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June 2004

Fiji Islands Weather Summary
June 2004
Rainfall Outlook till September 2004

FIJI METEOROLOGICAL SERVICE

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IN BRIEF

June was exceptionally wet in most parts of the country except for Nadi Airport, Lautoka and Ba which received normal rainfall. The remaining parts of the country received above average to well above average rainfall (>120%). Most of the rainfall received fell within the first half of the month and on the 17th and 29th when troughs of low pressure and fronts which brought showers and isolated heavy falls affected the Group.

On the 4th severe flooding was reporting in Tailevu and Naitisiri especially Korovou town (2-4m). Roads in the area were closed and buildings and root crops are reported to have been damaged. The Rewa and Wainibuka Rivers rose considerably and landslides were reported in Veisari (7th) and along the Nairukuruku Road on the way to Vunidawa. Flooding was also reported in the Northern Division on the 10th with portions of roads washed away.

Day-time air temperatures were generally average to above average across the country and three new high temperature records were set in Viwa, Vunisea and Monasavu. Night-time air temperatures were also generally average to above average across the country with a new high nighttime temperature of 24.5°C recorded at Tokotoko, Navua. Sea surface temperatures around Fiji were slightly above average except for an area to the SW which was near normal.

Although east to southeast trade winds were above average especially in the southern parts of the Group for most of the second half of the month relative humidity was mainly above average.

Sunshine hours were below the long-term average. Nadi Airport recorded 83%, Laucala Bay/Suva, 76%, Nacocolevu 86% and Rotuma 100% of normal.

WEATHER PATTERNS

On the 1st of June fresh and occasionally strong southeast winds dominated the group. However early on the 2nd a front moved over the Lau group and remained slow moving over the area and causing showers around the southern Lau islands. On the 3rd a trough of low pressure moved over Vanua Levu and merged with the front that was over the Lau group. The trough then remained slow moving over the country until the 14th, causing rain across most areas with heavy falls recorded over the main islands. A weak low had also developed along the trough during this period moving southeast across the group from the 11th to the 13th.

From the 14th to the 16th a high pressure over NZ directed fresh to strong southeast winds over the Fiji group with fine weather prevailing. Early on the 17th a second trough moved onto the Lau group from the northeast, weakening two days later but significant rain was recorded in Lakeba and Onoi-Lau. With the high pressure receding to the southeast, east to northeast wind flow affected the Fiji group until the 21st.

Early on the 23rd a front moved towards Kadavu and became slow moving just southwest of the island. It finally crossed over Kadavu two days later and became slow moving over the area for the next 24 hours before drifting away to the east. As the front moved east fresh to strong east to northeast winds again became dominant over the group with the high pressure present to the south.

On the morning of the 29th a front to the west and a third trough to the north both moved closer to Fiji. The front and trough moved east across the group on the last two days of the month causing rain over most places.

With the SPCZ and the continued presence of a westward moving trough over Rotuma, rain was recorded on the island almost every day of the month with significant falls during the first half of June.

TABLE 1: RAINFALL FROM APRIL TO JUNE 2004

Station	Actual Rainfall (mm)	Rainfall in the last three months (Below average, average or above average)	No. of Rain days in April (% of total rain)	No. of Rain days in May (% of total rain)	No. of Rain days in June (% of total rain)
Penang Mill	414.0	Average	12 (61)	05 (03)	14 (36)
Monasavu Dam	1096.8	Average	23 (35)	14 (07)	27 (58)
Vatukoula Mine	470.9	Above Average	10 (67)	4 (03)	11 (30)
Rarawai Mill, Ba	310.6	Average	7 (50)	4 (17)	8 (33)
Yasawa-I-Rara	-		-	-	-
Viwa Is.	337.5	Average	9 (34)	4 (05)	9 (61)
Lautoka Mill(Research)	261.4	Below Average	9 (69)	4 (08)	8 (23)
Nadi Airport	192.6	Below Average	9 (61)	5 (03)	9 (36)
Nacocolevu, Sigatoka	396.2	Average	15 (43)	4 (07)	10 (50)
Tokotoko, Navua	1393.6	Above Average	20 (42)	17 (16)	26 (42)
Laucala Bay, Suva	960.8	Above Average	24 (46)	18 (20)	25 (34)
Nausori Airport	974.5	Above Average	21 (45)	15 (15)	22 (40)
Nabouwalu	574.5	Average	24 (29)	17 (19)	27 (52)
Labasa Airport	395.9	Average	11(45)	7 (08)	16 (47)
Savusavu Airport	745.1	Above Average	16 (28)	13 (21)	16 (51)
Udu Point	-	-	20	17	-
Matei Airport	654.2	Average	12 (24)	9 (14)	16 (62)
Lakeba Is.	721.0	Above Average	15 (38)	10 (27)	20 (35)
Matuku Is.	-		-	-	-
Ono-I-Lau Is.	493.0	Above Average	11 (43)	9 (11)	12 (46)
Vunisea, Kadavu	616.1	Above Average	18 (46)	13 (16)	23 (38)
Rotuma	763.8	Average	21 (30)	15 (18)	25 (52)

RAINFALL IN THE LAST THREE MONTHS

Rainfall in June

Rainfall in June was average to well above average across the country with most of the rainfall received during the first fourteen days of the month. Fine weather followed until the 29th when more rainfall was received across the country. Rainfall in the Western Division ranged from 83-307% of normal, Eastern Division 182-329% of normal, Central Division 199-301% of normal and in the Northern Division rainfall was 279-328% of normal..

Rainfall in the 3-months from April to June

The Rainfall Outlook for the period April to June in the March Fiji Islands Weather Summary was for rainfall to be variable with most sites expected to receive around average. The confidence level of the forecast was low to moderate.

Of the twenty sites that reported in time for this summary, nine sites reported average, eight above average and two below average.

Figure A

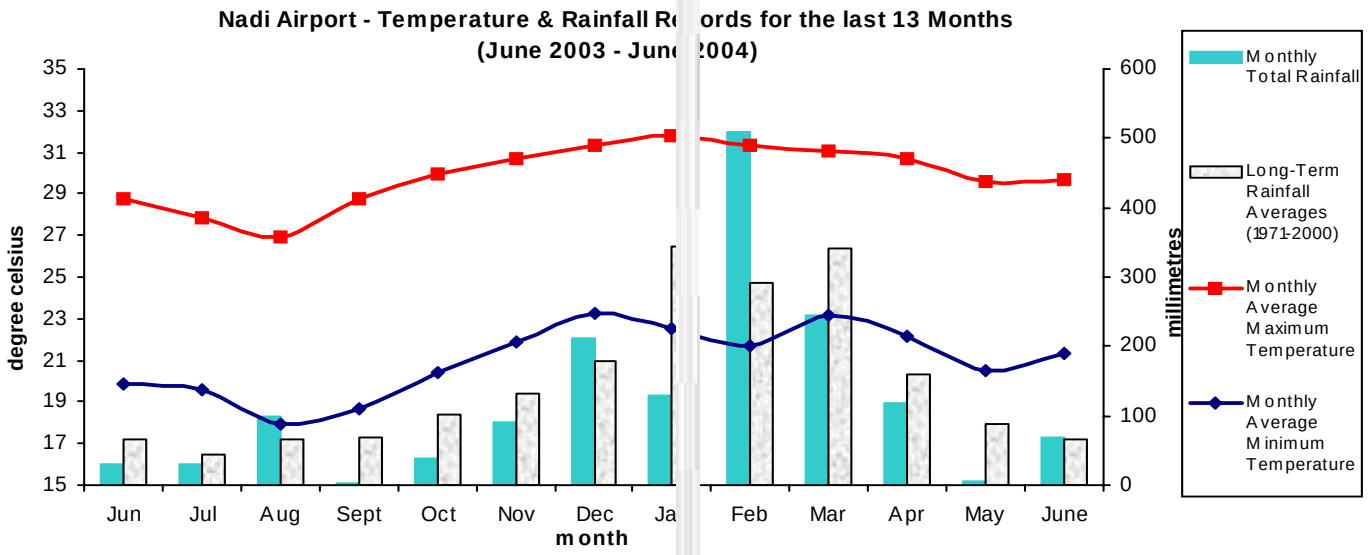


Figure B

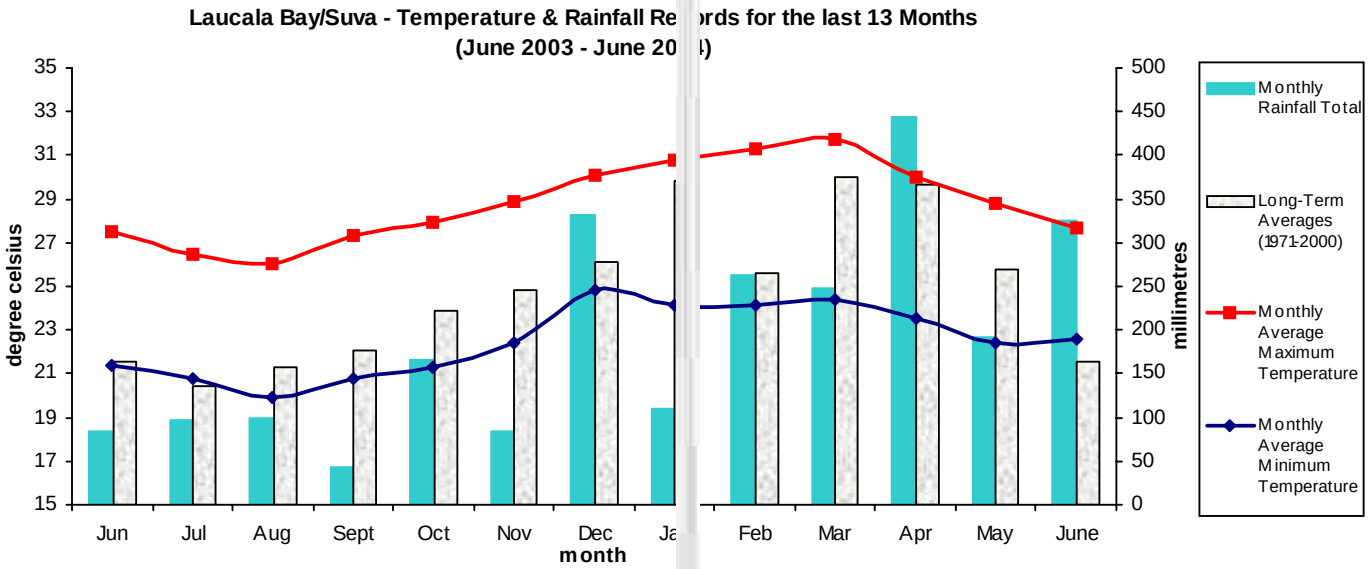
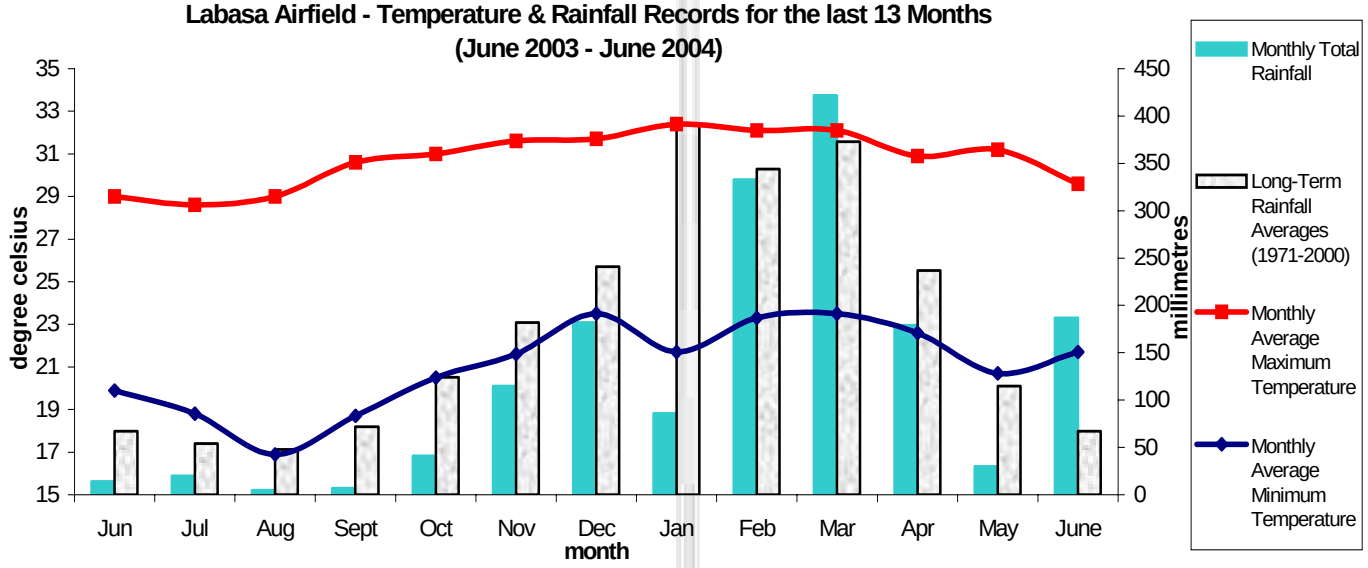


Figure C



Climate in June

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 departures were recorded at the Lautoka and Penang Mills which recorded 0.8°C above normal. The greatest negative departure was recorded at Ono-I-Lau and Savusavu Airport which recorded 0.3°C and 0.2°C below normal. Three day time temperature records were set this month at Viwa, Vunisea and Monasavu (see table below).

Night-time temperatures were average to above average across the country with a new night-time high of 24.5°C recorded at Navua. The greatest positive departures were recorded at Labasa Airport, Vatukoula and Rarawai Mill which recorded 2.8°C, 2.7°C and 2.4°C respectively above normal. The greatest negative departure were recorded at Ono-I-Lau and Nabouwalu which recorded 1.3°C and 0.5°C respectively below normal.

Relative Humidity (RH) at 0900hrs were mostly above average across the country. The greatest positive departures from normal were recorded at Ono-I-Lau and Matei (8%). The greatest negative departure of 7% below normal was recorded at Rarawai Mill.

SOIL MOISTURE AND RUNOFFS

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

In the Central Division conditions were excessive in the first half of the month then ample in the second half of the month.

In the Northern Division, conditions were excessive to ample at Nabouwalu and Savusavu Airport. At Nabouwalu conditions were similar to Savusavu but were excessive at the end of the month.

In the Eastern Division, Lakeba, Vunisea and Ono-I Lau recorded dry to moderate conditions for first few days then excessive to ample throughout the month.
Rotuma recorded excess to ample conditions throughout the month.

Significant runoffs were recorded at Monasavu (560.4mm), Tokotoko, Navua (495.6mm), Matei (298.2mm) and Savusavu Airfield (259.6mm).

SUNSHINE, RADIATION & WINDS

Total sunshine hours were below the June long-term average. Nadi Airport recorded 83%, Laucala Bay/Suva, 76%, Nacocolevu 86% and Rotuma 100% of normal.

Global Solar Radiation (average per day) recorded at Nadi Airport was 11.8MJ/ M^2.

Monthly average wind speed was well above average to above average at Nausori Airport, Nadi Airport, Nabouwalu and Vunisea except for Rotuma which recorded below average winds.

RECORDS SET IN JUNE 2004

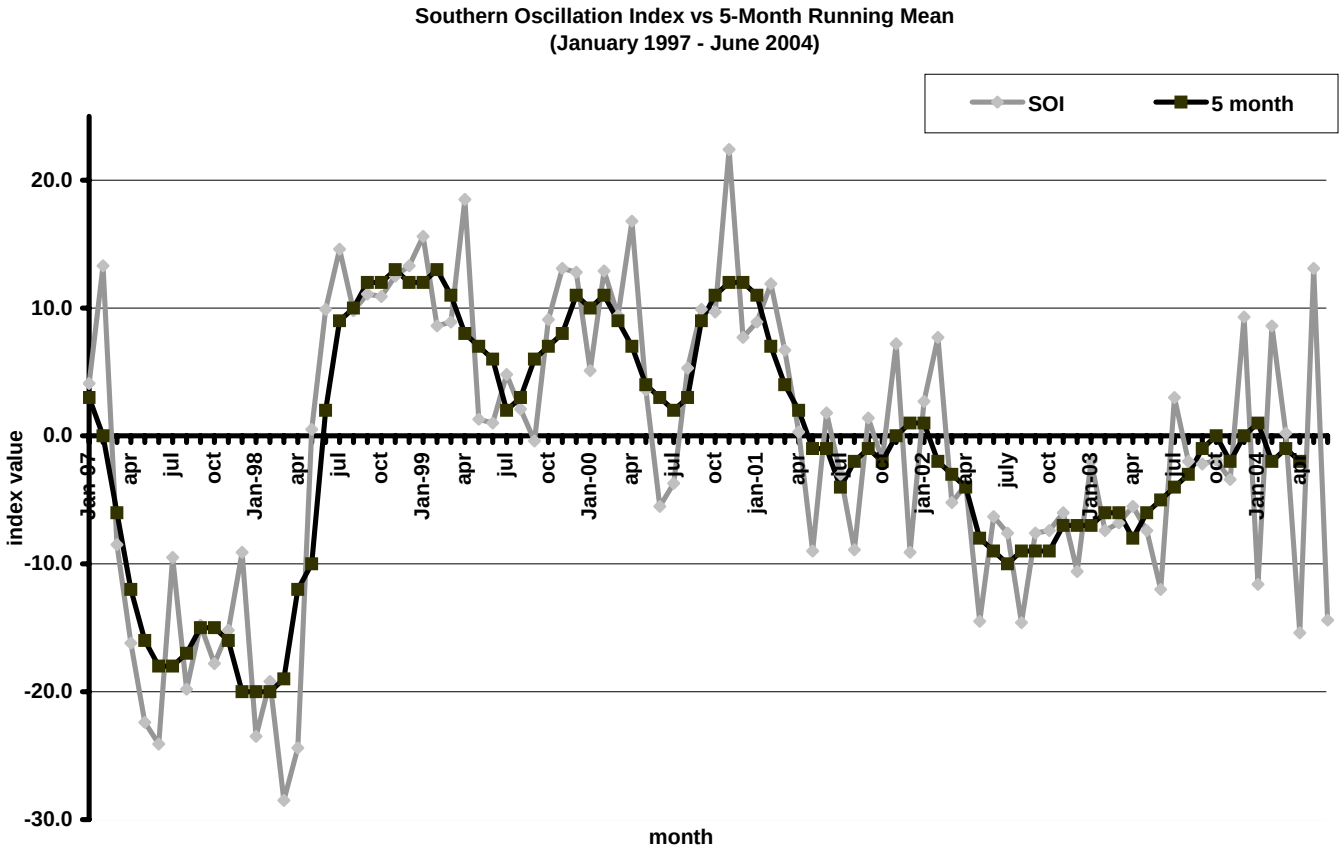
Element	Station	Observed (record)	On	Rank	Previous (record)	Year	Records Began
Rainfall	Viwa	205.4mm	-	New High	177.0mm	1992	1978
	Monasavu	640.2mm	-	New High	528.0mm	1996	1980
	Tokotoko, Navua	587.8mm	-	New High	495.0mm	2000	1992
Maximum Temperature	Viwa	33.5°C	8th	New High	31.7°C	1997	1978
	Monasavu	27.0°C	19th	New High	26.5°C	1982	1980
	Vunisea	31.5°C	19th	New High	31.4°C	1996	1929
Minimum Temperature	Tokotoko, Navua	24.5°C	29th	New High	24.0°C	1998	1992

PRELIMINARY CLIMATOLOGICAL SUMMARY FOR JUNE 2004

	RAINFALL					AIR TEMPERATURES								SUNSHINE	
	TOTAL	*	RAIN DAYS	+	MAX. FALL	AVERAGE DAILY MAX.	#	AVERAGE DAILY MIN.	#	EXTREME MAX.	ON	EXTREME MIN.	ON	TOTAL	*
	MM	%			MM ON	C	C	C	C	C		C		HRS	%
NADI AIRPORT	70	108	9		30 12	29.7	0.7	21.3	2.1	32.7	18	18.0	17	169	83
SUVA/LAUCALA BAY	325	199	25		63 4	27.7	0.0	22.6	1.2	30.6	19	19.4	2	107	76
NACOCOLEVU	198	263	10		60 29	28.7	0.3	20.3	1.6	32.5	18	16.0	1	128	86
ROTUMA	400	174	25		143 2	30.7	1.1	24.8	0.2	32.0	6	21.8	3	188	100
VIWA	205	307	9		68 11	29.4	1.0	22.8	-0.4	33.5	8	20.4	16		
UDU POINT	Poor quality observations - data not included														
LABASA AIRFIELD	187	279	16		49 7	29.6	-0.1	21.7	2.8	32.3	19	18.3	22		
NABOUWALU	299	305	27		41 29	27.4	0.3	22.1	-0.5	31.3	19	19.5	10		
SAVUSAVU AIRFIELD	384	328	16		104 8	27.8	-0.2	21.6	0.0	30.0	5	20.0	11		
MATEI AIRFIELD	401	326	16		85 8	27.9	-0.1	22.3	0.1	31.0	12	20.0	1		
*YASAWA-I-RARA	Faulty AWS														
VATUKOULA	139	190	11		55 29	30.0	0.3	21.2	2.7	32.6	17	18.7	17		
MONASAVU	640	268	27		112 3	22.0	0.2	17.5	1.4	27.0	19	14.2	24		
NAUSORI AIRPORT	387	258	22		70 6	27.3	0.1	21.6	1.1	31.7	6	18.9	24		
NAVUA/TOKOTOKO	588	301	26		92 6	27.3	0.5	21.4	1.2	30.5	14	17.0	15		
LAKEBA	257	329	20		56 11	27.3	0.1	23.2	1.2	29.7	29	20.2	2		
*MATUKU	Faulty AWS														
VUNISEA	229	182	23		35 12	26.5	-0.1	22.3	1.8	31.5	19	19.7	2		
ONO-I-LAU	225	256	12		67 12	25.6	-0.3	20.1	-1.3	28.4	20	17.1	13		
BA/RARAWAI MILL	100	112	8		46 29	30.2	0.2	20.4	2.4	32.3	21	16.8	17		
LAUTOKA AES	60	83	8		35 29	29.6	0.8	21.9	1.2	32.1	27	18.8	16		
PENANG MILL	149	150	14		75 29	28.5	0.8	21.5	0.1	30.6	20	17.8	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 September 2004

EL NIÑO - SOUTHERN OSCILLATION UPDATE

The Southern Oscillation Index (SOI) for June was -14.4 (May was 13.1) with the five-month running mean of -2 centred on March (March was –1) (Figure D).

As of 23/6/04, the current El Niño-Southern Oscillation status remains neutral, and this situation is likely to persist for the rest of 2004. Although the Southern Oscillation Index (SOI) has once again dropped below zero, its persistent fluctuating behaviour is consistent with a neutral pattern. There remains nothing in the current observations to suggest the emergence of an appropriate trigger for an El Niño event. Based on historical data, the chance of an El Niño event occurring this late in the year can almost be ruled out, given that there has been only one clearly defined instance of an event developing in the second half of the year.

Following a substantial rise in the SOI during May, the index has once again dropped below zero. This has been largely driven by above average pressure in Darwin. Cloudiness near the dateline has increased during June which is consistent with the drop in the SOI.

Sea-surface temperatures (SST) in the central and eastern tropical Pacific, cooled by between 0.2 and 0.5°C during the past fortnight, with cooler than average conditions persisting in the far east, adjacent to the South American coast. The western Pacific continues to be warmer than average, especially just west of the dateline.

Although most show some level of warming, the consensus (by a 9–2 majority) of computer SST forecasts, including the Bureau-run POAMA model, is for a neutral temperature pattern in the central to eastern equatorial Pacific continuing into the southern spring.

The Trade Winds have been weaker than average west of the dateline over the last fortnight, but were near to above average in the central and eastern tropical Pacific.

The Kelvin wave of subsurface warming that resulted from a westerly wind burst in late March, has contributed to the weakening of negative anomalies in the far eastern Pacific. The subsurface temperature pattern is now showing temperatures generally close to normal across the equatorial Pacific, and a major subsurface warming (indicating the potential for an El Niño event to develop) now seems unlikely.

(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 in the Northern, Central and Western Divisions to be below average except for Nabouwalu, Suva, Dobuilevu and Yasawa-I-rara (average-below average). Average to below average rainfall is also expected in the Eastern Division. There are equal chances of receiving below, average and above average rainfall in Rotuma (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 30-53% chance (depending on location) of receiving average (mean) rainfall across Fiji in next three months (Table. 2).

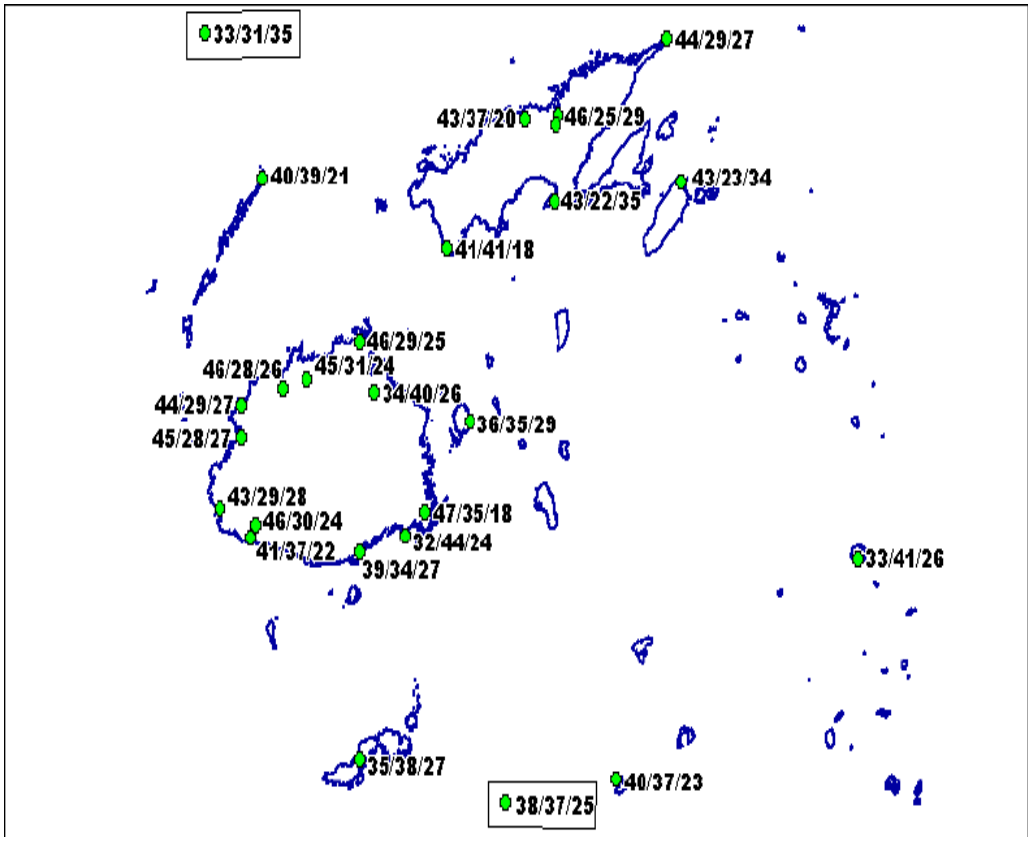
RAINFALL OUTLOOK FOR JULY TO SEPTEMBER 2004

Most parts of the country based on model predictions and current ocean and atmospheric conditions can expect rainfall in the next three months to be near average. There may be parts of the Western and Northern Divisions which receive below average rainfall.

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

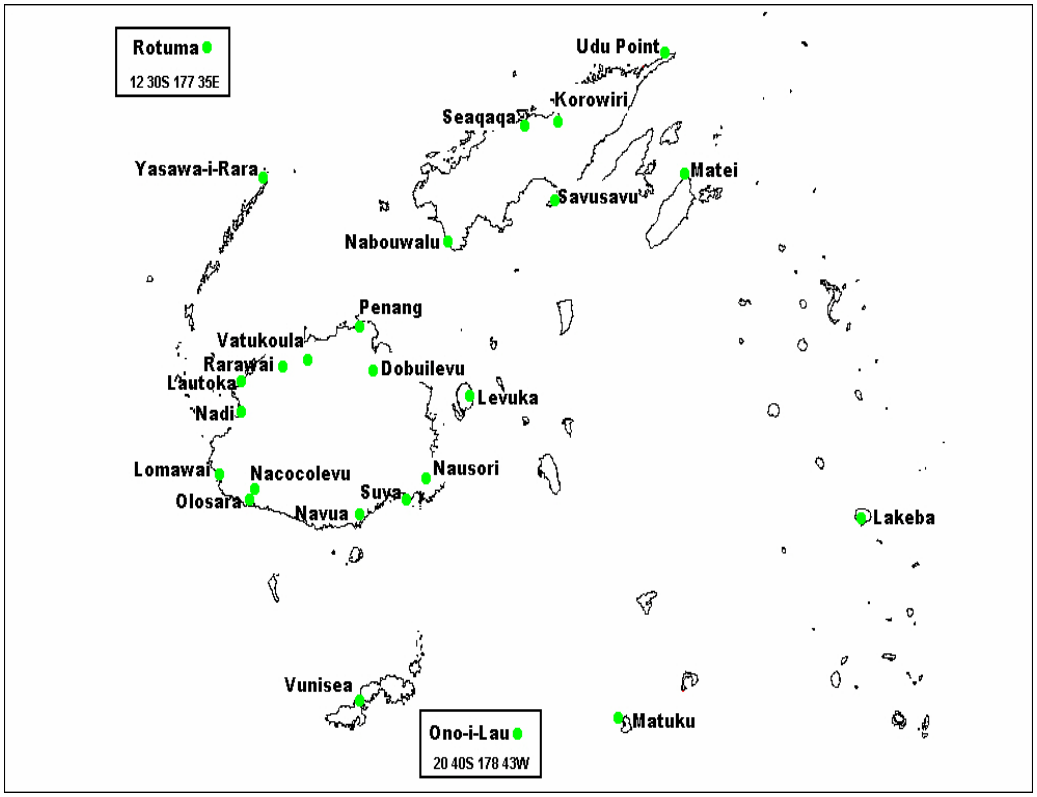
Three Month Rainfall Outlook Probabilities for July to September 2004

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	207	300
Vatukoula	124	212
Rarawai	132	231
Penang	153	234
Lautoka	120	223
Nadi	127	202
Lomawai	151	256
Nacocolevu	191	280
Olosara	199	308
Yasawa	121	202
Central Division		
Navua	512	700
Suva	384	512
Nausori	363	501
Eastern Division		
Levuka	283	417
Lakeba	174	294
Matuku	197	308
Ono-I-Lau	238	343
Vunisea	274	381
Northern Division		
Labasa Mill	116	201
Seaqaqa	118	241
Nabouwalu	212	369
Savusavu	249	336
Udu Point	212	351
Matei	292	421
Rotuma	575	808

TABLE 3: Monthly Rainfall Outlook Probabilities for July to September 2004

	July 2004		August 2004		September 2004		July to September 2004 combined	
Station Name	**Average***	**Probability#**	**Average***	**Probability#**	**Average***	**Probability#**	**Average***	**Probability#**
Western Division								
Dobuilevu	56	**38**	80	**57**	119	**36**	255	**38**
Vatukoula	50	**35**	68	**33**	78	**41**	196	**37**
Rarawai	39	**52**	65	**34**	74	**47**	178	**49**
Penang	55	**41**	73	**35**	96	**37**	224	**38**
Lautoka	49	**43**	70	**29**	72	**43**	191	**52**
Nadi	45	**37**	65	**43**	70	**55**	180	**41**
Lomawai	62	**46**	79	**32**	71	**49**	212	**50**
Olosara	77	**52**	98	**28**	103	**49**	278	**49**
Nacocolevu	71	**49**	83	**34**	92	**40**	246	**46**
Yasawa-I-Rara	43	**44**	63	**34**	66	**35**	172	**46**
Central Division								
Navua - Tamanoa	186	**49**	202	**45**	229	**40**	617	**48**
Suva	136	**33**	158	**33**	177	**43**	471	**46**
Nausori	118	**41**	147	**52**	165	**40**	430	**53**
Eastern Division								
Lakeba	80	**44**	102	**27**	101	**42**	283	**45**
Ono-I-Lau	92	**42**	118	**20**	108	**37**	318	**35**
Northern Division								
Korowiri	52	**30**	52	**39**	75	**48**	179	**35**
Seaqaqa	52	**24**	56	**49**	82	**44**	190	**44**
Nabouwalu	92	**41**	105	**39**	113	**47**	390	**30**
Savusavu	96	**47**	116	**29**	133	**40**	345	**39**
Udu Point	89	**28**	85	**42**	113	**39**	287	**45**
Rotuma	233	**38**	210	**40**	238	**39**	681	**40**

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.

The probabilities in the three-month combined column are not an average of the three individual months. The model in this case has been re-run for three combined months. There is a higher degree of skill association with predicting rainfall for three combined months compared to three individual months.

** 'Long-term Average' for the 30 year period from 1971-2000.*
 # Probability of expecting at least normal rainfall.