

FIJI METEOROLOGICAL SERVICE

Private Mail Bag (NAP0351)

Nadi Airport, Fiji

Ph: +679 6724888, Fax: +679 6724050

Email: climate@met.gov.fj

Also online at <http://www.met.gov.fj>

Fiji Climate Summary

June 2015

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1.0 IN BRIEF

Fiji's climate is displaying typical El Niño like characteristics with drier and cooler than *normal* conditions experienced over many parts of the country during June.

The majority of the country received *below average* to *well below average* rainfall during the month. The western Viti Levu, Yasawa-i-rara, northern parts of the Vanua Levu, Laucala Bay, Levuka and Vanuabalavu recorded less than half the *normal* rainfall.

It was exceptionally dry across the Nadi to Rakiraki corridor on Viti Levu, Seaqaqa and Labasa on Vanua Levu, and Vanuabalavu, where less than 15mm of the total monthly rainfall was received.

Consequently, majority of the Western Division, northern parts of the Vanua Levu and a few islands in the Lau Group are in serious rainfall deficiencies, which is affecting crops and trees, creeks, streams, wells and rivers.

The mean monthly air temperatures, that is, both day and night-time temperatures, were *normal* to *below normal* during the month. Significantly cool conditions were experienced during the last two weeks of the month. Nadarivatu recorded daily night-time temperatures as low as 11.2°C on the 25th, followed by Rarawai Mill with 11.6°C on the 27th and Monasavu with 12.1°C on the 25th.

Two new temperature records for June were established during the month. A new high daily maximum temperature of 32.6°C was established at Matuku on the 2nd, while Koronivia recorded a new daily low minimum temperature of 14.2°C on the 25th.

2.0 WEATHER PATTERNS

June's weather was largely influenced by southeast wind flow and ridges of high pressure.

On the 1st, the southeast trade winds prevailed across Fiji and persisted as late as the 12th. However, on the 4th, a weak trough of low pressure lingered over the country. Some showers were experienced over most places.

Later on the 13th, a trough of low pressure lay just to the north of Fiji and continued to drift northwards. Occasional showers were observed over most places. A southeast wind flow prevailed thereafter from the 15th to the 21st bringing in cool nights. On the 22nd and 23rd, another trough approached Fiji from the west with occasional showers affecting the whole group.

On the 24th a ridge of high pressure extended onto the group from the southwest. It displaced the trough northwards and directed a fresh to strong southeast wind flow over Fiji which continued till the end of the month. Fine and cool conditions prevailed till the month end with Nadarivatu recording the lowest daily night-time temperature of 11.2°C on the 25th.

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

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

3.0 RAINFALL

The majority of the country received *below average* to *well below average* rainfall during the month (Figure 1). The western Viti Levu, Yasawa-i-rara, northern parts of the Vanua Levu, Laucala Bay, Levuka and Vanuabalavu recorded less than half the *normal* rainfall. Out of the 27 rainfall recording stations, 11 received *well below average* rainfall, 11 *below average*, 4 *average*, while Nacocolevu was the only station to record *above average* rainfall (Table 2 and Figures 1-5).

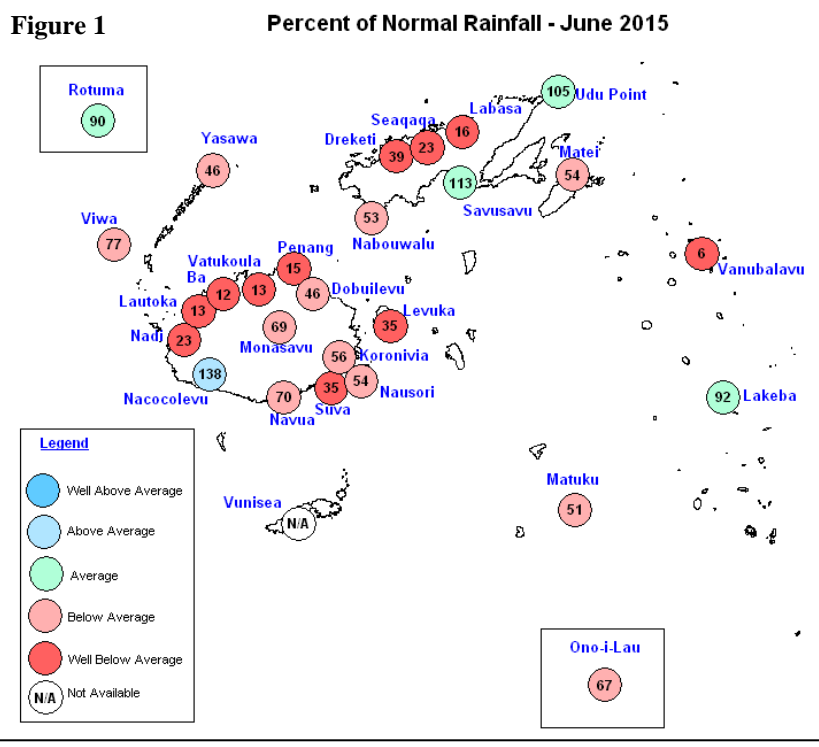
It was exceptionally dry across the Nadi to Rakiraki corridor on Viti Levu, Seaqaqa and Labasa on Vanua Levu, and Vanuabalavu, where less than 15mm of the total monthly rainfall was received.

Due to drier than *normal* conditions of the past several months, majority of the Western Division, northern parts of the Vanua Levu and a few islands in the Lau Group are in serious rainfall deficiencies, which is affecting crops and trees, creeks, streams, wells and rivers.

Vanuabalavu was driest during the month with 8.4mm of rainfall, followed by Vatukoula with 9.3mm, Lautoka Mill, 9.7mm and Rarawai Mill, 10.4mm. On the other hand, Rotuma was the wettest with 211.5mm of the total monthly rainfall, followed by Monasavu with 176.3mm and Tokotoko, 135.6mm.

Nadi Airport, Lautoka Mill, Rarawai Mill, Vatukoula, Viwa, Labasa Airport and Seaqaqa all recorded less than 5 rain days during the month, while Nacocolevu, Yasawa-i-rara, Dreketi and Vanuabalavu with all less than 10 rain days. On the other hand, Monasavu recorded rainfall on 26 days, followed by Rotuma and Nausori Airport with both 24.

The highest daily rainfall for the month was 103.6mm, recorded at Rotuma on the 22nd, followed by 64.4mm at Udu Point on the 15th and 52.0mm at Nacocolevu on the 16th.



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 ≥ 0.1mm.

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 temperatures were generally *normal* to *below normal* during the month, with 12 out of the 23 stations recording anomalies $\leq -0.5^{\circ}\text{C}$, 9 within $\pm 0.5^{\circ}\text{C}$ and 2 $\geq 0.5^{\circ}\text{C}$ (Table 2 & Figures 2-5).

The warmest days on average was at Viwa with 31.0°C , followed by Labasa Airport with 30.3°C and Rotuma, 29.5°C . On the other hand, Monasavu was the coolest with 20.2°C , followed by Nadarivatu with 22.2°C and Ono-i-lau, 25.5°C .

The highest daily maximum temperature of the month (32.8°C) was recorded at Labasa Airport on the 11th, followed by Matuku with 32.6°C on the 2nd. This daily maximum temperature at Matuku was a new daily high record, breaking the 1999 record of 32.2°C (Table 1). On the other hand, the coolest daytime during the month was at Monasavu with 16.5°C on the 26th, followed by Nadarivatu with 18.4°C on the 27th.

Significantly cooler than *normal* mean monthly maximum air temperature was recorded at a number of stations, with the greatest difference from the *normal* at Tokotoko (-1.9°C), followed by Monasavu (-1.6°C).

B. Minimum Night-time Air Temperatures

The average minimum temperatures were also generally *normal* to *below normal*, with 7 out of the 23 stations recording anomalies $\leq -0.5^{\circ}\text{C}$, 13 within $\pm 0.5^{\circ}\text{C}$ and 3 $\geq 0.5^{\circ}\text{C}$ (Table 2 & Figures 2-5).

The coolest nights on average was at Nadarivatu with 15.7°C , followed by Monasavu with 16.0°C . Conversely, the warmest nights on average was experienced at Rotuma with 25.1°C , followed by Vanuabalavu with 22.9°C .

Significantly cool conditions were experienced during the last two weeks of the month. Nadarivatu recorded daily night-time temperatures as low as 11.2°C on the 25th, followed by Rarawai Mill with 11.6°C on the 27th and Monasavu with 12.1°C on the 25th. On the other hand, the warmest night was at Rotuma on the 9th with 26.6°C .

Cooler than *normal* minimum air temperatures were recorded at a number of stations, with the most significant mean minimum temperature anomaly of -1.7°C recorded at Viwa.

A new low daily minimum temperature record (14.2°C) for June was established at Koronivia on the 25th, breaking the 1991 record of 14.4°C (Table 1).

TABLE 1. CLIMATE RECORDS ESTABLISHED IN JUNE 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 Temperature | Matuku | 32.6°C | 2 nd | New High | 32.2°C | 1999 | 1952 |
| Daily Minimum Temperature | Koronivia | 14.2°C | 25 th | New Low | 14.4°C | 1991 | 1965 |

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 JUNE 2015

| | RAINFALL | | | | | AIR TEMPERATURES | | | | | | | | SUNSHINE | |
|-------------------|----------|------|----|-----------|----|------------------|------|--------|------|---------|----|--------|----|----------|----|
| | TOTAL | RAIN | | MAX. FALL | | AVERAGE DAILY | | | | EXTREME | | | | TOTAL | |
| | MM | % | + | MM | ON | MAX. C | # C | MIN. C | # C | MAX. C | ON | MIN. C | ON | HRS | % |
| NADI AIRPORT | 15 | 23 | 3 | 8 | 4 | 28.4 | -0.6 | 19.6 | 0.4 | 31.5 | 3 | 14.5 | 20 | 166 | 82 |
| SUVA/LAUCALA BAY | 57 | 35 | 18 | 9 | 13 | 26.6 | -1.1 | 21.7 | 0.3 | 29.6 | 4 | 18.3 | 19 | 92 | 65 |
| NACOCOLEVU | 105 | 138 | 9 | 52 | 16 | 27.3 | -1.1 | 19.7 | 1.0 | 32.0 | 3 | 13.7 | 27 | 114 | 76 |
| ROTUMA | 212 | 90 | 24 | 104 | 22 | 29.5 | -0.1 | 25.1 | 0.5 | 31.3 | 4 | 23.5 | 23 | 167 | 89 |
| VIWA | 52 | 77 | 3 | 49 | 4 | 31.0 | 2.6 | 21.5 | -1.7 | 32.3 | 29 | 18.9 | 4 | | |
| UDU POINT | 122 | 105 | 19 | 64 | 15 | 27.7 | -1.0 | 22.9 | -0.2 | 29.9 | 2 | 20.5 | 20 | | |
| SAVUSAVU AIRFIELD | 135 | 113 | 16 | 33 | 15 | 27.0 | -0.9 | 21.9 | 0.3 | 30.1 | 3 | 18.1 | 25 | | |
| LABASA AIRFIELD | 11 | 16 | 1 | 11 | 28 | 30.3 | 0.5 | 17.4 | -1.5 | 32.8 | 11 | 15.0 | 29 | | |
| NABOUWALU | 52 | 53 | 18 | 12 | 13 | 27.1 | 0.0 | 22.0 | -0.6 | 30.1 | 4 | 19.6 | 29 | | |
| KORONIVIA | 87 | 56 | 18 | 19 | 13 | 26.6 | -0.8 | 20.3 | 0.0 | 30.8 | 8 | 14.2 | 25 | | |
| NAUSORI AIRPORT | 81 | 54 | 24 | 13 | 13 | 26.4 | -0.9 | 20.6 | 0.1 | 30.0 | 8 | 14.0 | 25 | | |
| NAVUA/TOKOTOKO | 136 | 69 | 20 | 30 | 4 | 26.2 | -1.9 | 20.5 | 1.6 | 30.0 | 3 | 15.5 | 25 | | |
| MONASAVU | 176 | 69 | 26 | 24 | 17 | 20.2 | -1.6 | 16.0 | -0.1 | 24.3 | 7 | 12.1 | 25 | | |
| LAUTOKA AES | 10 | 13 | 3 | 6 | 4 | 28.8 | 0.0 | 19.5 | -1.2 | 31.5 | 8 | 15.4 | 27 | | |
| BA/RARAWAI MILL | 10 | 12 | 4 | 5 | 9 | 29.3 | -0.7 | 17.7 | -0.3 | 32.0 | 7 | 11.6 | 27 | | |
| PENANG MILL | 15 | 15 | 10 | 6 | 22 | 27.9 | 0.2 | 21.4 | -0.0 | 30.7 | 16 | 18.0 | 27 | | |
| MATEI AIRFIELD | 68 | 54 | 16 | 22 | 15 | 27.5 | -0.5 | 22.4 | -0.1 | 29.5 | 8 | 19.9 | 26 | | |
| VANUABALAVU | 8 | 6 | 7 | 3 | 23 | 27.4 | -0.2 | 22.9 | 0.1 | 30.3 | 17 | 20.5 | 21 | | |
| LAKEBA | 74 | 92 | 11 | 40 | 13 | 27.0 | -0.3 | 21.8 | -0.2 | 30.2 | 8 | 19.2 | 26 | | |
| LEVUKA | 54 | 35 | 19 | 11 | 9 | 27.1 | -0.6 | 21.5 | -0.8 | 30.1 | 8 | 18.5 | 28 | | |
| VUNISEA | | | | | | 26.2 | -0.4 | 20.7 | 0.2 | 30.9 | 8 | 17.0 | 24 | | |
| MATUKU | 55 | 51 | 16 | 16 | 13 | 27.1 | 0.2 | 20.3 | -1.4 | 32.6 | 2 | 16.0 | 26 | | |
| ONO-I-LAU | 60 | 67 | 16 | 16 | 23 | 25.5 | -0.4 | 20.2 | -1.2 | 30.1 | 8 | 17.0 | 28 | | |
| DREKETI | 26 | 39 | 9 | 8 | 15 | | | | | | | | | | |
| SEAQAQA | 15 | 23 | 3 | 8 | 22 | | | | | | | | | | |
| DOBUILEVU | 47 | 46 | 14 | 21 | 22 | | | | | | | | | | |
| YASAWA-I-RARA | 37 | 44 | 5 | 31 | 4 | | | | | | | | | | |
| VATUKOULA | 9 | 13 | 2 | 8 | 13 | | | | | | | | | | |

| | TEMPERATURE (C) | | HUMIDITY | | WIND | SUN RAD | |
|-------------------|-----------------|------------------|----------|-----|------|---------|-----------|
| | MEAN | DRY | WET | RH% | | VP | %OF |
| | | (AVERAGE AT 9AM) | | | KT | POS | SQ.M |
| NADI AIRPORT | 24.0 | 24.1 | 20.9 | 74 | 22.4 | 6.2 | 52 37.5\$ |
| SUVA/LAUCALA BAY | 24.2 | 24.4 | 22.1 | 81 | 24.9 | | 29 27.8\$ |
| NACOCOLEVU | 23.5 | 24.3 | 21.9 | 81 | 24.6 | | 36 12\$ |
| ROTUMA | 27.3 | 27.5 | 25.1 | 82 | 29.9 | | 51 15\$ |
| VIWA | 26.3 | 26.7 | 24.6 | 84 | 29.4 | | |
| UDU POINT | 25.3 | 25.7 | 22.5 | 75 | 25.0 | | |
| SAVUSAVU AIRFIELD | 24.4 | 24.9 | 22.2 | 78 | 24.8 | | |
| LABASA AIRFIELD | 23.9 | 26.5 | 22.8 | 72 | 25.1 | | |
| NABOUWALU | 24.6 | 24.9 | 22.1 | 77 | 24.6 | | |
| KORONIVIA | 23.4 | 24.1 | 21.8 | 81 | 24.4 | | |
| NAUSORI AIRPORT | 23.5 | 23.7 | 21.7 | 84 | 24.6 | 2.7 | |
| NAVUA/TOKOTOKO | 23.4 | 23.3 | 21.4 | 84 | 24.1 | | |
| MONASAVU | 18.1 | 18.0 | 17.2 | 92 | 19.2 | | |
| LAUTOKA AES | 24.1 | 25.6 | 21.6 | 69 | 22.7 | | |
| BA/RARAWAI MILL | 23.5 | 24.2 | 20.6 | 72 | 21.7 | | |
| PENANG MILL | 24.6 | 24.7 | 21.5 | 74 | 23.3 | | |
| MATEI AIRFIELD | 24.9 | 25.4 | 22.1 | 74 | 24.2 | | |
| VANUABALAVU | 25.2 | 25.4 | 22.2 | 75 | 24.5 | | |
| LAKEBA | 24.4 | 25.1 | 21.8 | 74 | 23.6 | | |
| LEVUKA | 24.3 | 24.4 | | | | | |
| VUNISEA | 23.4 | 23.2 | | | | | |
| MATUKU | 23.7 | 24.0 | 20.5 | 72 | 21.7 | | |
| ONO-I-LAU | 22.8 | 23.4 | 20.0 | 72 | 21.0 | | |

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; MISSING DATA WITH LESS THAN FIVE DAYS.

Figure 2

Nadi Airport (Western Division) - Temperature & Rainfall Records for the last 13 Months (June 2014 - June 2015)

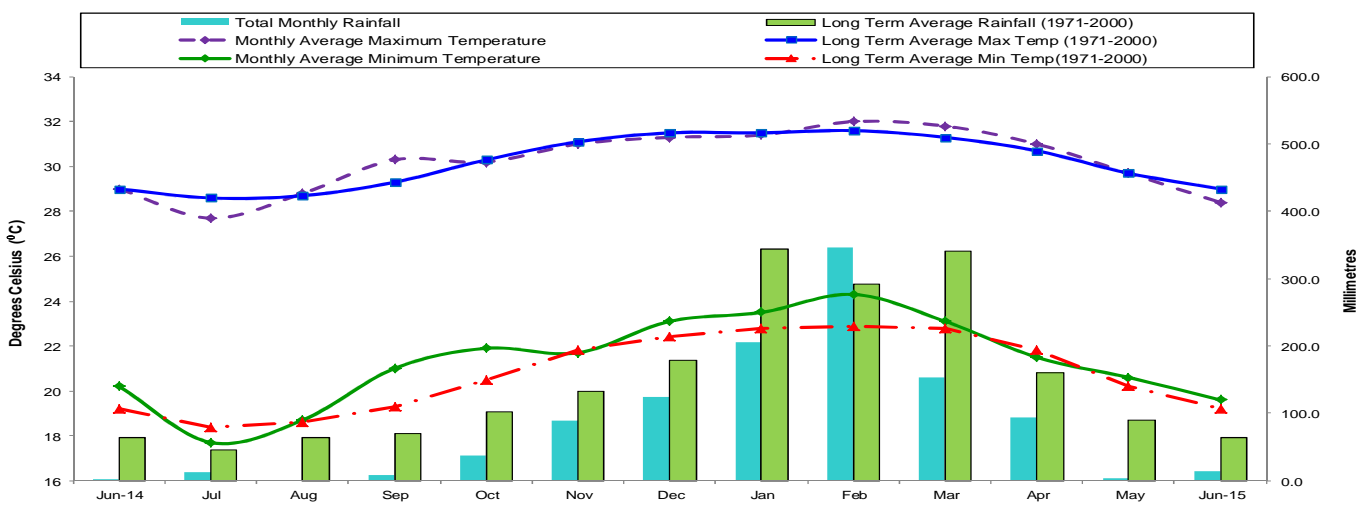


Figure 3

Laucala Bay - (Suva) (Central Division) - Temperature & Rainfall Records for the last 13 Months (June 2014 to June 2015)

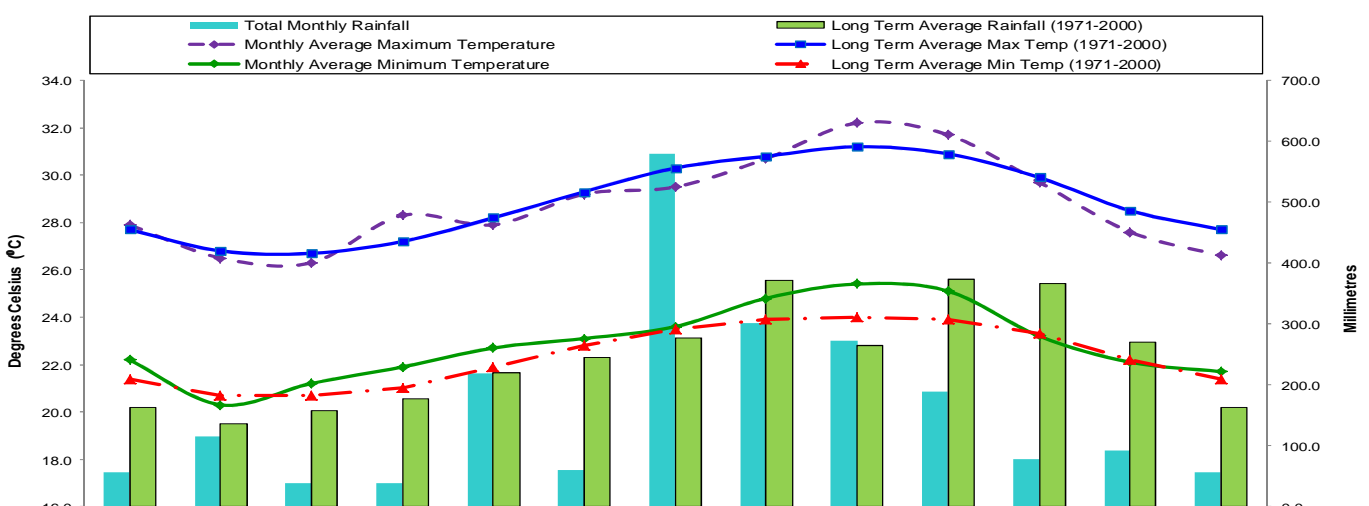


Figure 4

Labasa Airport (Northern Division) - Temperature & Rainfall Records for the last 13 Months (June 2014 - June 2015)

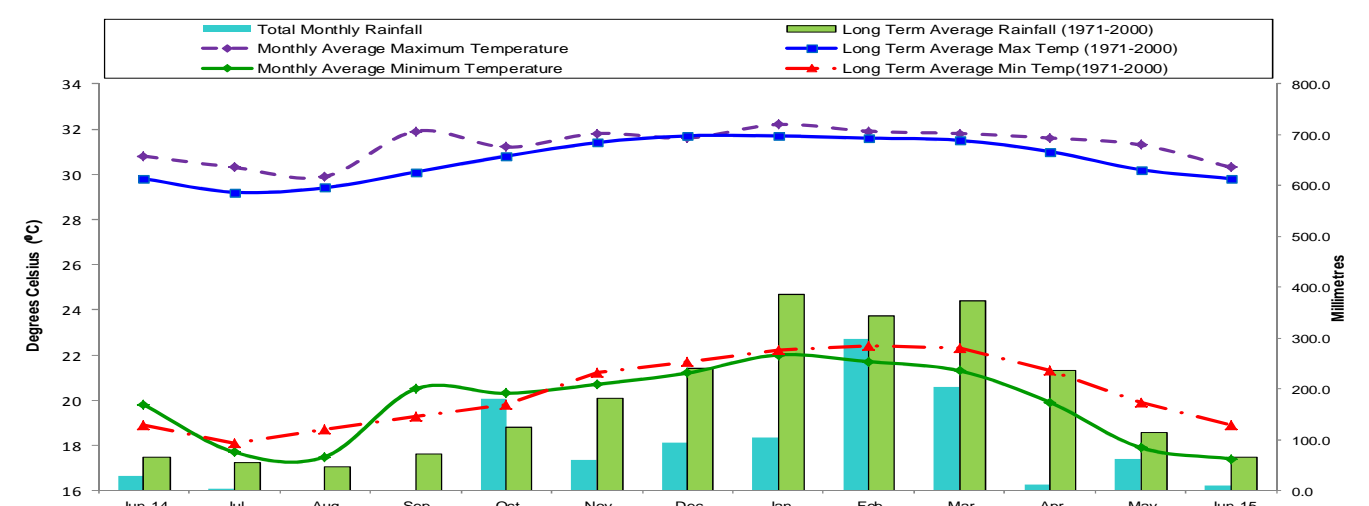
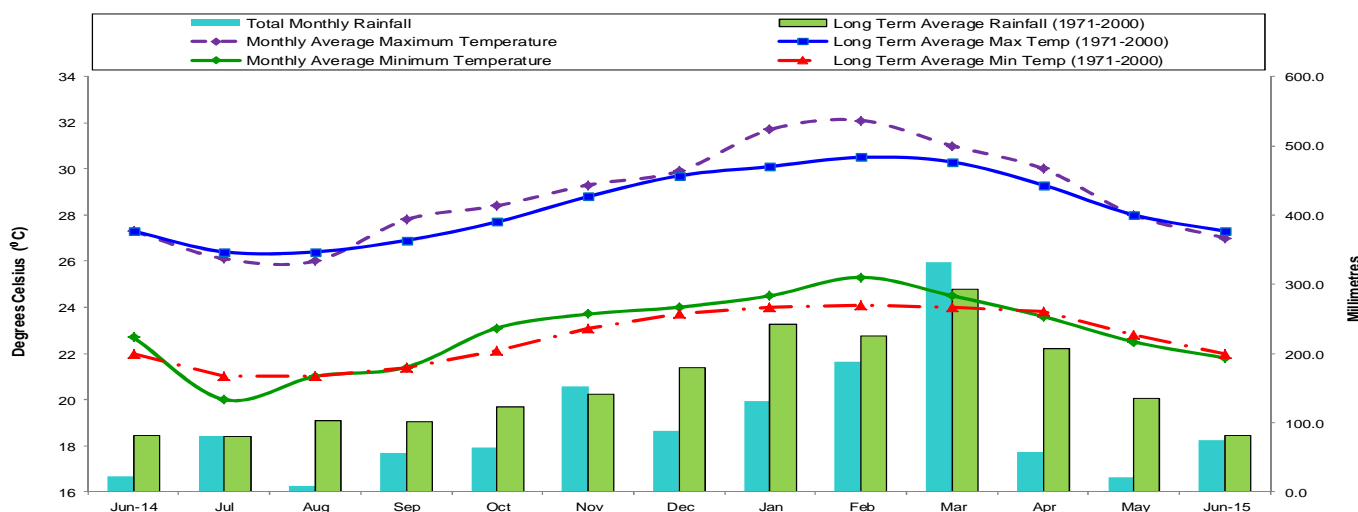


Figure 5

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



5.0 RELATIVE HUMIDITY AT 0900HOURS

The atmosphere was drier than *normal* over majority of the country during the month, with negative 9am average relative humidity (RH) anomalies from the *normal* recorded at 18 out of the 21 stations.

The average monthly RH ranged from 69% to 92% (Table 2), with the daily values expanded from 41% to 100%.

The Western Division stations recorded daily average RH values between 69% and 84%. Majority of the places recorded negative mean monthly RH departures from the *normal*, with the most significant departure of -9.6% at Penang Mill.

The Central Division stations recorded daily average RH values between 81% and 84%. Negative mean monthly RH departures from the *normal* were recorded throughout

the Division, with the greatest anomaly of -3.9% at Koronivia.

The stations in the Northern Division registered daily average RH between 72% to 78%. Negative mean monthly RH departures from the *normal* were recorded throughout the Division, with the most significant departure of -9.4% observed at Labasa Airport.

The Eastern Division stations recorded daily average RH between 72% to 75%. Negative mean monthly RH departures from the *normal* were also recorded throughout the Division, with the greatest anomaly of -4.3% at Matuku.

The daily average RH at Monasavu was 92% and at Rotuma, 82%.

6.0 SUNSHINE

Rotuma, Nadi Airport, Rotuma, Nacocolevu and Laucala Bay recorded 89%, 82%, 76% and 65% of the *normal* bright sunshine hours, respectively, during the month (Table 2).

Nadi Airport recorded 166.4 hours of bright sunshine, with a mean of 5.5 hours/day. The longest duration of bright sunshine at the station was 10.4 hours on the 17th, while 14th was an overcast day with 0 hour of bright sunshine recorded.

Laucala Bay recorded 91.6 hours of the total monthly bright sunshine, with a mean of 3.1 hours/day. Its highest daily sunshine of 9.3 hours was recorded on the 7th, while 9th, 13th and 14th were overcast with 0 hour of bright sunshine.

Nacocolevu received 113.8 hours of bright sunshine, with a mean of 3.8 hours/day. The station's longest duration of bright sunshine was on the 8th (9.0 hours), while 12th to 14th were generally overcast, with only 0.5 hours of bright sunshine recorded on each of the day.

Rotuma recorded 166.9 hours of bright sunshine, with a mean of 5.6 hours/day. The station's longest duration of bright sunshine of 8.9 hours was recorded on the 5th. On the other hand, overcast conditions persisted on the 12th, with no bright sunshine hours recorded.

7.0 WIND SUMMARY

The 10-minute average wind statistics recorded every three hours at Nadi Airport in June showed that south easterly winds were dominant, accounting for 40.4% of the total observations, followed by easterlies with 28.3% and southerlies, 8.3% (Figure 6(a)). Calm conditions were recorded on 10.4% of the occasions. The wind speed ranged from light to moderate in strength (Figure 6(b)).

Incidentally, the wind anomalies map on the NOAA web-site shows persistence of south easterly wind anomalies of around 2m/s in the Fiji region (Figure 12).

At Nausori Airport, calm conditions accounted for 50.8% of the three hourly observations. Otherwise, south easterly winds were most common accounting for 25.0% of the records, followed by easterlies with 11.7% and southerlies, 7.5% (Figure 7(a)). The 10-minute average wind speeds were light to moderate in strength (Figure 7(b)).

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)

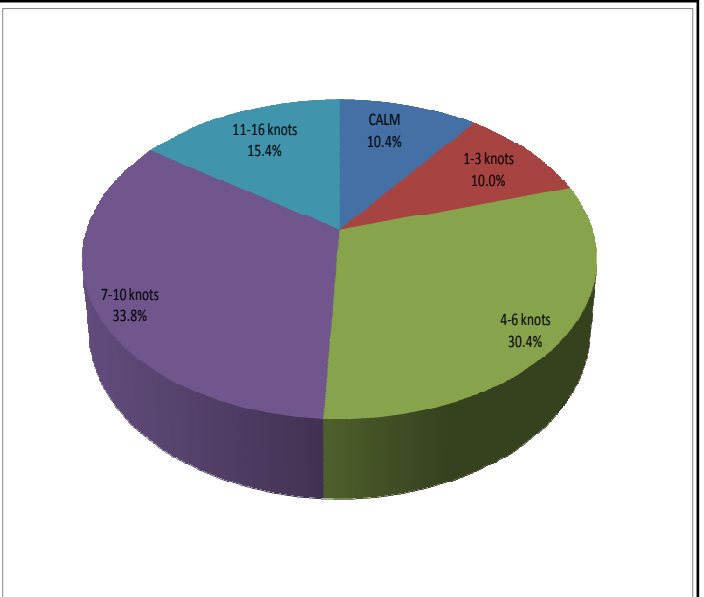
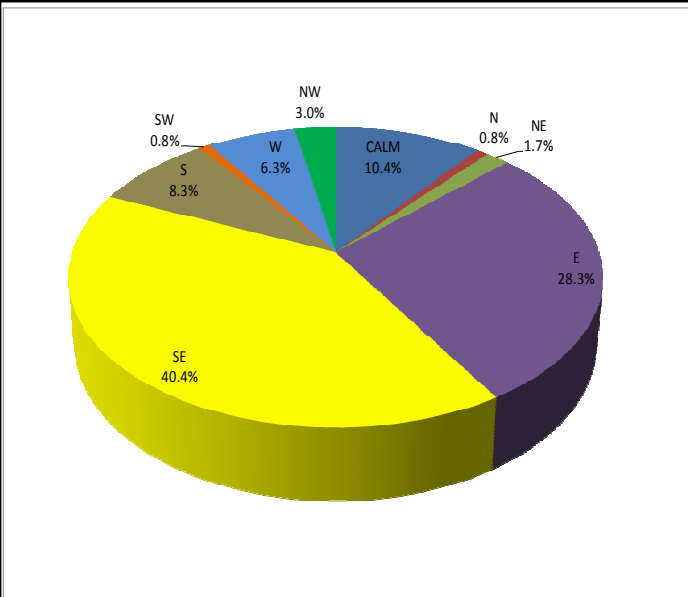
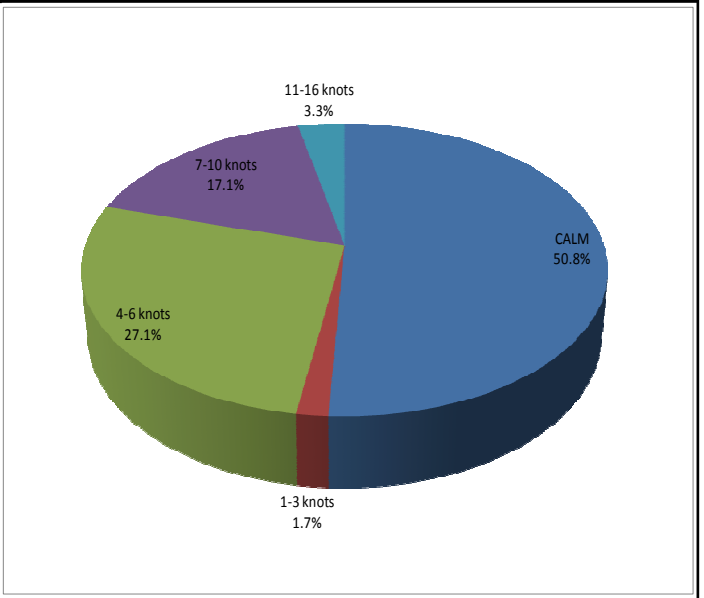
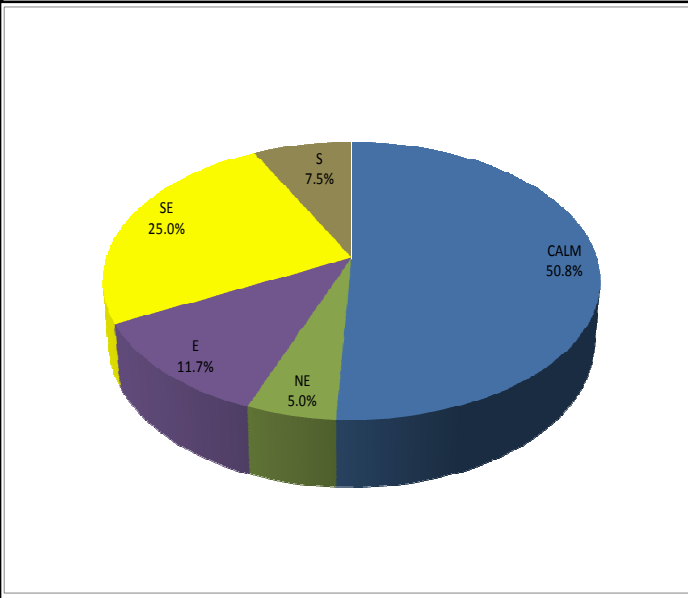
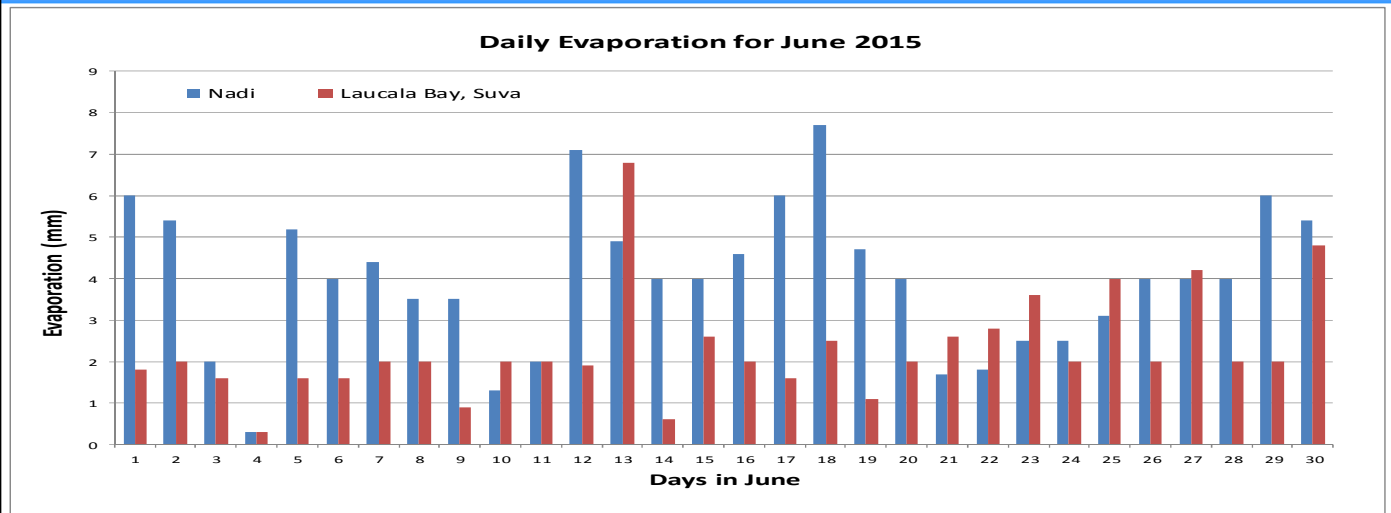


Figure 7(a) Surface Wind Direction for Nausori Airport, Fiji. (WMO 91683 Lat 18°02'47"South Long 178°33'33"East Height above MSL 3m)

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



The total monthly raised pan evaporation at Nadi Airport was 119.6mm, while Laucala Bay recorded 68.9mm. Nadi Airport's highest daily evaporation was 7.7mm on the 18th, while Laucala Bay recorded the highest of 6.8mm on the 13th.

9.0 RADIATION

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

SEA SURFACE TEMPERATURE (SST)

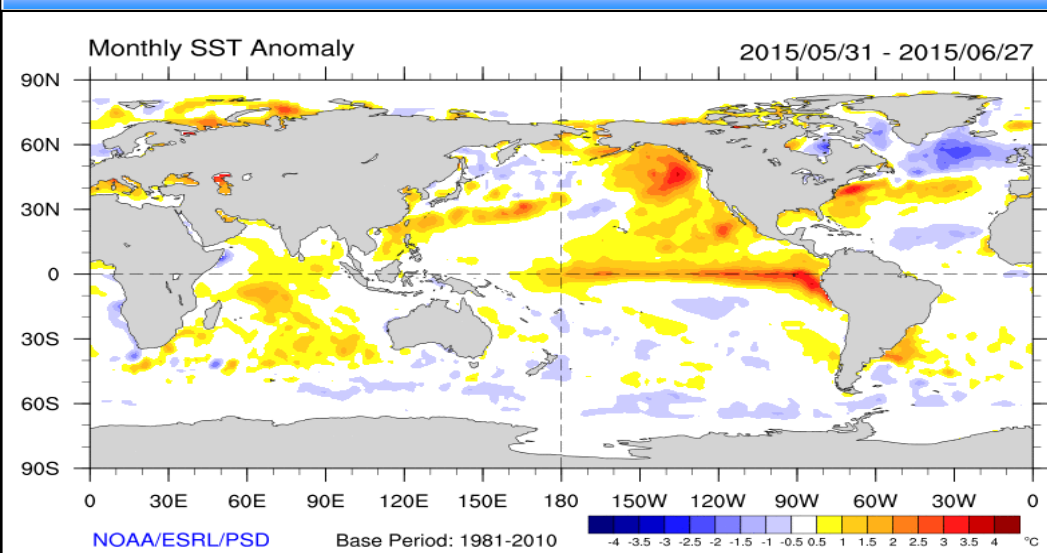


Figure 9:

SST in the tropical Pacific reflected classical El Niño like pattern. SST in the Fiji region was slightly below normal in the Eastern Division waters (base period: 1981-2010).

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

CLOUD COVER

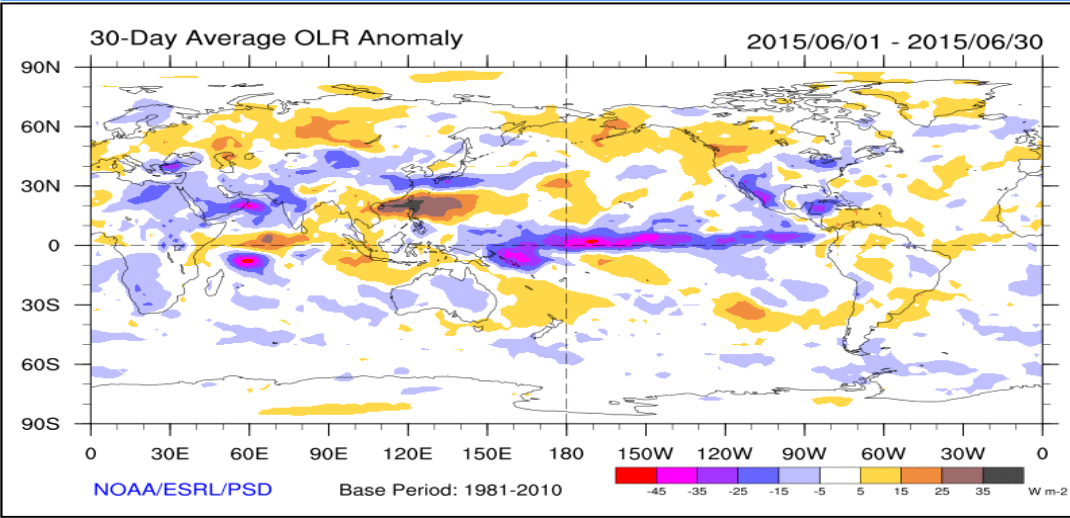


Figure 10:
OLR anomalies reflected near normal cloud cover in the Fiji region (Fiji: ~17°S, 180°) (base period: 1981-2010).

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

SEA LEVEL

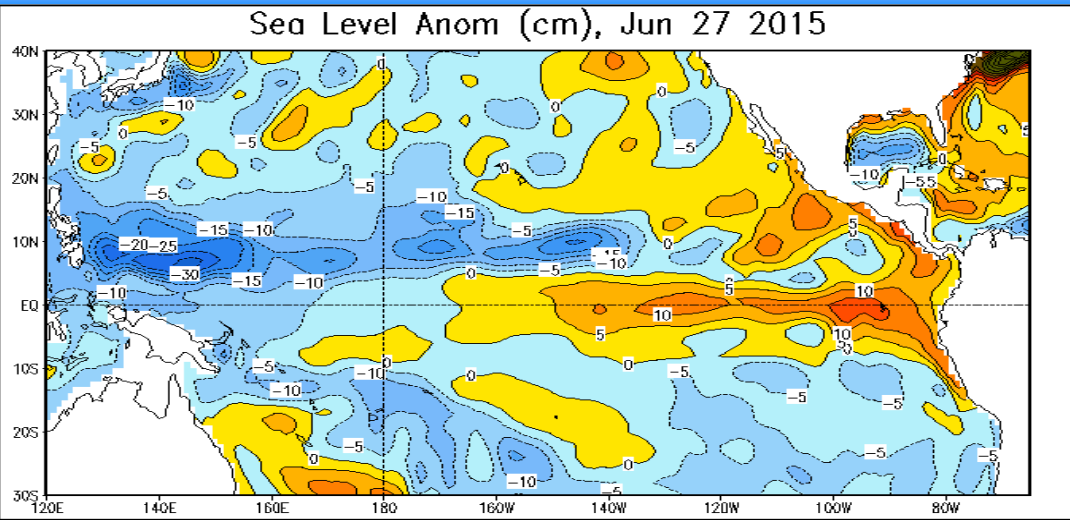


Figure 11:
Negative sea level anomalies of -10cm to -15cm persisted in most of the Fiji waters (base period: 1981-2010).

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

WIND ANOMALIES

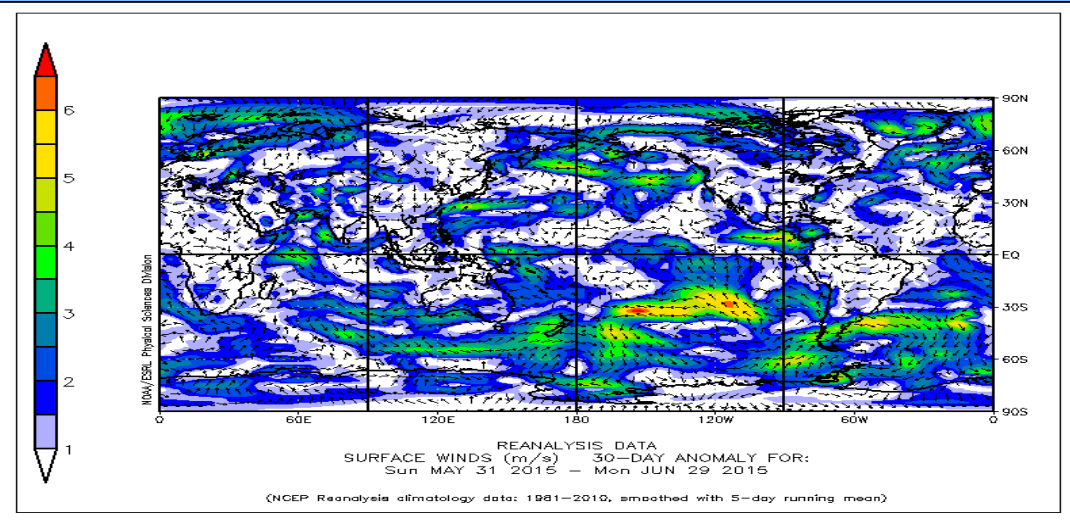


Figure 12:
South easterly wind anomalies of 2m/s persisted in the Fiji region (Fiji: ~17°S, 180°) (base period: 1981-2010).

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 June 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>