Climate Services Division

ENSO Update

A weak El Niño likely to develop in the later part of 2018

ISO 9001:2015 certified Climate Services

Volume 11 : Issue 06
November 26, 2018

Fiji Meteorological Service

Content
In Brief

History and Current Situation

ENSO Outlook

Observations of Climate Anomalies

Rainfall & Temperature Outlook

Explanatory Note:

In Brief

- *El Niño Southern Oscillation (ENSO) is presently in a neutral state (neither El Niño nor La Niña);*
- *However, atmospheric and oceanic indicators are still showing signs of a developing El Niño with more than 90% chance to establish towards the end of 2018;*
- *The anticipated El Niño event is expected to be a weak one;*
- *Rainfall is likely to be below average or average through the November 2018 to January 2019 period;*
- *The anticipated El Niño event can delay the onset of the Wet Season, which normally begins in November;*
- *The Tropical Cyclone season has begun on 1st November 2018 and it will end on 30th April, 2019.*

History and Current Situation

The tropical Pacific reached weak La Niña state in November 2017. The event peaked as a weak event in January 2018 and officially ended in March 2018, with a return to ENSO neutral conditions. Since then, equatorial Pacific Ocean has gradually warmed, but not warm enough to surpass El Niño threshold. Atmospheric and oceanic indicators are still currently being closely monitored.

Current Situation

The sea surface temperatures are warmer than average along virtually all of the equator in the Pacific Ocean, across much of the tropics, to the north of the equator, and much of the western Pacific, both north and south of the equator. SSTs within both the NINO3 and NINO3.4 region (170°W - 90°W: regions usually monitored for ENSO development) have been above El Niño thresholds since the second half of last month. Warm anomalies in the sub– surface have increased significantly in October, compared to the preceding months. Large pool of warmer than average water extends across the sub-surface of the equatorial Pacific, with the areas between 150°E– 100°W, being more than 3.0°C warmer than average.

SOI currently remains within neutral-ENSO range, trade winds is currently close to average across the tropical Pacific, while the cloudiness near the Date Line was mostly above average during the last fortnight, which indicates that the coupling of the atmosphere and oceanic indicators is yet to occur. Decreased cloudiness near the Date Line is typical during La Niña, with broader pattern across the tropical Pacific is consistent with neutral-ENSO conditions.

ENSO Outlook

All of the surveyed global climate models run by the Bureau of Meteorology (Australia) currently favour the sea surface temperatures across the central tropical Pacific Ocean will be above the El Niño thresholds around December and continue to exceed El Niño thresholds until January. Thereafter, several models indicate a gradual cooling trend will occur, while others maintain values consistent with El Niño until at least mid March to May 2019. All models predict central equatorial Pacific SSTs will be warmer than usual until at least April 2019.

Historically, Fiji normally experiences drier than average condition during an El Niño event. While it can continue to affect Fiji's climate during the Wet Season from November to April, its impact is most greatly felt during the Dry Season in the following year. The other centres, such as the International Research Institute for Climate and Society (Columbia University), for its November 2018 to January 2019 outlook, there is now 95% chances of El Niño event to be established. However, the event is likely to be a weak one, if it develops. Moreover, Bureau of Meteorology (Australia) outlook suggests El Niño conditions are likely to be developed during December 2018 to February 2019.

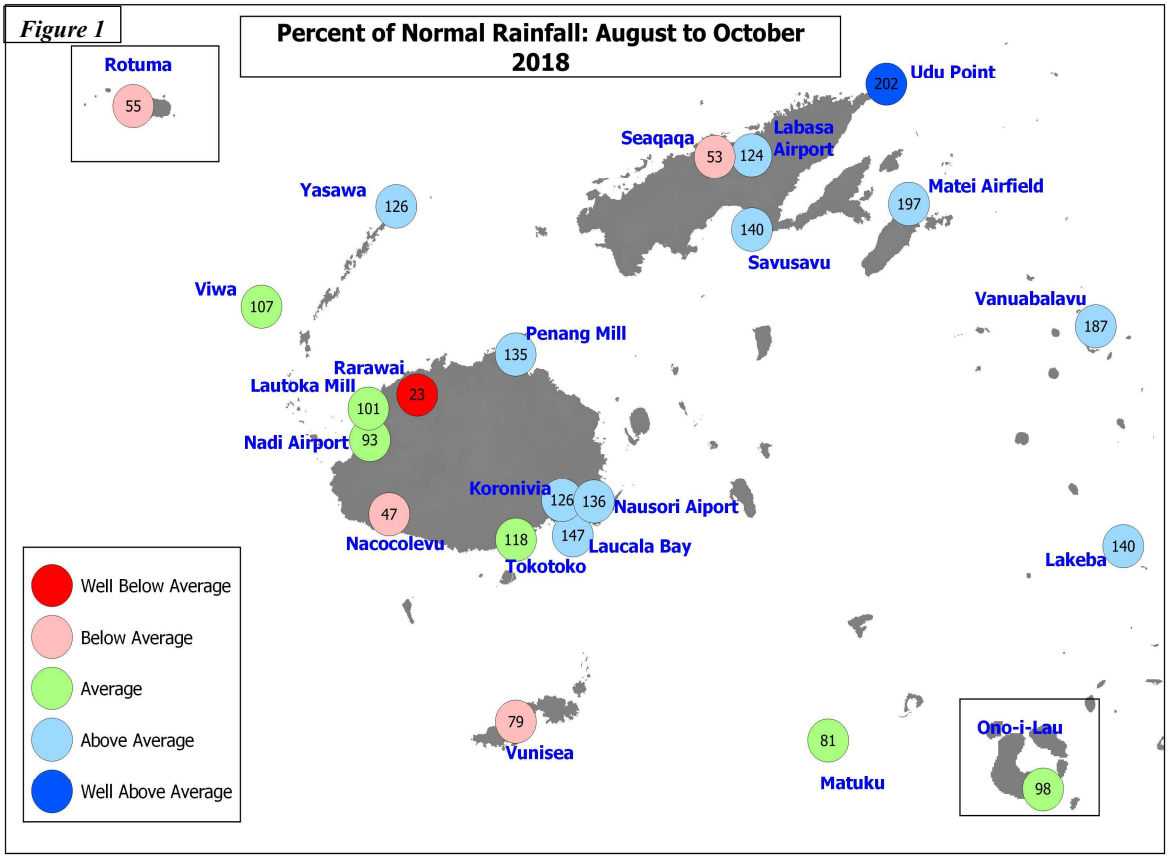
Observations of Previous Three Months: August to October 2018

The month of August began with a weak trough of low pressure just to the south of the group which brought brief showers over the southern and eastern parts of the country which affected till the 3rd. It was a significantly dry month with *well below average* rainfall recorded at 24 out of the 25 climate monitoring stations. Rotuma recorded *below average* rainfall. Notably, Lautoka Mill to Yaqara corridor and as well as Labasa Airport recorded no rainfall at all during the month.

The climate during September 2018 varied across the country, with 6 out of the 24 rainfall monitoring stations registering *well below average* rainfall, 6 *below average*, 5 *average* and 7 *above average*. In general, rainfall activity picked up during the month after significantly dry July and August. The most significant rainfall of the month was registered at Laucala Bay on the 25th with 156mm of rainfall, which resulted in flash flooding in parts of Suva.

October began with a south– easterly wind flow over the Fiji Group, with a trough of low pressure over Rotuma. Troughs of low pressure systems dominated during the month, contributing immensely to the mostly *average* to *well above average* rainfall observed across the country during October. Wetter than normal conditions were experienced at majority of the sites after being considerably dry, from the 2nd half of June 2018. Rainfall activity substantially picked up during the month of October with 10 stations recorded more than twice the *normal* rainfall and another 6 received more than thrice the *normal* rainfall this month.

Figure 1



Rainfall and Temperature Outlook

The SCOPIC model, the rainfall prediction model of FMS, favours *average* or *below average* rainfall during the November 2018 to January 2019 period. Apart from the Central Division, confidences in the SCOPIC predictions at this time of the year ranges from *moderate* to *very high*. The global climate models favour *average* rainfall in the Fiji region during the same period.

Rainfall activity is expected to pick up as the country progresses towards the peak Wet/Tropical Cyclone Season (January to March 2019).

The air temperatures are likely to *above normal* during the November 2018 to January 2019 period. The sea surface temperature in the Fiji region is expected to be *normal* during the November 2018 to January 2019 period.

Table 1: Rainfall Distribution for June to August 2018

	August 2018 Rainfall (mm)	September 2018 Rainfall (mm)	October 2018 Rainfall (mm)	August - October 2018 Total Rainfall (mm)
Nadi Airport	5.5	42.2	173.1	220.8
Nacocolevu, Nadroga	19.1	44.4	195.7	259.2
Lautoka Mill	0.0	25.5	220.8	246.3
Viwa	0.5	28.7	171.1	200.3
Yasawa-i-Rara	6.3	12.8	265.0	284.1
Rarawai Mill, Ba	0.0	17.3	187.4	204.7
Penang Mill	5.7	35.2	341.2	382.1
Monasavu	21.1	281.1	1200.5	1502.7
Nabouwalu	3.0	Missing	632.4	Missing
Seaqaqa	5.0	145.0	267.0	417.0
Labasa Airfield	0.0	49.7	252.7	302.4
Udu Point	14.7	170.9	546.1	731.7
Savusavu Airport	12.4	117.3	457.9	587.6
Matei, Taveuni	9.0	228.2	717.2	954.4
Tokotoko, Navua	47.6	287.5	503.6	838.7
Koronivia	30.0	146.3	524.1	700.4
Laucala Bay, Suva	13.2	262.6	541.9	817.7
Nausori Airport	34.4	113.9	542.0	690.3
Lakeba	6.9	188.5	259.7	455.1
Ono-i-Lau	40.5	195.0	71.0	306.5
Matuku	20.6	25.0	213.1	258.7
Vunisea	35.6	159.8	126.2	321.6
Rotuma	172.0	98.3	175.8	446.1

Explanatory Note - El Niño and La Niña

ENSO is an irregular cycle of persistent warming and cooling of SSTs in the tropical Pacific Ocean. The warm extreme is known as El Niño and cold extreme, La Niña.

The term El Niño was given to a warming of the ocean near the Peruvian coast in South America that appears around Christmas. Scientists now refer to an El Niño event as sustained warming over a large part of central and eastern equatorial Pacific Ocean. This warming is usually accompanied by persistent negative values of Southern Oscillation Index (SOI), a decrease in the strength or reversal of the trade winds, increase in cloudiness near Dateline in the equatorial Pacific and a reduction in rainfall over most of Fiji (not immediate effect as there is a lag period) which can, especially during moderate to strong events, lead to drought.

La Niña is a sustained cooling of the central and eastern equatorial Pacific Ocean. The cooling is usually accompanied by persistent positive values of SOI, an increase in strength of the equatorial trade winds, decrease in cloudiness near the Dateline in the equatorial Pacific and higher than average rainfall for most of Fiji (not immediate effects as there is a lag period), with frequent and sometimes severe flooding, especially during the wet season (November to April).

Table 2: Meteorological Drought Status as at end of October 2018

Timescale	Sites currently under Meteorological Drought	Sites currently under Meteorological Drought Warning Status	Sites currently under Meteorological Drought Watch
3-month	Nausori Airport, Koronivia, Laucala Bay, Nacocolevu, Nadi Airport, Lautoka Mill, Rarawai Mill, Tavua, Penang Mill, Viwa, Yasawa-i-Rara, Monasavu, Labasa Airport, Seaqaqa, Savusavu Airfield, Matei Airfield, Lakeba and Rotuma	Vanuabalavu and Vunisea	Navua, Udu point, Matuku and Ono-i-Lau
6-month	Matei Airfield, Savusavu Airfield and Rotuma	-	Nausori airport, Navua and Monasavu
12-month	Matei Airfield and Savusavu Airfield	-	Rotuma

Background Information on Drought Monitor

FMS currently uses the Standardized Precipitation Index (SPI) for monitoring monthly rainfall variability in Fiji. The selection of the SPI method follows extensive research into its suitability for Fiji conditions in comparison with other notable indices by both the Fiji Meteorological Service and Australian Bureau of Meteorology (via the AusAID Pacific Islands Climate Prediction Project). The SPI was developed in 1993 at the Colorado State University in the United States of America to be a relatively simple, year-round index, applicable to the water supply conditions in the United States. Since then, it has become the most widely used index for operational drought monitoring.

The SPI is widely accepted because of its special characteristic of being able to be normalized to a location and in time. Rainfall data needs to be normalized, as statistically, rainfall is not normally distributed. Rainfall is zero bounded and no rainfall days outnumber rainfall days. Fiji's rainfall is also positively skewed. This standardization technique allows the SPI to determine the rarity of a current drought event, as well as the probability of the rainfall necessary to end the current drought. It allows the SPI to be computed at any location and at any number of time scales, depending on the impacts of interest to the user. Because SPI values fit a typical normal distribution, one can expect these values to be within one standard deviation approximately 68% of the time, within two standard deviations 95% of the time and within three standard deviations 99% of the time. A related interpretation would be that moderate drought occurs 16 times in 100 years, severe drought occurs two or three times in 100 years, and extreme drought occurs once in approximately 200 years. The fundamental strength of the SPI is that it can be calculated for a variety of time scales. This versatility allows the SPI to monitor short-term water supplies, such as soil moisture, important for agricultural production, and longer-term water resources such as groundwater supplies, stream flow and reservoir storage.

Drought status for 25 sites are provided in Table 2. FMS monitors rainfall deficiencies (drought status) at three time-scales that are indicators of meteorological and as well as applied to agricultural and hydrological drought conditions:

- *3-months – most shallow rooted agricultural crops, small streams and small water tanks;*
- *6-months – most deep rooted agricultural crops, fruit trees, small rivers and reservoirs; and*
- *12-months – medium to large rivers, medium to large reservoirs, shallow wells, dam storages.*

For more information, contact:
Fiji Meteorological Service, Private Mail Bag NAP0351, Nadi Airport, Fiji. Phone : 6724888, Fax : 6724050. Visit website at http:/www.met.gov.fj for other products and services. Email: climate@met.gov.fj or fms@met.gov.fj.
All correspondences must be addressed to the Director of Meteorology.