

Fiji Islands Climate Summary

June 2009

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IN BRIEF

Intense ridges of high pressure and three major troughs of low pressure resulted in a cooler and wetter than normal conditions at a number of locations in Fiji in June. More than 80% of observation sites recorded *average to well above average* rainfall. Only four sites on the main islands and one site in the Lau Group recorded *below average* rainfall. Several sites recorded *well above average* rainfall. These were Dreketi (394% - new high), Nacocolevu (341% - new high), Seaqaqa Agriculture (329%), Matei (223%) and Viwa (221%).

Rainfall over the April to June 2009 period was favoured to be *average to above average*. Of the 28 stations that reported in time for this summary, 6 stations recorded *above average* rainfall, 15 received *average* rainfall while the rest recorded *below average* rainfall.

Maximum and minimum air temperatures were generally *average or below average* across the country in June. Four maximum air temperature records were established during the month. These were 32.0°C at both Laucala Bay-Suva and Lakeba which was a record high maximum temperature for the month of June and 21.9°C and 24.1°C which were record low maximum temperatures for Koronivia and Vanua Balavu respectively.

Near average sea surface temperatures existed in the Fiji Waters and sea level ranged from +5 to +10cm about the main islands in June. Sunshine hours were *average* at most sites. Satellite observations show cloud cover was slightly *above average*.

More evidence of a developing El Niño event has emerged over the past fortnight with more Climate models forecasting very little chance of the development stalling or reversing. Trade winds at the equator remained weaker than normal and cloudiness near the Date Line was near normal and yet to show a consistent trend towards El Niño conditions. Climate models predict the tropical Pacific to continue to warm and to be above El Niño thresholds throughout most of the second half of 2009.

For the *June to August* 2009 period, *equal chances of below average, average or above average* rainfall are favoured across Fiji and Rotuma.

WEATHER PATTERNS

Rainfall in June was associated with three major troughs of low pressure and a weak frontal system. In between the passage of the systems, intense ridges of high pressure directed strong, cool winds over the Fiji Group.

Trade showers associated with a broad southeasterly wind flow were received mainly on the windward sides of the larger islands from June 1 to 12.

The first of the three major troughs affected the Group from June 13 to 15. Daily rainfall totals during this period were below 25mm. This was followed Trade showers on the windward side of the larger islands as another ridge of high pressure affected the country on June 16 and 17. Meanwhile, a weak frontal system moved eastwards over the southern parts of the Group on June 16 before dissipating.

Another trough of low pressure affected the country from the June 16 to 22. Labasa recorded 86 mm of rainfall on

June 21.

Strong winds and cooler temperatures dominated the weather from June 23 to 25 as an intense ridge of high pressure over the Tasman Sea directed Trade showers over the eastern parts of the Group. Significantly low minimum temperatures were recorded at Ba-Rarawai Mill (12.4°C), Monasavu (13.4°C) and Nacocolevu (13°C) on June 25.

An active trough of low pressure that developed to the west of the country on June 26 moved over Fiji on June 29. Significant rainfall was recorded at Savusavu (100mm), Matei (88.2) and Vatukoula (57.6mm) on June 30.

Rainfall at Rotuma was generally due to the close proximity of the South Pacific Convergence Zone to the island. Notable rainfall was received on June 2 (106.9mm) and June 4 (89.0mm).

RAINFALL IN RECENT MONTHS**June Rainfall**

More than 80% of observation sites recorded *average to well above average* rainfall. *Well above average* rainfall was recorded at Nacocolevu, Viwa in the Mamanuca Group, Dreketi, Seaqaqa and Matei-Taveuni. *Above average* rainfall was recorded at Yasawa-i-Rara, Nadi and Lautoka in the Western Division, parts of the Northern Division, Lakeba and Ono-i-Lau in the Lau Group. Rainfall was *below average* at Penang, Udu Point, Laucala Bay (Suva) and Vanuabalavu. The rest of the country received *average* rainfall (Table 1, Figures 1-4).

The significant rainfall deficiency that existed for Matei and Rotuma has ended.

Three-month rainfall from April to June

Rainfall over the April to June 2009 period was favoured to be *average to above average* across the country. The confidence level of the prediction was *moderate*. Of the 28 stations that reported in time for this summary, 6 stations received *above average*, 15 received *average* rainfall while the remaining stations received *below average* rainfall.

Rainfall was *below average* in the Central Division, parts of the Eastern Division and at Monasavu (Table 2).

TABLE 1. PRELIMINARY CLIMATOLOGICAL SUMMARY FOR JUNE 2009

	RAINFALL				AIR TEMPERATURES								SUNSHINE		
	TOTAL MM	RAIN * DAYS % +		MAX. FALL MM ON	AVERAGE DAILY				EXTREME		TOTAL		*		
		C	#		C	#	C	MAX. C ON	MIN. C ON	HRS	%				
NADI AIRPORT	113	176	7	31	18	27.9	-1.1	19.9	0.7	30.8	28	16.9	25	172	84
SUVA/LAUCALA BAY	101	62	22	27	19	27.3	-0.4	21.6	0.2	32.0	29	19.0	21	105	75
NACOCOLEVU	259	340	8	189	21	27.5	-0.9	18.6	-0.1	32.1	29	13.0	25	123	82
ROTUMA	350	149	22	107	2	29.2	-0.4	24.9	0.3	31.1	29	23.1	3	154	82
VIWA	147	220	11	57	18	28.7	0.3	23.2	0.0	31.6	2	21.1	20		
UDU POINT	85	73	17	25	20	28.9	0.2	23.2	0.1	31.4	16	20.0	21		
SAVUSAVU AIRFIELD	189	159	15	100	30	27.6	-0.3	20.7	-0.9	31.8	17	17.6	21		
LABASA AIRFIELD	133	199	7	86	21	29.3	-0.5	19.8	0.9	32.2	16	14.5	25		
NABOUWALU	143	146	20	33	30	26.8	-0.3	22.2	-0.4	30.4	29	18.7	21		
KORONI VIWA	141	91	20	39	30	26.7	-0.7	20.4	0.1	31.0	29	17.0	25		
NAUSORI AIRPORT	152	101	17	39	30	26.3	-1.0	20.1	-0.4	30.5	29	17.5	10		
NAVUA/TOKOTOKO	173	88	20	38	19	26.4	-1.8	19.5	0.6	29.0	1	16.5	10		
MONASAVU	221	86	20	44	19	20.9	-0.9	16.0	-0.1	25.5	29	13.3	21		
LAUTOKA AES	96	133	9	25	16	28.2	-0.6	20.3	-0.4	30.3	29	15.4	25		
BA/RARAWAI MILL	76	85	8	20	18	29.4	-0.6	18.4	0.4	31.1	17	12.4	25		
PENANG MILL	79	79	13	30	30	27.6	-0.1	21.0	-0.4	31.2	17	17.0	9		
MATEI AIRFIELD	277	222	28	88	30	27.2	-0.8	22.1	-0.4	29.3	28	19.8	23		
VANUABALAVU	81	61	14	25	21	27.1	-0.5	21.7	-1.1	29.8	1	18.0	21		
LAKEBA	100	124	18	30	21	27.6	0.3	21.0	-1.0	32.0	12	15.5	9		
ST. JOHNS COLLEGE	167	108	19	27	19	27.3	-0.4	21.0	-1.3	29.5	5	18.5	21		
VUNI SEA	100	80	17	46	21	26.2	-0.4	21.0	0.5	30.4	29	18.4	9		
ONO-I-LAU	160	180	9	40	21	25.1	-0.8	20.4	-1.0	28.0	30	16.6	22		
DREKETI	255	383	10	169	21										
SEAQAQA AGRIC.	206	329	10	87	21										
TAMAVUA	168	77	22	35	30										
YASAWA-I-RARA	140	165	10	50	30										
VATUKOULA	106	144	9	58	30										
DOBUI LEVU	138	136	15	48	30										

ENSO STATUS and RAINFALL OUTLOOK - JULY TO SEPTEMBER 2009

More evidence of a developing El Niño event has emerged during the past fortnight and computer forecasts show there's very little chance of the development stalling or reversing. Responding to continued weak equatorial Trade Winds, equatorial sea-surface temperatures are now more than 1°C above normal in the eastern half of the Pacific. Although it has risen in the past fortnight, the Southern Oscillation Index (SOI) remains below zero at around -2.

The Pacific Ocean sea surface is currently significantly warmer than the long-term average across most of the tropical Pacific, especially central to eastern areas. Trade winds remained weaker than normal across the central equatorial Pacific. Cloudiness near the date-line is also near-normal and is yet to show a consistent trend towards El Niño conditions. All international climate models predict the tropical Pacific to continue to warm and to be above El Niño thresholds during most of the second half of 2009. It should be noted that some National Meteorological Services have declared an El Niño based on ocean temperatures in the tropical Pacific reaching their El Niño thresholds.

For the *June to August 2009* period, *equal chances of below average, average or above average* rainfall are favoured across Fiji and at Rotuma.

Normal - Long term average from 1971 to 2000.

Well Below Average - Rainfall less than 40%.

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 : APRIL TO JUNE 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 April 09 (% of total rain)</u>	<u>No. of Rain days in May 09 (% of total rain)</u>	<u>No. of Rain days In June 09 (% of total rain)</u>
Penang Mill, Rakiraki	497.7	Average	16 (29)	11 (55)	13 (16)
Monasavu Dam	718.6	Below Average	22 (47)	15 (22)	20 (31)
Vatukoula	387.1	Average	10 (41)	5 (32)	9 (27)
Rarawai Mill, Ba	315.7	Average	12 (29)	7 (47)	8 (24)
*Nacocolevu	485.5	Above Average	15 (27)	11 (20)	8 (53)
Viwa Island	436.4	Average	12 (44)	12 (22)	11 (34)
Yasawa-I-Ra	400.5	Average	12 (40)	10 (25)	8 (35)
Lautoka (FSC Res.)	314.0	Average	12 (33)	9 (37)	9 (30)
Nadi Airport	349.0	Average	13 (21)	12 (47)	7 (32)
Dobuilevu	509.0	Average	21(37)	13 (36)	15 (27)
Tokotoko, Navua	597.6	Below Average	22 (33)	18 (38)	20 (29)
Laucala Bay, Suva	563.4	Below Average	23 (33)	20 (49)	22 (18)
Tamavua	825.5	Average	24 (28)	17 (52)	22 (20)
Koronivia	638.1	Below Average	22 (25)	17 (53)	20 (22)
Nausori Airport	616.8	Below Average	25 (25)	20 (50)	17 (25)
Nabouwalu	843.6	Above Average	18 (39)	17 (44)	20 (17)
Labasa Airport	438.4	Average	10 (54)	9 (16)	7 (30)
Dreketi Climate	654.0	Above Average	17 (36)	16 (25)	9 (39)
Seaqaqa	607.5	Above Average	17 (38)	14 (28)	7 (34)
Savusavu Airport	754.0	Above Average	13 (22)	17 (53)	15 (25)
Udu Point	541.4	Average	18 (40)	13 (45)	17 (15)
Matei Airport	556.9	Average	27 (26)	23 (24)	28 (50)
Vanuabalavu, Lau	263.9	Below Average	15 (54)	12 (15)	14 (31)
Lakeba, Lau	366.5	Average	19 (51)	11 (22)	18 (27)
*Ono-I-Lau, Lau	798.5	Above Average	16 (51)	10 (29)	9 (20)
Levuka, Ovalau	570.0	Average	17 (26)	15 (45)	19 (29)
Vunisea, Kadavu	434.5	Below Average	26 (46)	16 (31)	17 (23)
Rotuma	905.6	Average	25 (30)	23 (31)	22 (39)

* Data missing : Ono-I-Lau: 1 day in April & 1 day in May, Nacocolevu 1 day in May & 2days in June.

Figure 1

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

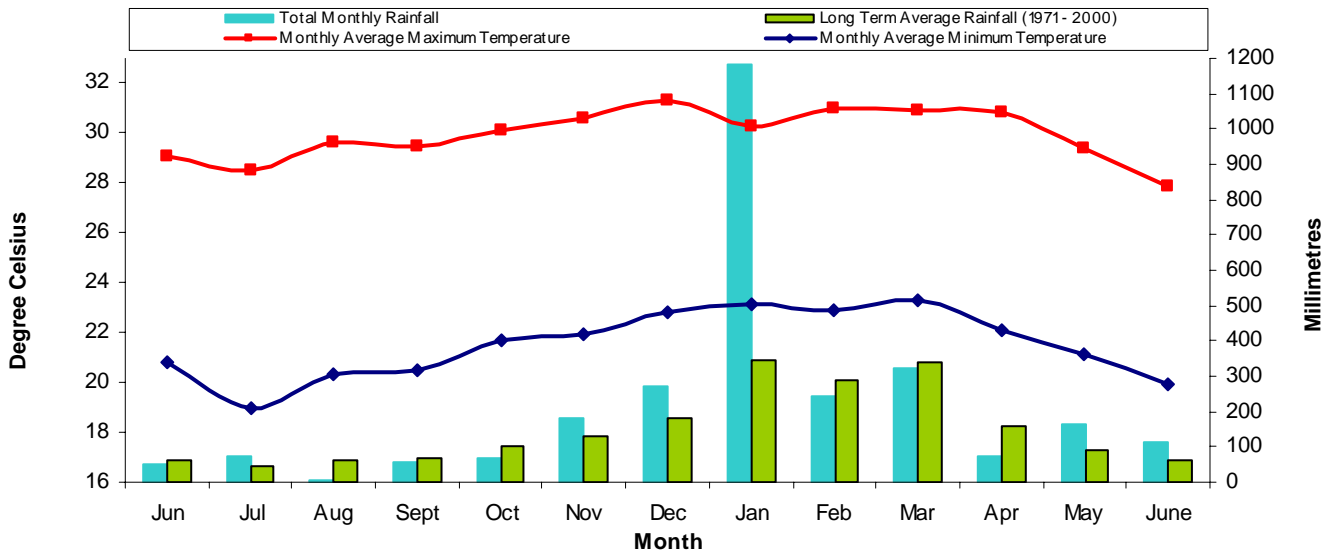


Figure 2

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

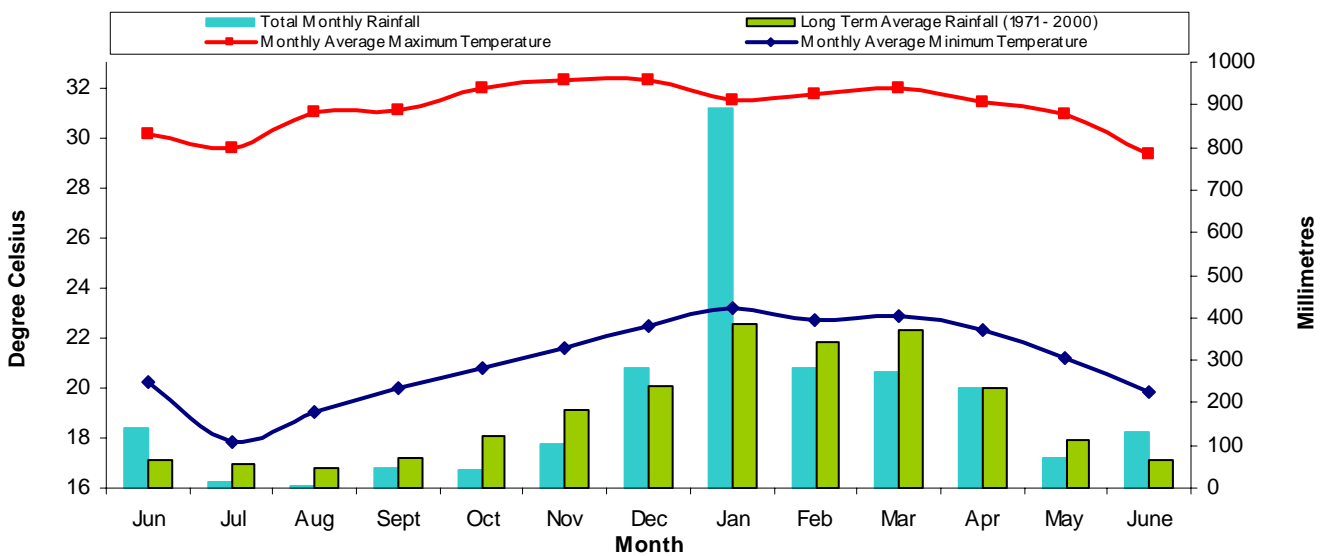
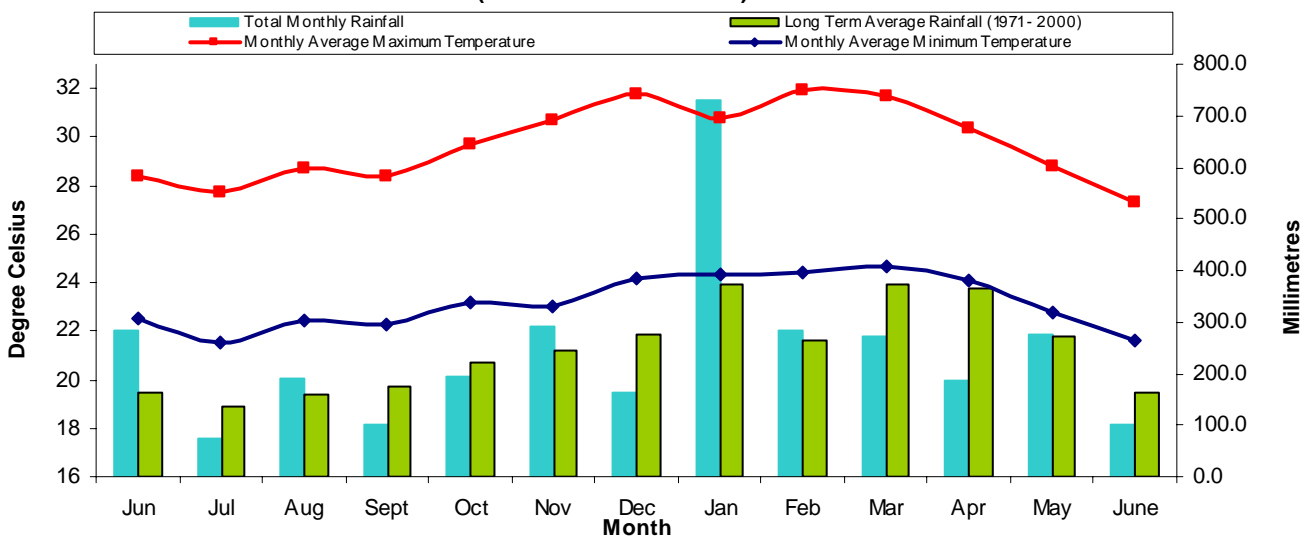


Figure 3

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



AIR TEMPERATURES, RELATIVE HUMIDITY AND SUNSHINE IN JUNE 2009

Maximum Air Temperatures were generally *average or below average* across the country in June. The greatest negative departures from normal were recorded at Nadi (-1.1°C) and Nausori Airport (-1.0°C) and the greatest positive departures were at Viwa and Lakeba (0.3°C) (Table 1).

Two new daily maximum air temperatures were established during the month. (Table 3).

Minimum Air Temperatures were generally *average or below average* across the country in June. The greatest negative departures were recorded at St John's College, Levuka (-1.3°C) and Vanuabalavu (-1.1°C). The greatest positive departures was recorded at Labasa Airport (0.9°C) and Nadi Airport (0.7°C) (Table 1).

Sunshine hours were *average* at three of the four recording sites (Table 1).

Relative Humidity at 0900hrs were generally *average or below average* in most parts of the country. The greatest negative anomalies were recorded at Savusavu (-9.1%) and Vunisea, Kadavu (-7.7%). The greatest positive anomalies were recorded at Vanuabalavu (+4.8%) and Nadi Airport (+2.0%).

Outgoing Longwave Radiation (OLR, proxy of cloudiness) shows slightly *above average* cloud cover over the Fiji Group in June (Figure 4).

Positive **Sea Surface Temperatures** anomalies in the order of -0.5 to 0.5°C existed in the Fiji region in June (Figure 5). Positive **Sea Level** anomalies in the order of 5 to 10cm existed in the Fiji region in June (Figure 6).

Wind speeds were generally *above average* at most wind recording stations. Satellite images show *positive* easterly anomalies across the Fiji region (Figure 7).

TABLE 3. CLIMATE RECORDS ESTABLISHED IN JUNE 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>Re-records Began</u>
Daily Total Rainfall	Nacocolevu	189.2mm	21st	New High	180.7mm	2002	1926
Monthly Total Rainfall	Nacocolevu	258.7mm	-	New High	239.3mm	1941	1926
Monthly Total Rainfall	Dreketi	254.5mm	-	New High	234.2mm	1996	1977
Daily Max Temperature	Laucala Bay, Suva	32.0 °C	29th	New High	31.9°C	1975	1942
Daily Max Temperature	Lakeba	32.0°C	12th	New High	30.8°C	1961	1924
Daily Min Temperature	Koronivia	21.9°C	20th	New Low	22.0°C	1995	1964
Daily Min Temperature	Vanua Balavu	24.1°C	20th	New Low	24.4°C	1986	1985

CLOUD COVER IN JUNE 2009

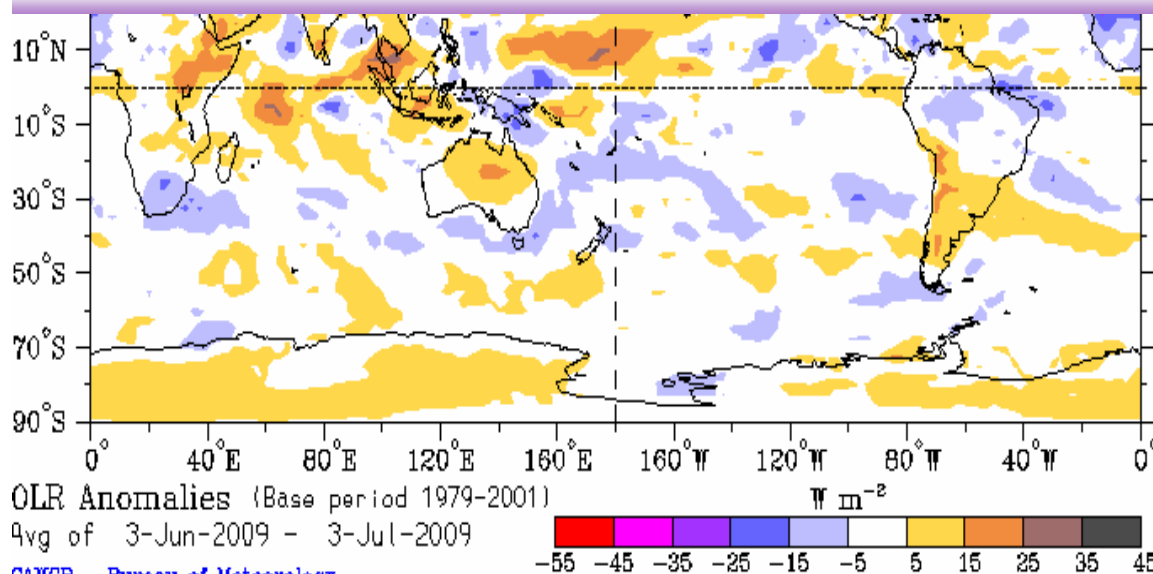


Figure 4. Southern Hemisphere Outgoing Longwave Radiation Anomalies (Wm^{-2}) for the period of June 3 to July 3, 2009. Above average cloud cover existed in the Fiji region in June (~17°S, 180°).

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 SURFACE TEMPERATURE, SEA LEVEL ANOMALIES AND WIND FLOW IN JUNE 2009

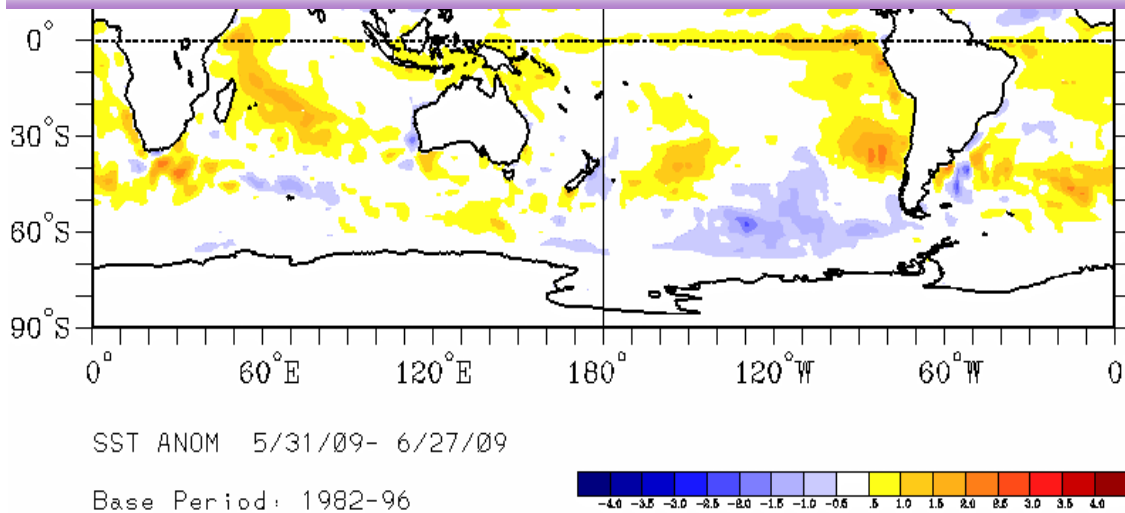


Figure 5. Southern Hemisphere SST Anomalies (°C) for the period of May 31 to June 27 2009. positive anomalies in the order of -0.5-0.5°C existed in the Fiji region (~17°S, 180°).

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

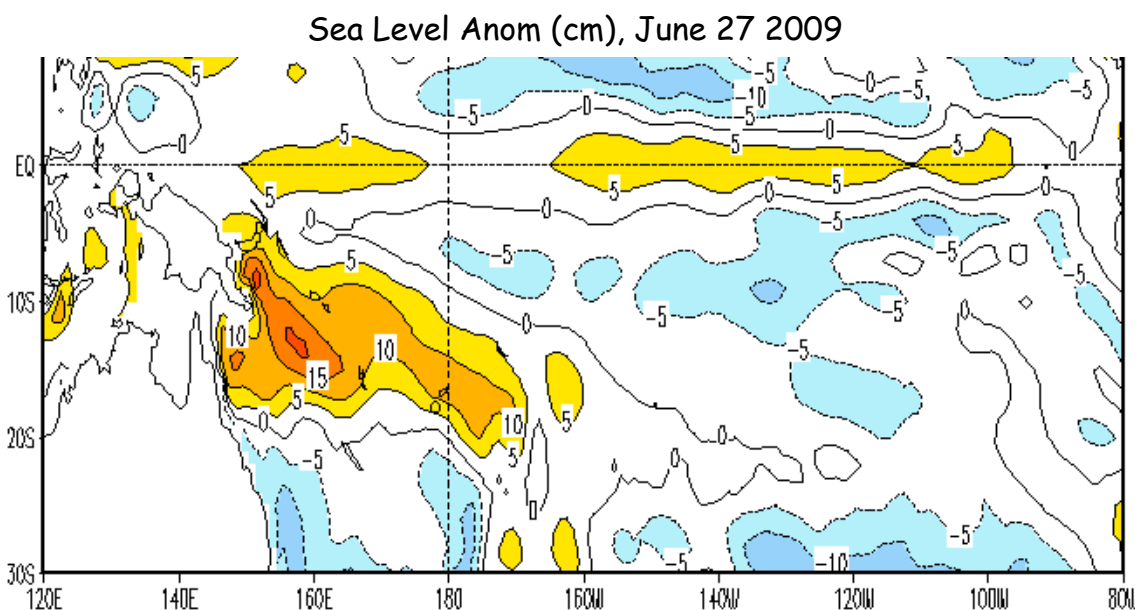


Figure 6. Southern Hemisphere Sea Level Anomalies (cm) for 30 days to June 27, 2009. Anomalies in the order of 5cm to 10cm existed in the Fiji region (~17°S, 180°).

http://www.cpc.noaa.gov/products/analysis_monitoring/ens0_update/sealev.gif

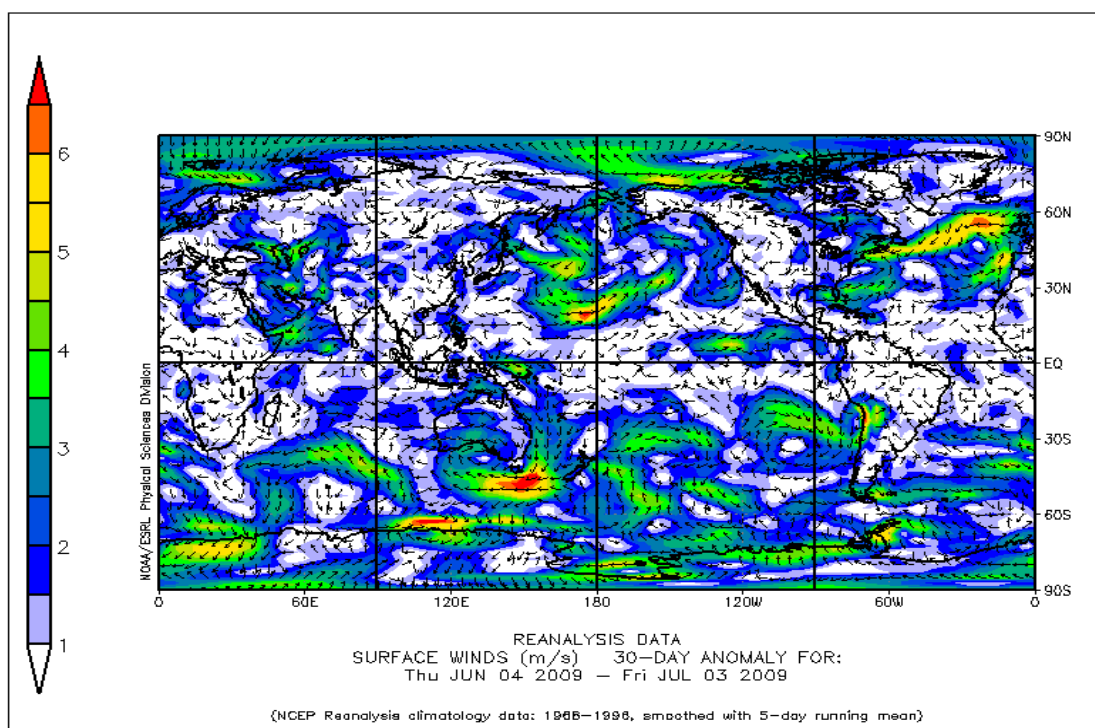


Figure 7. Global surface wind anomalies (m/s) for the period June 4 to July 3, 2009. Positive easterly anomalies existed across the Fiji region (~17°S, 180°).

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