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Fiji Climate Summary September 2014

Issued : October 9, 2014 Since : August 1980* Volume 35 : Issue 09

1.0 IN BRIEF

September was considerably drier than *normal* across the country.

The South Pacific Convergence Zone (SPCZ), remained weaker than *normal*, and since June, displaced to the north of Fiji.

At the end of September, the majority of observing sites (21 out of the 26) registered *well below average* to *below average* rainfall, for the fourth consecutive month, running.

Rain received in the last week of September brought brief relief to some parts of the country. However, this was not enough to reverse the effects of the long dry spell.

All the rainfall monitoring stations (26) in Fiji are currently under meteorological drought, on a three-month timescale, while twenty-three, on a six-month timescale.

The day-time air temperatures were *above normal* at the majority of the stations, with twenty, out of the twenty one temperature stations, recording anomalies ≥ 0.5 °C.

The mean maximum air temperatures ranged from 27.5°C to 31.9°C in the coastal areas of Fiji, while Monasavu recorded 24.5°C. The highest daily day-time air temperature of 34.9°C was recorded at Nadi Airport on the 28th.

The night-time air temperatures were also above *normal* at most places, with 16 out of the 21 stations recording anomalies >0.5°C.

The mean minimum air temperatures ranged from 18.6°C to 24.8°C in the coastal areas, whilst at Monasavu, it was 16.3°C. The lowest daily night-time air temperature of 11.3°C was recorded at Monasavu on the 14th.

Though El Niño-Southern Oscillation (ENSO) conditions remain at neutral state, the development of an El Niño in the last quarter of 2014 is still possible.

The total monthly September rainfall recorded at Udu Point, Tokotoko, Penang Mill, Vatukoula and Dobuilevu ranked the lowest in these stations' historical record. New records for rainfall (5) and temperature (10) were established in September (Table 1).

2.0 WEATHER PATTERNS

September weather was influenced by slow-moving ridges of high pressure and weak frontal systems.

From the 1st to 7th, a ridge of high pressure extended over Fiji and directed an easterly wind flow over the group. Showers were mostly confined to the eastern parts of the larger islands. Later on the 7th, a frontal system moved onto Fiji from the southwest and continued east affecting only the southern parts of the country with brief showers.

On the 8th, a ridge extended onto Fiji maintaining an easterly wind flow over the group till the 10th. The ridge intensified on the 11th and was the predominant feature till the 25th. Brief showers were experienced over the eastern parts of Fiji. During this episode, Monasavu recorded the lowest monthly overnight minimum temperature of 11.3°

C, on the 14th.

From the 26th a trough developing to the west eventually moved onto the group, on the 29th, and lingered till the end of the month. Most parts of Fiji received rainfall during this period, with Koronivia receiving the highest of 62mm, on the 27th, which was also the highest rainfall for the month.

Rotuma's weather in September was influenced by the SPCZ and moist easterly winds. It recorded the lowest overnight temperature of 20.6°C on the 2nd.

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

3.0 RAINFALL

Rainfall in September was considerably drier than *normal* with *below average* to *well below average* experienced across the country (Table 2 and Figures 1-5).

Of the twenty-six rainfall monitoring stations in the country, twenty-one received *well below average* rainfall and five *below average*.

For four straight months running, most of these sites registered *below average* to *well below average* rainfall.

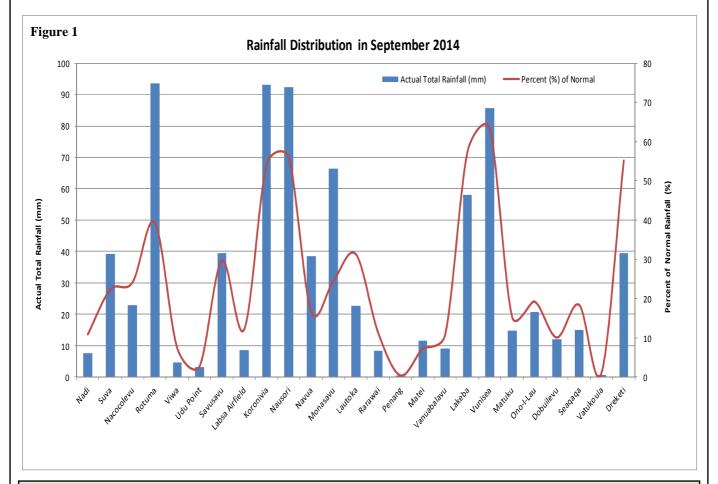
Koronivia recorded the highest 24-hpur rainfall of 62.0mm on the 27th, followed by Nausori Airport with 57.5mm on the 27th and Monasavu with 47.0mm on the 30th.

Rain received in the last week of September, while most welcome, were not enough to reverse the current long dry spell in Fiji (Table 2).

Udu Point, Tokotoko, Penang Mill, Vatukoula and Dobuilevu registered new lowest total monthly rainfall this month (Table 1).

Rotuma recorded the highest total monthly rainfall of 93.5mm, followed by Koronivia, 93.2mm, Nausori Airport, 92.4mm and Vunisea, 85.8mm. On the other hand, the lowest total monthly rainfall was recorded at Penang Mill with 0.4mm, followed by Vatukoula, 0.8mm, Udu Point, 3.1mm and Viwa, 4.7mm (Figure 1).

Rotuma recorded the highest number of rain days (rainfall ≥0.1mm) with 16 days, followed by Ono-i-lau with 13 and Vunisea with 11. At the same time, Penang Mill, Yasawai-rara and Vatukoula record only 1 rain day, followed by Nacocolevu and Viwa with 2, and Nadi Airport, Lautoka Mill, Vanuabalavu and Labasa Airport with 3.



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.

eu Above Average: Rainjau greaier inan or equal to 200% of normal

4.0 AIR TEMPERATURES

A. Maximum Daytime Air Temperatures

The average maximum air temperatures were *above nor-mal* at most places during the month, with twenty out of the twenty-one stations recording anomalies ≥ 0.5 °C and 1 within ± 0.5 °C (Table 2 & Figures 2-5).

The highest monthly average maximum air temperature was recorded at Labasa Airport with 31.9°C, followed by Rarawai Mill with 31.7°C and Viwa with 30.8°C. On the other hand, Monasavu registered the lowest with 24.5°C, followed by Matuku, 27.5°C and Ono-i-lau, 27.7°C.

The highest daily maximum air temperature was observed at Nadi Airport with 34.9°C on the 28th, followed by Savusavu Airfield with 34.4°C on the 29th and Rarawai Mill with 33.5°C on the 11th. In contrast, the lowest daily maximum temperature was registered at Monasavu with 27.8°C on the 21st, followed by Matuku with 30.0°C on the 29th.

Positive mean monthly maximum air temperature anomalies were recorded throughout the country, with the highest of +2.6°C observed at Viwa, followed by +2.3°C at Vunisea and Ono-i-lau.

Ten new maximum air temperature records were established during the month. New daily high temperature records were established at Nadi Airport, Savusavu Airfield, Tokotoko, Vunisea and Ono-i-lau, while new high mean monthly temperature records were set at Labasa Airport, Koronivia, Tokotoko, Monasavu and Vunisea (Table 1).

B. Minimum Night-time Air Temperatures

The minimum air temperatures were also *above normal* at most of the locations, with 16 out of the 21 stations recording anomalies ≥ 0.5 °C, 3 within ± 0.5 °C and 2, ≤ 0.5 °C (Table 2 & Figures 2-5).

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The lowest monthly average minimum air temperature of 16.3°C was recorded at Monasavu, followed by Labasa Airport with 18.6°C. On the other hand, the highest average minimum temperature was registered at Rotuma with 24.8°C, followed by Udu Point, 23.5°C, and Vanuabalavu and Viwa, 23.3°C.

The lowest daily minimum air temperature was recorded at Monasavu with 11.3°C on the 14th, followed by Labasa Airport with 16.0°C on the 9th and Nausori Airport with 16.4°C on the 14th. On the other hand, the highest daily minimum temperature was observed at Rotuma with 26.5°C on the 2nd, followed by Viwa with 26.1°C on the 27th.

Several stations recorded mean monthly minimum temperature anomalies $\geq 1.0^{\circ}$ C, with the highest of $+2.4^{\circ}$ C recorded at Tokotoko, followed by $+1.6^{\circ}$ C at Nadi Airport. On the other hand, Labasa Airport and Savusavu Airfield registered negative temperature anomalies of -0.7° C and -0.6° C, respectively.

No new minimum air temperature record was established during the month (Table 1).

TABLE 1. CLIMATE RECORDS ESTABLISHED IN SEPTEMBER 2014

<u>Element</u>	Station	Observed (record)	<u>On</u>	Rank	Previous (record)	<u>Year</u>	Records Began
Total Monthly Rainfall	Udu Point	3.1mm	-	New Low	4.2mm	1987	1946
Total Monthly Rainfall	Tokotoko	38.4mm	-	New Low	47.3mm	2003	1992
Total Monthly Rainfall	Penang Mill	0.4mm	-	New Low	1.0mm	1933	1910
Total Monthly Rainfall	Vatukoula	0.8mm	-	New Low	5.1mm	2003	1945
Total Monthly Rainfall	Dobuilevu	12.0mm	-	New Low	13.0mm	1937	1945
Daily Maximum Temp.	Nadi Airport	34.9°C	28^{th}	New High	34.6°C	1943	1942
Daily Maximum Temp.	Savusavu Airfield	34.4°C	29 th	New High	32.2°C	1960	1957
Daily Maximum Temp.	Tokotoko	32.0°C	28^{th}	New High	31.2°C	1992	1992
Daily Maximum Temp.	Vunisea	31.7°C	28^{th}	New High	31.6°C	1955	1947
Daily Maximum Temp.	Ono-i-Lau	30.7°C	7^{th}	New High	30.6°C	2007	1943
Mean Maximum Temp.	Labasa Airport	31.9°C	-	New High	31.8°C	2010	1956
Mean Maximum Temp.	Koronivia	28.5°C	-	New High	28.4°C	2010	1965
Mean Maximum Temp.	Tokotoko	27.9°C	-	New High	27.8°C	2007	1992
Mean Maximum Temp.	Monasavu	24.5°C	-	New High	23.4°C	1984	1980
Mean Maximum Temp.	Vunisea	28.4°C		New High	27.9°C	2007	1947

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 SEPTEMBER 2014

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RAINFALL
                                                    AIR TEMPERATURES
                                                                                    SUNSHINE
                      TOTAL RAIN MAX.
                                                AVERAGE DAILY
                                                                     EXTREME
                                                                                     TOTAL
                           * DAYS FALL
                                                              #
                                             MAX. #
                                                      MIN.
                                                                  MAX.
                                                                          MIN.
                                                                     C ON
                       MM
                            %
                                    MM ON
                                               C
                                                          C
                                                                C
                                                                              C ON
                                                                                     HRS
                                                                                            %
                               +
NADI AIRPORT
                                            30.4
                        8
                                     6 29
                                                   1.1 20.9
                                                              1.6 34.9 28 17.8 14
                                                                                     215 102
                           11
SUVA/LAUCALA BAY
                       39
                           22
                                9
                                    14 27
                                            28.3
                                                   1.1 21.9
                                                              0.9 32.1 29 19.9 14
                                                                                     192 141
                                            29.5
29.7
                                2
                                    17 29
                       23
                           24
                                                   1.6 19.5
                                                                           17.0 30
                                                                                     185 107
                                                              1.1 33.0 28
NACOCOLEVU
ROTUMA
                       94
                           39 16
                                    42
                                       10
                                                   0.4 24.8
                                                              0.7
                                                                  31.1 14 20.6
                                                                                29
                                                                                     115
                                                                                           64
                        5
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                                     5 29
                                            30.8
                                                   2.6 23.3
                                                              0.6 32.7
                                                                        22
VIWA
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                                            29.5
                                                              1.0 31.8 29 22.1 14
UDU POINT
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                                                   0.9 20.6
                       39
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                                    21 29
                                            28.3
                                                            -0.6 34.4 29 18.5
SAVUSAVU AIRFIELD
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                                                            -0.7 33.5 19 16.0
LABASA AIRFIELD
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NABOUWALU
                        INSUFFICIENT DATA
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                           54
                                            28.5
                                                   1.6 20.6
                                                              0.8 31.9 29
                                    62 27
KORONIVIA
                                    58 27
NAUSORI AIRPORT
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                                8
                                    15 29
                                            27.9
                                                              2.4 32.0 28 18.0
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                           17
                                                   0.5 20.8
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NAVUA/TOKOTOKO
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1.3 21.7
MONASAVU
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                                    47
                                        30
                                            24.5
                                                              0.4 27.8 21
                                                                           11.3
                                                                                 14
                                    16 29
                                            30.0
                                                                           18.9
LAUTOKA AES
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                                                                  33.2
                                                                        13
                                                                                14
                           11
                                     4 28
                        8
                                            31.7
                                                   1.3 19.5
                                                              1.3 33.5 11 16.5
BA/RARAWAI MILL
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                                1
                                     0 28
                                            29.9
                                                   1.9 21.9
                                                              0.7 32.0 28 19.8
                                                                                24
PENANG MILL
                            0
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                                                              0.1 30.5
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                                     7
                                        30
                                                   1.2 21.9
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MATEI AIRFIELD
                       12
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                                     8
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                                            27.9
                                                   0.6 23.3
                                                              1.0 30.5
                                                                       29
VANUABALAVU
                                                                           22.2
                                                                                 14
                                                                       29
                                                                           17.5
                       58
                           57
                                        29
                                            27.8
                                                   0.9 21.4
                                                              0.0
                                6
                                    35
                                                                  30.8
                                                                                16
LAKEBA
                                                  2.3 21.0
                                                              1.2
                       86
                           63 11
                                    40
                                       30
                                            28.4
                                                                  31.7 28 18.7
                                                                                19
VUNISEA
                                     4 27
                       15
                           15 10
                                            27.5
                                                   1.1 22.0
                                                              1.2 30.0 29 18.1
                                                                                15
MATUKU
                                       13
29
                       21
                           19
                              13
                                     6
                                            27.7
                                                   2.3 21.1
                                                              0.7
                                                                  30.7
                                                                           19.5
ONO-I-LAU
SEAQAQA
                       15
                           18
                                5
                       40
                           55
                                4
                                    21 30
DREKETT
                       12
                           10
                                8
                                     4 13
DOBUILEVU
                                     8
                        8
                                1
                                       30
YASAWA-I-RARA
                           12
VATUKOULA
                                       28
TEMPERATURE( C) HUMIDITY WIND SUN RAD
                                    RH%
                                          VP
                                                      %OF M1/
                          DRY WFT
                            (AVERAGE AT 9AM)
                  MEAN
                                                ΚT
                                                     POS SQ.M
                     25.6 26.8 21.9
                                      64 22.5
                                                6.8
                                                      62 22.4
NADI AIRPORT
                                                      56 19.5$
SUVA/LAUCALA BAY
                     25.1 25.3 22.5
                                      78 25.1
                     24.5 25.9 22.2
NACOCOLEVU
                                      71 23.8
                                                      57 19$
                     27.2 27.8
ROTUMA
                     27.1 27.9 24.1
                                      72 27.0
VIWA
                     26.5 27.1 23.4
                                      72 25.9
UDU POINT
                    24.4 25.5 22.6
25.3 28.2 24.5
SAVUSAVU AIRFIELD
                                      77
                                          25.1
                                      73 27.9
LABASA AIRFIELD
                     INSUFFICIENT DATA
NABOUWALU
                     24.5 25.6 22.6
KORONIVIA
                                      76
                                      79 25.2
NAUSORI AIRPORT
                     24.2 25.1 22.5
                                                3.1
                     24.4 24.8 22.5
NAVUA/TOKOTOKO
                                      82
                                          25.6
                     20.4 19.6 17.9
25.8 27.3 22.8
                                         19.3
MONASAVU
                                      85
                                      67 24.2
LAUTOKA AFS
                     25.6 27.7 22.3
BA/RARAWAI MILL
                                      62 22.8
                     25.9 26.8 22.5
                                      68 23.8
PENANG MILL
                     25.3
                          26.3 23.0
                                      74 25.5
MATEI AIRFIELD
                                      74 25.1
                     25.6 26.1 22.8
VANUABALAVU
                     24.6 25.8 22.4
LAKEBA
                                      73 24.4
```

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.

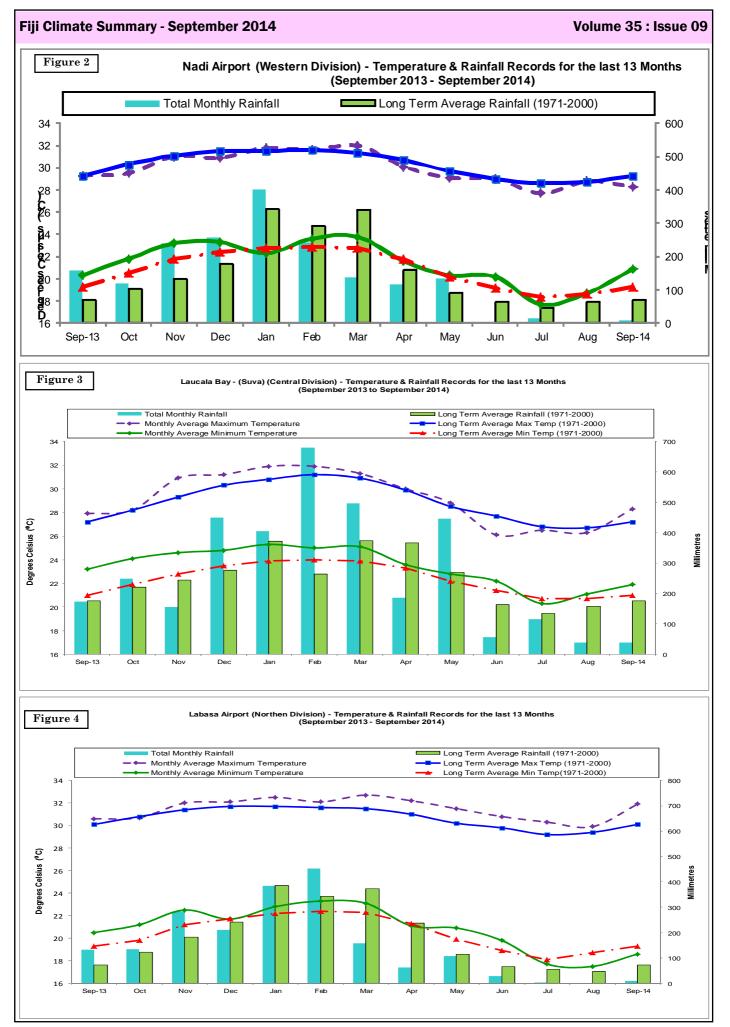
8.6

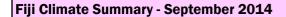
74 23.5 72 22.8

24.7 25.3 24.7 25.1 21.7 24.4 24.9 21.4

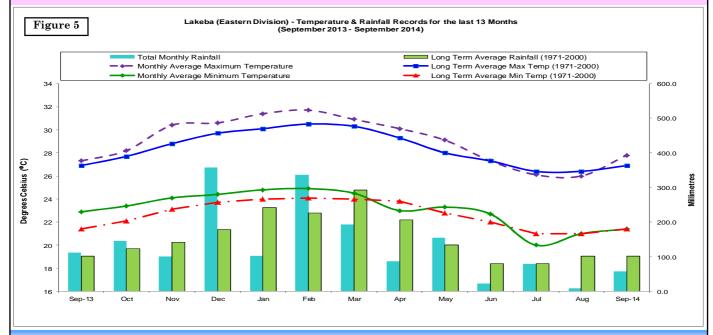
VUNISEA MATUKU

ONO-I-LAU





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5.0 RELATIVE HUMIDITY AT 0900HOURS

The 9am average relative humidity (RH) in September varied between 62% and 85% (Table 2); daily values ranged from 48% to 99%.

The stations in the Western Division recorded daily average RH values between 62% and 72%. Negative RH departures from the *normal* were recorded across the Division with the lowest of -12.9% at Penang Mill.

The Central Division stations recorded daily average RH between 76% and 82%. The majority of the stations recorded negative departures from the *normal*, with Koronivia, Tokotoko and Laucala Bay recording -2.6%, -2.0% and -0.8%, respectively. Nausori Airport was the lone station that recorded a positive anomaly (+0.1%).

The daily average RH in the Northern Division ranged from 72% to 77%. Negative departures were recorded at the majority of the stations, with the most significant departure of –3.6% observed at Matei Airfield.

The stations in the Eastern Division registered daily average RH between 72% to 74%. Vanuabalavu, Ono-i-lau and Lakeba recorded anomalies of -2.3%, -1.8% and -1.4%, respectively, while Matuku registered a positive anomaly of +0.6%.

The daily average RH at Monasavu was 85%.

Rotuma's analysis is not available due to missed observations.

6.0 SUNSHINE

Laucala Bay, Nadi Airport and Nacocolevu recorded 141%, 107% and 102% of the *normal* bright sunshine hours, respectively, during the month (Table 2).

Nadi Airport recorded 215.3 hours of bright sunshine, with a mean of 7.2 hours/day. More than 10 hours of bright sunshine was recorded on a number of days, with the highest of 11.0 hours registered on the 28th. On the other hand, the 10th was an overcast day with only 0.4 hours of bright sunshine recorded.

Laucala Bay recorded 192.2 hours of bright sunshine during the month, with a mean of 6.4 hours/day. Its highest daily sunshine of 10.4 hours was recorded on the 5th, while the 10th, an overcast day, zero hours of bright sunshine was recorded.

Nacocolevu recorded 184.8 hours of bright sunshine, with a mean of 6.6 hours/day. The station's longest duration of bright sunshine of 10.0 hours was recorded on the 30th, followed by 9.8 hours on the 23rd. In contrast, overcast conditions prevailed on the 30th with no bright sunshine hours recorded.

Rotuma's analysis is not available due to missed observations.

7.0 WIND SUMMARY

The 10-minute average wind statistics recorded at three hourly intervals at Nadi Airport in September showed that south-easterly winds were dominant, accounting for 22.1% of the total observations, followed by easterlies with 18.8% and westerlies, 17.9% (Figure 6(a)). Calm conditions were recorded on 11.7% of the occasions. The 10-minute average wind speeds were generally light to moderate in strength, however, strong breeze of up to 22 knots was recorded on the 20th (Figure 6(b)). The three-hourly mean wind speed at the station was 6.4 knots.

At Nausori Airport, calm conditions were observed on more than half of the occasions, accounting for 55.0% of the total three-hourly observations. Easterly winds were otherwise dominant accounting for 22.9% of the observations, followed by south-easterlies with 9.6%. The 10-

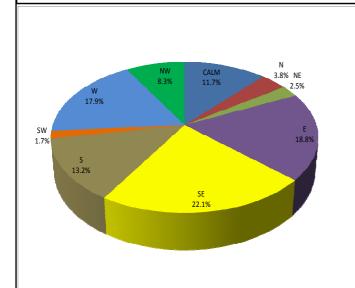
minute average wind speeds were light to moderate in strength (Figure 7(b)). The three-hourly mean wind speed at Nausori Airport was 3.2 knots.

The wind anomalies map on the NOAA website shows weak north-westerly wind anomalies of 0-1m/s (near average) persisted in the Fiji region during the month (Figure 13).

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



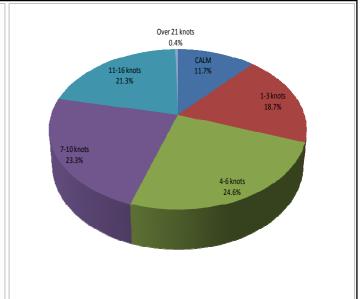
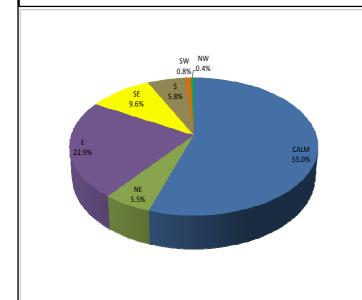
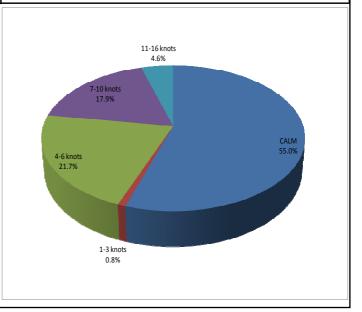


Figure 7(a) Surface Wind Direction for Nausori Airport, Fiji. (WMO 91683 Lat 18°02'47"South Long 178°33'33"East Height above MSL 3m)

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)

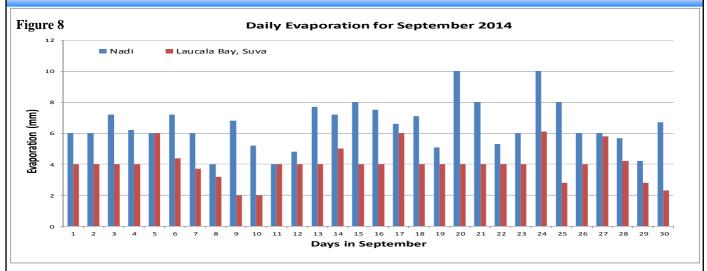




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8.0 EVAPORATION



The total monthly raised pan evaporation at Nadi Airport was 194.5mm, while Laucala Bay recorded 120.3mm. Nadi Airport's highest daily evaporation was 10.0mm on the 20th and 24th, with Laucala Bay recording the highest of 6.1mm on the 24th.

9.0 RADIATION

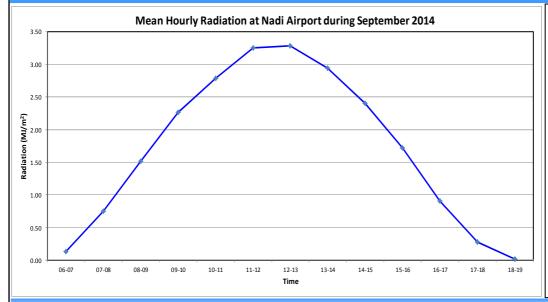


Figure 9:

The mean daily solar radiation at Nadi Airport during September 2014 was 22.4MJm², while the *normal* during September is 19.1MJm².

10.0 SEA SURFACE TEMPERATURE (SST)

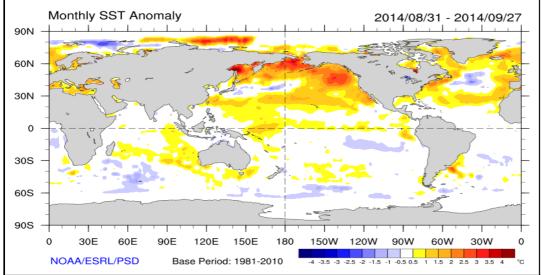


Figure 10:

SST anomalies (°C) from 31st August to 27th September, 2014.

SST was near normal in the Fiji region (Fiji: ~17°S, 180°), (base period: 1981-2010).

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

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CLOUD COVER

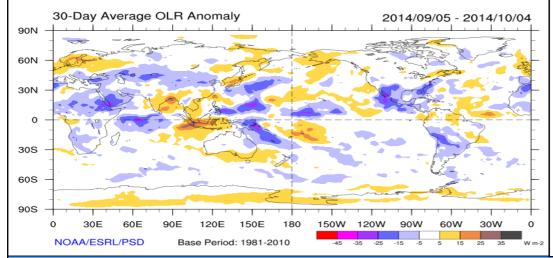


Figure 11:

Outgoing Longwave anomalies (Wm⁻²) from 5th September to 4th October, 2014. The map shows *normal* to *below 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

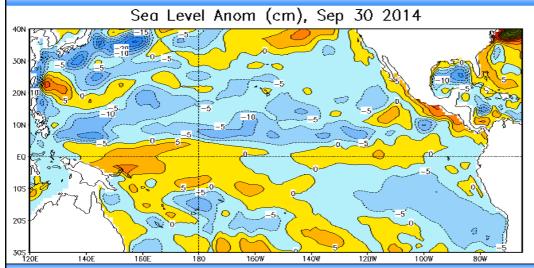


Figure 12:

Negative sea level anomalies of -5 to -10cm persisted in the northern Fiji region while normal sea levels in the southern region.

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

WIND ANOMALIES

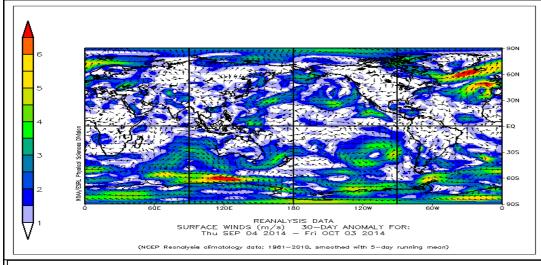


Figure 13:

Wind anomalies for September 2014.

Weak north-westerly wind anomalies of 0-1m/s persisted 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.rnl.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.

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