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Fiji Climate Outlook

September to November 2017 & December 2017 to February 2018

ISO 9001:2008 certified Climate Services

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1.0 HIGHLIGHTS

- The El Niño-Southern Oscillation (ENSO) remains in a neutral state, but flipped towards cooler side of neutral;
- Climate models are favouring for the ENSO-neutral conditions through the remainder of 2017, but Fiji's climate may start to resemble conditions usually experienced during a weak La La Niña towards the end of the year;
- While the SCOPIC model is not biased towards *below average*, *average* or *above average* rainfall at most places in Fiji during both September to November 2017 and December 2017 to February 2018 periods, it may begin to favour *average* rainfall in the next issue of this outlook if equatorial Pacific Ocean continues a cooling trend;
- Noting that the peak period for Dry Season in Fiji is usually from June to August, and the country now heading towards the Wet Season (beginning November 2017), rainfall deficiencies in the Western Division may start to progressively ease over the coming months;
- Air temperatures are expected to fluctuate around *normal* across the Fiji Group during both September to November 2017 and December 2017 to February 2018 periods;
- Sea surface temperature in the Fiji region is likely to be *near normal* during the September to November 2017 period.

2.0 RAINFALL & TEMPERATURE OUTLOOK

SEPTEMBER TO NOVEMBER 2017 RAINFALL OUTLOOK

The SCOPIC model favours almost equal chances of *below average, average* and *above average* rainfall over most parts of Fiji through the September to November 2017 period. However, if the cool anomalies in the equatorial Pacific Ocean continues to persist through this month, then the SCOPIC model may start to favour *average* rainfall with the next issue of this outlook. The global climate models are already favouring *average* or *above average* rainfall in the Fiji region through the September to November 2017 period. Noting that the peak period for Dry Season in Fiji is usually from June to August, and the country now heading towards the Wet Season (beginning November 2017), rainfall deficiencies in the Western Division may start to progressively ease over the coming months.

The SCOPIC model rainfall predictions are as follows (Table 1):

Western Division : ***Average*** or ***below average*** (Confidence - *good* to *high*)
Central Division : Equal chances of ***below average, average*** and ***above average*** (Confidence - *good*)
Northern Division : ***Average*** (Confidence - *moderate* to *very high*)
Eastern Division : Equal chances of ***below average, average*** and ***above average*** (Confidence - *good* to *high*)
Rotuma : Equal chances of ***below average, average*** and ***above average*** (Confidence - *very low*)

Global Rainfall Models (e.g. ECMWF, NSIPP, IRI, NCEP, etc.):
The global climate models favour *average* or *above average* rainfall in the Fiji region during the September to November 2017 period (Figures 3a & 3b: two of the several global climate models that the Fiji Meteorological Service uses).

DECEMBER 2017 TO FEBRUARY 2018 RAINFALL OUTLOOK

The SCOPIC model rainfall predictions are as follows (Table 2):

Western Division : ***Average*** or ***below average*** (Confidence - *good* to *high*)
Central Division : Equal chances of ***below average, average*** and ***above average*** (Confidence - *very low* to *low*)
Northern Division : ***Average*** or ***below average*** (Confidence - *moderate* to *high*)
Eastern Division : Equal chances of ***below average, average*** and ***above average*** (Confidence - *moderate*)
Rotuma : ***Average*** or ***below average*** (Confidence - *high*)

TEMPERATURE OUTLOOK:

The maximum and minimum temperatures are favoured to fluctuate around *normal* during both September to November 2017 and December 2017 to February 2018 periods (Tables 3 & 4). The sea surface temperature in the Fiji region is favoured to be *near normal* during the September to November 2017 period (Figures 2a & 2b: two of the several global climate models that Fiji Meteorological Service uses).

The X LEPS % scores, which are used to categorize the confidence of the outlook are as follows:
Very Low: $X < 0.0$ ***Low***: $0 \leq X < 5$ ***Moderate***: $5 \leq X < 10$ ***Good***: $10 \leq X < 15$
High: $15 \leq X < 25$ ***Very High***: $25 \leq X < 35$ ***Exceptional***: $X \geq 35$

*Prior to July 2006, the Fiji Islands Climate Outlook was incorporated in the Fiji Islands Weather Summary

3.0 EL NIÑO SOUTHERN OSCILLATION (ENSO) CONDITIONS

Current El Niño Southern Oscillation (ENSO) Status

During August 2017, above normal sea surface temperatures (SSTs), which were persisting since April 2017, dissipated across the central and eastern Pacific Ocean. The SSTs are currently normal to slightly below normal in the equatorial Pacific Ocean. The waters below the surface of the equatorial Pacific Ocean further cooled during the past month, with cool anomalies presently evident in the central and eastern regions from surface to the depth of 200m.

The Southern Oscillation Index for August 2017 was +3.3, with the 5 month running mean of –1.0 (Figure 1). Sustained positive values of SOI above +7 indicates presence of La Niña conditions. The Trade winds were near normal over most of the equatorial Pacific Ocean during the past month, with the cloud patterns fluctuating around average.

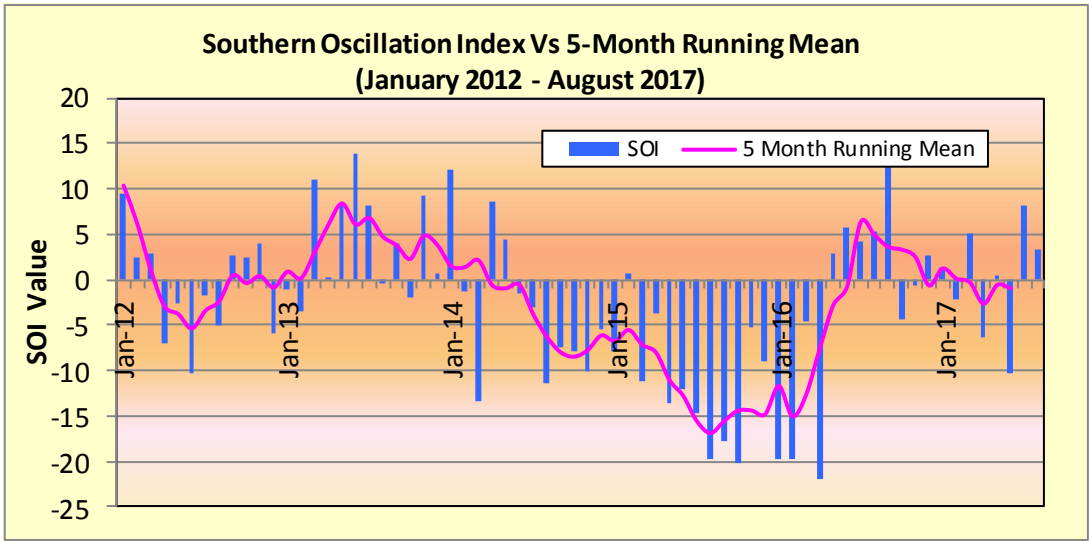
Collectively, the ocean and atmosphere are reflecting continuation of neutral conditions, but now flipped towards cooler side of neutral conditions.

El Niño Southern Oscillation Prediction

Most of the climate models currently favour ENSO-neutral conditions to persist at least until late 2017. Close to 80% of the models are predicting such conditions. However, the central tropical Pacific Ocean may further cool in the coming months. If this happens, then Fiji might have some weak La Niña like effects over the coming wet season.

Fiji typically experiences enhanced rainfall during a La Niña event. This increases the incidences of flooding, especially during the Wet Season from November to April.

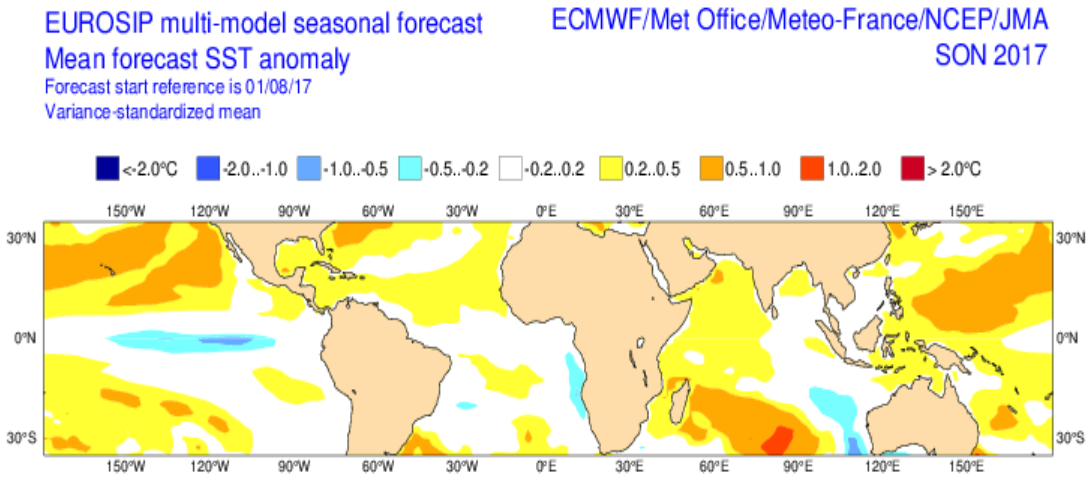
Figure 1: Southern Oscillation Index (SOI) Graph



SOI (in bars) and 5 month running mean (continuous pink line)

The SOI for August was +3.3, with the 5 month running mean of –1.0. SOI values are still fluctuating within the ENSO–neutral thresholds.

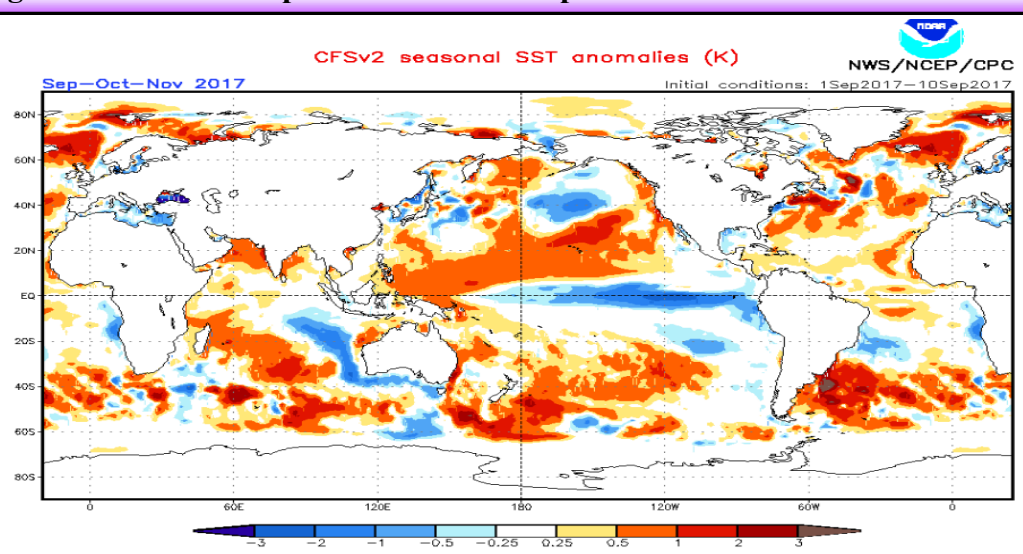
Figure 2a: ECMWF Sea Surface Temperature (SST) for September to November 2017



ECMWF Seasonal SST Forecast favours *normal* SSTs in the Fiji region.

(http://www.ecmwf.int/en/forecasts/charts/seasonal/sea-surface-temperature-public-charts-long-range-forecast)

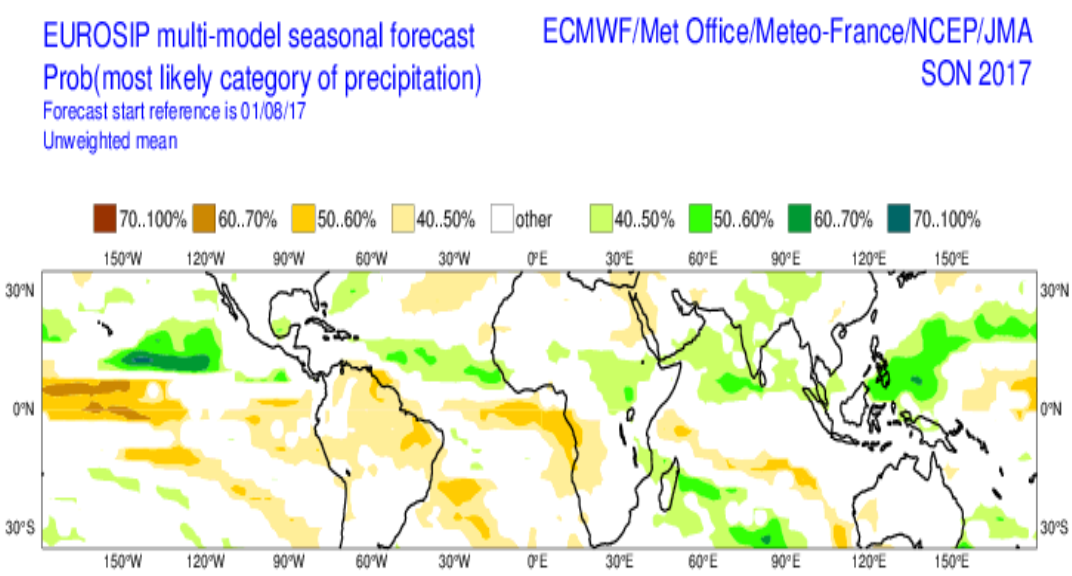
Figure 2b: NCEP Coupled Model - SST September to November 2017



NCEP Coupled Model favours near normal SSTs in the Fiji region.

(http://www.cpc.ncep.noaa.gov/products/CFSv2/imagesInd3/glbSSTSeaInd1.gif)

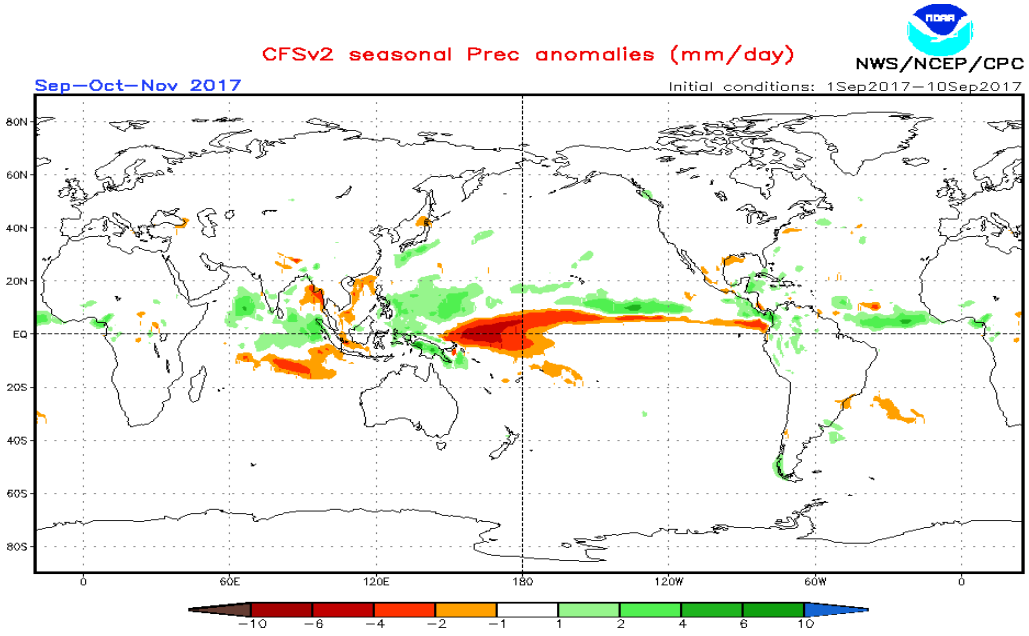
Figure 3a: ECMWF Rainfall Outlook for September to November 2017



ECMWF Seasonal Forecast favours *average* rainfall in the Fiji region.

(http://www.ecmwf.int/en/forecasts/charts/seasonal/rain-public-charts-long-range-forecast)

Figure 3b: NCEP Coupled Model - Rainfall Outlook for September to November 2017



NCEP Coupled Model forecast favours *average* rainfall in the Fiji region.

(http://www.cpc.ncep.noaa.gov/products/CFSv2/imagesInd3/glbPrecSeaInd1.gif)

Table 1: Three Months: September to November 2017 Rainfall Outlook

Station (Locations in Figure 4)	Dry	33 %	Normal	67 %	Wet
	(%)	(mm)	(%)	(mm)	(%)
Western Division					
Dobuilevu	35	364	37	544	28
Penang Mill	33	238	**38**	358	29
Yasawa-i-rara	**37**	194	**38**	352	25
Vatukoula Mine	**36**	194	**37**	352	27
Rarawai Mill	33	204	**39**	365	28
Lautoka Mill	**34**	184	**39**	325	27
Vaturu	25	330	**44**	555	31
Nadi Airport	33	239	**41**	343	26
Nabou Pine	32	193	**41**	305	27
Lomawai	**37**	192	**39**	333	24
Olosara	35	236	**40**	354	25
Nacocolevu	**34**	248	**39**	361	27
Monasavu Dam	30	870	35	1202	35
Central Division					
Navua	34	645	**39**	932	27
Lami	34	752	33	1027	33
Laucala Bay, Suva	34	460	35	754	31
Tamavua	32	624	33	1000	35
Nausori Airport	35	433	37	713	28
Koronivia	35	496	37	787	28
Naduruloulou	34	541	34	760	32
Eastern Division					
St. John's College, Levuka	27	238	**40**	442	33
Lakeba	35	266	36	393	29
Ono-i-lau	33	208	35	351	32
Matuku	34	231	37	384	29
Vunisea	34	308	37	440	29
Northern Division					
Nabouwalu	**36**	**352**	**37**	541	27
Dreketi	29	238	38	380	33
Seaqaqa	32	276	38	447	30
Labasa Airfield	31	259	**40**	379	29
Savusavu Airfield	30	369	**41**	502	29
Wainigata	35	421	37	582	28
Udu Point	34	365	35	562	31
Matei Airfield	33	470	35	683	32
Rotuma	35	723	30	946	35

The FMS uses the Seasonal Climate Outlook for Pacific Island Countries (SCOPIC) Model as its main guidance for predicting climate on a three to six month timescale. SCOPIC bases its calculations on there being a correlation between sea surface temperatures and rainfall/air temperatures. For some parts of Fiji e.g. the middle of the Dry Zone, this link is very strong. For others e.g. Suva, the link is not as strong, but it is still a useful indicator.

When calculating rainfall for example for the upcoming three month period (e.g. February to April 2015), SCOPIC uses measurements from the current three month period (in this case November to December 2014) to look for similar ocean patterns in the historical record. The rainfall for the following three month period are then used to calculate the probabilities for the outlook period.

Table 2: Three-months: December 2017 to February 2018 Rainfall Outlook

Station (Locations in Figure 4)	Dry	33 %	Normal	67 %	Wet
	(%)	(mm)	(%)	(mm)	(%)
Western Division					
Dobuilevu	36	831	36	1156	28
Penang Mill	36	784	38	1071	26
Yasawa-i-rara	37	491	42	779	21
Vatukoula Mine	36	788	39	1223	25
Rarawai Mill	33	765	39	1134	28
Lautoka Mill	34	610	40	925	26
Vaturu	32	1053	36	1387	32
Nadi Airport	35	653	38	908	27
Nabou Pine	32	580	39	821	29
Lomawai	36	461	37	826	27
Olosara	33	457	40	669	27
Nacocolevu	35	580	39	803	26
Monasavu Dam	37	1550	34	1968	29
Central Division					
Tokotoko, Navua	34	886	34	1140	32
Lami	34	932	33	1193	33
Laucala Bay, Suva	35	783	34	1027	31
Tamavua	32	853	34	1109	35
Nausori Airport	34	786	34	1005	33
Koronivia	34	832	33	1031	33
Naduruloulou	33	853	34	1119	33
Eastern Division					
St. John's College, Levuka	33	554	34	972	33
Lakeba	35	571	41	757	24
Ono-i-lau	34	439	35	591	31
Matuku	30	461	37	655	33
Vunisea	34	498	33	724	33
Northern Division					
Nabouwalu	37	785	39	1030	24
Dreketi	29	823	40	1115	31
Seaqaqa	34	874	38	1207	28
Labasa Airfield	33	798	41	1127	26
Savusavu Airfield	35	573	36	849	29
Wainigata	34	743	33	997	33
Udu Point	34	733	35	1011	31
Matei Airfield	34	801	35	1008	31
Rotuma	36	901	38	1099	26

Table 3: Maximum and Minimum Air Temperature Outlook - September to November 2017

Station	Maximum Air Temperature			Minimum Air Temperature		
	Cool (%)	Normal (°C)	Warm (%)	Cool (%)	Normal (°C)	Warm (%)
Selected Sites						
Laucala Bay, Suva	53	27.9	47	52	21.9	48
Nadi Airport	53	30.0	47	52	20.6	48
Labasa Airport	51	30.8	49	50	20.2	50
Nabouwalu	53	27.8	47	52	22.7	48
Vunisea	53	27.1	47	54	21.0	46
Lakeba	55	27.9	45	53	22.2	47
Rotuma	49	29.8	51	47	24.3	53

Table 4: Maximum and Minimum Air Temperature Outlook - December 2017 to February 2018

Station	Maximum Air Temperature			Minimum Air Temperature		
	Cool (%)	Normal (°C)	Warm (%)	Cool (%)	Normal (°C)	Warm (%)
Selected Sites						
Laucala Bay, Suva	49	30.6	51	46	23.6	54
Nadi Airport	42	31.4	58	48	22.7	52
Labasa Airport	47	31.8	53	50	22.2	50
Nabouwalu	51	30.0	49	47	24.2	53
Vunisea	51	29.7	49	48	23.5	52
Lakeba	50	30.1	50	47	23.9	53
Rotuma	41	30.6	59	37	24.7	64

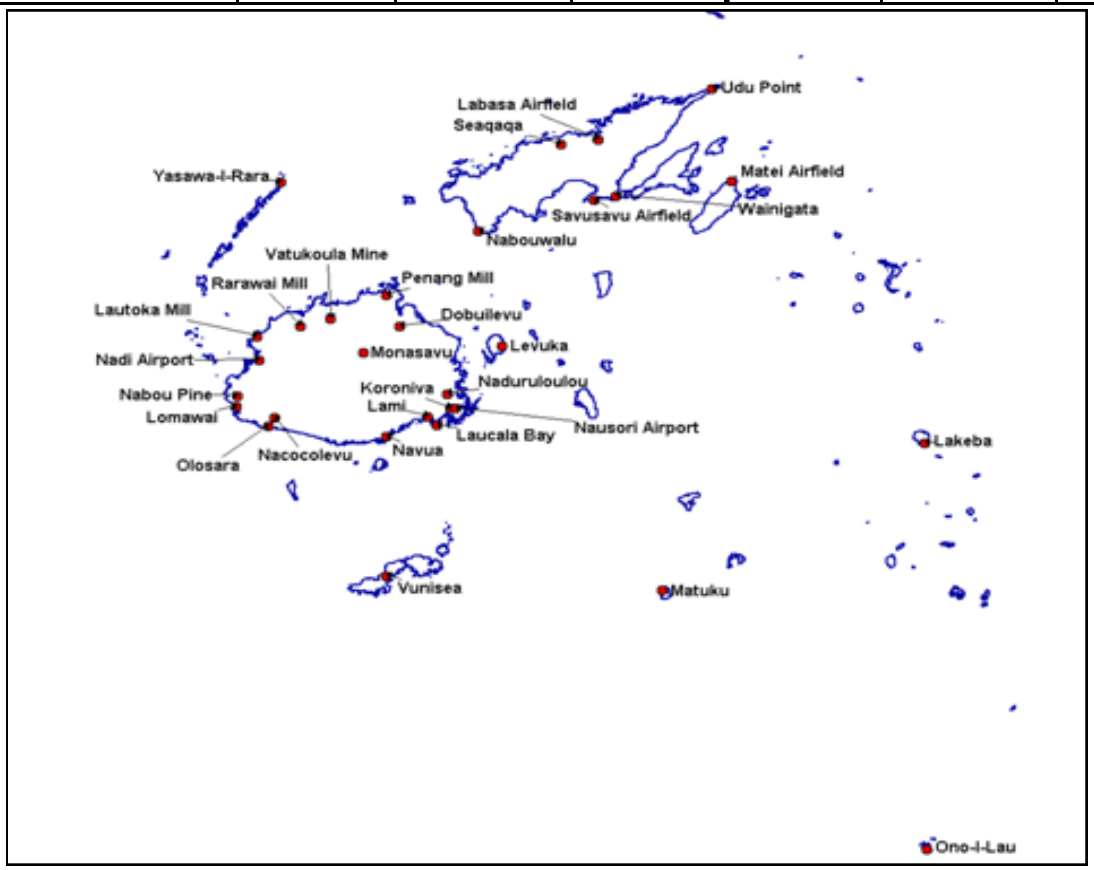


Figure 4. Location of climate monitoring stations in Fiji.