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Fiji Islands Climate Summary December 2008

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IN BRIEF

Rainfall varied from *below average* to *above average* across the country in December. Moist north-easterly wind flow was the dominant feature accounting for most of the months rainfall. The passage of four troughs of low pressure further enhanced convective activity resulting in some notable heavy rainfall over the main islands.

Rainfall was *below average* at Matei Airport, Laucala Bay (Suva), Lautoka Mill, Monasavu, Rotuma and in the Eastern Division except Vanuabalavu. Savusavu Airport was the lone site that recorded *well below average* rainfall. *Above average* rainfall was recorded at Nacocolevu, Nadi and Navua.

Rainfall over the October to December period was predicted to be *average to above average.* Observed rainfall was *below average* in the Northern Division and *above average* in most parts of the Western Division, Vunisea (Kadavu) and southern Lau Group. The rest of the country received *average* rainfall.

Both maximum and minimum air temperatures were generally *above average* across the country. One new air temperature record was established during the month at St. John's College in Levuka (Table 3).

The Sea surface Temperatures (SST) in the equatorial Pacific has been cooling in the recent months. It has further cooled in the recent weeks with the east and centre of the basin between 0.5ºC and 1.5ºC cooler than normal. Computer models show mixed predictions with nine out of fourteen models favouring *La Nina* like conditions while the rest favour *neutral* conditions to continue over the January to March period.

Given the current conditions and recent trends, rainfall is likely to be variable with substantial part of the country receiving *average* to *above average* rainfall while some areas may receive *below average* rainfall in the coming three months.

Two months of TC season have passed without any cyclone formation in the region. With current climatic conditions and the latest model predictions showing shift from *neutral* towards *La Nina* conditions, the region may end with fewer tropical cyclones than earlier predicted.

For Fiji, there is still an *average* risk (2-3) of TCs passing through Fiji's EEZ in the remaining season with 1-2 expected to affect land areas.

WEATHER PATTERNS

The month of December was a precarious one with irregular passages of troughs of low pressure, tail ends of eastward moving fronts and the SPCZ affecting the country. These conditions combined with moist and warm east to northeasterly wind flow remained dominant most of the month resulting in rather unstable, humid and uncomfortable conditions and enhanced convective activity. Thunderstorms and heavy showers of rain were experienced across the Group but more so over the larger islands.

From December 1 to 4, a slow moving trough lingered over the northern and eastern parts of the country coupled with a moist trade flow. During this time, the northern tip of a weak front hovered over the southern parts of the country. Isolated heavy rainfall was experienced when Udu Point recorded 55.6mm of rain on the December 2.

A second trough developed to the west of the Group and moved over the country from December 10 to 14. Rainfall was widespread with heavy rainfall mainly occurring over the western parts of the country. On December 10, Penang Mill, Yasawa-i-Ra and Rakiraki recorded 52.0mm, 69.2mm and 75.8mm of rain respectively. Twenty-four hours later, Nadi reported 52.7mm while Ono-i-Lau recorded with 52.1mm of rainfall on December 12.

Fine weather conditions prevailed thereafter from December 15 to 17, however, moisture and humidity levels were still high during this time and was further enhanced by a predominantly tropical easterly wind flow. Afternoon heating and convection resulted in thunderstorm developments over the larger islands, resulting in heavy falls being reported over Monasavu with 53.3mm and Udu Point with 64.0mm on December 15 and 17 respectively.

Between December 18 and 22, a third trough developed over the Group while the tail end of an eastward moving front remained slow moving over the southern parts of Fiji. The combined effect together with a persistent moist easterly wind flow resulted in significant rainfall over some locations. Tokotoko and Nacocolevu reported rainfall greater than 100mm on December 19 and 22 respectively.

A moist east to northeast wind flow prevailed thereafter from December 22 to 28. Afternoon convection brought some thunderstorms and rainfall over the larger islands with significant rainfall (62.5mm) being recorded at Tokotoko on December 22 .

From December 29 to 31, another trough moved across the country from the northeast and was accompanied by rainfall and squally thunderstorms. During this event Labasa recorded the highest rainfall of 65.8mm on December 29.

Rotuma received rainfall throughout the month largely due to the presence of the SPCZ near the island. No significant falls were reported.

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

RAINFALL IN RECENT MONTHS

Rainfall in December

Rainfall varied considerably across the country ranging from *well below average* to *above average*. Rainfall was *below average* at Matei Airport, Laucala Bay (Suva), Lautoka Mill, Rotuma, Monasavu and the Eastern Division except Vanuabalavu. Well *below average* rainfall was recorded at Savusavu Airport.

In contrast, Nadi, Nacocolevu (Sigatoka) and Tokotoko (Navua) were the only sites that recorded *above average* rainfall while the rest of the country received *average* rainfall (Table 1, Figures 1-4).

Rainfall in the last three months

Rainfall over the October to December 2008 period was predicted to be *average to above average* across the country except at Levuka where an equal chances of *below average*, *average* and *above average* rainfall was expected. The confidence level of the prediction was *moderate to good*.

Of the 23 stations that reported in time for this summary, 7 sites received *above average* rainfall, 10 received *average* rainfall and 6 received *below average* rainfall (Table 2). Rainfall was *below average* in the Northern Division and *above average* in most parts of the Western Division, Vunisea (Kadavu) and southern Lau Group.

TABLE 1. PRELIMINARY CLIMATOLOGICAL SUMMARY FOR DECEMBER 2008

PRELIMINARY CLIMATOLOGICAL DATA FOR MONTH 12 , 2008 : SUMMARY FOR DAYS 1 TO 31

	RAINFALL					AIR TEMPERATURES								SUNSHINE	
	TOTAL		RAIN DAYS	MAX. FALL		AVERAGE DAILY MAX.	#	AVERAGE DAILY MIN.	#	EXTREME MAX.	ON	EXTREME MIN.	ON	TOTAL	
	MM	%	* +	MM	ON	C		C		C		C		HRS	* %
NADI AIRPORT	271	152	19	53	11	31.3	-0.2	22.8	0.4	33.8	29	20.2	3	230	101
SUVA/LAUCALA BAY	162	59	23	32	20	31.8	1.5	24.2	0.7	33.8	28	21.9	1	193	99
NACOCOLEVU	278	155	16	115	22	32.2	1.3	22.3	0.7	33.8	29	19.3	1	161	88
ROTUMA	138	48	20	19	15	31.7	1.0	25.1	0.4	32.9	18	22.8	11	223	123
VIWA	149	104	13	58	29	32.1	1.2	25.0	0.0	33.6	24	22.8	1		
UDU POINT	309	117	23	64	17	31.2	0.7	24.6	0.5	33.0	24	21.5	23		
SAVUSAVU AIRFIELD	84	33	11	16	11	30.6	0.4	22.7	-0.3	32.8	29	21.2	9		
LABASA AIRFIELD	283	117	21	66	29	32.3	0.6	22.5	0.8	33.7	16	21.0	6		
NABOUWALU	209	82	22	33	10	31.1	1.5	24.0	0.0	32.5	28	22.6	22		
KORONIVIA	243	93	21	47	14	30.7	0.9	23.0	0.6	32.7	24	20.3	1		
NAUSORI AIRPORT	239	89	21	61	14	30.7	1.0	22.8	0.2	32.5	12	20.7	3		
NAVUA/TOKOTOKO	470	135	19	185	19	30.2	-0.1	22.6	1.7	32.5	30	20.0	1		
MONASAVU	418	78	26	53	15	26.1	1.1	18.9	0.4	27.8	16	15.1	1		
LAUTOKA AES	117	61	14	48	4	31.5	0.5	23.7	0.4	32.8	26	21.7	1		
BA/RARAWAI MILL	185	82	16	36	27	32.4	0.1	22.6	0.9	34.2	4	18.9	1		
PENANG MILL	242	92	20	52	10	31.4	1.1	23.9	0.4	33.0	23	21.3	16		
MATEI AIRFIELD	212	71	20	44	24	30.6	1.0	24.3	1.4	31.8	26	22.7	17		
VANUABALAVU	159	86	20	32	13	30.5	0.8	24.9	0.5	31.9	24	22.9	18		
LAKEBA	138	77	14	40	12	30.7	1.0	21.8	-1.9	32.0	21	20.0	3		
ST. JOHNS COLLEGE	170	68	21	32	10	30.4	0.6	23.8	-0.0	31.6	29	22.0	16		
VUNISEA	110	60	16	46	11	30.5	1.1	23.8	0.9	32.4	29	20.3	1		
MATUKU	80	52	9	26	14	29.7	0.0	24.0	0.2	31.7	7	21.2	13		
ONO-I-LAU	110	73	7	52	12	30.5	1.8	23.9	0.4	33.0	30	21.1	1		

RAINFALL OUTLOOK - JANUARY TO MARCH 2009

The equatorial Pacific Ocean has continued to cool during the recent weeks, with large areas in the east and centre of the basin between 0.5-1.5ºC cooler than normal. In the atmosphere, equatorial Trade Winds have been persistently stronger than normal for some months across the western half of the basin, cloudiness is suppressed along much of the central and eastern equatorial Pacific and the SOI remains strongly positive, with value of +13.3 in December, 2008. For the first quarter of 2009, computer models show mixed predictions with nine out of fourteen models favouring *La Nina* like conditions while the rest favour *neutral* conditions to continue over the January to March period.

For the coming three months from January to March 2009, rainfall is likely to be quite variable with substantial part of the country receiving *average* to *above average* rainfall while some areas may receive *below average* rainfall. The confidence in this prediction is *moderate*.

More detailed climate predictions will follow in the "Fiji Islands Climate Outlook" to be released in the coming days.

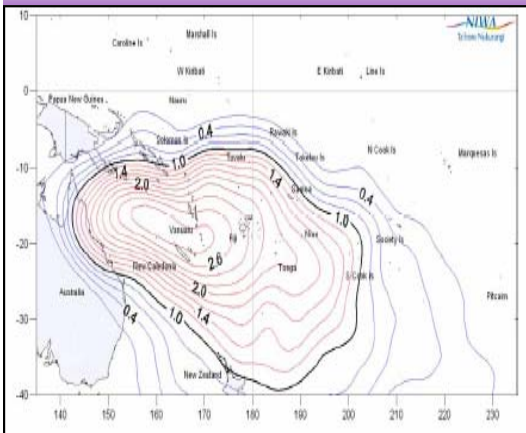
Normal *- Long term average from 1971 to 2000.*	***Average*** *- Rainfall between 80 to 119%.*
Well Below Average *- Rainfall less than 39%.*	***Above Average*** *- Rainfall between 120 to 199%.*
Below Average *- Rainfall between 40 to 79%.*	***Well Above Average*** *- Rainfall more than 200%.*

TABLE 2. THREE MONTH RAINFALL : OCTOBER TO DECEMBER 2008

Station	Actual Rainfall (mm)	Rainfall in the last three months (Below average, average or above average)	No. of Rain days in October 08 (% of total rain)	No. of Rain days in November 08 (% of total rain)	No. of Rain days in December 08 (% of total rain)
Penang Mill, Rakiraki	643.4	Above Average	08 (3)	18 (59)	20 (38)
Monasavu Dam	1410.2	Average	27 (28)	23 (42)	26 (30)
Rarawai Mill, Ba	667.3	Above Average	07 (12)	17 (60)	16 (28)
Nacocolevu	611.5	Above Average	07 (18)	10 (36)	16 (46)
Viwa Island	334.9	Average	04 (16)	10 (39)	13 (45)
Lautoka (FSC Res.)	426.8	Average	12 (25)	13 (48)	14 (27)
Nadi Airport	546.9	Above Average	12 (13)	15 (38)	19 (49)
Tokotoko, Navua	1094.4	Average	19 (25)	18 (32)	19 (43)
Laucala Bay, Suva	649.5	Average	21 (30)	21 (45)	23 (25)
Koronivia	715.5	Average	17 (33)	22 (33)	21 (34)
Nausori Airport	698.9	Average	16 (32)	23 (34)	21 (34)
Nabouwalu	467.3	Below Average	19 (15)	17 (40)	22 (45)
Labasa Airport	428.3	Below Average	03 (9)	14 (25)	21 (66)
Savusavu Airport	353.0	Below Average	08 (30)	13 (46)	11 (24)
Udu Point	477.2	Below Average	13 (10)	13 (25)	23 (65)
Matei Airport	533.1	Below Average	17 (23)	22 (37)	20 (40)
Vanuabalavu, Lau	424.3	Average	06 (11)	19 (51)	20 (38)
Lakeba, Lau	532.3	Above Average	06 (7)	16 (68)	13 (25)
Matuku, Lau	340.1	Average	06 (25)	09 (54)	7 (21)
*Ono-I-Lau, Lau	600.9	Above Average	07 (22)	12 (60)	7 (18)
Levuka, Ovalau	530.6	Average	11 (16)	19 (52)	21 (32)
Vunisea, Kadavu	629.7	Above Average	19 (44)	14 (39)	16 (17)
Rotuma	507.3	Below Average	23 (50)	17 (23)	20 (27)

* Data missing : 2 days in December for Ono I Lau

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).

Two months of TC season have passed without any cyclone formation in the region. With current climatic conditions and the latest model predictions showing shift from *neutral* towards *La Nina* like conditions, there is a slight possibility of fewer number of tropical cyclones than earlier predicted.

On *average*, in a *neutral* season, nine TCs occur over the entire southwest Pacific region per season with January to March being peak period of TC season. A surge in TC activity is likely in the coming three months with a good chance of more than one cyclone occurring in January.

In seasons similar to the current conditions, two or more TCs have occurred in the Vanuatu, New Caledonia, Fiji and Tonga region with fewer numbers occurring further east and north of these islands. On *average*, about half of the TCs that develop in this region reach category 3 or hurricane intensity with mean wind speeds greater than 64 knots.

For Fiji, there is still an average risk (2-3) of TCs passing through Fiji's EEZ in the remaining season with 1-2 expected to affect land areas.

Figure 1

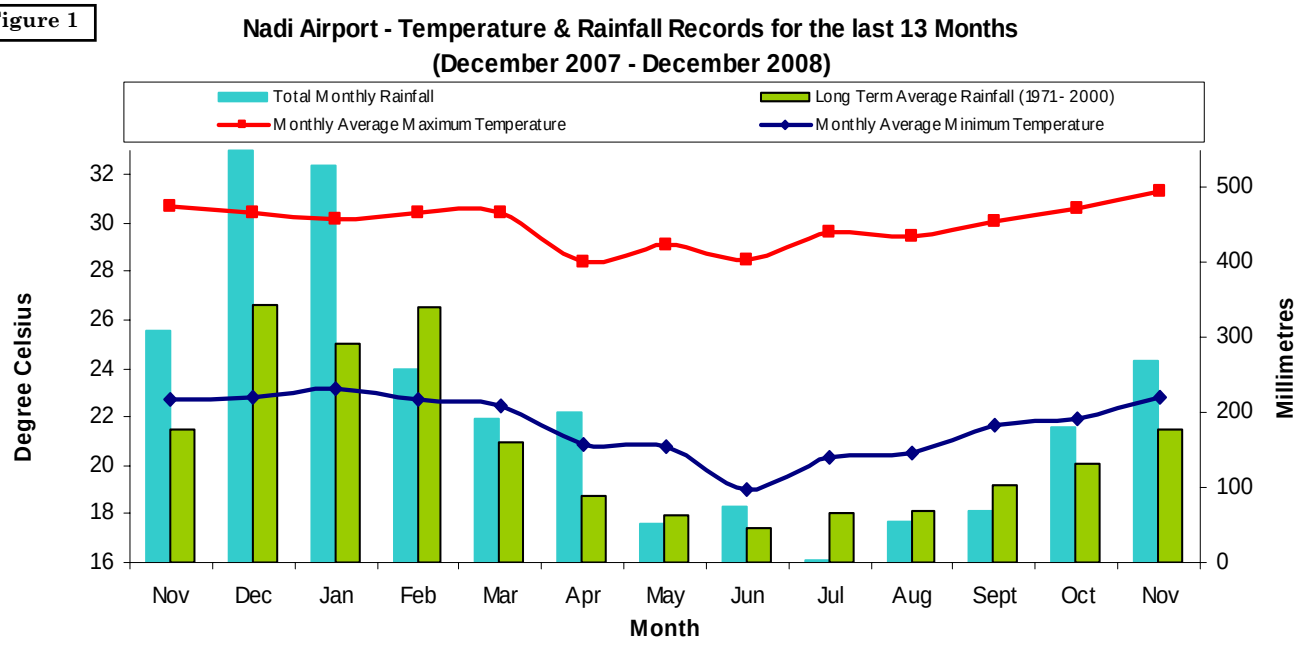


Figure 2

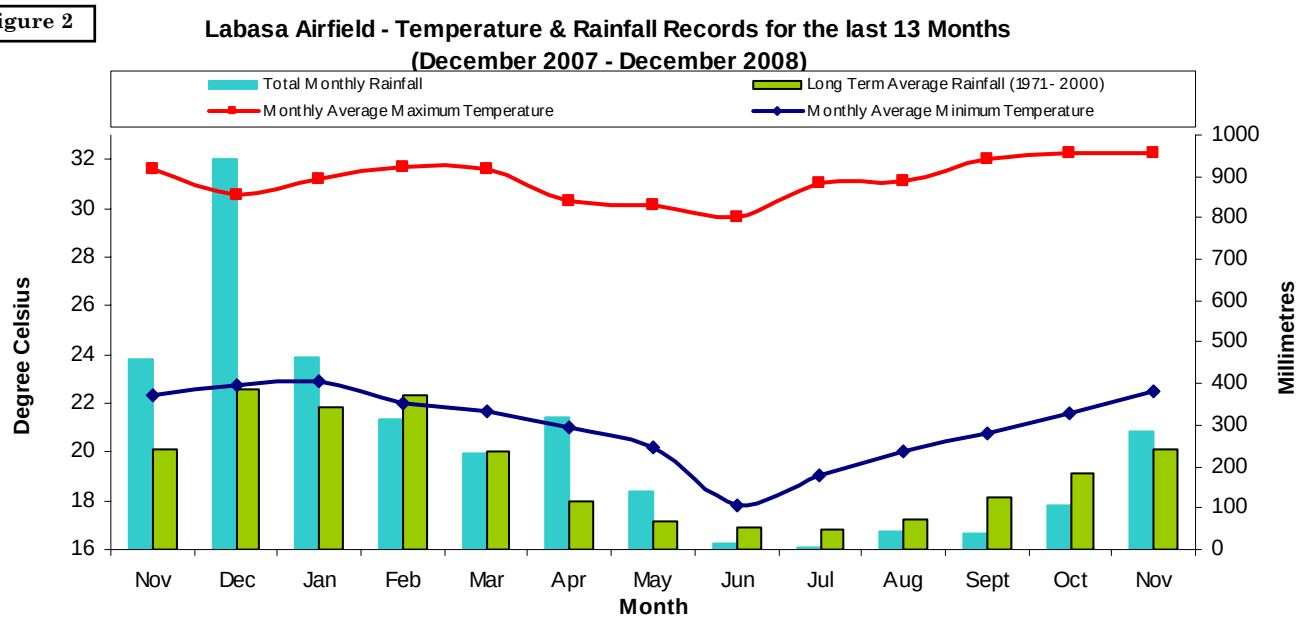
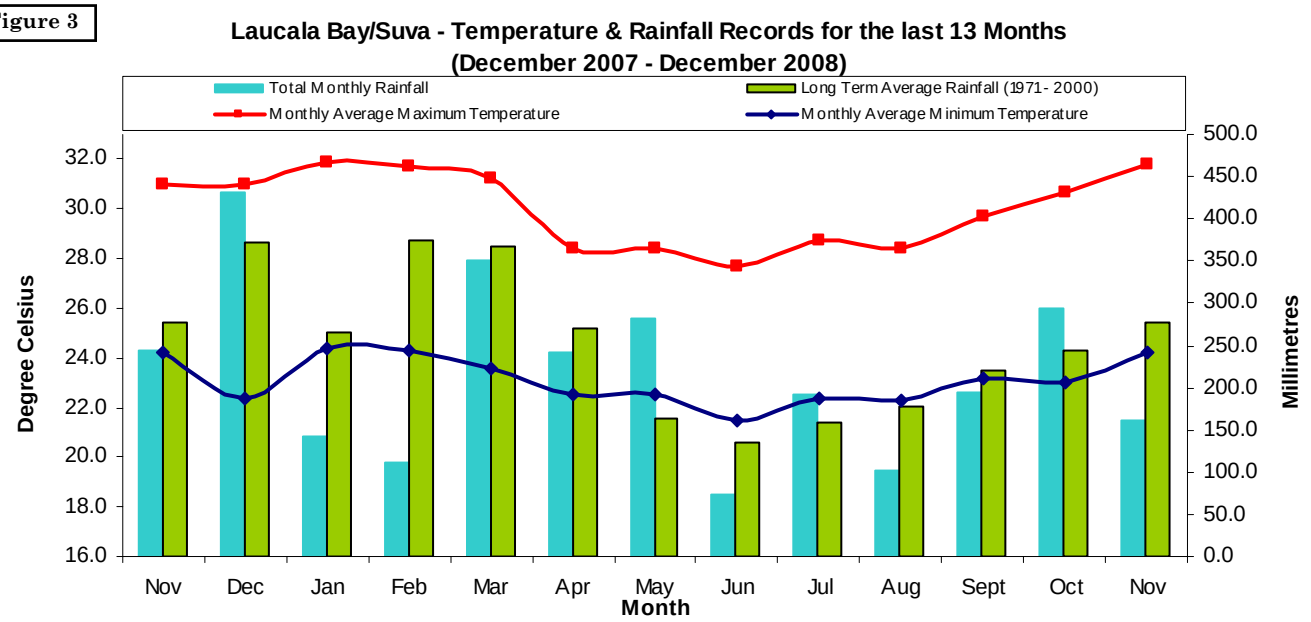


Figure 3



AIR TEMPERATURES, RELATIVE HUMIDITY AND SUNSHINE IN DECEMBER

Maximum Air Temperatures were generally *above average* across the country in December. Majority of the sites recorded 0.5˚C above normal in December. The greatest positive anomalies were recorded at Ono I Lau (1.8˚C), Nabouwalu and Laucala Bay, Suva (1.5˚C) and Nacocolevu (1.3ºC). Nadi was the lone site that recorded a negative anomaly (-0.2˚C) (Table 1).

Minimum Air Temperatures were near *average* to *above average* across the country in December. The greatest positive departures were recorded at Tokotoko (Navua) (1.7˚C), Matei Airport (1.4ºC) and Vunisea (0.9ºC). The greatest negative departure was recorded at Savusavu Airfield (-0.3ºC). (Table 1).

One new air temperature record in daily values was established in December. (Table 3).

Positive **Sea Surface Temperatures** anomalies in the order of 0.5 to 1.5ºC continued to exist in the Fiji region in December (Figure 5). The highest positive anomalies were to the south of the Group.

Positive **Sea Level** anomalies in the order of 5cm to 10cm continued to exist in the Fiji region in December. The greatest anomalies remains to the south of the Group (Figure 6).

Relative Humidity at 0900hrs were generally *average to below average* in most parts of the country. The greatest positive anomalies were recorded at Nadi (4.8%), Vanuabalavu (2.5%), Udu Point (1.8%) and Nausori (1.4%). The greatest negative anomalies were recorded at Penang Mill (-10.7%) and St. Johns College, Levuka (-8.0%).

Sunshine hours were *average at* Nadi Airport and Laucala Bay (Suva), *below average* at Nacocolevu (Sigatoka) and *above average* at Rotuma (Table 1).

The Outgoing Longwave Radiation (OLR, proxy to cloudiness) in December show near normal cloud cover over the northern parts and above normal cloud cover over Viti Levu and the southern parts of the Group (Figure 4).

Wind (speed) was generally *below average* at all wind recording sites around the country. Satellite images show positive north-westerly anomalies around 1.5-2.5m/s over the Fiji Group especially in the western and southern parts (Figure 7).

TABLE 3. CLIMATE RECORDS ESTABLISHED IN DECEMBER 2008

Element	Station	Observed (record)	On	Rank	Previous (record)	Year	Records Began
Daily Min Temp	St. John's, Levuka	26.2ºC	26th	New High	25.0ºC	2007	1985
Mean Monthly Min Temp	Vanuabalavu	24.9ºC		Equal High	24.9ºC	1998	1978

CLOUD COVER IN DECEMBER

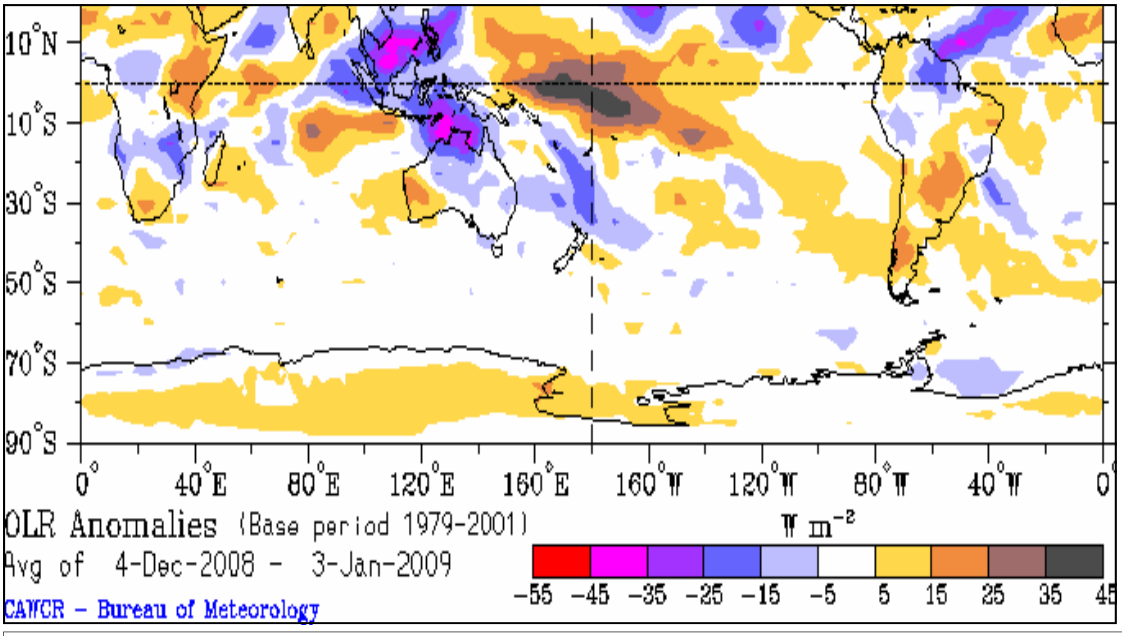


Figure 4.

Southern Hemisphere Outgoing Longwave Anomalies (Wm^{-2}) for the period 4 Dec 2008 to 3 Jan 2009. Above normal cloud cover existed across the centre of Fiji (~17ºS, 180º.

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 AND WIND FLOW IN DECEMBER

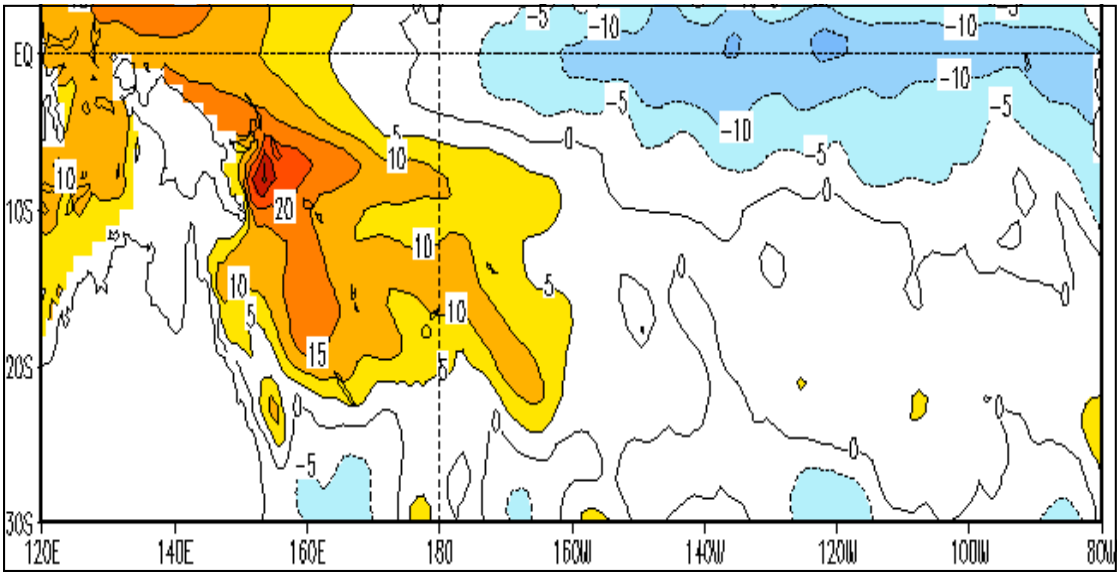


Figure 5. Southern Hemisphere SST Anomalies (ºC) for the period 30 Nov 2008 to 27 Dec 2008. Positive anomalies in the order of .5-1.5ºC existed in the Fiji region, (~17ºS, 180º). http://www.cdc.noaa.gov/map/images/sst/sst.anom.month.gif

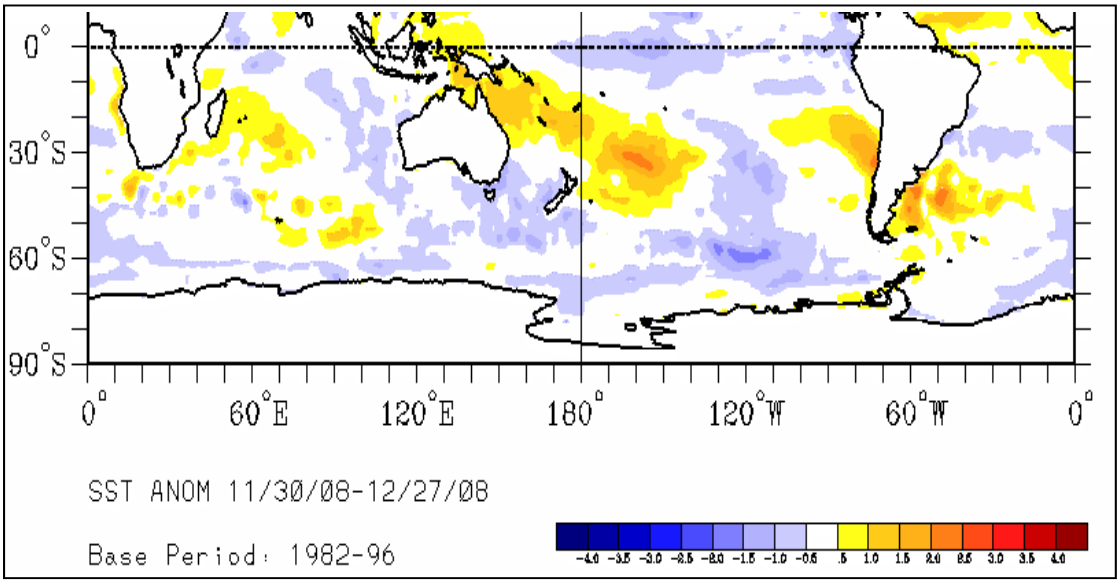


Figure 6.

Southern Hemisphere Sea Level Anomalies (cm) as of Dec 29, 2008. Positive anomalies in the order of 5cm to 10cm existed in the Fiji region (~17ºS, 180º).

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

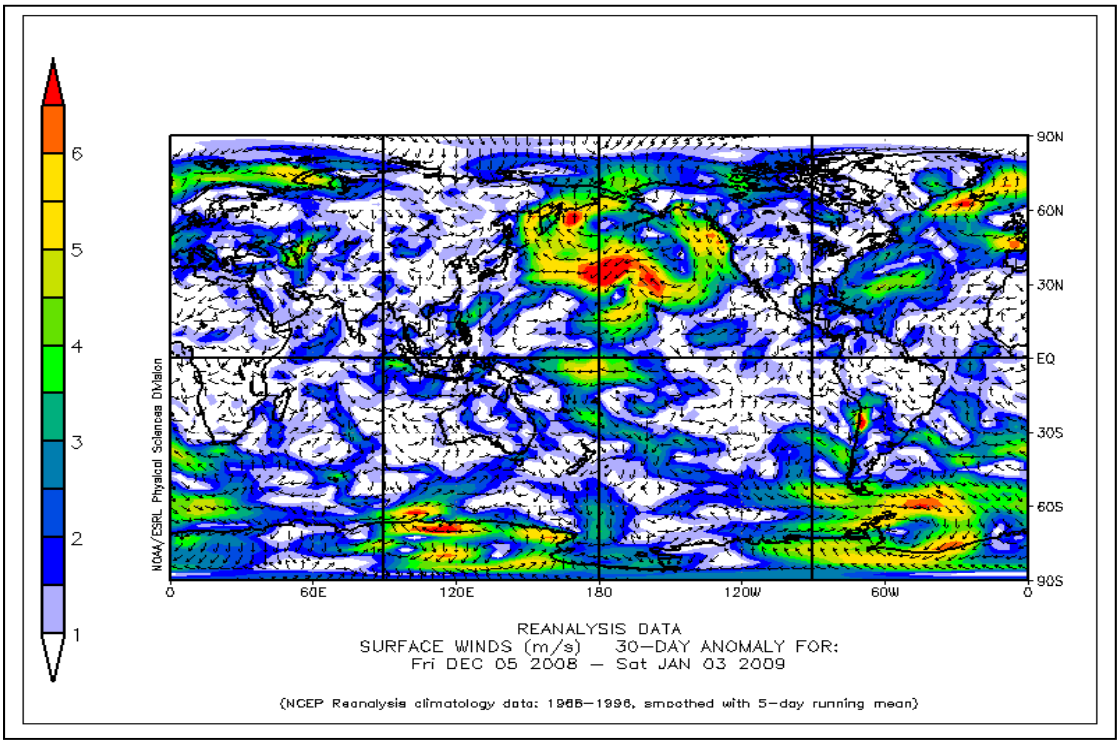


Figure 7.

Global surface wind anomalies (m/s) for the period Dec 05, 2008 to Jan 03, 2009. Positive north-westerly anomalies existed in the Fiji region (~(17ºS, 180º).

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