, Ovalau	1004.8	Above Average	21 (17)	23 (72)	23 (11)
Vunisea, Kadavu	938.7	Above Average	16 (12)	25 (58)	20 (30)
Rotuma	900.4	Average	20 (15)	24 (56)	21 (29)

* Data missing : Ono-I-Lau; 2days in Dec & 6days in Jan, Nacocolevu; 17days in Jan & 1day in Feb, Rarawai; 10days in Jan and Koronivia:1day in Feb

TROPICAL CYCLONE SEASON 2008/09



The map above shows average number of tropical cyclones during *Neutral* ENSO periods, from 1969/70 to 2007/08. Source: NIWA, 2008 (<http://www.niwa.cri.nz/news/2008/2008-09-18>).

For the region east of 160°E (RSMC-Nadi region), an average of seven Tropical Cyclones (TCs) form a season. With the current weak La Niña ENSO state, *below average* TC activity is expected in the South Pacific region east of the Date Line over the remaining months of the season. Above average activity is expected in the Solomon Islands, Vanuatu and New Caledonia region. On *average*, about half of the TCs that develop in the entire South Pacific region reach category 3 or hurricane intensity with mean wind speeds greater than 64 knots.

The first tropical depression (TD) of the season didn't develop until Dec 1. Since then ten TDs have formed in the RSMC-Nadi region along with two developing into TCs. TC Hettie developed on Jan 28 in the southern Tonga region and TC Innis on Feb 17 near New Caledonia. Four of the ten TDs developed in the Cook Islands region. In fact, the first three of the season developed in this area. The remaining six TDs formed west of the Date Line in the Vanuatu-Fiji region. In addition to the above two TCs, two TCs have developed in the western South Pacific east of 160E making four the total for the South Pacific so far this season.

Figure 1

**Nadi Airport - Temperature & Rainfall Records for the last 13 Months
(February 2008 - February 2009)**

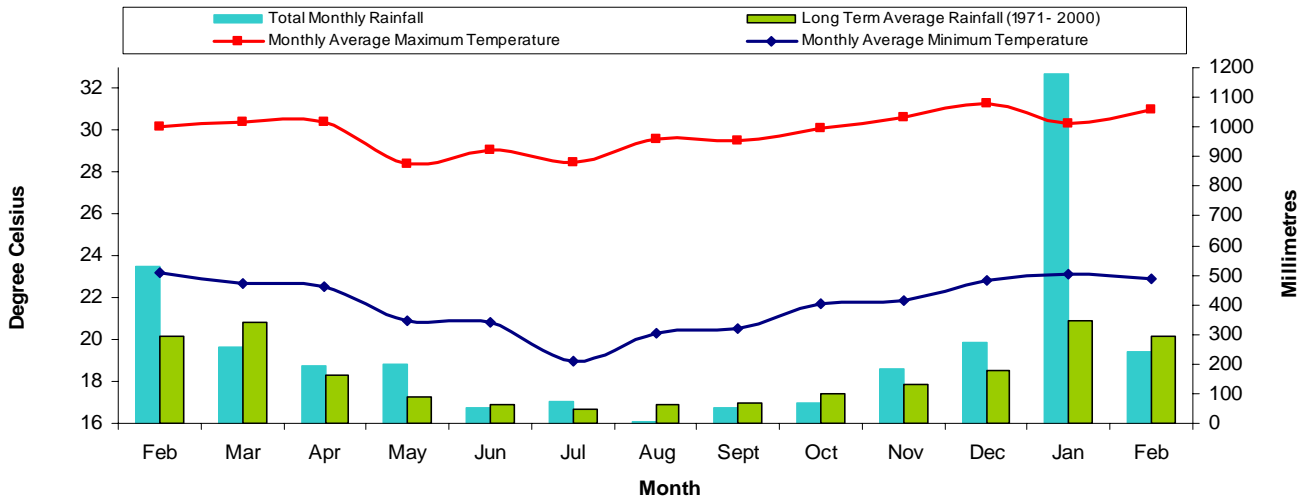


Figure 2

**Labasa Airfield - Temperature & Rainfall Records for the last 13 Months
(February 2008 - February 2009)**

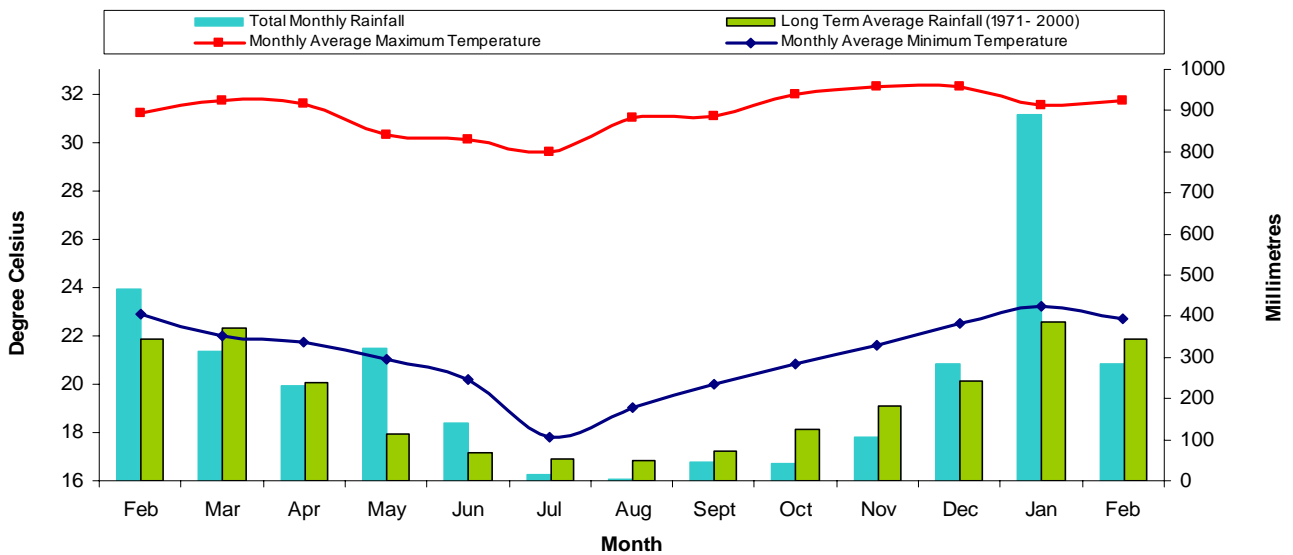
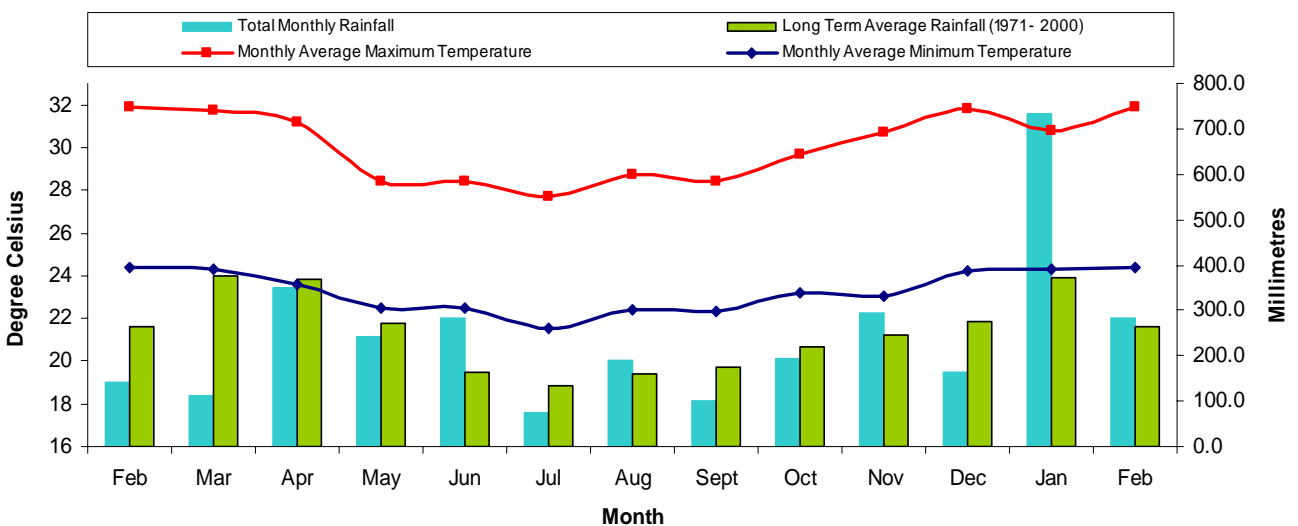


Figure 3

**Laucala Bay/Suva - Temperature & Rainfall Records for the last 13 Months
(February 2008 - February 2009)**



AIR TEMPERATURES, RELATIVE HUMIDITY AND SUNSHINE IN FEBRUARY

Maximum Air Temperatures were *near average* at most sites across the country. The greatest positive departures from normal were recorded at Ono-I-Lau (+1.8°C) and Penang Mill (+1.1°C) and the greatest negative departures were recorded at Matuku (-1.2°C) and Nadi Airport (-0.6°C) (Table 1).

Minimum Air Temperatures were also *near average* at most sites. The greatest negative departures were recorded at Savusavu Airport (-1.8°C) and Matuku (-1.1°C). The greatest positive departures were recorded at Tokotoko (Navua) (1.2°C) and Vunisea (Kadavu) (0.6°C) (Table 1).

A monthly mean maximum air temperature record was established during the month at Ono-i-Lau (Table 3).

Sunshine hours were *near average* at all recording sites. (Table 1).

Positive **Sea Level** anomalies in the order of 5cm to 15cm existed in the Fiji region in February. The greatest anomalies were to the north of the Fiji Group (Figure 6).

Relative Humidity at 0900hrs were generally *average to below average* in most parts of the country. The greatest negative anomalies were recorded at Penang Mill (-7.6%), St. John's College, Levuka (-6.8%), Matuku (-4.5%) and Nabouwalu (-3.9%). The greatest positive anomaly was recorded at Nadi Airport (2.8%) and Nausori Airport (2.2%).

The Outgoing Longwave Radiation (OLR, proxy of cloudiness) shows *near average* cloud cover over the Fiji region in February (Figure 4).

Positive **Sea Surface Temperatures** anomalies in the order of 0.5 to 1.0°C continued exist in the Fiji region in February (Figure 5). The highest positive anomalies in the southernmost part of the Group.

Wind (speed) was generally *below average* at all wind recording sites around the country. Satellite images show positive easterly anomalies between 1.5-4.0m/s across the northern part of Fiji and *near average* or *below average* wind speeds elsewhere except for the far south of the country (Figure 7).

TABLE 3. CLIMATE RECORDS ESTABLISHED IN FEBRUARY 2009

<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>
Mean Mthly Max Temperature	Ono-I-Lau	31.6°C		New High	31.4°C	2001	1943

CLOUD COVER IN FEBRUARY 2009

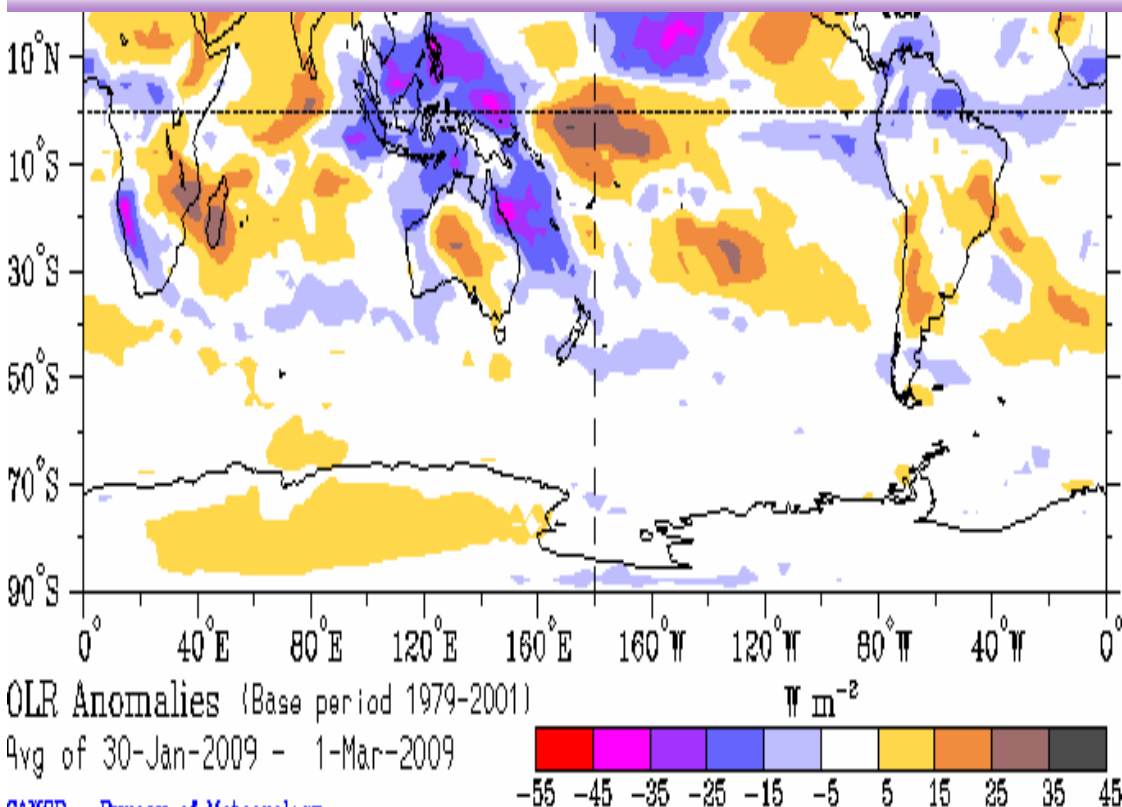


Figure 4. Southern Hemisphere Outgoing Longwave Anomalies (Wm^{-2}) for the period of Jan 30 to Mar 1, 2009. Near normal cloud cover existed across the Fiji over February (~17°S, 180°).

<http://www.bom.gov.au/bmrc/clfor/cfstaff/matw/maproom/OLR/m.lm.html>

This summary is prepared as soon as possible following the end of the month, once climate data is received from various recording stations around Fiji and ENSO information is received from various 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 analysis and rainfall predictions presented, and accepts no liability for any losses incurred through the use of this summary and its contents. The contents of the summary may be freely disseminated provided the source is acknowledged. All requests for data should be directed to the Fiji Meteorological Service HQ in Namaka, Nadi.

SEA LEVEL, SEA SURFACE TEMPERATURE AND WIND FLOW IN FEBRUARY

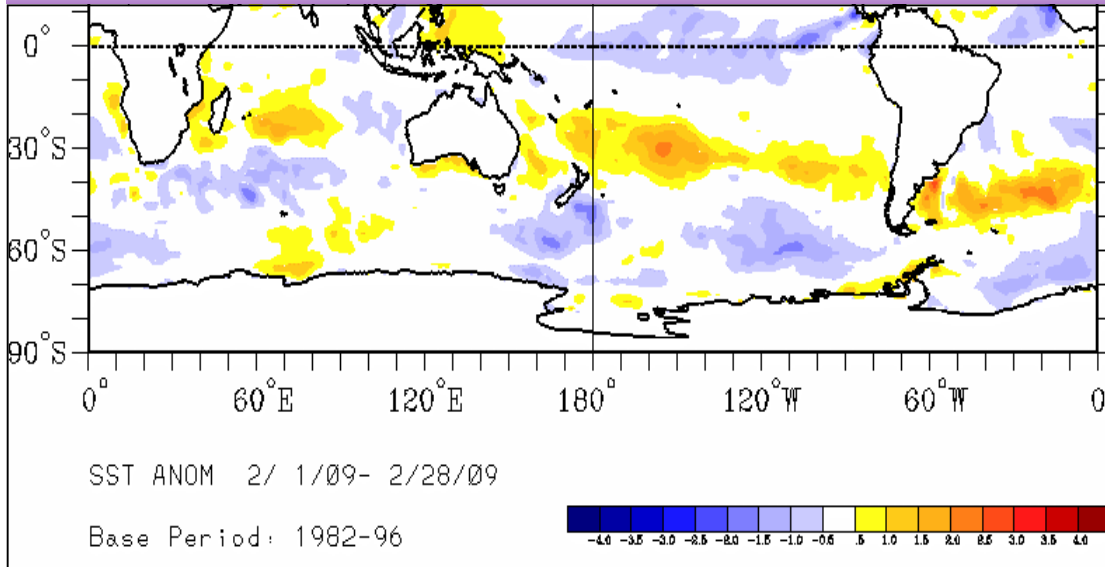


Figure 5. Southern Hemisphere SST Anomalies (°C) for the period of Feb 1 to Feb 28, 2009. Positive anomalies in the order of 0.5-1.0°C existed in the southern Fiji region, (~17°S, 180°).

<http://www.cdc.noaa.gov/map/images/sst/sst.anom.month.gif>

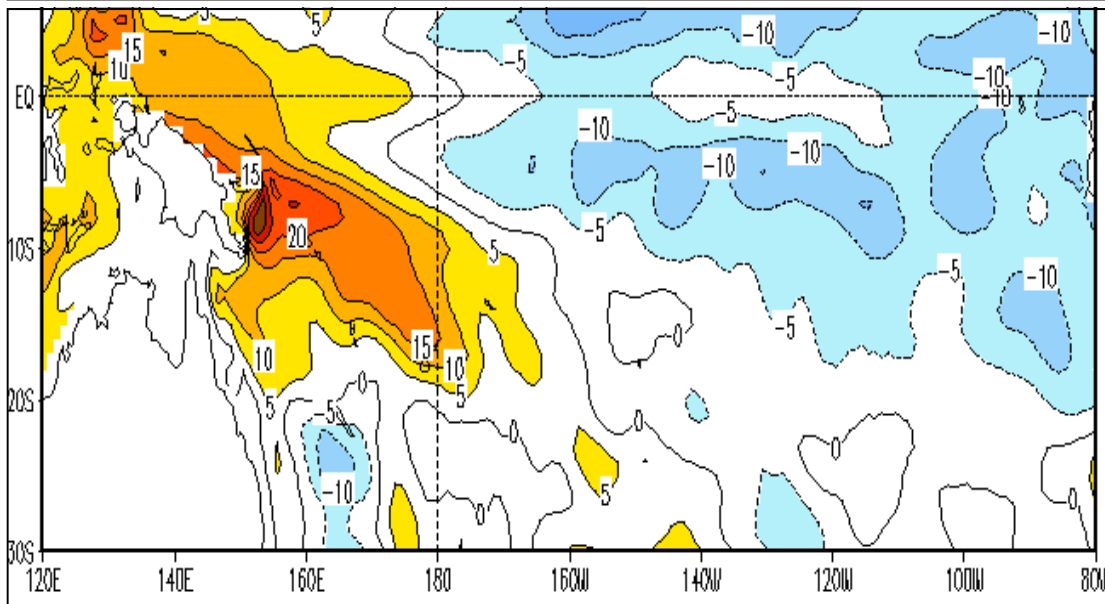


Figure 6. Southern Hemisphere Sea Level Anomalies (cm) as of Feb 27, 2009. Positive anomalies in the order of 5cm to 15cm existed in the Fiji region (~17°S, 180°).

http://www.cpc.noaa.gov/products/analysis_monitoring/enso_update/sealev.gif

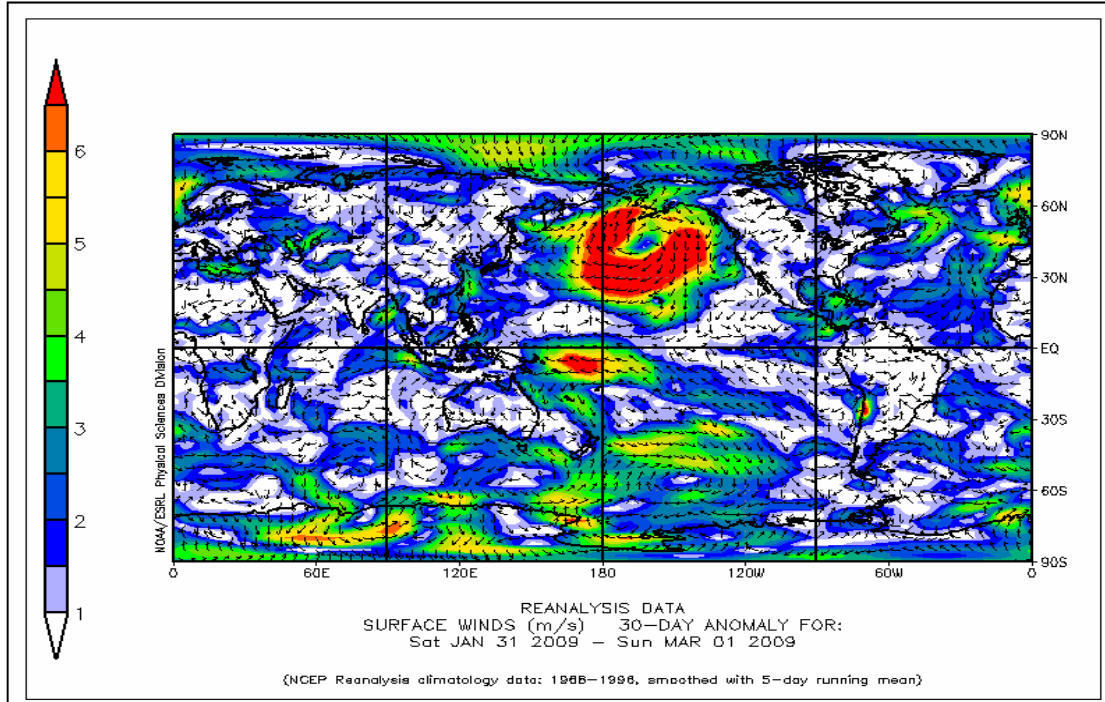


Figure 7. Global surface wind anomalies (m/s) for the period Jan 31 to Mar 01, 2009. Positive easterly anomalies existed in the northern Fiji region with near normal conditions elsewhere, except for the far south of the country (~17°S, 180°).

http://www.cdc.noaa.gov/map/images/rnl/sfcwnd_30a.rnl.html