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Fiji Islands Weather Summary
August 2004
Rainfall Outlook till November 2004

FIJI METEOROLOGICAL SERVICE

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IN BRIEF

August this year was exceptionally wet for a dry season month. The abnormally wet weather pattern observed over Fiji was associated with prolonged enhanced convective activity (an active phase of MJO) which affected the western north and near equatorial Pacific for much of August. As a result, low pressure systems and fronts had dominant effect on the country's weather.

Most parts of Fiji reported receiving well above average rainfall during the month. In the Western Division rainfall ranged from 181-582% of normal rainfall. Rainfall was also close to or well above average in the Central & Eastern Divisions and western parts of Vanua Levu. Most of the rainfall was received on the 1-2nd, 10-13th and 21-29th. Two one-day extreme rainfall records were set at Vatukoula and Lautoka and four monthly rainfall total records were set at Viwa, Vatukoula, Rarawai and Penang Mills.

In the capital city flash floods were reported in the early hours of the morning on the 2nd. Heavy rain on the same day resulted in flash flooding in the northern part of Viti Levu forcing the closure of roads especially in Tavua area. Prolonged heavy rainfall and flash flooding from the 23rd to 25th also caused the three sugar mills on Viti Levu to stop crushing. Torrential rainfall on the 28th left residents in Levuka without water after landslips broke water lines which supply the town. The heavy rainfall caused flash flooding in various parts of the old capital resulting in the closer of some roads.

Monthly average maximum and minimum air temperatures varied considerably around average during the month. Two one-day and four monthly records were broken. Relative humidity was generally above average.

Sunshine hours were below average at all recording sites. Nadi Airport received the lowest amount of sunshine in August since records began in 1942.

WEATHER PATTERNS

August was unusually wet due to the frequent passage of troughs of low pressure and cold fronts over Fiji. There were a few days with fine weather when the subtropical ridge affected Fiji but this was transient, lasting only a few days at a time. On these occasions Fiji experienced warm dry days and very cool nights.

A trough moved across Fiji during the first three days of the month resulting in heavy rainfall and flooding in northern and central Viti Levu. From the 4th to 6th a ridge from the south brought fine and cool conditions over the country. Later on the 6th and 7th, a rapidly eastward moving front caused showers over Fiji. Another ridge from the south brought a brief clearance in the weather later on the 7th however this was replaced by a slow moving front on the 8th, which maintained dull and wet conditions over Fiji till the 12th.

On the 13th an active trough brought squally conditions to the western and southern parts of Fiji as it moved across the Group. The next day a ridge from the south brought fine weather to the country which lasted till the 16th. A slow-moving front moved over the country from the west on the 17th causing scattered rainfall. This front later combined with a trough that approached from the west of Fiji, resulting in widespread rain and occasional heavy falls on the 21st and 22nd. With the whole system becoming slow moving, the wet conditions lasted till the 29th. An intensifying ridge from the southwest pushed the combined trough and front to the northeast of the Group eventually, bringing fine and cool weather to Fiji on the last few days of the month.

Moist east to northeast winds and the close proximity of the South Pacific Convergence Zone caused rainfall activity over Rotuma for most of August. However, the Island still ended up receiving below average rainfall for the month.

TABLE 1: RAINFALL FROM JUNE TO AUGUST 2004

Station	Actual Rainfall (mm)	Rainfall in the last three months (Below average, average or above average)	No. of Rain days in June (% of total rain)	No. of Rain days in July (% of total rain)	No. of Rain days in August (% of total rain)
Penang Mill	507.6	Above Average (2nd High)	14 (29)	6 (19)	16 (52)
Monasavu Dam	1251.8	Above Average (New High)	27 (51)	16 (15)	25 (34)
Vatukoula Mine	637.9	Above Average (New High)	11 (22)	3 (17)	15 (61)
Rarawai Mill, Ba	605.3	Above Average (2nd High)	8 (16)	3 (21)	12 (63)
Yasawa-I-Rara	-		-	-	-
Viwa Island	661.3	Above Average (New High)	9 (31)	3 (28)	13 (41)
Lautoka (FSC Res.)	433.9	Above Average (2nd High)	8 (14)	3 (22)	15 (64)
Nadi Airport	385.1	Above Average	9 (18)	4 (15)	15 (67)
Nacocolevu, Sigatoka	520.3	Above Average (New High)	10 (38)	3 (19)	16 (43)
Tokotoko, Navua	1120.1	Above Average	26 (52)	3 (14)	21 (34)
Laucala Bay, Suva	948.4	Above Average (2nd High)	25 (34)	17 (22)	24 (44)
Nausori Airport	851.5	Above Average (2nd High)	22 (45)	13 (16)	23 (39)
Nabouwalu	682.9	Above Average	27 (44)	12 (17)	20 (39)
Labasa Airport	427.7	Above Average (2nd High)	16 (44)	5 (21)	9 (35)
Savusavu Airport	694.5	Above Average (New High)	16 (55)	10 (20)	15 (25)
Udu Point	-	-	-	14	11
Matei Airport	543.0	Above Average	16 (74)	7 (12)	10 (14)
Lakeba Is.	543.8	Above Average	20 (47)	9 (4)	18 (49)
Matuku Is.	-	-	-	-	15
Ono-I-Lau Is.	562.4	Above Average (New High)	12 (40)	9 (8)	16 (52)
Vunisea, Kadavu	576.1	Above Average	23 (40)	11 (11)	17 (49)
Rotuma	1010.0	Above Average	25 (40)	26 (46)	18 (14)

RAINFALL IN THE LAST THREE MONTHS

Rainfall in August

The whole country reported receiving above average rainfall in August except for Matei, Taveuni, Udu Point and Rotuma. In the Western Division rainfall was well above average, >200% (except at Monasavu) and in some cases three to almost six times above average. Rainfall was also close to or well above average in the Central & Eastern Divisions and western parts of Vanua Levu. Most of the rainfall was received on the 1-2nd, 10-13th and 21-29th. New records were set at Viwa, Vatukoula, Lautoka, Rarawai and Penang Mills (see Table on extremes).

Rainfall in the 3-months from June to August

The Rainfall Outlook for the period June to August in the May Fiji Islands Weather Summary was for rainfall to be average to below average. The confidence level of the forecast was low to moderate.

All nineteen sites that reported in time for this summary, reported receiving above average rainfall. Monasavu (1980) , Vatukoula (1936), Viwa Island (1978), Nacocolevu (1927), Ono-I-Lau (1943) and Savusavu Airport (1957) reported their wettest June to August on record (figures in brackets indicate when records began). Second highs were recorded at Penang Mill (1910), Rarawai Mill (1910), Lautoka Mill (1910), Laucala Bay, Suva (1942), Nausori Airport (1957), Labasa Airport (1956).

Figure A

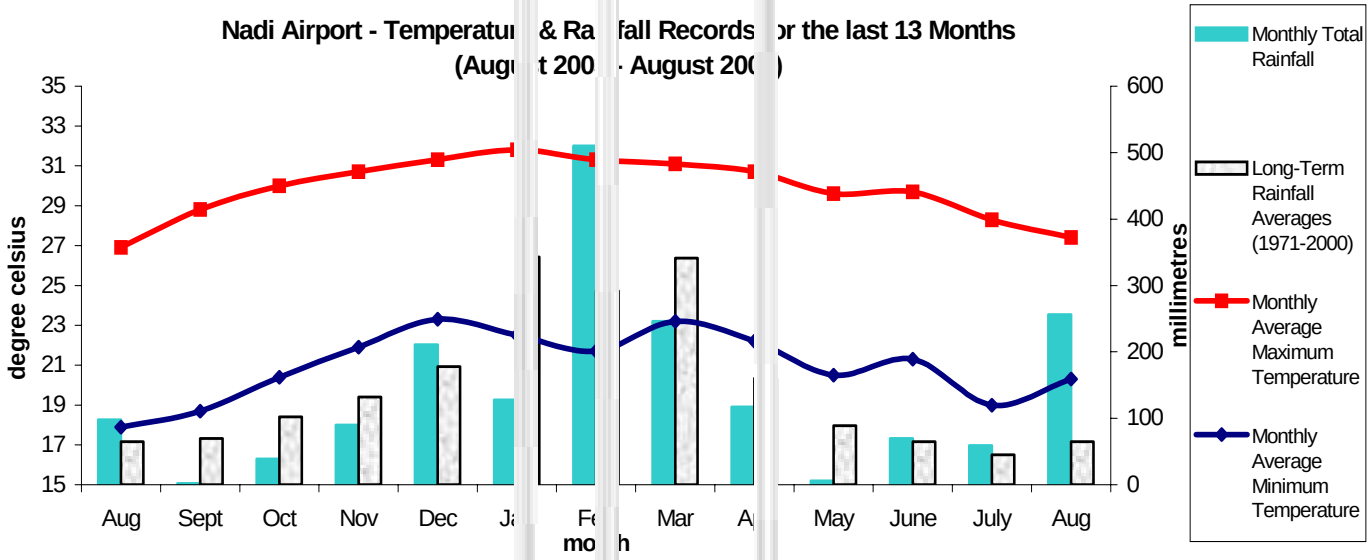


Figure B

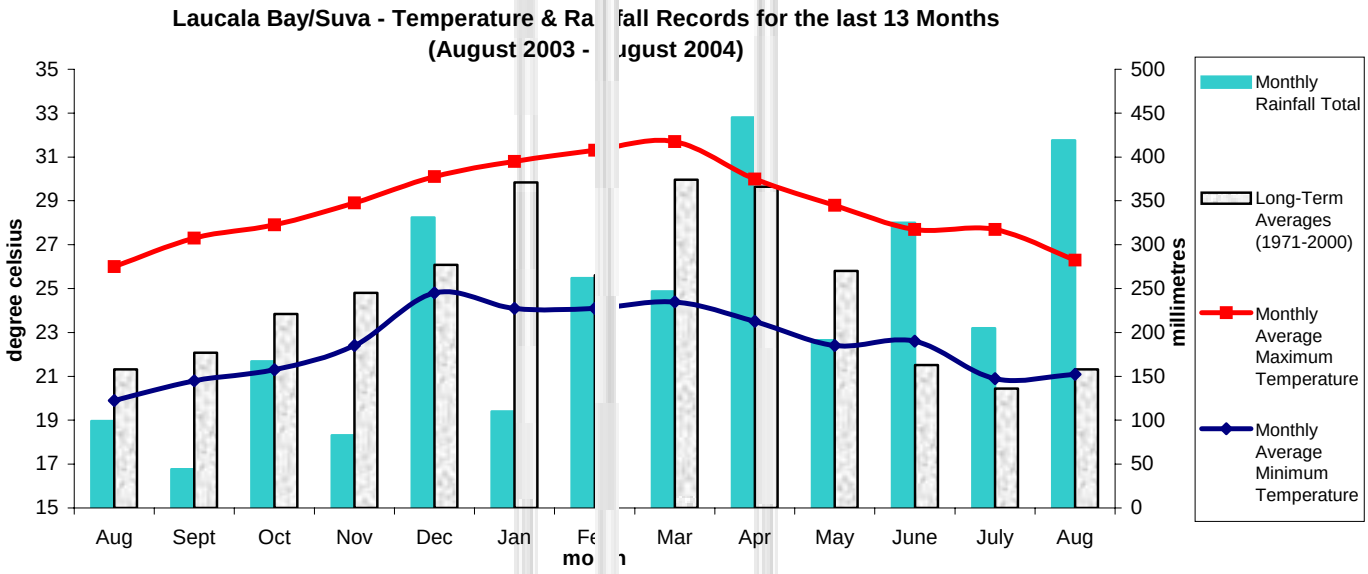
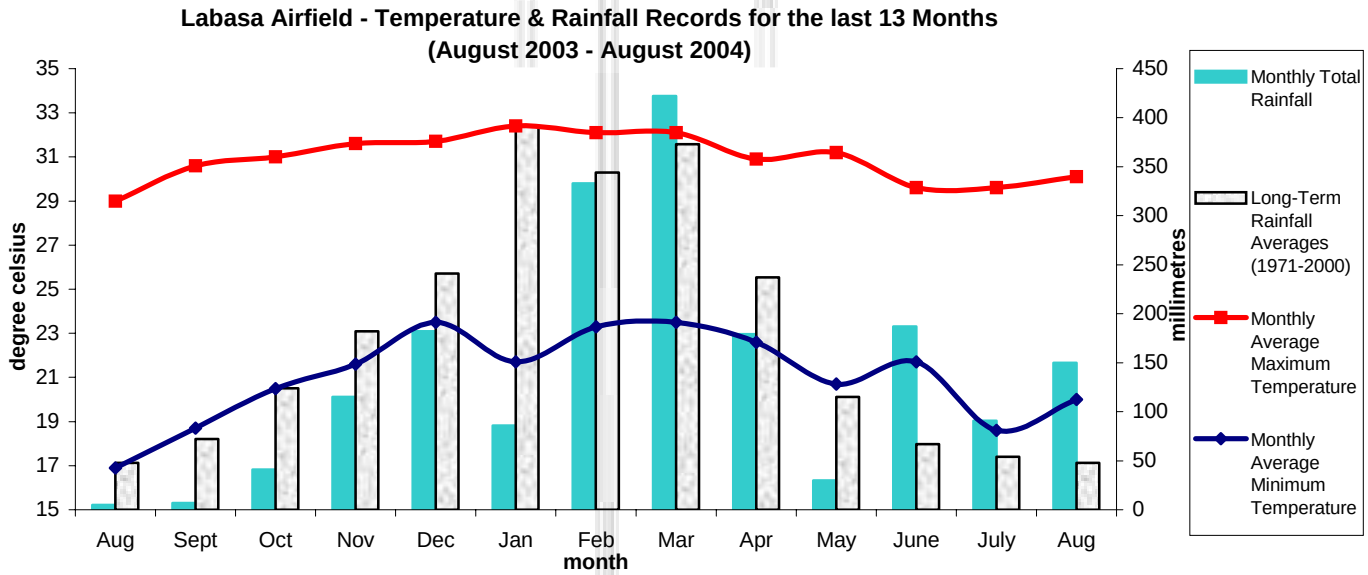


Figure C



Climate in August

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

Day-time temperatures varied around average across the country. The greatest positive departure was recorded at Rotuma which recorded 1.6°C above normal. The greatest negative departures were recorded at Vatukoula, Nadi Airport and Rarawai Mill which recorded at 1.4°C, 1.3°C and 1.2°C below normal.

Night-time temperatures also varied average across the country. The greatest positive departures were recorded at, Vatukoula, Rarawai Mill and Nadi Airport which recorded 2.9° C, 2.5°C and 1.7°C respectively above normal.

The greatest negative departure were recorded at Ono-I-Lau, Penang Mill and Viwa which recorded 1.7°C, 1.1°C and 0.8° C below normal.

Relative Humidity (RH) at 0900hrs were mostly above average across the country. The greatest positive departures from normal were recorded at Nadi Airport, Ono-I-Lau and Lautoka Mill which recorded 14.2%, 8.9% and 7.8% respectively above normal. The only negative departure recorded was at Matuku 1.4% below normal.

SOIL MOISTURE AND RUNOFFS

In the Central Division, Northern Division and Western Division (including Monasavu) conditions were excessive to ample for most of the month.

In the Eastern Division, all sites recorded ample to limiting conditions for most of the month then excessive conditions towards the end.

Rotuma recorded excessive to ample conditions at the beginning of the month then ample to moderate conditions in the middle of the month then experiencing excessive to ample conditions towards the end of the month.

Significant runoffs were recorded at most sites around the country with the greatest runoffs recorded at Monasavu (350.1mm), Laucala Bay, Suva (309.6mm) and Navua (263.8mm).

SUNSHINE, RADIATION & WINDS

Total sunshine hours were below the August 1971-00 average at Nadi Airport (63%), Laucala Bay/Suva (52%), Nacocolevu (54%) and Rotuma (98%). Nadi recorded a new low monthly sunshine total of 144.2 hrs. Global Solar Radiation (average per day) recorded at Nadi Airport was 12.0MJ/ M^2.

Monthly average wind speed was below average at Nabouwalu, Vunisea, Rotuma, Nausori Airport and Nadi Airport.

RECORDS SET IN AUGUST 2004

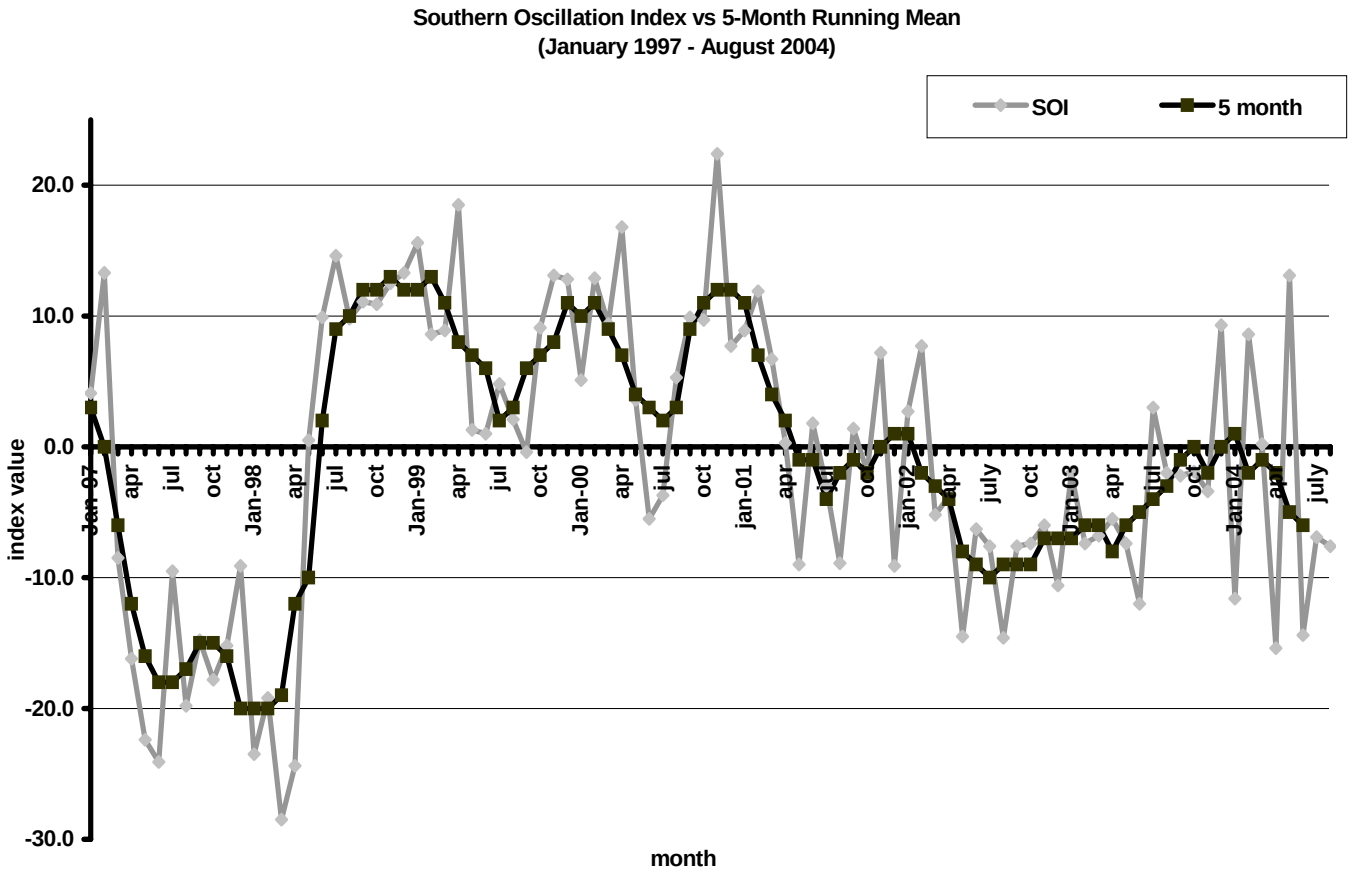
Element	Station	Observed (record)	On	Rank	Previous (record)	Year	Records Began
Rainfall (mm)	Viwa	270.0	-	New Mly High	174	1999	1978
	Vatukoula	387.9	-	New Mly High	191	1990	1936
	Vatukoula	163.3	1st	New 1-Day High	87	1990	1936
	Rarawai Mill	378.1	-	New Mly High	301	1974	1910
	Penang Mill	264.2	-	New Mly High	234	1927	1910
	Lautoka Mill	92.7	1st	New 1-Day High	91.3	1983	1910
Maximum-Temperature (°C)	Rotuma	32.1	31st	New 1-Day High	32.0	2001	1933
	Rotuma	30.7	-	New Mly High	30.5	1999	1933
Minimum Temperature (°C)	Vatukoula	23.7	21st	New 1-Day High	23.0	1991	1984
	Vatukoula	20.4	-	New Mly High	20.0	2000	1984
	Ono-I Lau	18.3	-	New Mly Low	18.7	1982	1943
	Rarawai Mill	19.9	-	New Mly High	19.7	1999	1925
Sunshine (hrs)	Nadi Airport	144.2hrs	-	New Mly Low	154.0hrs	1993	1947

PRELIMINARY CLIMATOLOGICAL SUMMARY FOR AUGUST 2004

	RAINFALL					AIR TEMPERATURES								SUNSHINE	
	TOTAL		RAIN	MAX.		AVERAGE DAILY				EXTREME				TOTAL	
		*	DAYS	FALL		MAX.	#	MIN.	#	MAX.		MIN.			*
	MM	%	+	MM	ON	C	C	C	C	C	ON	C	ON	HRS	%
NADI AIRPORT	256	394	15	91	22	27.4	-1.3	20.3	1.7	30.7	20	16.8	15	144	63
SUVA/LAUCALA BAY	419	265	24	82	12	26.3	-0.4	21.1	0.4	29.9	10	15.6	15	74	52
NACOCOLEVU	223	269	16	70	1	26.7	-0.8	19.5	1.6	31.4	20	14.5	15	100	54
ROTUMA	151	72	18	25	24	30.7	1.6	24.6	0.6	32.1	31	22.2	17	203	98
VIWA	270	458	13	69	22	27.7	-0.1	21.6	-0.8	29.5	19	19.5	15		
UDU POINT	97	114	11	23	28	28.8	0.7	22.3	0.1	31.6	25	20.0	15		
LABASA AIRFIELD	150	312	9	40	10	30.1	0.7	20.0	1.3	32.0	6	16.4	15		
NABOUWALU	266	253	20	113	13	27.3	1.0	21.8	0.2	31.2	13	18.3	15		
SAVUSAVU AIRFIELD	171	147	15	36	2	27.4	0.3	21.6	0.8	31.9	20	18.0	15		
MATEI AIRFIELD	80	63	10	33	28	28.0	1.0	21.3	-0.4	30.4	21	17.8	18		
*YASAWA-I-RARA	faulty AWS														
VATUKOULA	388	570	15	163	1	28.0	-1.4	20.4	2.9	30.7	12	15.8	15		
MONASAVU	430	181	25	94	22	21.7	0.6	16.1	1.0	25.3	6	10.3	15		
NAUSORI AIRPORT	331	225	23	36	22	25.7	-0.5	20.2	0.6	28.5	10	14.6	15		
NAVUA/TOKOTOKO	373	161	21	61	1	25.9	0.3	19.9	0.5	30.5	14	13.5	15		
LAKEBA	266	261	18	78	21	26.6	0.2	21.5	0.5	29.8	21	16.2	15		
MATUKU	360	316	15	71	28	25.0	-0.8	20.8	0.3	27.7	10	16.1	15		
VUNISEA	283	228	17	75	21	25.6	-0.2	20.7	1.3	28.6	3	16.6	15		
ONO-I-LAU	294	249	16	60	21	24.1	-0.8	18.3	-1.7	26.6	16	15.6	20		
BA/RARAWAI MILL	378	582	12	155	1	28.6	-1.2	19.9	2.5	31.0	24	15.1	5		
LAUTOKA AES	277	395	15	93	1	27.6	-0.7	21.1	1.1	29.9	12	17.4	4		
PENANG MILL	264	362	16	91	2	27.4	0.0	19.6	-1.1	30.5	24	11.8	15		

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 November 2004

EL NIÑO - SOUTHERN OSCILLATION UPDATE

The Southern Oscillation Index (SOI) for August was -7.6 (July was -6.9) with the five-month running mean of -6 centred on June (May was -5) (Figure D).

As of September 1st, little had changed across the Pacific during the past week, and the risk that we're seeing the beginnings of an El Niño event remained about the same. After cooling slightly the previous week, central Pacific surface temperatures warmed somewhat and continued to hover near El Niño thresholds.

This renewed warming was in response to a weakening of the Trade Winds which have been at below average strength in the central Pacific for about one and a half weeks. Continued weakness of these Trade Winds may cause the central Pacific to warm to a level that triggers an El Niño event. In short, the situation is delicately poised and conditions will continue to be monitored very closely.

The recent westerly wind burst in the western Pacific has caused an increase in sub-surface temperatures; another observation that is consistent with a possible El Niño onset. However, cloudiness in the central Pacific remains below average, 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 excess cloudiness would be expected during an El Niño.

In the most recent survey of computer model guidance, a 6 to 5 majority suggested warming of the central to eastern Pacific to a level consistent with El Niño. 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 equal chances of receiving average, below or above average rainfall for most of the country. In parts of the Western and Northern Division there is a slightly higher chance of receiving average to below average rainfall (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 27-50% chance (depending on location) of receiving median rainfall across Fiji in next three months (Table 2).

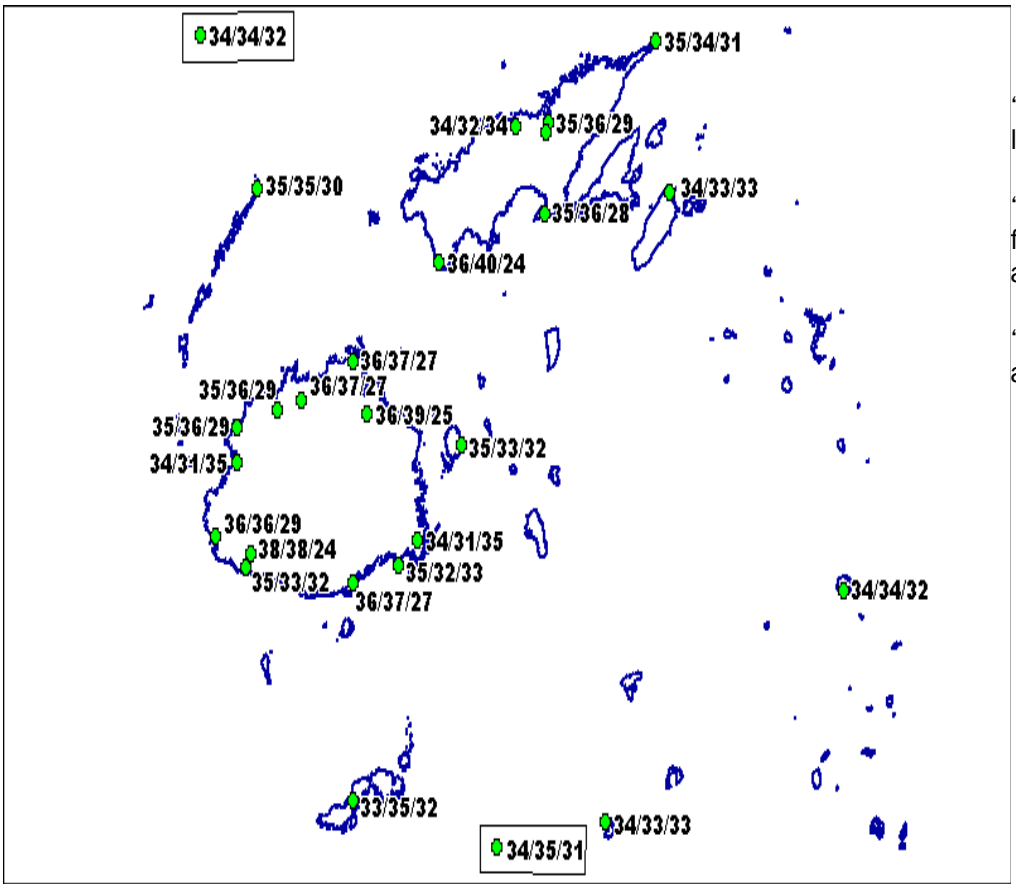
RAINFALL OUTLOOK FOR SEPTEMBER TO NOVEMBER 2004

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 predict how much rainfall we might receive in the coming three months. The rainfall outlook terciles for Fiji for Sept-Nov are 35:40:25. A way of interpreting this is as follows: For Sept-Nov in years similar to 2004, 35 were dry (below average), 40 were normal (average) and 25 were wet (above average). In summary, we are predicting that there is a higher chance of receiving average or below average rainfall in the coming three months.

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

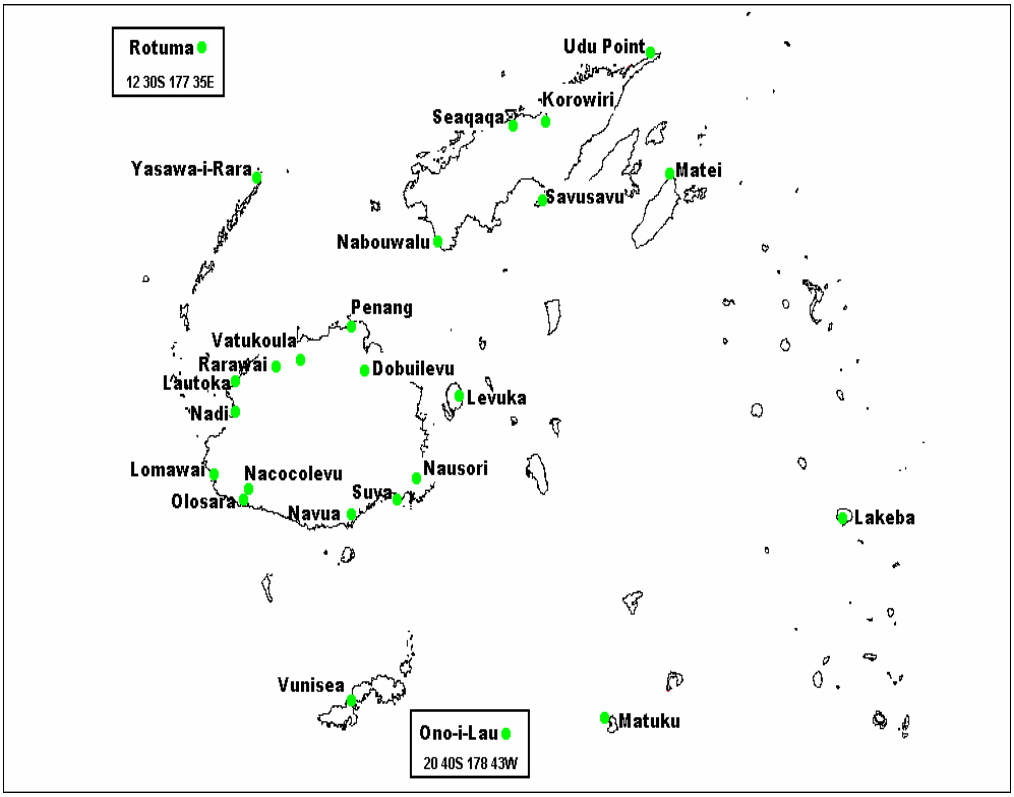
Three Month Rainfall Outlook Probabilities for September to November 2004

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	365	514
Vatukoula	207	352
Rarawai	204	361
Penang	237	351
Lautoka	190	235
Nadi	211	342
Lomawai	192	336
Nacocolevu	243	353
Olosara	230	367
Yasawa	190	367
Central Division		
Navua	649	892
Suva	441	742
Nausori	432	684
Eastern Division		
Levuka	355	546
Lakeba	298	392
Matuku	224	367
Ono-I-Lau	200	347
Vunisea	297	302
Northern Division		
Labasa Mill	244	370
Seaqaqa	267	442
Nabouwalu	352	506
Savusavu	373	507
Udu Point	377	561
Matei	470	663
Rotuma	728	927

TABLE 3: Australian Rainman Rainfall Outlook Probabilities for September to November 2004

	September to November 2004 combined	
Station Name	**Average***	**Probability#**
Western Division		
Dobuilevu	441	**25**
Vatukoula	281	**19**
Rarawai Mill	289	**29**
Penang Mill	295	**38**
Lautoka Mill	265	**25**
Nadi Airport	279	**29**
Lomawai	255	**24**
Olosara	256	**13**
Nacocolevu	284	**17**
Yasawa-I-Rara	262	**25**
Central Division		
Navua - Tamanoa	744	**24**
Laucala Bay - Suva	579	**36**
Nausori Airport	592	**36**
Eastern Division		
Lakeba	361	**50**
Ono-I-Lau	299	**49**
Northern Division		
Korowiri (Labasa Mill)	320	**25**
Seaqaqa Pine	376	**18**
Nabouwalu	425	**23**
Savusavu Airport	429	**27**
Udu Point	488	**21**
Rotuma	865	**50**

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.