

Fiji Islands Weather Summary December 2004 Rainfall Outlook till March 2005

FIJI METEOROLOGICAL SERVICE

IN BRIEF

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WEATHER PATTERNS

Early on the 03rd a trough developed over Vanuatu and gradually moved east towards Fiji, with winds tending northeast over Fiji as the trough moved closer. Over the next few days the associated cloud band affected the country, resulting in flooding over inland and eastern parts of Viti Levu from the night of the 7th to the 8th.

Around midnight on the 07th a convergence zone developed to the north of Vanua Levu and drifted over the Lau group with an associated low pressure bringing heavy rain to Vanua Levu, Taveuni, Lomaiviti, Lau and eastern parts of Viti Levu. The convergence zone gradually moved towards Tonga two days later dragging the low pressure with it. With the trough now to the east of Fiji, the southeast trade winds again prevailed over the country.

A second trough moved onto Vanua Levu early on the 11th, gradually moving southwest across the country over the next three days and caused rain over most places with some areas experiencing heavy falls. The

trough remained to the west in a weak state from the 15th to the 19th as moist northeast winds prevailed over the group. Around midday on the 19th the trough moved back over Fiji and swiftly travelled east across the country, becoming slow - moving over the northeastern parts of the Group. Heavy rainfall caused flooding in parts of the Central Division. The trough slid back southwest over the rest of the country on the evening of the 20th to lie to the southwest of Viti Levu by midnight of the 21st before finally dissipating on the 27th.

After the trough dissipated on the 27th a moist east to northeast flow persisted over the Group which lasted until the end of the month.

The close proximity of the South Pacific Convergence Zone caused wet conditions over Rotuma throughout the month. Particularly heavy falls occurred during the first six days and also towards the end of the month, particularly on the 27th.

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TABLE 1: RAINFALL FROM OCTOBER TO DECEMBER 2004

| Station | Actual Rainfall (mm) | Rainfall in the last three months (Below average, average or above average) | No. of Rain days in Oct (% of total rain) | No. of Rain days in Nov (% of total rain) | No. of Rain days in Dec (% of total rain) |
|----------------------|-----------------------------|--|--|--|--|
| Penang Mill | 71.5 | Well Below Average | 2 (2) | 3 (41) | 12 (57) |
| Monasavu Dam | 746.4 | Below Average | 20 (29) | 13 (19) | 26 (52) |
| Vatukoula Mine | 185.5 | Well Below Average | 3 (32) | 4 (11) | 8 (57) |
| Rarawai Mill, Ba | 120.7 | Well Below Average | 6 (17) | 3 (3) | 10 (80) |
| Yasawa-I-Rara | - | - | - | 3 | 6 |
| Viwa Island | 87.4 | Well Below Average | 4 (18) | 7 (23) | 8 (59) |
| Lautoka (FSC Res.) | 121.9 | Well Below Average | 4 (5) | 4 (30) | 13 (65) |
| Nadi Airport | 81.9 | Well Below Average | 5 (30) | 7 (32) | 12 (38) |
| Nacocolevu, Sigatoka | 144.1 | Well Below Average | 6 (20) | 2 (1) | 11 (79) |
| | | | | | |
| Tokotoko, Navua | 672.4 | Below Average | 19 (32) | 19 (16) | 23 (52) |
| Laucala Bay, Suva | 524.5 | Average | 22 (14) | 14 (16) | 22 (70) |
| Nausori Airport | 431.4 | Below Average | 23 (13) | 12 (16) | 16 (71) |
| | | | | | |
| Nabouwalu | 216.4 | Well Below Average | 17 (20) | 13 (20) | 23 (60) |
| Labasa Airport | 179.9 | Well Below Average | 6 (38) | 8 (30) | 10 (32) |
| Savusavu Airport | 295.9 | Below Average | 7 (15) | 8 (48) | 15 (37) |
| Udu Point | 843.0 | Above Average | 10 (25) | 11 (41) | 22 (34) |
| Matei Airport | 562.7 | Below Average | 13 (28) | 16 (27) | 13 (45) |
| | | | | | |
| Lakeba Is. | 248.1 | Below Average | 9 (19) | 10 (17) | 13 (64) |
| Matuku Is. | 143.5 | Below Average | 6 (24) | 4 (21) | 10 (55) |
| Ono-I-Lau Is. | 80.4 | Well Below Average | 8 (35) | 3 (13) | 7 (52) |
| Vunisea, Kadavu | 296.9 | Below Average | 17 (19) | 12 (41) | 20 (40) |
| | | | | | |
| Rotuma | 1481.9 | Above Average | 26 (37) | 19 (41) | 21 (22) |

RAINFALL IN THE LAST THREE MONTHS

Rainfall in December

Rainfall was below average (<80%) to well below average (<40%) across most of the Western Division, Northern and Eastern Divisions except at Matei, Udu Pt and Lakeba which recorded average rainfall.

The Central Division recorded average to above average rainfall ranging from 93%-162%.

Average rainfall was received at Rotuma.

Rainfall in the 3-months from October to December

The Rainfall Outlook for the period October to December in the September Fiji Islands Weather Summary was for rainfall to be close to average for a majority of the sites. The confidence level of the forecast was low to moderate.

Out of the twenty one sites that reported in time for this summary, ten sites reported well below average rainfall, eight sites reported receiving below average, one site with average and two sites with above average rainfall.

Figure A

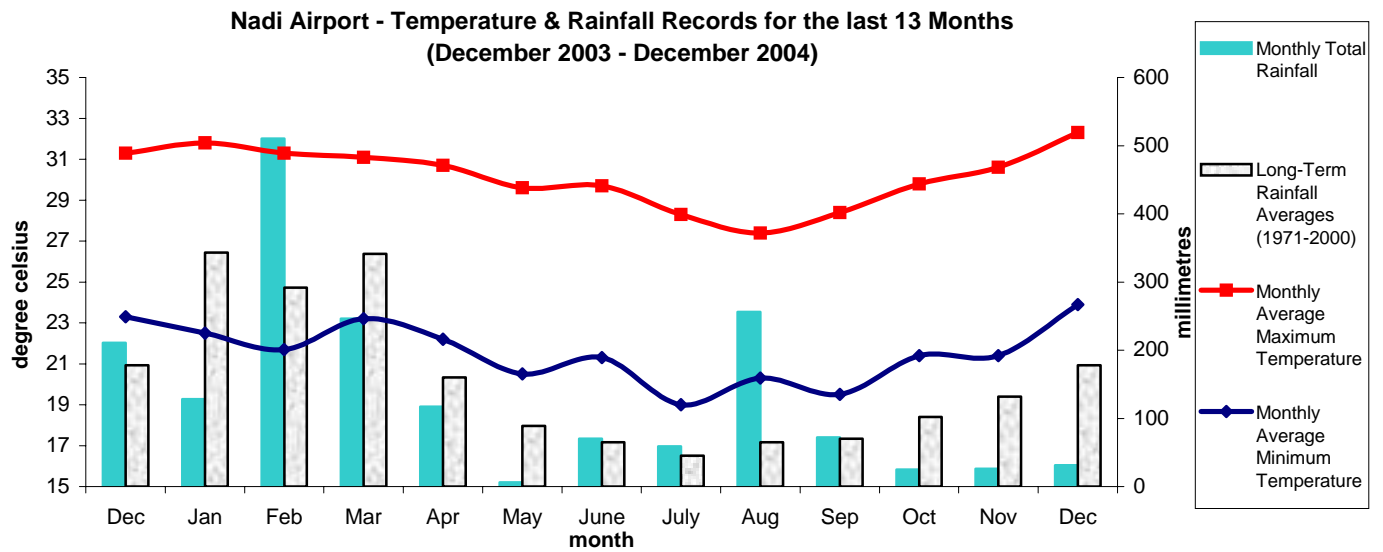


Figure B

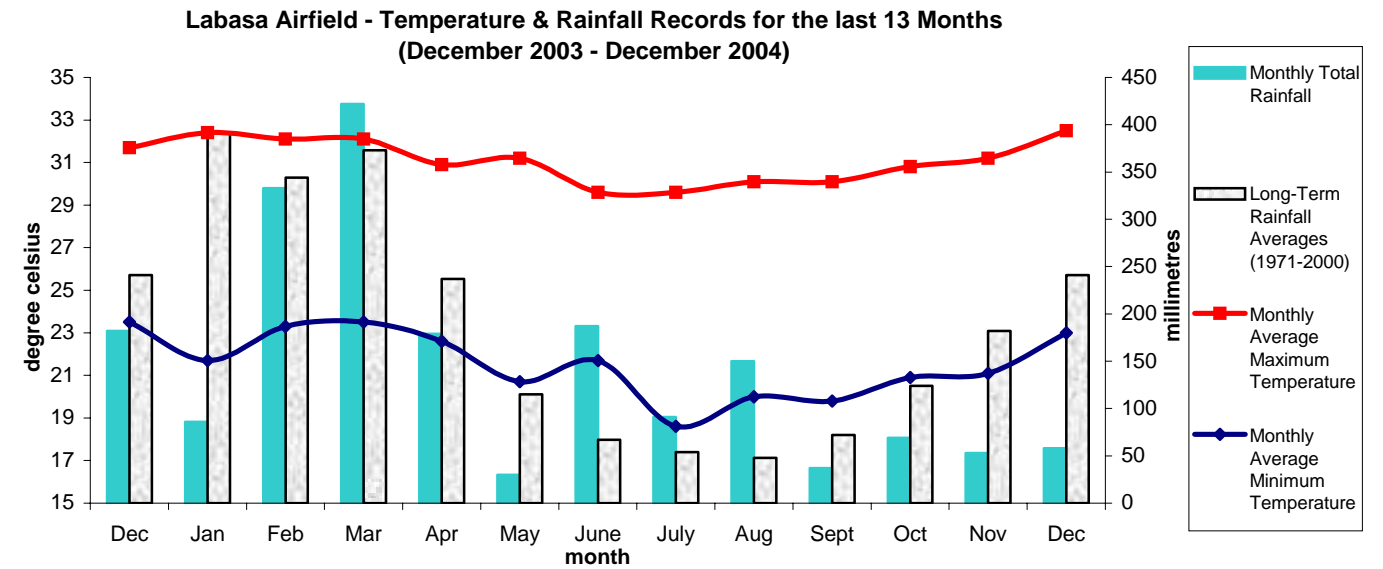
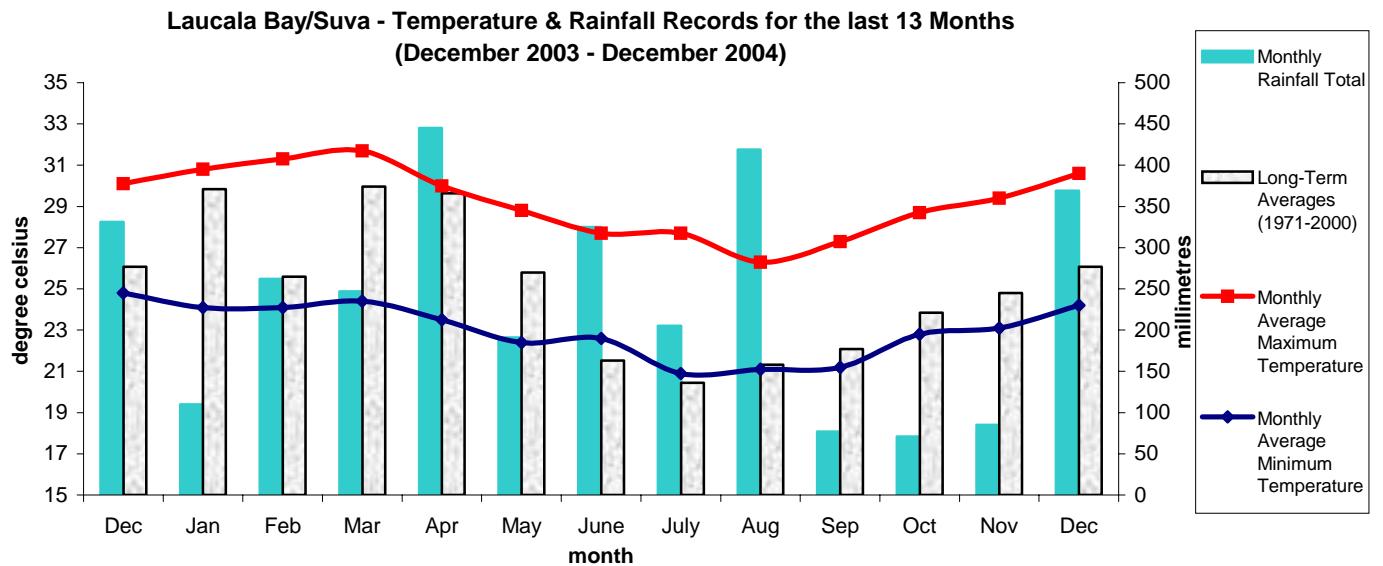


Figure C



Climate in December

MEAN DAY-TIME AND NIGHT-TIME AIR TEMPERATURES AND RELATIVE HUMIDITY AT 0900HRS.

Day-time temperatures were average to above average across the country. The greatest positive departure was recorded at Yasawa-I-Rara which recorded 1.8°C above normal, Penang Mill and Viwa recorded 1.6°C and 1.4°C respectively above normal. The greatest negative departures were recorded at Savusavu Airport which recorded 0.3°C above normal. Matuku and St. Johns College recorded 0.2°C below normal.

Night-time temperatures were generally average to above average across the country. The greatest positive departures were recorded at Vatukoula which recorded 1.7°C above normal. Rarawai Mill and Nadi Airport recorded 1.5°C above

normal. The greatest negative departure were recorded at Ono-I-Lau which recorded 1.0°C below normal, Udu Pt. and Tokotoko, Navua recorded 0.5 °C below normal.

Relative Humidity (RH) at 0900hrs were above average to below average across the country. The highest positive departure from normal of 12.6% was recorded at Nacocolevu. The greatest negative departure from normal was recorded at Matuku which recorded 12.4% below normal.

SOIL MOISTURE AND RUNOFFS

In the Central Division, conditions were generally limiting to moderate during the first half of the month then ample to excessive for the rest of the month.

In the Western Division, conditions were limiting to dry for most of the month except at Monasavu which recorded ample to excessive conditions.

In the Eastern Division, all sites reported conditions generally limiting to dry conditions for most of the month. Rotuma recorded excessive to ample conditions throughout the

month.

In the Northern Division, Nabouwalu, Savusavu Airport and Labasa Airport recorded limiting to dry conditions while Matei and Udu Point recorded excessive to ample conditions at the beginning of the month and ample to moderate conditions towards the end of the month.

Significant runoffs were recorded at Monasavu (274.1mm), Tokotoko, Navua (178.7mm), Udu Point (178.3mm), Rotuma (171.5mm) and Laucala Bay, Suva (164.5mm).

SUNSHINE, RADIATION & WINDS

Total sunshine hours were near average in December. Nadi Airport received 87%, Laucala Bay/Suva 85% and Nacocolevu 89%. Global Solar Radiation at Nadi Airport was 19.2 MJ/ M² (average per day).

Monthly average wind speed was below average at Nabouwalu and average at Rotuma. Nadi Airport and Nausori Airport reported receiving above average surface winds.

RECORDS SET IN DECEMBER 2004

| <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> |
|--------------------|-------------------|--------------------------|-----------|-------------|--------------------------|-------------|----------------------|
| Mly Min. Temp (°C) | Laucala Bay, Suva | 23.9 | - | Equal High | 23.9 | 1998 | 1941 |
| Dly Min. Temp (°C) | Tokotoko, Navua | 26.5 | 10th | New High | 26.0 | 2003 | 1992 |
| Dly Min. Temp (°C) | Rarawai Mill, Ba | 26.5 | 27th | New High | 25.7 | 1994 | 1925 |

Tropical Cyclone Season - November 2004 to April 2005

The South Pacific Tropical Cyclone Season officially began on 1st November and will continue till 30th April 2005.

78, 80, 81 (2 Events), 82, 85 (2 Events), 97, 98, 2000 (2 Events) and 2003.

The chances of a cyclone affecting Fiji this season are moderate to high especially with sea surface temperatures in the western and central Pacific being on the *Warm* side of *Neutral*. The mean number of cyclones that affect Fiji in a season (including pre-season events) is between 1-2. However, there have been as many as 6 events such as during the 1996/97 season.

To date there have been two tropical cyclones form in the SW Pacific this season. TC *Judy* (Max int. Gale) formed on the 25th Dec. near (and affected) French Polynesia and TC *Kerry* which formed on the 6th January north-east of (and affected) Vanuatu is still active. The average number of tropical cyclones that form in a season is between 9-10.

Historical records of tropical cyclones show that there have been 14 cyclones that have affected Fiji in the month of January since the 1969/70 season. The years were 1970, 75

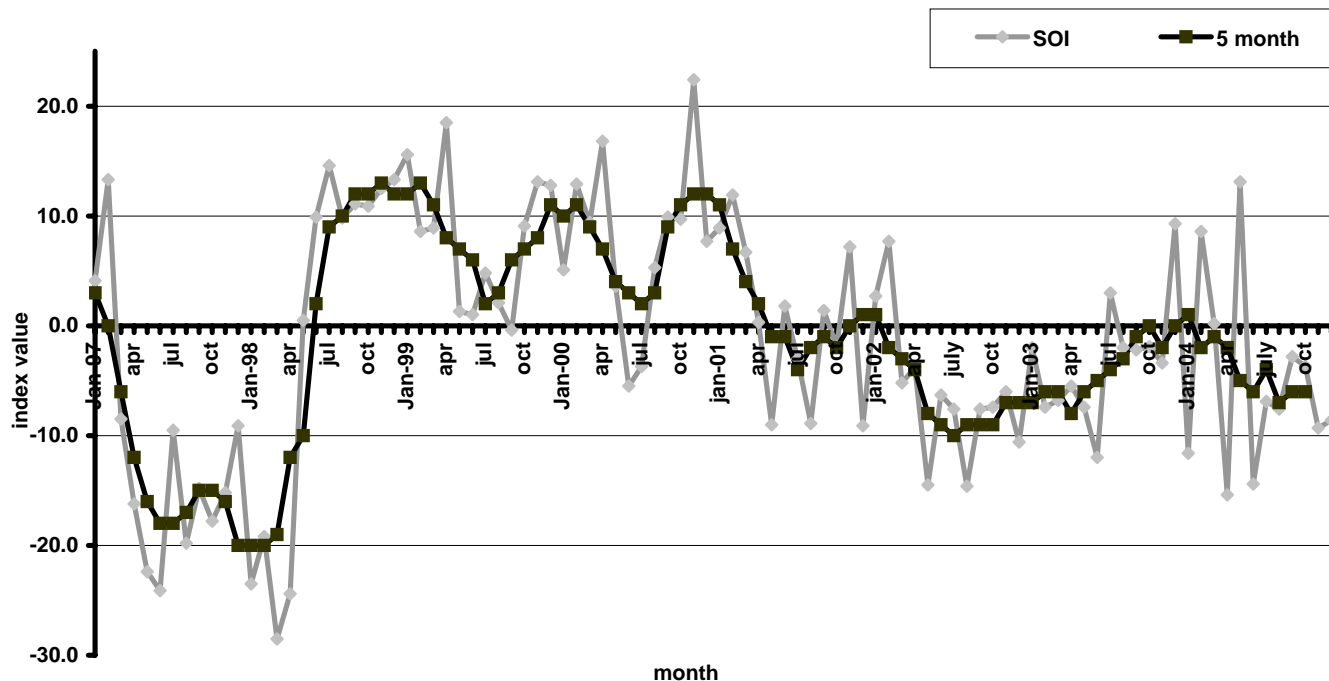
Prior to and during a cyclone information can be accessed from the Fiji Meteorological Service on its website <http://www.met.gov.fj>, via email: NadiTCC@met.gov.fj, via Weather fax - 6721 227 (Polling fax), via Fax 6720190 or Phone 6724 888. Information is also available through the local media.

PRELIMINARY CLIMATOLOGICAL SUMMARY FOR DECEMBER 2004

| | RAINFALL | | | | AIR TEMPERATURES | | | | | | SUNSHINE | | | | |
|-------------------|----------|------|----------|-------|------------------|------|------|---------|------|-------|----------|------|-----|-----|----|
| | TOTAL | RAIN | MAX. | | AVERAGE DAILY | | | EXTREME | | TOTAL | | | | | |
| | MM | % | * DAYS + | MM ON | MAX. | # | MIN. | # | MAX. | MIN. | C | ON | HRS | % | |
| NADI AIRPORT | 31 | 17 | 12 | 14 | 14 | 32.3 | 0.8 | 23.9 | 1.5 | 35.4 | 12 | 21.7 | 3 | 199 | 87 |
| SUVA/LAUCALA BAY | 369 | 162 | 22 | 69 | 21 | 30.6 | 0.3 | 24.2 | 0.7 | 32.6 | 13 | 21.5 | 4 | 165 | 85 |
| NACOCOLEVU | 114 | 60 | 11 | 47 | 21 | 31.6 | 0.7 | 22.8 | 1.2 | 34.2 | 15 | 18.1 | 3 | 163 | 89 |
| ROTUMA | 327 | 115 | 21 | 49 | 2 | 31.0 | 0.3 | 25.3 | 0.6 | 32.7 | 19 | 23.5 | 29 | U/S | |
| VIWA | 52 | 36 | 8 | 16 | 13 | 32.3 | 1.4 | 24.8 | -0.2 | 35.2 | 25 | 22.5 | 19 | | |
| UDU POINT | 287 | 109 | 22 | 122 | 10 | 31.1 | 0.6 | 23.6 | -0.5 | 33.6 | 22 | 22.0 | 5 | | |
| LABASA AIRFIELD | 58 | 24 | 10 | 19 | 22 | 32.5 | 0.8 | 23.0 | 1.3 | 34.5 | 30 | 20.3 | 3 | | |
| NABOUWALU | 129 | 51 | 23 | 42 | 19 | 30.5 | 0.9 | 24.3 | 0.3 | 33.7 | 13 | 22.7 | 2 | | |
| SAVUSAVU AIRFIELD | 110 | 43 | 15 | 39 | 19 | 29.9 | -0.3 | 24.2 | 1.1 | 33.7 | 15 | 22.0 | 4 | | |
| MATEI AIRFIELD | 256 | 85 | 13 | 53 | 11 | 30.0 | 0.4 | 24.7 | 0.9 | 31.5 | 23 | 22.5 | 1 | | |
| YASAWA-I-RARA | 17 | 11 | 6 | 6 | 13 | 32.2 | 1.8 | 25.3 | 0.9 | 34.0 | 24 | 23.9 | 8 | | |
| VATUKOULA | 108 | 45 | 8 | 51 | 19 | 32.8 | 0.7 | 23.1 | 1.7 | 34.9 | 31 | 19.9 | 1 | | |
| MONASAVU | 392 | 73 | 26 | 59 | 22 | 24.9 | -0.0 | 19.0 | 0.6 | 29.0 | 18 | 15.6 | 1 | | |
| NAUSORI AIRPORT | 307 | 115 | 16 | 115 | 20 | 29.7 | 0.0 | 23.1 | 0.5 | 32.1 | 23 | 19.6 | 4 | | |
| NAVUA/TOKOTOKO | 349 | 93 | 23 | 74 | 27 | 29.5 | 0.0 | 22.3 | -0.5 | 33.5 | 15 | 19.0 | 6 | | |
| ST. JOHNS COLLEGE | 105 | 39 | 16 | 29 | 16 | 29.6 | -0.2 | 24.5 | 0.9 | 31.6 | 23 | 22.3 | 1 | | |
| LAKEBA | 158 | 88 | 13 | 39 | 11 | 29.9 | 0.2 | 24.3 | 0.6 | 32.4 | 22 | 20.9 | 3 | | |
| MATUKU | 79 | 51 | 10 | 17 | 11 | 29.5 | -0.2 | 24.2 | 0.4 | 33.4 | 15 | 22.0 | 3 | | |
| VUNISEA | 119 | 62 | 20 | 41 | 12 | 29.6 | 0.2 | 24.2 | 1.3 | 32.5 | 13 | 20.6 | 22 | | |
| ONO-I-LAU | 42 | 31 | 7 | 14 | 12 | 29.9 | 1.2 | 22.5 | -1.0 | 32.4 | 16 | 20.2 | 3 | | |
| BA/RARAWAI MILL | 97 | 43 | 10 | 37 | 16 | 33.1 | 0.8 | 23.2 | 1.5 | 35.1 | 8 | 19.8 | 3 | | |
| LAUTOKA AES | 80 | 41 | 13 | 26 | 27 | 31.4 | 0.4 | 24.2 | 0.9 | 33.0 | 12 | 22.0 | 9 | | |
| PENANG MILL | 41 | 15 | 12 | 13 | 11 | 31.9 | 1.6 | 23.1 | -0.4 | 34.2 | 25 | 21.4 | 3 | | |

Figure D

Southern Oscillation Index vs 5-Month Running Mean
(January 1997 - December 2004)



ENSO status and Rainfall Outlook to March 2005

EL NIÑO - SOUTHERN OSCILLATION UPDATE

The Southern Oscillation Index (SOI) for November was -8.6 (November was -9.3) with the five-month running mean of -6 centred on October (September was -6) (Figure D).

Surface temperatures in the western to central Pacific remain close to El Niño thresholds, and are likely to maintain their warmth during the southern summer.

2004 saw other ENSO indicators move only partially towards typical El Niño values (eg subsurface temperatures and the SOI), while others generally oscillated about their long-term averages (eg cloud and wind in the central Pacific). As far as El Niño is concerned, the important question now is what will happen in the autumn and winter of 2005.

To this end, the most recent survey of computer model guidance had a 8 to 3 majority with central to eastern Pacific temperatures in the neutral range in May. By August the split was 7 to 1 in favour of neutral. So the general message from the models is for a gradual cooling of the Pacific during the first half of 2005, although March to June is known as the "predictability" barrier and model skill is at its lowest predicting across this span of months

Information on **Interseasonal Patterns including the Madden-Julian Oscillation** can be found on the Australian Bureau of Meteorology website <http://www.bom.gov.au/climate/tropnote/tropnote.shtml> This information is part of the 'Weekly Tropical Climate Note' and is updated each Tuesday at 0330 UTC. For more information or interpretation please contact the Fiji Meteorological Service.

(The ENSO Update is kindly provided by the Australian Bureau of Meteorology and can be found on their website <http://www.bom.gov.au>)

RAINFALL PREDICTIONS

The FMS Rainfall Prediction Model has been replaced by the Seasonal Climate Outlook for Pacific Island Countries Model (Figure E): We expect the predictions from this model to far better than the previous FMS model. As it is being tested please use these predictions with caution. A full description of the new model will be presented in the next summary.

The model predicts rainfall to be below average in the whole of the Western Division except at Nacocolevu (average or below average) and Monasavu (not shown) where rainfall is predicted to be near average. In the Central Division rainfall is expected to be below average in Navua and average or below average in Suva and Nausori. In the Northern Division rainfall is expected to be below average except at Matei where rainfall is expected to be average or above. In the Eastern Division rainfall is expected to be below average except at Rotuma, Vunisea and Levuka where rainfall is expected to be average or below.

RAINFALL OUTLOOK FOR JANUARY TO MARCH 2005

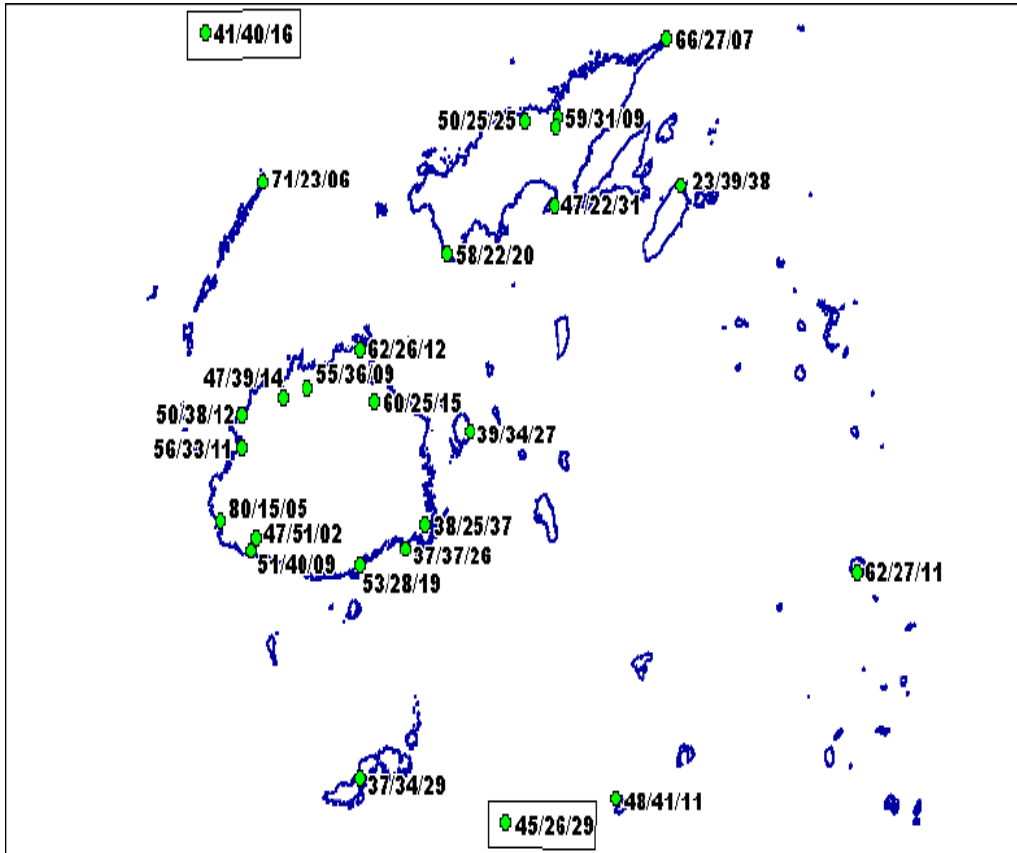
Rainfall is expected to be average to below average across the most of the country from January to March. The confidence level of this prediction is moderate to high.

NOTE: The confidence level of this prediction is moderate to high.

Seasonal Climate Outlook for Pacific Island Countries Model (beta testing version)

FIGURE E: Three Month Forecast for Selected Stations in Fiji using the SCOPIC Model

The forecast probabilities are presented as



DRY/NORMAL/WET

‘DRY’ range refers to rainfall less than 33rd percentile.

‘NORMAL’ (average) range refers to rainfall between 33rd and 67th percentiles.

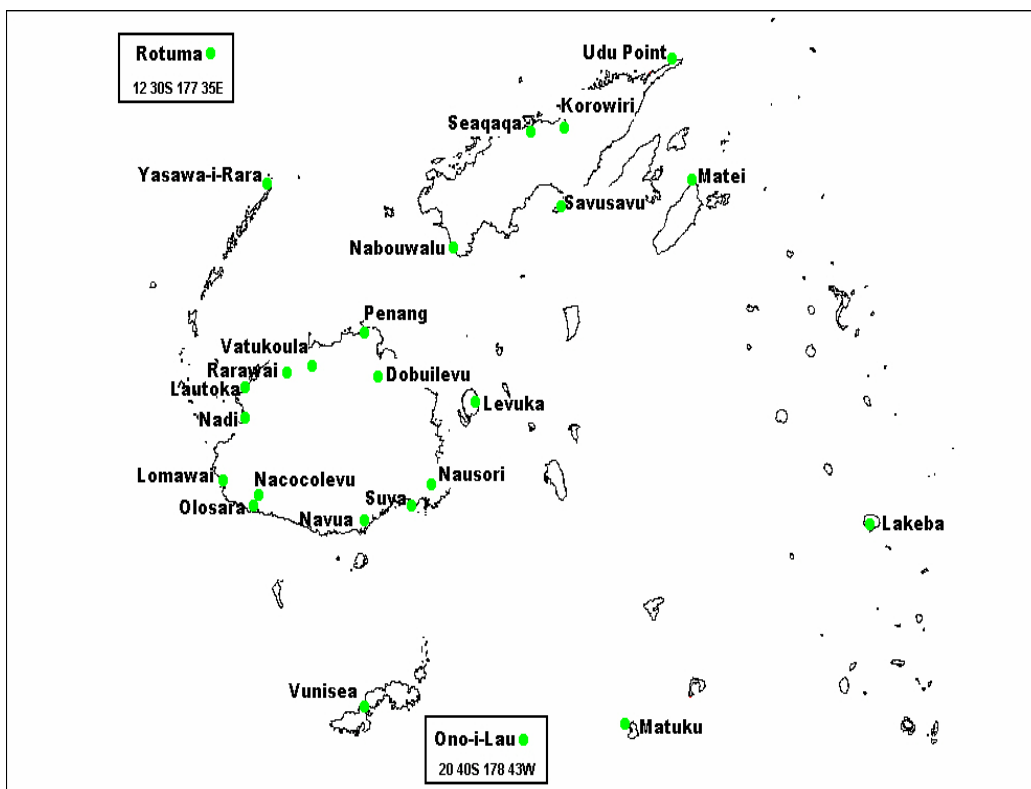
‘WET’ range refers to rainfall above 67th percentile.

Reference Table for 33rd and 67th Percentile

| Station | 33% (mm) | 67% (mm) |
|--------------------------|----------|----------|
| Western Division | | |
| Dobuilevu | 988.9 | 1213.4 |
| Vatukoula | 980.3 | 1434.0 |
| Rarawai | 972.6 | 1278.7 |
| Penang | 1043.0 | 1269.3 |
| Lautoka | 824.7 | 1084.8 |
| Nadi | 801.8 | 1046.4 |
| Lomawai | 697.0 | 1016.7 |
| Nacocolevu | 701.5 | 967.7 |
| Olosara | 632.8 | 837.0 |
| Yasawa | 671.0 | 932.7 |
| Central Division | | |
| Navua | 939.1 | 1259.0 |
| Suva | 878.2 | 1112.8 |
| Nausori | 894.0 | 1078.5 |
| Eastern Division | | |
| Levuka | 764.0 | 1032.0 |
| Lakeba | 654.0 | 872.5 |
| Matuku | 556.3 | 765.9 |
| Ono-I-Lau | 512.0 | 689.5 |
| Vunisea | 677.7 | 843.0 |
| Northern Division | | |
| Labasa Mill | 979.9 | 1347.6 |
| Seaqaqa | 1047.1 | 1378.1 |
| Nabouwalu | 841.1 | 1067.6 |
| Savusavu | 675.2 | 870.4 |
| Udu Point | 793.7 | 1012.5 |
| Matei | 771.5 | 1051.6 |
| Rotuma | 892.2 | 1160.7 |

Please note that the probabilities are listed beside of the corresponding station marker or dot.

FIGURE F: Reference Map of selected Climate/Rainfall sites in Fiji



| | | |
|--------------------------|--------|--------|
| Central Division | | |
| Navua | 939.1 | 1259.0 |
| Suva | 878.2 | 1112.8 |
| Nausori | 894.0 | 1078.5 |
| Eastern Division | | |
| Levuka | 764.0 | 1032.0 |
| Lakeba | 654.0 | 872.5 |
| Matuku | 556.3 | 765.9 |
| Ono-I-Lau | 512.0 | 689.5 |
| Vunisea | 677.7 | 843.0 |
| Northern Division | | |
| Labasa Mill | 979.9 | 1347.6 |
| Seaqaqa | 1047.1 | 1378.1 |
| Nabouwalu | 841.1 | 1067.6 |
| Savusavu | 675.2 | 870.4 |
| Udu Point | 793.7 | 1012.5 |
| Matei | 771.5 | 1051.6 |
| Rotuma | 892.2 | 1160.7 |