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March 2004

Fiji Islands Weather Summary
March 2004
Rainfall Outlook till June 2004

FIJI METEOROLOGICAL SERVICE

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IN BRIEF

March was typically hot and humid with troughs of low pressure or the South Pacific Convergence Zone near or over Fiji dominating the weather pattern across the country.

A substantial amount of rainfall received during the month about the western and central parts of the main islands fell during the late afternoon with occasional thunderstorm activity. Though most sites across the country recorded more than twenty days of rainfall during the month, only half of these sites reported receiving average or above average rainfall as the long-term average for March is high. The whole of Viti Levu except Ba recorded below average rainfall.

Day-time air temperatures were average to above average and night-time temperatures around average. Two new temperature records were set this month at Monasavu (new daytime high of 30.4°C and new nightime high of 23.3°C). Relative humidity varied around average across the country.

Total sunshine hours were around average at all the recording stations.

Based on model predictions and current 'neutral' ocean and atmospheric conditions, Fiji's rainfall is expected to be below average to average in the next three months.

WEATHER PATTERNS

From the 1st to the 4th, brief showers occurred over the eastern parts of the country and afternoon showers were predominant elsewhere. A frontal band moved across Fiji, from the south, on the 5th and 6th and merged with a trough to the northeast. The front produced scattered showers over the country. Ono-i-Lau recorded 120mm of rainfall within 24 hours during this period. An atypical dry and mild southerly airstream resulted over Fiji on the 7th and 8th.

Two troughs influenced Fiji's weather between the 8th and the 17th and a moist east to northeast air-stream covered the country from the 18th till the 21st. During this extensive period, the country experienced scattered showers with heavy downpours accompanied by thunderstorms about the main islands.

A convergence zone drifted over the Yasawa and Mamanuca Islands on the 22nd and lingered till the 27th, it weakened then proceeded to the far southwest of Fiji. Rain with isolated thunderstorms occurred during this time and a strong west to northwest wind warning was issued for the western areas of Fiji on the 23rd.

A third trough developed over the country on the 28th and a tropical disturbance was identified embedded along this trough axis over the Lau and Lomaiviti groups. The tropical disturbance moved to the southeast on the 30th and the trough drifted to the north of Fiji later on the 31st. Due to these two systems, heavy afternoon thunderstorms occurred about the main islands and significant showers were experienced elsewhere in the country till the 31st.

A series of troughs and convergence zones in the vicinity of Rotuma affected the island for most of the month.

TABLE 1: RAINFALL FROM JANUARY TO MARCH 2004

Station	Actual Rainfall (mm)	Rainfall in the last three months (Below average, average or above average)	No. of Rain days in January (% of total rain)	No. of Rain days in February (% of total rain)	No. of Rain days in March (% of total rain)
Penang Mill	715.5	Below Average	13 (7)	21 (52)	21 (41)
Monasavu Dam	831.0	Below Average	16 (2)	23 (47)	24 (32)
Vatukoula Mine	897.6	Below Average	9 (9)	19 (60)	15 (31)
Rarawai Mill, Ba	900.9	Below Average	8 (7)	18 (52)	18 (41)
Yasawa-I-Rara	-		-	-	-
Viwa Is.	601.9	Average	5 (2)	17 (58)	19 (40)
Lautoka Mill(Research)	645.2	Below Average	10 (5)	18 (57)	21 (38)
Nadi Airport	883.4	Average	9 (15)	18 (58)	27 (26)
Nacocolevu, Sigatoka	-		7	21	-
Tokotoko, Navua	812.6	Below Average	15 (26)	20 (36)	20 (38)
Laucala Bay, Suva	619.1	Below Average	20 (18)	24 (42)	29 (40)
Nausori Airport	631.9	Below Average	16 (17)	23 (48)	23 (35)
Nabouwalu	589.5	Below Average	15 (14)	26 (44)	25 (42)
Labasa Airport	840.4	Below Average	10 (10)	15 (40)	20 (50)
Savusavu Airport	543.8	Below Average	9 (23)	14 (31)	20 (45)
Udu Point	1010.5	Average	14 (16)	19 (52)	26 (32)
Matei Airport	590.2	Below Average	20 (20)	19 (50)	18 (30)
Lakeba Is.	462.4	Below Average	15 (16)	16 (49)	19 (35)
Matuku Is.	-		-	-	-
Ono-I-Lau Is.	507.6	Below Average	7 (5)	12 (35)	18 (60)
Vunisea, Kadavu	465.6	Below Average	7 (8)	17 (31)	25 (61)
Rotuma	837.8	Below Average	16 (18)	16 (39)	22 (43)

RAINFALL IN THE LAST THREE MONTHS

Rainfall in March

Rainfall in March was generally average to below average. Only Ono-I-Lau received above average rainfall (121%) which was the greatest positive departure from normal during the month. On the other hand, only 38% of normal March rainfall was received at Monasavu which was the greatest negative departure from normal across the country and also a new record.

In the Western Division rainfall ranged from 38-101%, in the Northern Division 47-121%, Eastern Division 55-121% and Central Division 58-78% of normal.

Rainfall in the 3-months from January to March

The Rainfall Outlook for the period January to March in the December Fiji Islands Weather Summary was for rainfall vary around average. The confidence level of the forecast was moderate.

Of the nineteen sites that reported in time for this summary, sixteen sites reported below average and three average.

Figure A

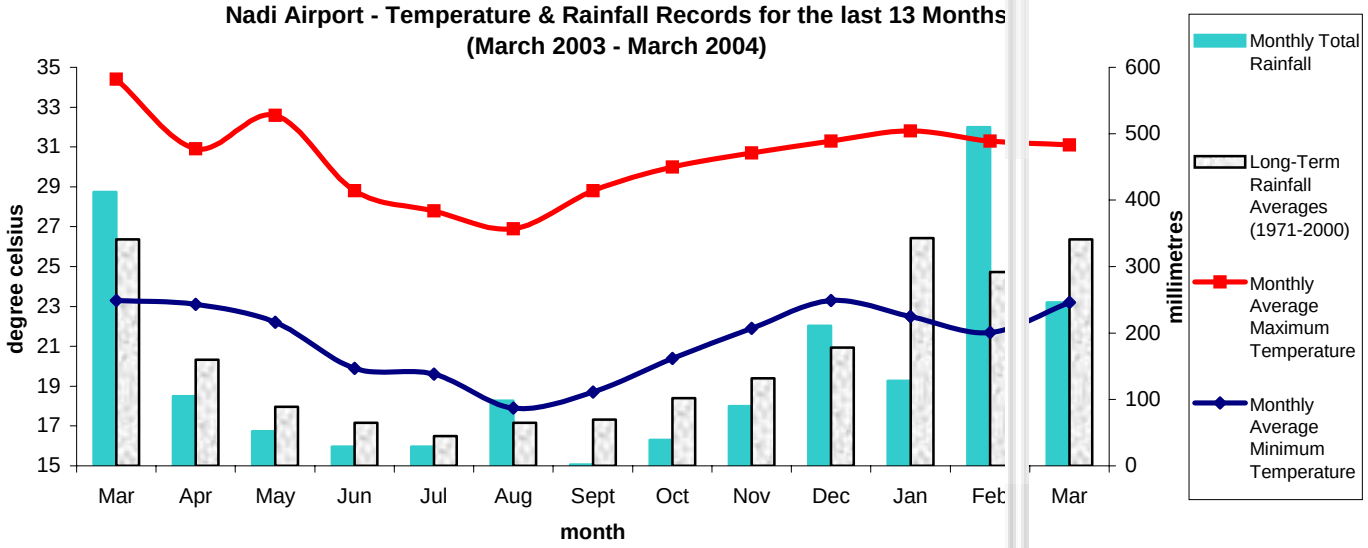


Figure B

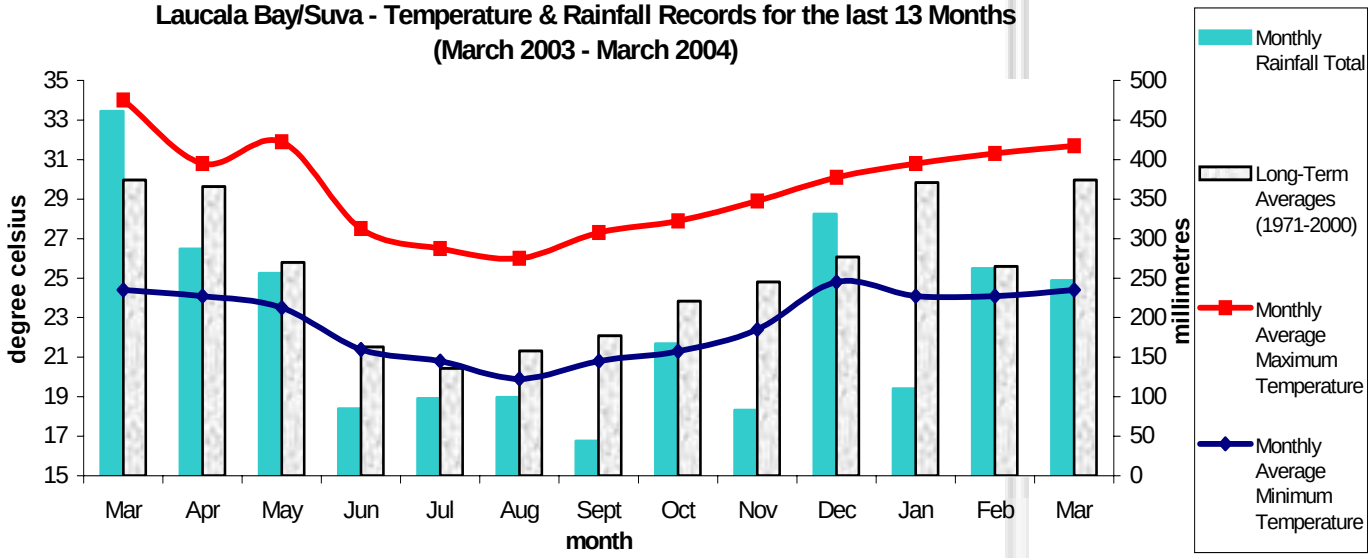
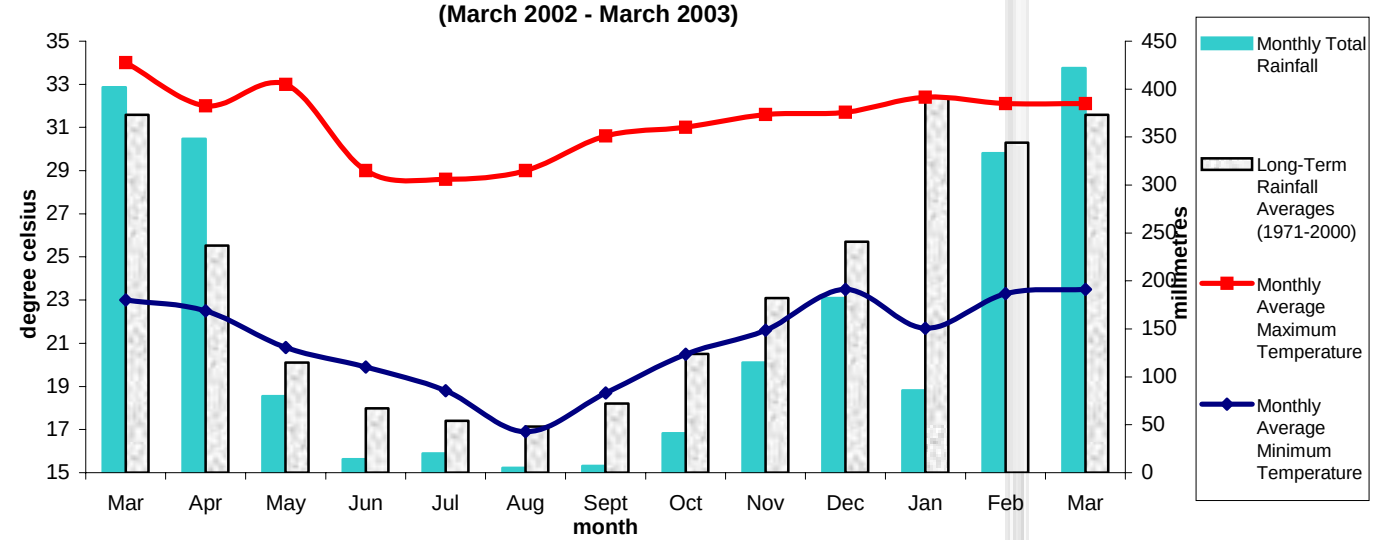


Figure C



Climate in March

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 departures were recorded at Nabouwalu and Monasavu/Viwa which recorded 1.5 and 1.1°C respectively above normal. There was only one negative departure (0.2°C) recorded at Nadi Airport. A new high day temperature was recorded at Monasavu.

Night-time temperatures varied around average. The greatest positive departures from normal were recorded at Labasa Airfield and Rarawai Mill which recorded 1.2 and 1.0°C respectively above normal. The greatest negative departures were recorded at Viwa and Penang Mill which recorded 1.2 and 0.7°C respectively below normal.

Relative Humidity (RH) at 0900hrs varied around average across the country. The greatest positive departures were recorded at Ono-I-Lau and Nadi Airport (+6 and +5%). The greatest negative departures was recorded at the Labasa Airfield (-5%).

SOIL MOISTURE AND RUNOFFS

Soil moisture conditions varied considerably throughout the month. The second half of the month was much wetter then the first.

In the Western Division conditions ranged from ample to moderate then limiting then ample to excessive at the end of the month at Nadi Airport and Lautoka. There was no pattern across the Division.

In the Central Division conditions were excessive to ample throughout the month. In the Northern Division, conditions were excessive to ample except for moderate conditions at various locations during the first 10 days. In the Eastern Division, Lakeba recorded moderate to dry conditions for most of the month. Vunisea and Ono-I-Lau recorded moderate to dry conditions during the first half of the month then excessive to ample conditions for the remainder.

Rotuma recorded ample to moderate during the first week, excessive to ample during the second, moderate during the third and excessive to ample during the last week.

Significant runoffs were recorded at Labasa Airport (232.9mm), Rarawai Mill (207.7mm), Rotuma (183.3mm), Navua (173.4mm) and Udu Point (155.3mm).

SUNSHINE, RADIATION & WINDS

Total sunshine hours were around average. Nadi Airport recorded 91%, Laucala Bay/Suva, 94%, Nacocolevu 108% and Rotuma 108% of normal.

Global Solar Radiation (average per day) recorded at Nadi Airport was 16.1 and Laucala Bay 17.3MJ/ M^2.

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

RECORDS SET IN MARCH 2004

Element	Station	Observed (record)	On	Rank	Previous (record)	Year	Records Began
Rainfall	Monasavu	264.6mm	-	New Low	328mm	1986	1980
Max Temp	Monasavu	30.4°C	22nd	New High	29.4°C	1996	1980
Min Temp	Monasavu	23.3°C	15th	New High	23.0°C	1998	1980

NOVEMBER TO APRIL 2003/04 TROPICAL CYCLONE SEASON

The South West Pacific Tropical Cyclone Season officially began on 01/11/2003 and will continue till 30/04/2004.

The chances of cyclone activity in the Fiji region this season are slightly higher than normal based on the prediction that *Neutral* conditions will continue through the season. The average number of cyclones that have affected Fiji (including pre-season events) since 1969/70 is between 1 and 2. However, there have been as many as six events such as in 1996/97.

Historical records of tropical cyclones affecting Fiji since the 1969/70 season show that six cyclones have affected Fiji in April with one of them causing severe damage. The years were 1973, 74, 75, 80, 86, and 2000.

Three cyclones TC *Heta ,Ivy and Grace* either developed within Nadi's RSMC region this season (*Heta* and *Ivy*) or developed outside the RSMC region but later moved in the case of TC *Grace*. Nadi's RSMC region extends from 160°E to 120°W. Fiji hasn't been directly affected by a TC so far this season.

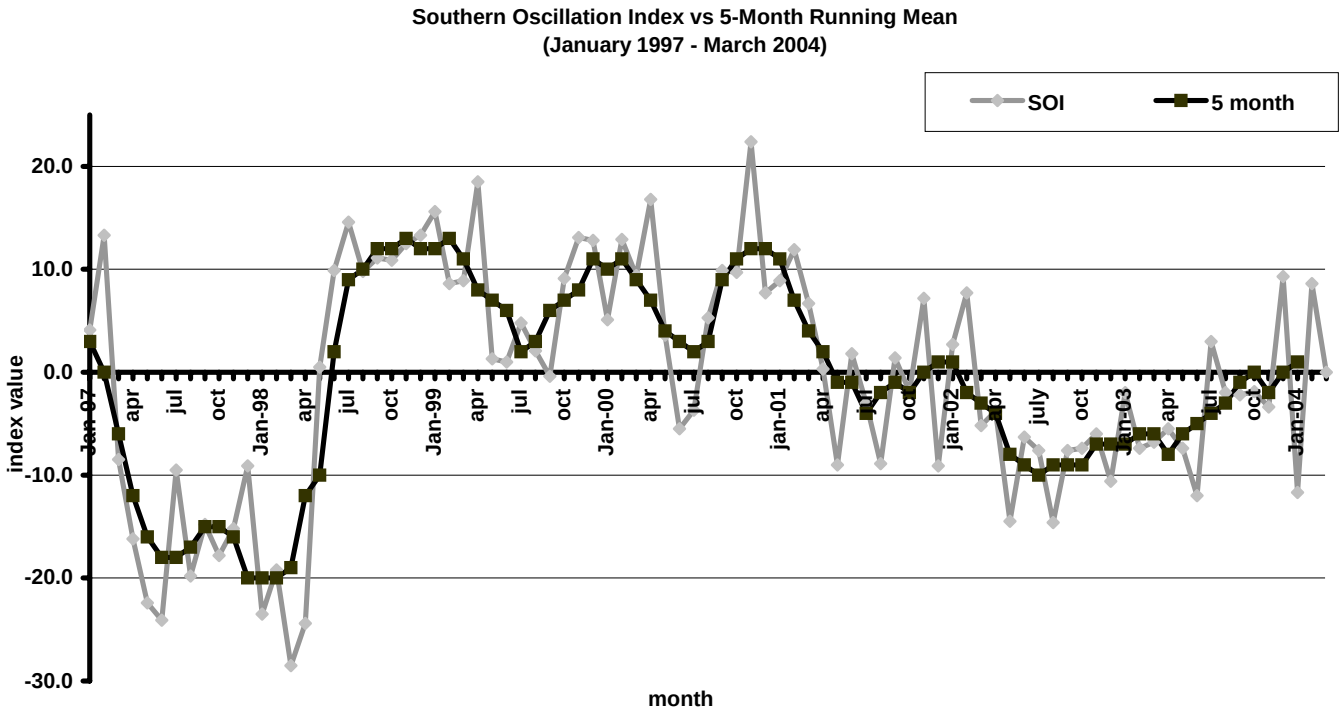
Prior to and during a cyclone information on the event and regular updates will be provided on the Fiji Met Service *http://www.met.gov.fj* website, via *Poll fax* and the media.

PRELIMINARY CLIMATOLOGICAL SUMMARY FOR MARCH 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	246	72	26	54 17	31.1	-0.2	23.2	0.4	33.2	5	19.2	8	176	91
SUVA/LAUCALA BAY	247	66	29	44 12	31.7	0.8	24.4	0.5	33.6	26	21.0	9	159	94
NACOCOLEVU	Insufficient Data				31.8	0.7	22.9	0.4	33.5	1	19.4	8	164	108
ROTUMA	359	97	22	69 28	31.4	0.8	25.2	0.5	33.2	29	23.0	8	178	108
VIWA	239	99	19	68 30	32.1	1.1	24.0	-1.2	33.5	4	21.5	9		
UDU POINT	320	100	26	53 29	30.9	0.2	23.9	-0.5	32.5	27	22.5	13		
LABASA AIRFIELD	422	113	20	103 25	32.1	0.6	23.5	1.2	34.5	15	20.0	8		
NABOUWALU	247	74	25	43 11	31.6	1.5	25.0	0.7	33.8	22	23.0	9		
SAVUSAVU AIRFIELD	246	87	20	52 31	30.8	0.2	24.1	0.5	34.5	25	21.5	8		
MATEI AIRFIELD	177	47	18	56 28	31.2	0.9	24.0	-0.2	33.0	10	20.5	16		
*YASAWA-I-RARA	Faulty AWS													
VATUKOULA	276	72	15	46 26	31.9	0.3	23.1	0.9	33.8	13	19.8	8		
MONASAVU	263	38	24	48 17	26.7	1.1	19.5	0.2	30.4	22	14.4	23		
NAUSORI AIRPORT	222	58	23	33 27	31.4	0.9	23.4	0.2	33.3	26	20.0	8		
NAVUA/TOKOTOKO	312	78	20	37 15	30.8	0.6	23.6	0.5	32.0	21	20.0	8		
LAKEBA	162	55	19	67 29	31.0	0.7	24.5	0.5	32.5	26	20.6	8		
*MATUKU	Faulty AWS													
VUNISEA	283	93	25	39 13	30.6	0.6	24.3	0.8	32.4	27	20.8	9		
ONO-I-LAU	306	121	18	120 5	29.9	0.6	24.7	0.3	32.0	9	22.1	7		
BA/RARAWAI MILL	367	101	18	58 15	32.4	0.4	23.3	1.0	34.0	16	20.0	23		
LAUTOKA AES	245	80	21	35 26	31.2	0.2	24.2	0.4	32.6	5	20.7	8		
PENANG MILL	292	69	21	46 21	31.4	0.9	23.1	-0.7	33.4	16	18.5	9		

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 April 2004

EL NIÑO - SOUTHERN OSCILLATION UPDATE

The Southern Oscillation Index (SOI) for February was 8.6 (January was -11.7) with the five-month running mean of 0 centred on December (November was -1) (Figure D).

As of 31/03/2004 the current El Niño-Southern Oscillation status remains neutral. Recent computer model outputs suggest an increased risk of an event developing during the southern winter, but there is very little in the current observational data to suggest an El Niño event is being either pre-conditioned or triggered. Surface temperatures in the equatorial Pacific are marginally warmer than average, but subsurface temperatures are cooler than average across the central to eastern Pacific. Trade Winds have decreased over the tropical Pacific during the past fortnight, and there is evidence of a westerly wind burst developing in the western Pacific. This will be monitored closely as these types of bursts have been associated with the onset or pre-conditioning of El Niño events in the past.

Of the 11 computer models recently surveyed, seven indicate a persistence of neutral conditions to August 2004, with the other four (including the Bureau model) indicating a possible El Niño. The overall picture therefore, is one of an increased risk of an El Niño later this year, although it's difficult to assign a quantified level of confidence to this assessment.

The March to June period is known as the "predictability barrier" and model skill is at its lowest when predicting across this span of months. Users should therefore be cautious when interpreting model forecasts for the middle of 2004. March to June is also the key time of year for El Niño events to be aided or triggered into development by westerly wind bursts.

INTERSEASONAL PATTERNS - 30/03/2004

"Tropical weather in Southeast Asia, Australia and SW Pacific can be influenced by tropical weather patterns on intra-seasonal time scales. The Madden-Julian oscillation (MJO) is normally seen as an alternating increase and decrease in broad scale tropical convection, of a scale that may, for example, encompass tropical Australia and the southwest Pacific. Active phases of the MJO typically recur about every 40-50 days and may last for two weeks or more, as the active area of the MJO moves west to east around the globe. Active phases are normally associated with an increase in shower and storm activity, and are a favoured time for the formation of tropical cyclones."

This southern hemisphere summer season, tropical convection (rainfall) near the dateline has been somewhat modulated by the Madden-Julian Oscillation [MJO], with three distinct active phases apparent. The first which began in later part of December/early January, coincided with significant rainfall in the Fiji region and development of TC *Heta*. The second occurred around mid-late February with TC *Ivy* developing near Vanuatu at the tail end of this phase. In between these two events was a clearly suppressed phase. The third event began in mid March, though the preceding 'inactive period' was partly obscured by continual active convection across much of Australia and the western Pacific.

For a time-longitude plot of OLR anomalies see www.bom.gov.au/fwo/IDD65204.gif. Following the present active phase is a suppressed phase of the MJO which is likely to persist through much of April.

(The ENSO Update and Interseasonal Patterns are 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 Western Division to be below average except for Ba, Rakiraki and Yasawa-I-Rara (below average to average). In the Northern Division rainfall is expected to be below average in the western half, below average to average at Savusavu and Matei and average to above at Udu Pt. Rainfall is expected to vary around average in the Eastern Division and be below average to average at 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 25-58% chance (depending on location) of receiving average (mean) rainfall across Fiji in next three months (Table. 2).

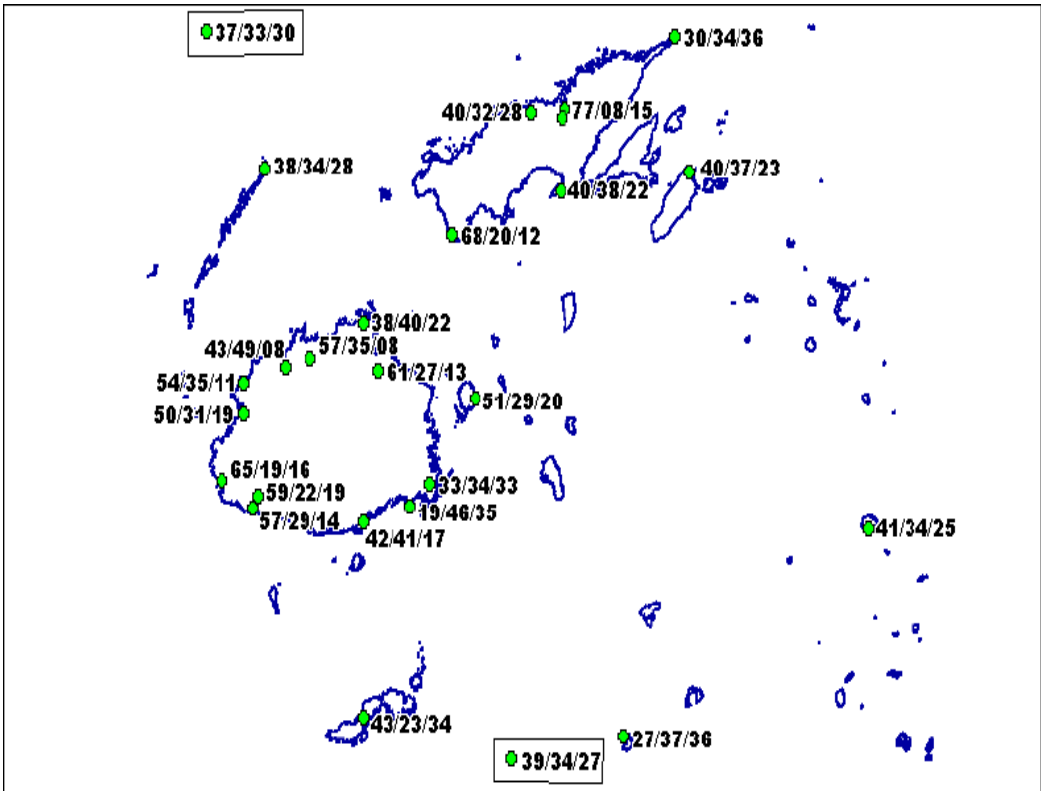
RAINFALL OUTLOOK FOR APRIL TO JUNE 2004

Based on model predictions and current 'neutral' conditions, Fiji's rainfall is expected to be variable in the next three months. Most sites are however expected to receive close to average rainfall.

NOTE: The confidence level in the outlook is 'low to moderate' due to the outlook period including the transition period from Wet to Dry Season.

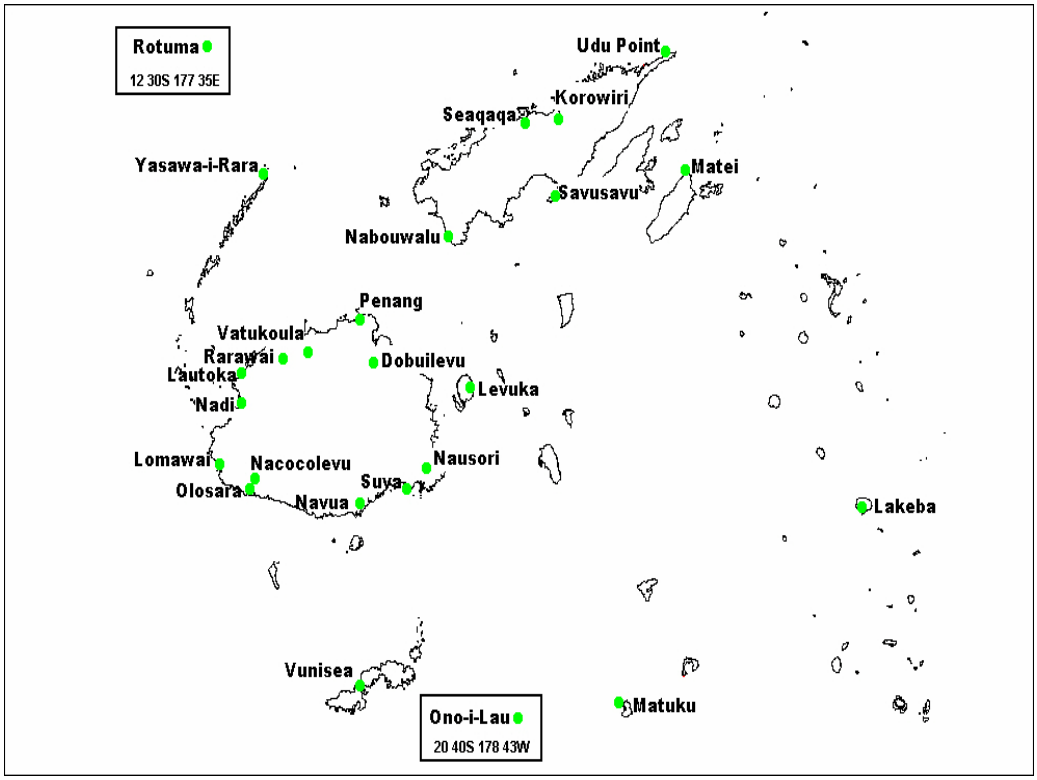
Three Month Rainfall Outlook Probabilities for April to June 2004

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	435	635
Vatukoula	301	433
Rarawai	280	434
Penang	343	497
Lautoka	273	393
Nadi	256	372
Lomawai	258	355
Nacocolevu	274	399
Olosara	260	542
Yasawa	270	431
Central Division		
Navua	779	1003
Suva	678	847
Nausori	634	777
Eastern Division		
Levuka	497	757
Lakeba	330	523
Matuku	347	458
Ono-I-Lau	274	454
Vunisea	437	598
Northern Division		
Labasa Mill	328	543
Seaqaqa	310	478
Nabouwalu	473	659
Savusavu	391	629
Udu Point	400	553
Matei	528	716
Rotuma	744	925

TABLE 3: Monthly Rainfall Outlook Probabilities for April to June 2004

	April 2004		May 2004		June 2004		April to June 2004 combined	
Station Name	**Average***	**Probability#**	**Average***	**Probability#**	**Average***	**Probability#**	**Average***	**Probability#**
Western Division								
Dobuilevu	286	**43**	130	**42**	98	**73**	514	**52**
Vatukoula	221	**68**	78	**46**	73	**74**	372	**48**
Rarawai	207	**71**	95	**33**	89	**35**	391	**31**
Penang	269	**53**	161	**32**	99	**37**	529	**28**
Lautoka	187	**70**	84	**56**	72	**41**	343	**39**
Nadi	160	**75**	89	**41**	65	**56**	314	**42**
Lomawai	169	**57**	90	**44**	72	**49**	331	**25**
Olosara	166	**69**	99	**53**	90	**46**	355	**45**
Nacocolevu	155	**70**	85	**58**	75	**52**	315	**56**
Yasawa-I-Rara	209	**51**	85	**46**	82	**63**	376	**48**
Central Division								
Navua - Tamanoa	448	**14**	287	**55**	196	**62**	931	**47**
Suva	366	**18**	270	**41**	163	**60**	799	**46**
Nausori	356	**19**	248	**48**	150	**57**	754	**52**
Eastern Division								
Lakeba	206	**26**	136	**50**	78	**59**	420	**58**
Ono-I-Lau	157	**78**	103	**54**	89	**44**	349	**49**
Northern Division								
Korowiri	251	**68**	116	**46**	73	**41**	440	**41**
Seaqaqa	269	**62**	125	**43**	63	**44**	457	**52**
Nabouwalu	300	**53**	171	**51**	98	**60**	569	**53**
Savusavu	261	**44**	196	**35**	117	**42**	494	**51**
Udu Point	276	**29**	167	**38**	116	**57**	559	**42**
Rotuma	294	**65**	296	**54**	234	**57**	824	**56**

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.