Volume 4: Issue: 10
October 2004

Fiji Islands Weather Summary October 2004 Rainfall Outlook till January 2005

FIJI METEOROLOGICAL SERVICE

Inside this issue:

Further Information:

The Director
Fiji Meteorological Service
Private Mail Bag NAP 0351
Nadi Airport
Fiji

Ph: (679) 672 4888
Fax: (679) 672 0430

Email: fms@met.gov.fj
Web Site: www.met.gov.fj

IN BRIEF

October's weather was considerably drier than normal across the country except at Rotuma and Udu Point to the far north-east of Vanua Levu. Monthly average air temperatures were generally average to above average however there were a few cool nights when the ridge of high pressure extending over Fiji from the south caused dry southeast winds to lower relative humidity and air temperatures.

Sea surface temperatures in the central equatorial Pacific remain warmer than normal although the progress towards an El Niño event this year has slowed over the past one to two months as a consistent pattern of Pacific wind and cloud signatures in the equatorial Pacific has failed to materialise, and the Southern Oscillation Index (SOI) is only weakly negative.

Rainfall in October was below to well below average across most of the country. Considerably low rainfall was received at the Penang Mill (1.3mm or 1% of normal) and Lautoka Sugar Cane Research Centre (5.9mm or 6% of normal). On a three-month basis rainfall has been mainly average to above average (except in parts of Vanua Levu) due to the considerable amount of rainfall received in August.

A new high minimum temperature record was set on the 29th at Tokotoko, Navua. Sea surface temperatures in Fiji waters have been near average.

Total sunshine hours were around average. Nadi Airport received 99%, Laucala Bay/Suva

WEATHER PATTERNS

The weather in October was mostly dominated by mobile ridges of high pressure extending over Fiji from the south and bringing relatively dry southeast wind flow over the country. The South Pacific Convergence Zone (SPCZ) remained to the north of the Group for most of the month.

During the first five days of October, a ridge of high pressure dominated the country from the south, maintaining relatively dry southeast winds over the Group. On the 6th, a trough was analysed to the far west of the country and moved closer to the Group by 7th, spreading cloud and rain over the southern areas until the following day. The trough then gradually weakened before drifting west.

On the 9th, another high pressure system developed to the south of the Group and extended a ridge over Fiji. The ridge weakened as a trough to the far west drifted closer to Fiji on the following day. The trough gradually moved across the Group and associated rain affected the country until 13th. A southeasterly wind flow later settled in and prevailed over the Group from 14th to the 16th, maintaining trade showers about the eastern parts of the main islands.

By early on the 17th, a weak trough developed to east of Fiji and brought hot and humid northeasterly winds across the Group. This also resulted in afternoon showers and thunderstorms developing about the interior and western parts of the main islands. The trough to the east weakend by 19th, but moist easterly winds and afternoon showers and thunderstorms dominated the Group till 21st.

A high pressure system to the far southwest extended another ridge over Fiji later on the 22nd, bringing dry southeast wind flow and generally fine weather conditions from 23rd to 27th. By late on the 27th, a weak low developed within the SPCZ to the north of Fiji causing rain about the eastern and northern parts of the Group. Afternoon showers and thunderstorms dominated the interior and western parts of the main islands during this time. Udu point reported the highest 24hr rainfall of 77.3 mm on 29th. As the low moved to the far east, a ridge again developed over the Group on the 30th and brought fine weather with relatively dry southeast winds over the Group till the end of the month.

Rotuma reported rain for most days of the month due to the SPCZ being in close proximity. The highest 24 hourly rainfall of 138.1 mm was recorded on the 28th, when the SPCZ was most active.

TABLE 1: RAINFALL FROM AUGUST TO OCTOBER 2004

Station	Actual Rainfall (mm)	Rainfall in the last three months (Below average, average or above average)	No. of Rain days in August (% of total rain)	No. of Rain days in Sept (% of total rain)	No. of Rain days in Oct (% of total rain)
Penang Mill	344.5	Above Average	16 (77)	4 (23)	2 (0)
Monasavu Dam	754.2	Average	25 (57)	22 (15)	20 (28)
Vatukoula Mine	488.4	Above Average	15 (79)	4 (09)	3 (12)
Rarawai Mill, Ba	461.7	Above Average	12 (82)	6 (14)	6 (04)
Yasawa-I-Rara	-	-	-	-	
Viwa Island	326.4	Above Average	13 (83)	4 (13)	4 (04)
Lautoka (FSC Res.)	366.5	Above Average	15 (75)	5 (23)	4 (02)
Nadi Airport	352.8	Above Average	15 (73)	7 (20)	5 (07)
Nacocolevu, Sigatoka	285.2	Average	16 (78)	4 (12)	6 (10)
Tokotoko, Navua	662.5	Average	21 (56)	15 (11)	19 (33)
Laucala Bay, Suva	566.7	Average	24 (74)	20 (14)	22 (12)
Nausori Airport	533.9	Average	23 (62)	15 (28)	23 (10)
Nabouwalu	411.4	Average	20 (65)	9 (25)	17 (10)
Labasa Airport	255.8	Above average	9 (59)	4 (14)	6 (27)
Savusavu Airport	276.2	Below Average	15 (62)	6 (22)	7 (16)
Udu Point	403.2	Average	11 (24)	10 (23)	10 (53)
Matei Airport	302.7	Below Average	10 (26)	8 (22)	13 (52)
Lakeba Is.	431.8	Above Average	18 (62)	9 (28)	9 (10)
Matuku Is.	482.0	Above Average	15 (75)	4 (18)	6 (07)
Ono-I-Lau Is.	534.6	Above Average	16 (55)	11 (40)	8 (05)
Vunisea, Kadavu	487.9	Above Average	17 (58)	11 (30)	17 (12)
Rotuma	1021.9	Above Average	18 (15)	21 (32)	26 (53)

RAINFALL IN THE LAST THREE MONTHS

Rainfall in October

Rainfall in October was below average to well below average. Above average rainfall (>120%) was received at Rotuma and Udu Point.

Well below average rainfall (<40%) was received across the Western Division expect at Vatukoula (59%) and Monasavu (69%). Considerably low rainfall was received at the Penang Mill (1.3mm or 1%) and Lautoka Sugar Cane Research Centre (5.9mm or 6%).

In the Central Division rainfall was well below average in Suva and Nausori and below average (78%) in Navua.

The Northern Division received well below average at Nabouwalu and Savusavu, below average at Labasa Airport and Matei and above average at Udu Pt. The Eastern Division received well below average rainfall. Rotuma received 161% of normal rainfall.

Rainfall in the 3-months from August to October

The Rainfall Outlook for the period August to October in the July Fiji Islands Weather Summary was for rainfall for most parts of the country to be near average. There was an additional note mentioning that parts of the Western and Northern Divisions may receive below average rainfall. The confidence level of the forecast was low to moderate.

Out of the twenty one sites that reported in time for this summary, twelve sites reported above average rainfall, seven sites average and two sites reported receiving below average rainfall. Most of the rainfall over the three month period fell in August e.g. Nadi Airport 73%.

Figure A

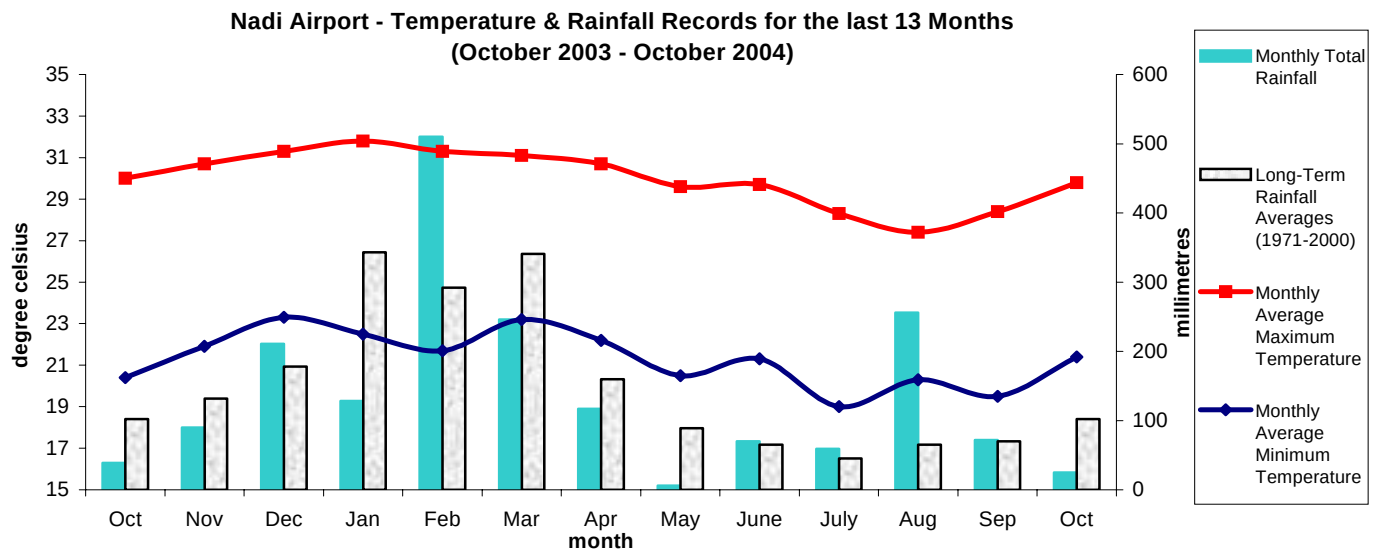


Figure B

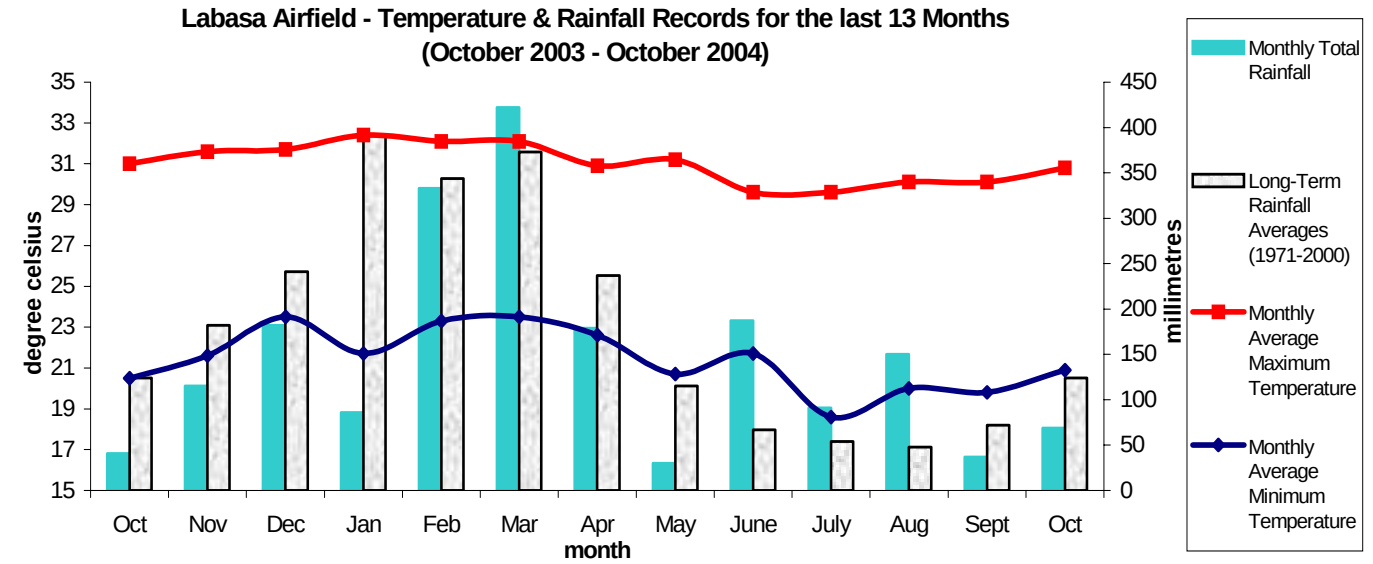
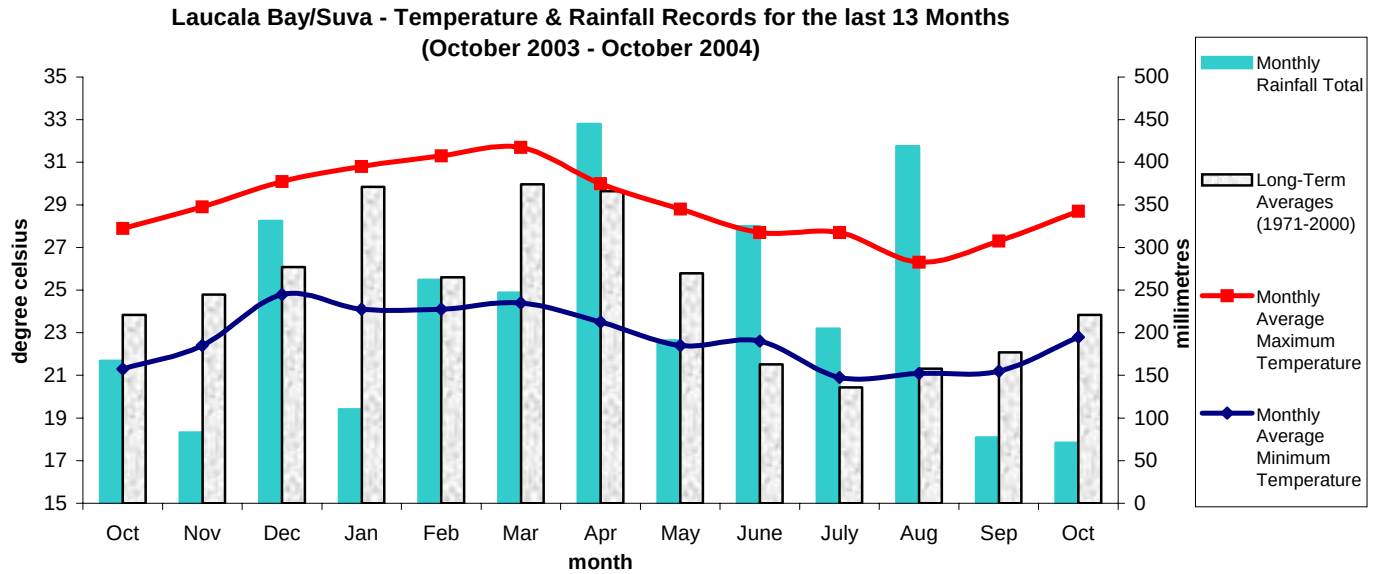


Figure C



Climate in October

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

Day-time temperatures were generally average to above average across the country. The greatest positive departure was recorded at Viwa which recorded 1.0°C above normal. Udu Pt and Penang Mill recorded 0.9°C above normal. The greatest negative departures were recorded at Nadi Airport and Vunisea which recorded 0.5°C and 0.3°C below normal.

Night-time temperatures were also mainly average to above average across the country. The greatest positive departures were recorded at, Ono-I-Lau which recorded 1.6°C above normal. Vatukoula and Matuku recorded 1.4°C above normal. The greatest negative departure were recorded at Ono-I-Lau, Penang Mill and Viwa which recorded 1.5°C, 0.9°C and 0.8°C below normal.

Relative Humidity (RH) at 0900hrs were mostly below average across the country. The greatest positive departures from normal were recorded at Ono-I-Lau, Nadi Airport and Matei which recorded 13.8%, 3.3% and 2.6% respectively above normal. The greatest negative departures from normal were recorded at Matuku, Penang and Rarawai Mill which recorded 11.1%, 6.1% and 5.4% below normal.

SOIL MOISTURE AND RUNOFFS

In the Central Division, conditions ranged from moderate to limiting to dry for most of the month except at Tokotoko,Navua which had moderate conditions at the beginning of the month then excessive to ample in the second half of the month.

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

In the Eastern Division, most sites recorded moderate to limiting to dry conditions for most of the month.

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

Rotuma recorded excessive conditions all throughout the month.

Significant runoffs were recorded at Rotuma (400.8mm), Monasavu (113.0mm), Tokotoko, Navua (79.9mm), and Udu Point (74.8mm).

SUNSHINE, RADIATION & WINDS

Total sunshine hours were around average in October. Nadi Airport received 99%, Laucala Bay/Suva 107%, Nacocolevu 102% and Rotuma 94%. Global Solar Radiation at Nadi Airport was 20.2MJ/ M^2 (average per day).

Monthly average wind speed was below average for Nabouwalu, Vunisea, Rotuma, Nadi Airport and Lakeba with only Nausori Airport reporting above average surface winds.

RECORDS SET IN OCTOBER 2004

Element	Station	Observed (record)	On	Rank	Previous (record)	Year	Records Began
Minimum Temp. (°C)	Tokotoko, Navua	25.5	29th	New High	24.0	1997	1992

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.

Historical records of tropical cyclones show that there have been two cyclones which have occurred in the month of November since the 1969/70 season. These were *Osea* in 1986, *Sina* in 1990.

The chances of a cyclone affecting Fiji this season are high especially with ocean conditions currently being on the *Warm* side of *Neutral*. The average number of cyclones that affect Fiji in a season (including pre-season events) is 1 to 2. However, there have been as many as six events in 1996/97.

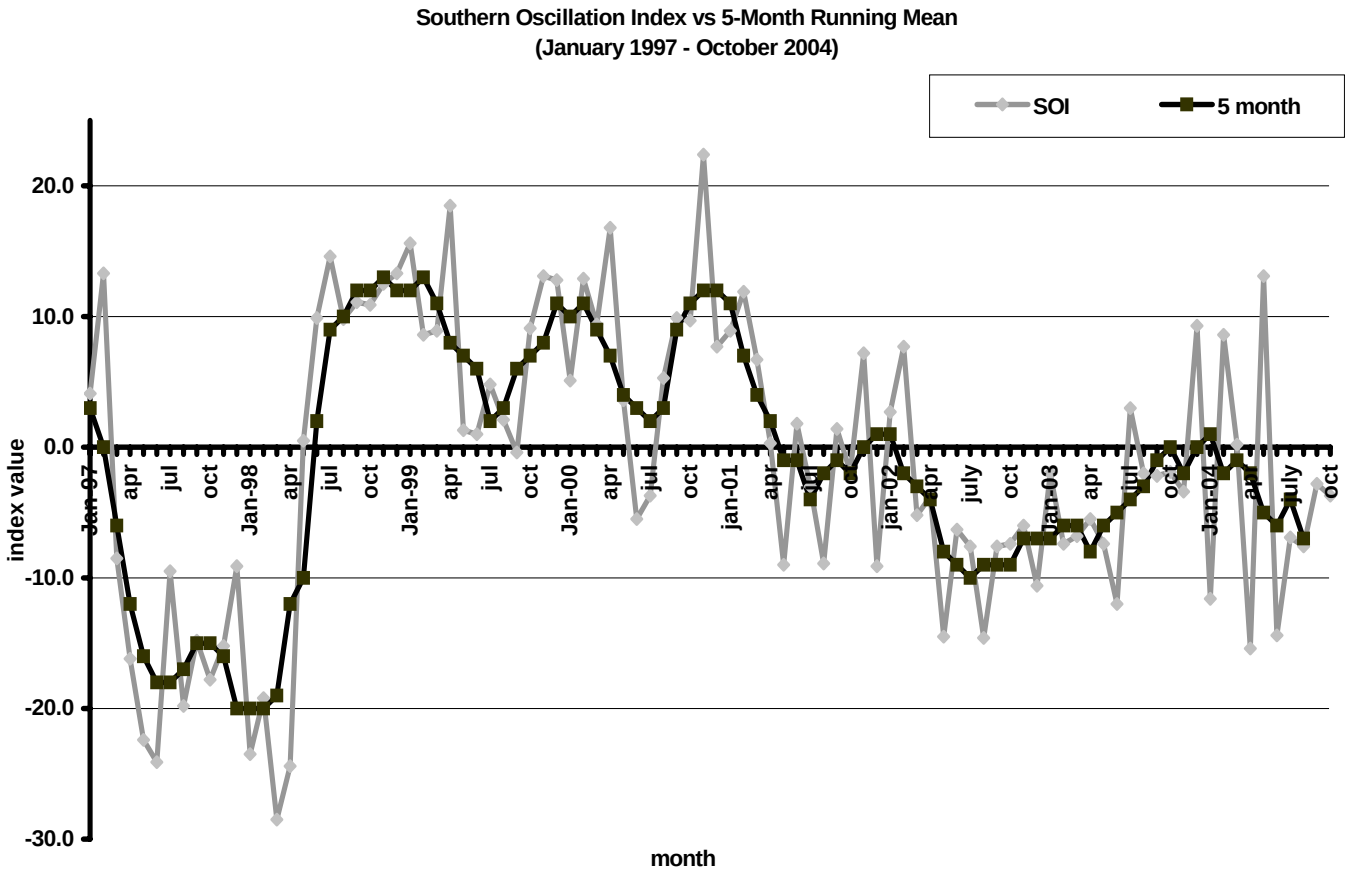
Prior to and during a cyclone information can be accessed from the Fiji Meteorological Service on its website http://www.met.gov.fj, via email: NadiTCC@met.gov.fj, via Weather fax - 6721 227 (Polling fax), via Fax 6720190 or Phone 6724 888. Information is also available through the local media.

PRELIMINARY CLIMATOLOGICAL SUMMARY FOR OCTOBER 2004

	RAINFALL					AIR TEMPERATURES								SUNSHINE	
	TOTAL	*	RAIN DAYS	MAX. FALL		AVERAGE DAILY MAX.	#	MIN.	#	EXTREME MAX.		MIN.		TOTAL	*
	MM	%	+	MM	ON	C	C	C	C	C	ON	C	ON	HRS	%
NADI AIRPORT	25	24	5	11	20	29.8	-0.5	21.4	0.9	33.1	28	18.9	1	234	99
SUVA/LAUCALA BAY	71	32	22	16	15	28.7	0.5	22.8	0.9	30.9	29	20.7	1	175	107
NACOCOLEVU	29	30	6	10	10	29.5	0.4	20.2	0.5	32.4	29	15.0	1	194	102
ROTUMA	546	161	26	138	27	30.3	0.6	24.9	0.7	32.3	19	23.0	27	184	94
VIWA	15	23	4	13	7	30.3	1.0	22.8	-0.8	32.5	30	19.9	8		
UDU POINT	213	129	10	77	28	30.2	0.9	22.7	-0.2	31.8	29	19.3	14		
LABASA AIRFIELD	69	56	6	29	17	30.8	0.0	20.9	1.1	33.3	9	18.0	3		
NABOUWALU	44	26	17	13	27	28.4	0.7	23.1	0.5	30.8	19	21.7	12		
SAVUSAVU AIRFIELD	44	26	7	15	16	28.1	-0.1	22.8	0.9	29.8	19	20.0	9		
MATEI AIRFIELD	156	78	13	57	11	28.5	0.3	22.8	0.3	30.0	18	19.2	15		
YASAWA-I-RARA	No Report														
VATUKOULA	59	59	3	51	22	31.6	0.5	20.5	1.4	34.2	20	17.3	1		
MONASAVU	214	69	20	29	19	23.4	0.6	17.0	0.7	27.8	18	14.2	5		
NAUSORI AIRPORT	56	27	23	9	28	27.7	0.1	21.8	0.9	31.0	18	18.3	1		
NAVUA/TOKOTOKO	216	78	19	59	10	27.2	0.3	21.2	0.5	29.0	20	16.0	7		
LAKEBA	47	38	9	19	17	27.7	-0.0	22.4	0.3	30.2	18	17.4	5		
MATUKU	35	30	6	12	29	27.6	0.2	23.2	1.4	30.9	21	22.4	14		
VUNISEA	57	39	17	15	10	26.8	-0.3	22.4	1.6	29.1	18	19.9	5		
ONO-I-LAU	28	31	8	14	17	26.7	0.3	19.9	-1.5	29.2	18	17.5	12		
BA/RARAWAI MILL	21	19	6	16	28	31.9	0.7	20.5	0.9	34.3	20	17.1	1		
LAUTOKA AES	6	6	4	3	20	29.7	0.2	21.8	0.2	31.9	10	18.6	15		
PENANG MILL	1	1	2	1	5	29.8	0.9	21.3	-0.9	32.3	18	19.0	2		

Note: This summary is prepared for rapid dissemination as soon as possible following the end of the month. The quantitative data are obtained daily on the phone or radiotelephone from a network of climate stations reporting 9 am observations; these data must be treated as provisional. FMS does not guarantee accuracy and reliability of the forecast information presented in this summary but the Department should be sought for expert advice, any clarification or additional information. Any person wishing to re-print any information provided in this summary must seek permission from the Director of Meteorology.

Figure D



ENSO status and Rainfall Outlook to January 2005

EL NIÑO - SOUTHERN OSCILLATION UPDATE

The Southern Oscillation Index (SOI) for October was -3.7 (September was -2.8) with the five-month running mean of -7 centred on August (July was -4) (Figure D).

The progress towards an El Niño event this year has slowed over the past one to two months, as a consistent pattern of Pacific wind and cloud signatures has failed to materialise, and the Southern Oscillation Index (SOI) is only weakly negative. Furthermore, there is no example in the historical record of an El Niño developing this late in the year. However, the situation remains delicately balanced with central Pacific surface temperatures persisting at levels characteristic of El Niño, and the situation will continued to be monitored closely.

Surface temperatures in the western to central Pacific have hovered near El Niño thresholds for about two months now, but subsurface temperatures are well below the levels normally associated with El Niño. Over the past two months warm subsurface waters in the far east have caused about a 1 degree rise in far eastern Pacific surface temperatures, but only to slightly warmer than average levels.

The Trade Winds returned to generally near normal strength during the past week after being weaker than average during the previous fortnight in association with a westerly wind burst (WWB). The WWB was the latest in a sequence of such events going back over several months, each one of which has resulted in a temporary decline in the strength of the Trades. There has been no persistent and significant decline in the Trade Winds as normally occurs during an El Niño.

Cloudiness in the central Pacific has oscillated between above and below average values since May, mostly as a result of the sequence of WWBs. This indicates that the atmosphere is yet to fully respond to the above average sea surface temperatures in this region. A sustained period of above average cloudiness would be expected during an El Niño. Cloudiness near the dateline was somewhat below average in the second half of October and a little above average during the first half.

In the most recent survey of computer model guidance, an 8 to 3 majority keep central to eastern Pacific temperatures in the neutral range until the end of the year. However, two of the eight push temperatures above the El Niño threshold in early 2005, and all models suggest continued warmer than average conditions across the central Pacific.

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

FMS Rainfall Prediction Model: *This model is based on schemes, which have run successfully at the Australian Bureau of Meteorology's National Climate Centre. These a statistical scheme based on the relationship between SOI and subsequent three-month rainfall totals. In each case the probability of low, medium or high rainfall in the oncoming three-month period is provided. The scheme uses the SOI averaged over the most recent three-month period. The reliability of the model is high during the wet season (Nov-Mar) but decreases during the dry season (May-Sept) and during the transitions months, April and October.*

The model predicts rainfall to be mainly average to above average in the next three months (Figure E).

Australian Rainman: *This is a Rainfall Prediction Model was created from joint efforts between Australia Meteorological and Agricultural Agencies. The model incorporates the use of SOI to test its effects on the probability of rainfall in upcoming months. It shows the relationship between ENSO (El Niño - Southern Oscillation) events and rainfall. Due to public demand this model is currently used to present the probability of receiving rainfall in the coming individual months over a three-month period. Please note that the reliability of forecast for one month is lower than for a combined three month period.*

The model predicts a 12-43% chance (depending on location) of receiving median rainfall across Fiji in next three months (Table 2).

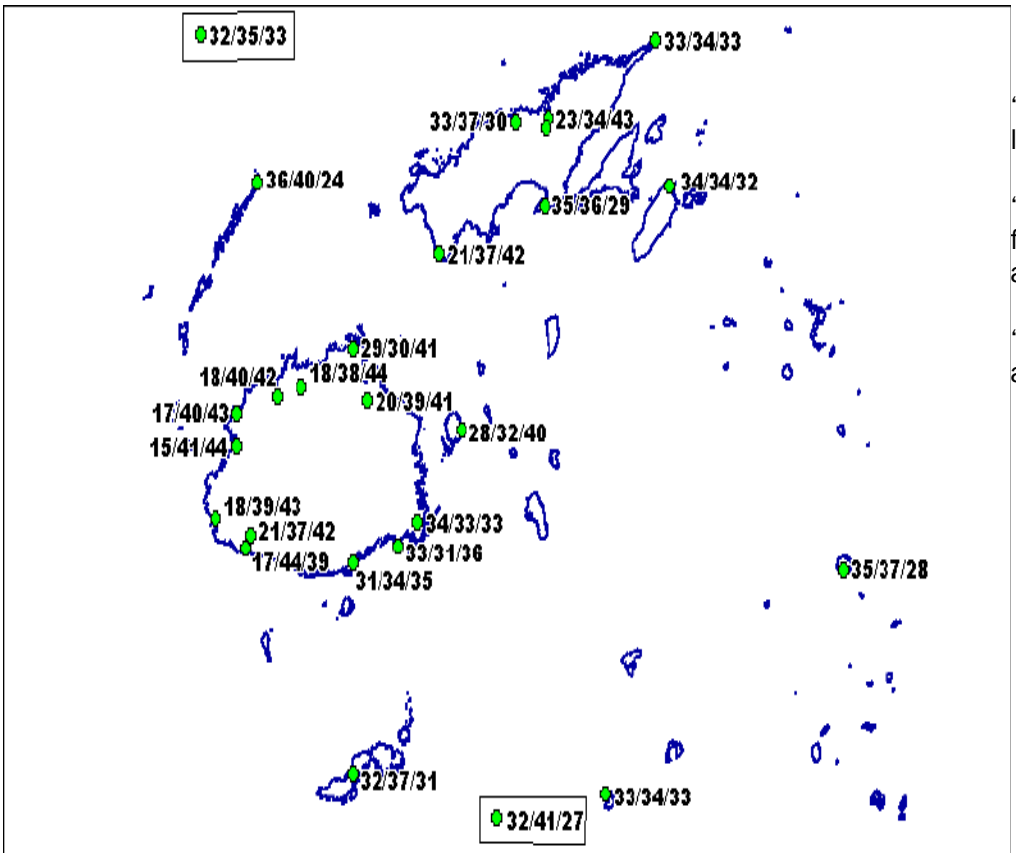
RAINFALL OUTLOOK FOR NOVEMBER 2004 TO JANUARY 2005

With the current weak warm to neutral state of Ocean & Atmosphere rainfall is expected to average to below average across most of the country. However, with sea surface temperatures in the equatorial Pacific being significantly warmer than normal there is significant chance of being affected by several tropical disturbances this season. Should a tropical disturbance e.g. tropical depression or cyclone affect Fiji, parts of the country could receive average to above average rainfall.

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

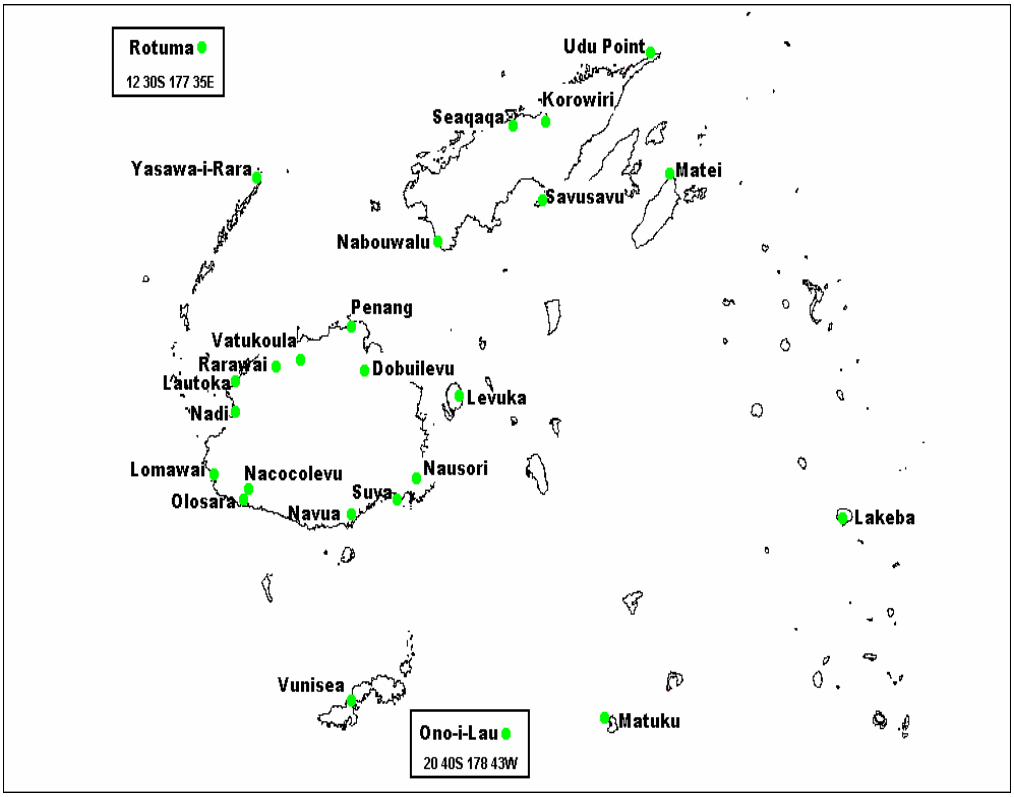
Three Month Rainfall Outlook Probabilities for November 2004 to January 2005

FIGURE E*:* Three Month Forecast for Selected Stations in Fiji using the Fiji Meteorological Services Rainfall Prediction Model



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



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	775	1035
Vatukoula	598	869
Rarawai	518	806
Penang	516	816
Lautoka	453	688
Nadi	503	685
Lomawai	471	664
Nacocolevu	461	627
Olosara	397	598
Yasawa	421	613
Central Division		
Navua	830	1106
Suva	713	935
Nausori	750	930
Eastern Division		
Levuka	519	704
Lakeba	458	588
Matuku	397	511
Ono-I-Lau	349	473
Vunisea	414	636
Northern Division		
Labasa Mill	652	838
Seaqaqa	752	924
Nabouwalu	621	856
Savusavu	574	793
Udu Point	667	925
Matei	773	1021
Rotuma	879	1085

TABLE 3: Australian Rainman Rainfall Outlook Probabilities for November to January 2005

	November to January 2005	
Station Name	**Average***	**Probability#**
Western Division		
Dobuilevu	836	**26**
Vatukoula	648	**16**
Rarawai Mill	670	**21**
Penang Mill	678	**28**
Lautoka Mill	578	**24**
Nadi Airport	657	**19**
Lomawai	572	**14**
Olosara	495	**12**
Nacocolevu	566	**19**
Yasawa-I-Rara	506	**13**
Central Division		
Navua - Tamanoa	921	**43**
Laucala Bay - Suva	834	**31**
Nausori Airport	858	**38**
Eastern Division		
Lakeba	576	**27**
Ono-I-Lau	449	**25**
Northern Division		
Korowiri (Labasa Mill)	728	**19**
Seaqaqa Pine	869	**25**
Nabouwalu	756	**16**
Savusavu Airport	673	**15**
Udu Point	751	**31**
Rotuma	1025	**39**

Please note that the above figures should be used with caution, as there is some degree of uncertainty associated with them, and particularly the reliability of the model is low during the transition months and the dry season.

** Median Rainfall (middle point in a range of three collective month rainfall values ordered from lowest value ever recorded to highest ever recorded for each site)*
 # Probability of expecting at least normal rainfall.