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Weather Summary for Fiji Islands- September 2004
Rainfall Outlook till December 2004

FIJI METEOROLOGICAL SERVICE

Inside this issue:

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IN BRIEF

Rainfall in September was generally average to below average. The only exceptions were Rotuma and Ono-I-Lau which received above average (>119%) and Nacocolevu and Navua which received well below average (<40%). Most of the rainfall occurred during the 7-9th, 16-17th and 25-26th except for Rotuma and Monasavu where it rained just about everyday during the second half of the month. Rainfall in the last three months has been generally above average.

There has been little change in ocean and atmospheric conditions in the Equatorial Pacific in the past month. The current situation can be described as being a marginally weak El Niño.

Day-time air temperatures have been generally average to below average and night-time temperatures varied around average. Sea surface temperatures in Fiji waters have been average to slightly above average.

Total sunshine hours were average or below the September long-term average. Nadi Airport received 85% of normal, Laucala Bay/ Suva 91%, Nacocolevu 85% and Rotuma 102%.

WEATHER PATTERNS

Three troughs of low pressure with associated cold fronts affected Fiji in September, interspersed by the sub-tropical ridge of high pressure. However, it was noticeable that rainfall amounts from the troughs/fronts were not as significant when compared with those in the past two months. The passage of these troughs/ fronts almost always ushered in fresh to strong and often gusty, as well as cool and drier, southeast winds. Consequently, parts or the whole of Fiji Waters were placed under strong wind warning.

In the first five days of the month, an area of high pressure located south of Fiji steadily moved eastwards while extending a ridge over the group. Fine weather ensued with cool and dry trades.

Later on the 5th, a weak and slow moving cold front emerged south of Fiji while a trough developed to the northwest of the country. The trough developed further and merged with the cold front over the next 3 days resulting in rain over most places. The combined system cleared the group later on the 9th, followed immediately by an intense ridge of high pressure which restored fresh to strong, cool trade winds over the country for the next several days. Fine weather prevailed till the 15th, apart from a few light showers particularly about the southeastern parts of the main islands.

In almost a repeat of the previous situation, a cold front approaching from the west combined with a trough that developed over Fiji, resulting in widespread rain during 16th and 17th. Some moderate to heavy falls occurred especially in the northwestern part of the country in this major rainfall event of the month. Later on the 18th, a ridge of high pressure spread over the country from the southwest directing fresh to strong as well as cool and dry southeast trade winds. As a result, generally fine weather conditions persisted till the 24th.

Another eastward-moving trough eventually reached Fiji on the 25th, bringing widespread rain over the country with isolated heavy falls. The system cleared rapidly on the 26th followed by another ridge of high pressure that remained the dominant weather feature till the end of the month.

For most of September, the SPCZ hovered near Rotuma bringing substantial rainfall to the islands. As a result, Rotuma ended up receiving above average rainfall for the month.

TABLE 1: RAINFALL FROM JULY TO SEPTEMBER 2004

Station	Actual Rainfall (mm)	Rainfall in the last three months (Below average, average or above average)	No. of Rain days in July (% of total rain)	No. of Rain days in August (% of total rain)	No. of Rain days in Sept (% of total rain)
Penang Mill	438.0	Above Average	6 (22)	16 (60)	4 (18)
Monasavu Dam	721.3	Average	16 (25)	25 (60)	22 (15)
Vatukoula Mine	541.0	Well Above Average	3 (21)	15 (72)	4 (07)
Rarawai Mill, Ba	568.6	Well Above Average	3 (22)	12 (66)	6 (12)
Yasawa-I-Rara	-	-	-	-	-
Viwa Island	497.0	Well Above Average	3 (37)	13 (54)	4 (09)
Lautoka (FSC Res.)	458.2	Well Above Average	3 (21)	15 (60)	5 (19)
Nadi Airport	387.4	Above Average	4 (15)	15 (66)	7 (19)
Nacocolevu, Sigatoka	355.7	Above Average	3 (28)	16 (63)	4 (09)
Tokotoko, Navua	606.7	Average	3 (26)	21 (61)	15 (13)
Laucala Bay, Suva	700.3	Above Average	17 (29)	24 (60)	20 (11)
Nausori Airport	611.6	Above Average	13 (22)	23 (54)	15 (24)
Nabouwalu	485.8	Above Average	12 (24)	20 (55)	9 (21)
Labasa Airport	277.3	Above Average	5 (33)	9 (54)	4 (13)
Savusavu Airport	371.5	Above Average	10 (38)	15 (46)	6 (16)
Udu Point	330.0	Average	14 (42)	11 (29)	10 (29)
Matei Airport	209.4	Below Average	7 (30)	10 (38)	8 (32)
Lakeba Is.	406.3	Above Average	9 (06)	18 (65)	9 (29)
Matuku Is.	451.6	Above Average	1 (01)	15 (80)	4 (19)
Ono-I-Lau Is.	550.5	Above Average	9 (08)	16 (53)	11 (39)
Vunisea, Kadavu	495.1	Above Average	11 (13)	17 (57)	11 (30)
Rotuma	935.1	Above Average	26 (49)	18 (16)	21 (35)

RAINFALL IN THE LAST THREE MONTHS

Rainfall in September

Rainfall varied from above average to well below average in September. Above average rainfall was received in Ono-I-Lau and Rotuma. Well below average rainfall was received in parts of the Central Division (Navua) and Western Division (Nacocolevu). The rest of the country received average or below average rainfall. Most of the rainfall received fell between the 7-9th, 16-17th and 25-26th except at Rotuma and Monasavu where it rained just about everyday especially during the second half of the month.

Rainfall in the 3-months from July to September

The Rainfall Outlook for the period July to September in the June Fiji Islands Weather Summary was for rainfall for most parts of the country to be near average. There may be parts of the Western and Northern Divisions that 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, seventeen sites reported receiving above average rainfall, three sites average and one site reported receiving below average rainfall.

Figure A

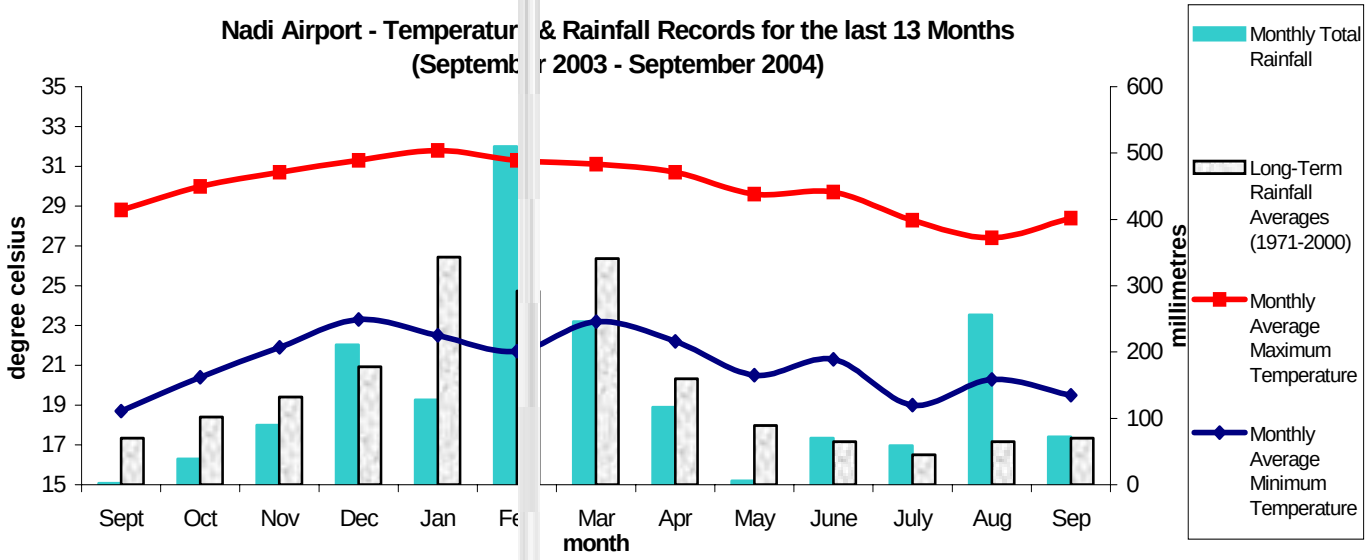


Figure B

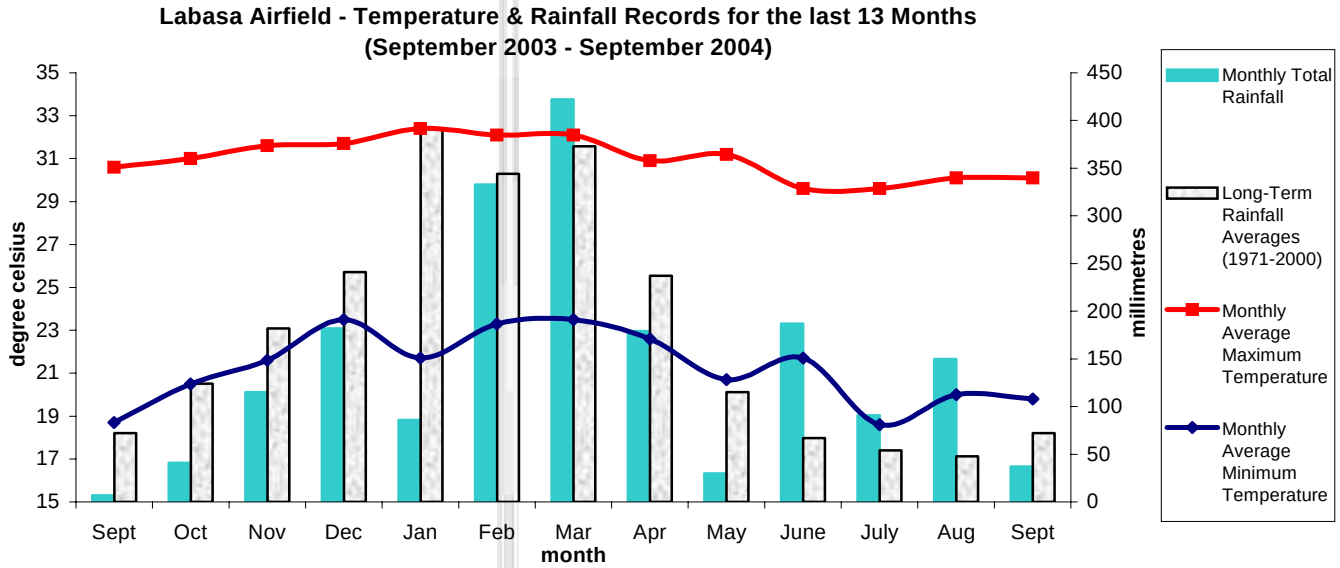
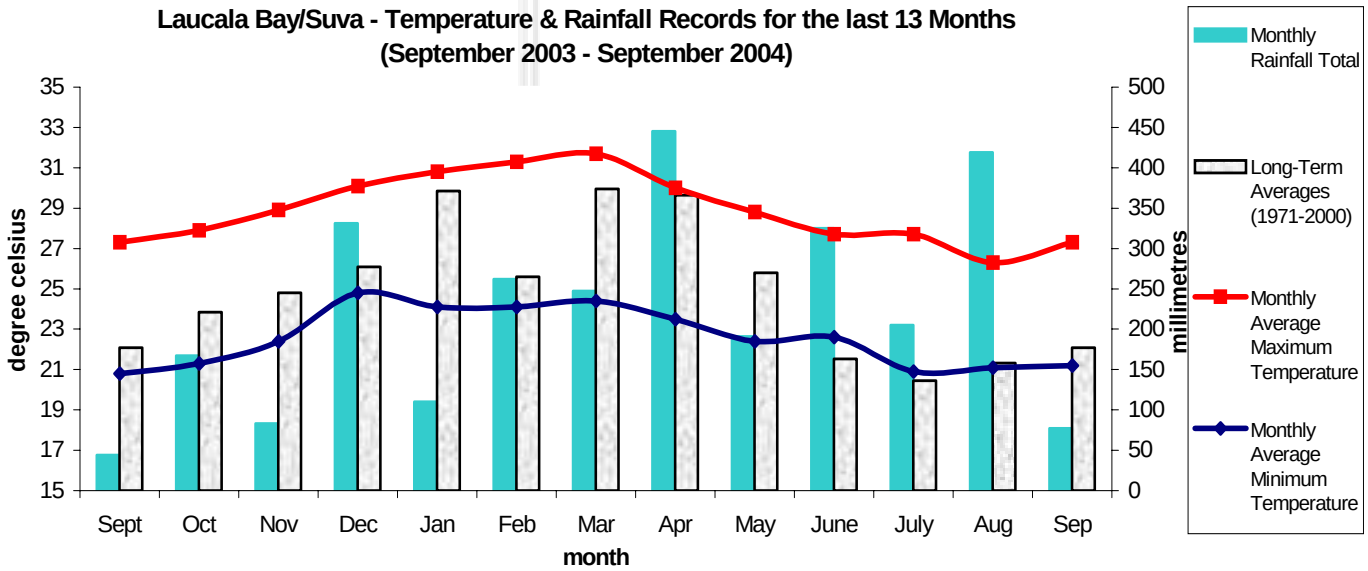


Figure C



Climate in September

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

Day-time temperatures were generally average to below average across the country. The greatest positive departure was recorded at Rotuma and Matei which recorded 0.6°C above normal. The greatest negative departures were recorded at Nadi Airport and Ono-I-Lau which recorded 0.9°C below normal. Vatukoula and Rarawai Mill recorded 0.8°C and 0.7°C below normal respectively.

Night-time temperatures varied around average across the country. The greatest positive departures were recorded at, Vunisea, Savusavu Airfield and Vatukoula which recorded 1.4°C, 1.1°C and 0.8°C respectively above normal. The greatest negative departure were recorded at Ono-I-Lau and Penang Mill which recorded 2.0°C below normal. Viwa and Lautoka Mill recorded 1.0 and 0.7°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 Vatukoula which recorded 11.3%, 5.1% and 2.6% respectively above normal. The greatest negative departures from normal were recorded at Matuku, Penang and Labasa Mill which recorded 10.4%, 7.9% and 4.5% below normal.

SOIL MOISTURE AND RUNOFFS

In the Central Division, conditions were generally excessive to moderate for most of the month.

In the Western Division, conditions were limiting dry to moderate for most of the month.

In the Eastern Division, most sites recorded ample to moderate conditions for most of the month except Matuku which recorded limiting to dry conditions towards the end of the month.

In the Northern Division, Nabouwalu, Savusavu Airport and Udu Point recorded ample to moderate conditions while Labasa Airport recorded limiting to dry conditions. Matei Airfield recorded ample to limiting dry conditions throughout the month.

Rotuma recorded ample to excessive conditions all throughout the month .

Significant runoffs were recorded at Rotuma (185.1mm), Ono-I-Lau (95.4mm), Nausori Airport (67.8mm), Vunisea (47.5mm), Lakeba (26.6mm), and Nabouwalu (5.1mm).

SUNSHINE, RADIATION & WINDS

Total sunshine hours were below the September 1971-2000 average at Nadi Airport (85%), Laucala Bay/Suva (91%), Nacocolevu (85%) except Rotuma which received 102% of normal sunshine hours. Global Solar Radiation (average per day) recorded at Nadi Airport was 16.8MJ/ M^2.

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

RECORDS SET IN SEPTEMBER 2004

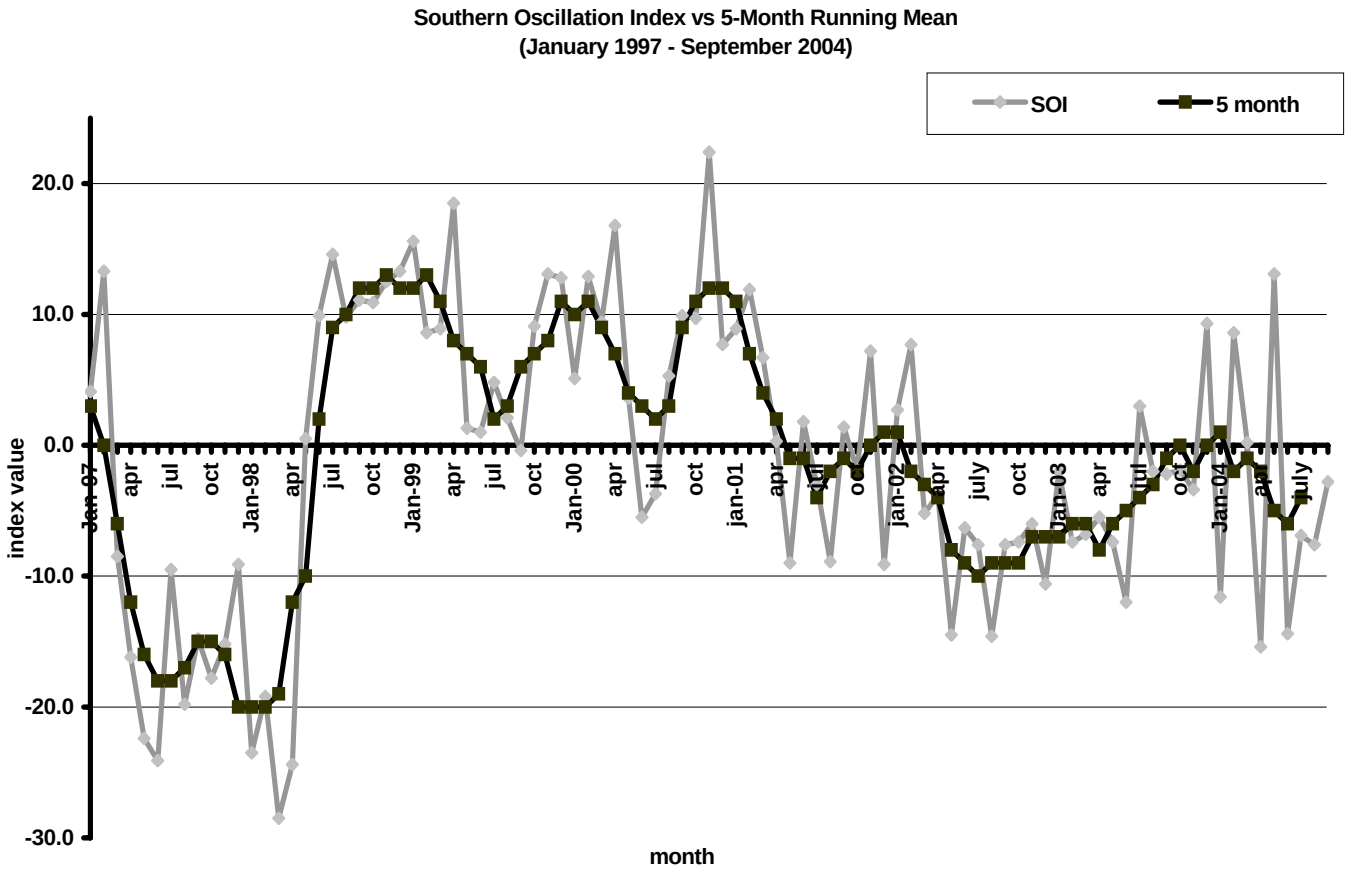
Element	Station	Observed (record)	On	Rank	Previous (record)	Year	Records Began
No New Records set in September							

PRELIMINARY CLIMATOLOGICAL SUMMARY FOR SEPTEMBER 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	72	103	7	45	16	28.4	-0.9	19.5	0.2	31.1	16	14.6	1	180	85
SUVA/LAUCALA BAY	77	44	20	17	17	27.3	0.1	21.2	0.2	29.5	16	18.9	4	124	91
NACOCOLEVU	33	36	4	16	16	27.7	-0.2	18.6	0.2	30.9	17	14.5	1	147	85
ROTUMA	325	136	21	59	8	29.9	0.6	24.3	0.2	31.8	4	20.9	12	182	102
VIWA	41	63	4	34	25	28.4	0.2	21.7	-1.0	31.2	9	19.2	13		
UDU POINT	94	83	10	28	17	29.1	0.5	21.8	-0.7	31.0	17	19.7	26		
LABASA AIRFIELD	37	51	4	26	25	30.1	-0.0	19.8	0.5	32.6	16	16.0	1		
NABOUWALU	102	90	9	51	17	27.3	0.5	22.0	0.0	30.6	26	19.6	4		
SAVUSAVU AIRFIELD	61	46	6	25	25	27.3	-0.1	22.0	0.8	31.6	16	18.0	14		
MATEI AIRFIELD	67	42	8	31	25	28.1	0.6	22.1	0.1	30.1	18	17.7	24		
YASAWA-I-RARA	No Report														
VATUKOULA	42	54	4	21	25	29.2	-0.8	19.0	0.7	31.3	15	14.5	1		
MONASAVU	110	46	22	27	25	21.7	-0.1	15.5	0.1	25.3	26	12.3	14		
NAUSORI AIRPORT	147	89	15	66	17	26.6	0.0	19.8	-0.2	29.0	26	16.2	12		
NAVUA/TOKOTOKO	74	32	15	20	9	26.0	-0.0	19.7	-0.2	29.5	16	16.5	3		
LAKEBA	119	118	9	74	25	26.3	-0.5	21.5	0.1	28.0	18	18.4	5		
MATUKU	87	91	4	30	17	26.1	-0.3	21.9	1.1	28.3	14	20.0	1		
VUNISEA	148	109	11	44	15	25.8	-0.3	21.2	1.4	28.6	16	17.9	3		
ONO-I-LAU	213	203	11	98	16	24.5	-0.9	18.4	-2.0	26.5	4	16.1	1		
BA/RARAWAI MILL	63	85	6	26	16	29.7	-0.7	17.9	-0.3	33.1	4	12.9	1		
LAUTOKA AES	84	117	5	54	16	28.3	-0.4	20.1	-0.6	30.7	4	15.3	1		
PENANG MILL	79	83	4	48	16	28.2	0.2	19.2	-2.0	30.5	3	13.4	14		

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 December 2004

EL NIÑO - SOUTHERN OSCILLATION UPDATE

The Southern Oscillation Index (SOI) for September was -2.8 (August was –7.6) with the five-month running mean of -4 centred on July (June was –6) (Figure D).

As of October 6th, Some parts of the climate system (eg central Pacific temperatures) are at levels characteristic of El Niño, while others (eg central Pacific cloud, eastern Pacific temperatures and SOI) are not. Central Pacific temperatures continue to be about a degree above average with very little change during the past week. Eastern Pacific temperatures cooled slightly during the week and are very close to average. Central Pacific cloudiness is also at close to normal levels and the SOI has continued to rise slowly. The risk that an El Niño event will develop this year has probably decreased a little over the past month, as a consistent pattern of wind and cloud signatures has failed to materialise. However, the situation remains delicately balanced and conditions will continue to be monitored very closely.

Warm central Pacific surface temperatures, which exceeded 1°C above average over a large area, changed little over the past week. Surface temperatures have hovered near El Niño thresholds for about two months now, during which time there has been a large increase in the area of warmer than average water. However, only slight changes have occurred in the past two to three weeks. While subsurface temperatures remain above average, they're well below the levels normally associated with El Niño, and there was some cooling during the week. Warm subsurface waters in the east, may still propagate to the surface, thereby raising eastern Pacific surface temperatures.

Although the Trade Winds were at below average strength in the central Pacific between mid-August and mid-September, they've been mainly near normal for a little over a fortnight now. Furthermore, there is nothing to suggest a renewed weakening is imminent.

Cloudiness in the central Pacific has oscillated between above and below average values since May, and 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. In the last week, cloud amounts have been close to average in the central Pacific.

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, all models suggest continued warmer than average conditions across the central Pacific. Even in the absence of a clearly defined El Niño event, a warmer than average central Pacific at this time of year is sufficient to increase the risk of areas of below average rainfall and above average temperatures persisting in parts of eastern Australia, especially when combined with negative SOI values.

(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 vary around 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 7-32% chance (depending on location) of receiving median rainfall across Fiji in next three months (Table 2).

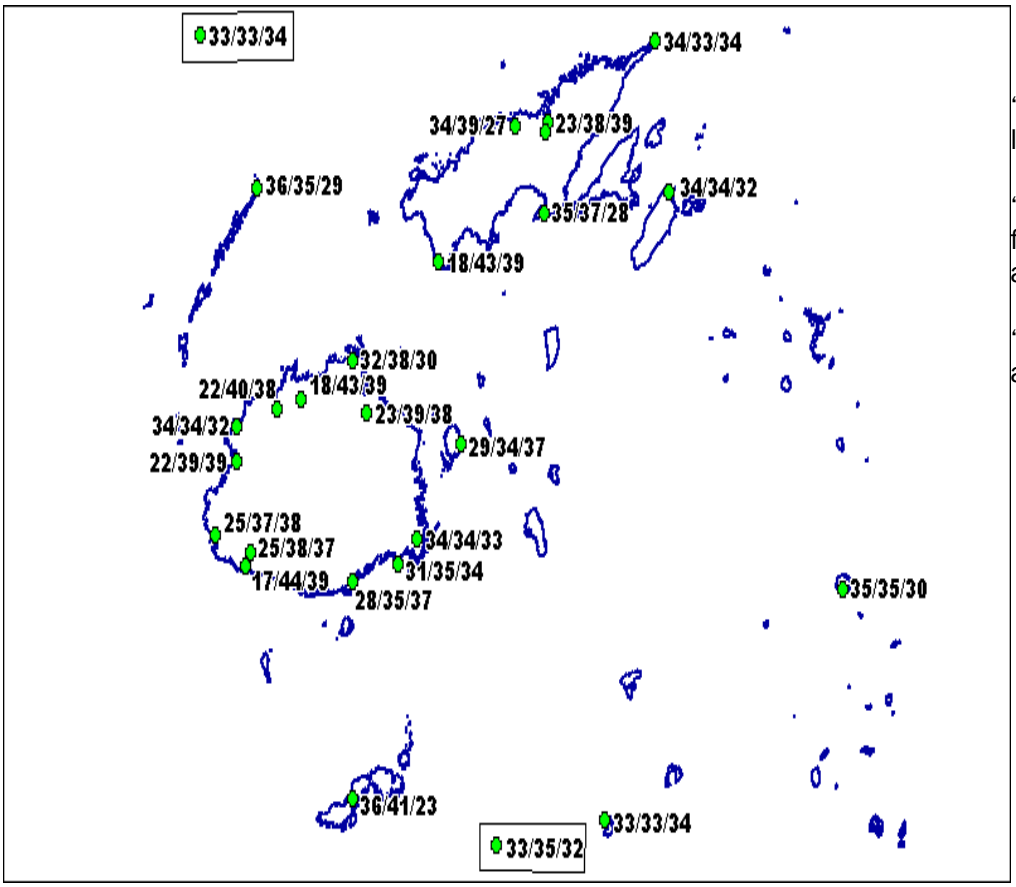
RAINFALL OUTLOOK FOR OCTOBER TO DECEMBER 2004

With the current weak warm to neutral state of Ocean & Atmosphere and outlook period coinciding with the transition from dry to wet season it is difficult to precisely predict rainfall in the coming three months. Rainfall normally fluctuates considerably during the transition period. However it is likely that a majority of sites will receive close to average rainfall.

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

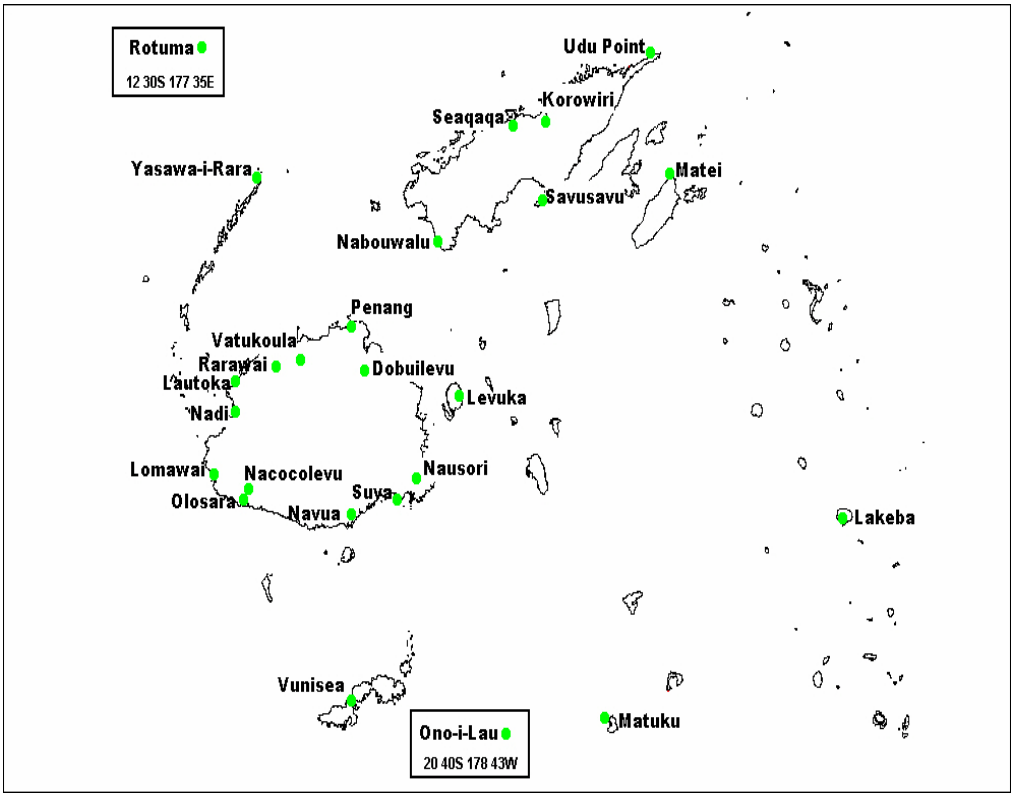
Three Month Rainfall Outlook Probabilities for October to December 2004

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	514	727
Vatukoula	312	510
Rarawai	312	250
Penang	322	537
Lautoka	267	452
Nadi	315	467
Lomawai	276	416
Nacocolevu	318	434
Olosara	253	391
Yasawa	249	434
Central Division		
Navua	733	1025
Suva	510	823
Nausori	552	750
Eastern Division		
Levuka	438	577
Lakeba	318	515
Matuku	242	448
Ono-I-Lau	210	417
Vunisea	302	483
Northern Division		
Labasa Mill	391	594
Seaqaqa	470	732
Nabouwalu	446	644
Savusavu	446	605
Udu Point	534	734
Matei	591	795
Rotuma	821	1052

TABLE 3: Australian Rainman Rainfall Outlook Probabilities for October to December 2004

	October to December 2004 combined	
Station Name	**Average***	**Probability#**
Western Division		
Dobuilevu	599	**24**
Vatukoula	402	**18**
Rarawai Mill	416	**23**
Penang Mill	461	**23**
Lautoka Mill	354	**23**
Nadi Airport	369	**20**
Lomawai	330	**16**
Olosara	303	**13**
Nacocolevu	360	**11**
Yasawa-I-Rara	356	**21**
Central Division		
Navua - Tamanoa	873	**21**
Laucala Bay - Suva	665	**27**
Nausori Airport	677	**17**
Eastern Division		
Lakeba	436	**15**
Ono-I-Lau	367	**7**
Northern Division		
Korowiri (Labasa Mill)	494	**19**
Seaqaqa Pine	543	**18**
Nabouwalu	546	**17**
Savusavu Airport	521	**25**
Udu Point	606	**27**
Rotuma	944	**32**

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.