Climate Services Division

ENSO Update

El Niño conditions favoured to develop

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Fiji Meteorological Service

Content

In Brief

- *ENSO-neutral conditions are currently in place, that is, neither El Niño nor La Niña;*
- *ENSO–neutral conditions are expected to continue over the next couple of months, but there is an increasing chance of an El Niño developing towards the end of 2017;*
- *Average or below average rainfall is expected over most places through the May to July 2017 period;*
- *Normal to below normal daytime and night-time air temperatures are anticipated through the May to July 2017 period;*
- *Sea surface temperatures in the Fiji region are favoured to be around normal for the coming three months;*
- *The official tropical cyclone season ended on April 30th, however, two off-season tropical cyclones traversed the Southwest Pacific during May 2017. Thus, all communities should remain alert, updated with latest weather forecasts and take appropriate precautionary measures when alerts and warnings are issued.*

History and Current Situation

History

Following the dissipation of the 2015-16 strong El Niño event in around May 2016, oceanic conditions reached weak La Niña state around August 2016. However, some of the overlying atmospheric indicators did not fully couple to reinforce this oceanic change. Thus, a La Niña event was not declared. From the beginning of 2017, the sea surface temperatures gradually warmed in the equatorial Pacific Ocean, with record warmth in the far eastern Pacific Ocean, near the coast of Peru, experienced around February and March, prompting some scientists to call it a coastal El Niño. These warm anomalies have now weakened.

Current Situation

The sea surface temperatures are leaning towards El Niño like conditions in the central and eastern equatorial Pacific Ocean, but remain within the neutral range. The sea waters below the surface of the equatorial Pacific Ocean are now warmer than average at this time of the year.

The atmospheric indicators of ENSO are mixed with rainfall and cloud patterns in the equatorial Pacific Ocean still reflective of La Niña like pattern. However, other atmospheric indicators are close to normal. The Trade winds are close to average across the equatorial Pacific. While the Southern Oscillation Index (SOI) is in the neutral range, it is hovering on the negative side since April 2017. The latest 30-day average SOI to May 20th was -3.8.

Overall, the tropical Pacific is currently in a ENSO-neutral state (neither El Niño nor La Niña).

ENSO Outlook

El Niño like conditions are slightly favoured over the ENSO-neutral conditions during the second half of 2017. Models and expert opinion suggest that the chances for El Niño is in the range of 50-60%. However, it must be noted that this outlook overlaps the ENSO transition months during which most ENSO predicting models have their lowest forecast accuracy. Chances of La Niña developing for the rest of 2017 is very low.

The Australian Bureau of Meteorology's ENSO Outlook is at El Niño watch, meaning there is around 50% chance that El Niño may develop in the coming months. The outlook from Climate Prediction Centre/International Research Institute from USA favours equal likelihood of ENSO-neutral and El Niño in the second half of 2017.

Observations of Previous Three Months

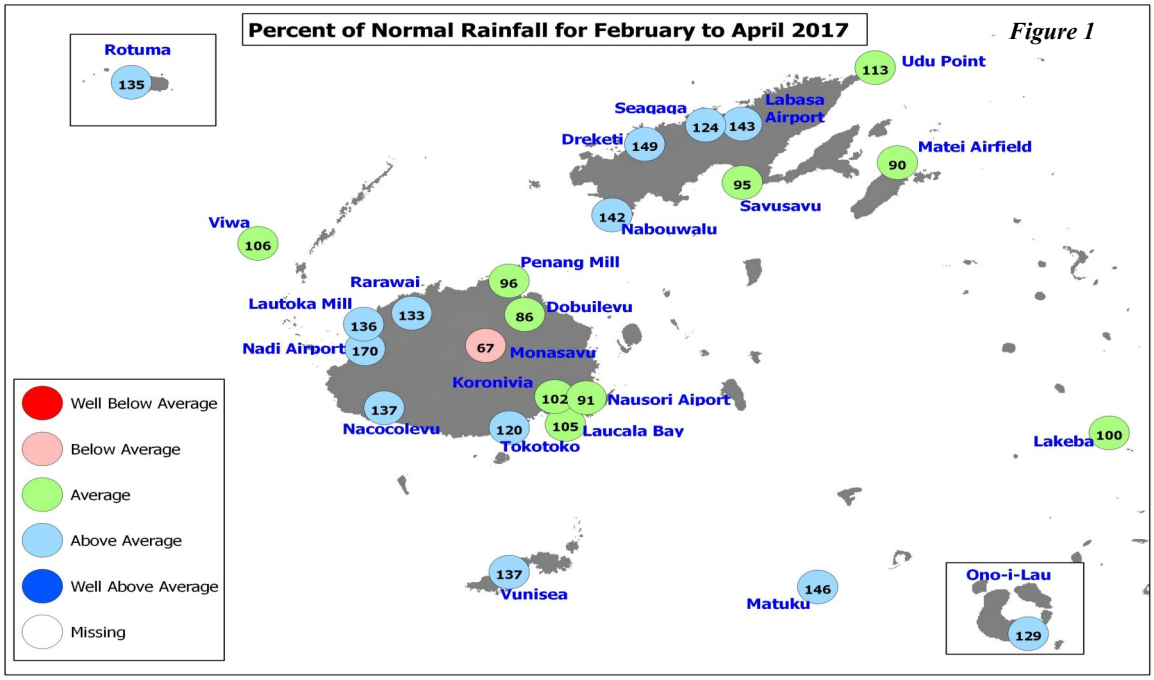
The previous three months have been dominated by an active South Pacific Convergence Zone (SPCZ), tropical disturbances/ depressions, troughs of low pressure systems, easterly trade winds and ridge of high pressure systems. The accumulated rainfall over the past three months (February to April 2017) was generally *average* to *above average* over majority of the country. Out of the 24 rainfall monitoring sites, 13 registered *above average* rainfall, 10 *average*, while Monasavu was the only station to record *below average* rainfall. Consequently, majority of the places were in no major meteorological drought alert as at end of April 2017.

During February 2017, tropical depression, TD09F, resulted in very significant rainfall over the Western and Eastern Divisions. Due to this depression and other systems, some record breaking rainfall for February were established, especially in the Lau Group.

The presence of frontal systems, troughs of low pressure, ridges of high pressure and moist easterly wind flow contributed to variable weather pattern during March. These resulted in generally *average* to *above average* rainfall.

April 2017 was significantly dry month with *below average* to *well below average* rainfall received at majority of the places. Over a century old low total monthly rainfall record for April was broken at Lautoka Mill, with low total monthly rainfall records also established at Monasavu, Penang Mill and Lakeba.

While the 2016-17 official tropical cyclone ended at the and of April 2017, two off-season cyclones formed in May 2017, that is, Donna and Ella. Tropical cyclone Ella traversed through the Fiji's Exclusive Economic Zone at a maximum intensity of a Category 2 system, but without any significant effects on the land areas.



Rainfall and Temperature Outlook

The SCOPIC model (the seasonal rainfall guidance tool used by FMS) favours *average* or *below average* rainfall over most parts of the country through the May to July 2017 period. The confidence in the SCOPIC predictions at this time of the year are generally *low* to *moderate*. This prediction is consistent with the global climate models which also favour *average* or *below average* rainfall in the Fiji region through the same period.

The country is now into its Dry Season and some parts of the country receive less than 30% of the annual average rainfall in the six months from May to October period, especially the Western Division and northern Vanua Levu. Extended dry days may be experienced in parts of the country as we progress through the season. The peak months for the dry conditions are usually from June to August, but it could extend if an El Niño conditions does establish.

The air temperatures, both maximum and minimum temperatures are favoured to fluctuate around *normal* to *below normal* through both the May to July and August to October 2017 periods. The sea surface temperatures in the Fiji region is favoured to be near *normal* through the May to July 2017 period.

Table 1: Rainfall Distribution for February to April2017

Stations	February 2017 Rainfall (mm)	March 2017 Rainfall (mm)	April 2017 Rainfall (mm)	February to April 2017 Total Rainfall (mm)
Nadi Airport	786.6	509.8	48.7	1345.1
Laucala Bay, Suva	351.3	383.0	317.9	1052.2
Nacocolevu, Nadroga	576.6	246.3	68.2	891.1
Udu Point	494.0	296.0	164.9	954.9
Nabouwalu	626.4	590.6	71.8	1288.8
Dreketi	736.5	425.6	69.0	1231.1
Seaqaqa	711.5	459.2	141.0	1311.7
Koronivia	486.9	374.4	215.9	1077.2
Tokotoko, Navua	562.8	623.9	187.5	1374.2
Nausori Airport	433.8	312.8	175.4	922.0
Monasavu	466.2	496.9	163.8	1126.9
Penang Mill	512.7	440.0	32.4	985.1
Rarawai Mill, Ba	716.0	430.0	76.8	1222.8
Lautoka Mill	697.0	369.8	15.2	1082.0
Dobuilevu	515.0	326.3	58.0	899.3
Viwa	410.1	285.5	63.2	758.8
Matei Airfield, Taveuni	314.7	335.9	215.8	866.4
Vunisea, Kadavu	474.0	302.6	273.9	1050.5
Lakeba	525.1	175.1	21.8	722.0
Matuku	571.2	241.3	82.8	895.3
Ono-i-Lau	590.9	143.4	44.4	778.7

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: Drought Monitor

Timescale	Sites currently under Meteorological Drought	Sites currently under Meteorological Drought Warning Status	Sites currently under Meteorological Drought Watch
3-month	-	-	Dobuilevu Lautoka Mill Savusavu Airfield
6-month	-	-	Savusavu Airfield Udu Point
12-month	-	Matei Airfield	Udu Point

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 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 24 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:
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All correspondences must be addressed to the Director of Meteorology.