



# Fiji Meteorological Service

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certified Climate Services

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## Climate Outlook for Hydro-electricity Generation from December 2023 to February 2024

### Current Conditions

#### Fiji's Climate

The weather across the country during 1<sup>st</sup> to 27<sup>th</sup> November, was dominated by a series of trough of low pressure systems and Severe Tropical Cyclone Mal. Showers and heavy falls were experienced over some parts of the country.

Overall, out of the 20 rainfall stations that reported in, in time for the compilation of this bulletin, 2 stations recorded *above average* rainfall, 5 *average*, 10 *below average*, and 3 recorded *well below average*.

At Monasavu, when comparing the total monthly rainfall against the 30-year average, *average* rainfall was received at Monasavu during November 2023.

The total monthly rainfall for Monasavu (until 29<sup>th</sup> November) was 434.8 mm, which was 108% of the *normal*. During September to 29<sup>th</sup> November, Monasavu recorded 1515mm of rainfall, which was 152% of the *normal*, while in the past 6 months (June to 29<sup>th</sup> November), 2372mm of rainfall was registered (139% of the *normal*) (Figure 1).

#### El Niño Southern Oscillation (ENSO) Status

The Pacific Ocean is now into a moderate El Niño state. The sea surface temperatures (SSTs) are warmer than average over most of the tropical and southern Pacific Ocean and are near to below average in the Western Pacific Ocean.

The Southern Oscillation Index (SOI) for October 2023 was -6.8, with the 5-month running mean of -7.4. The latest 30-day value to 26 November 2023 was -9.2.

Trade wind strength has been weaker than average over most of the equatorial Pacific. Over parts of the western equatorial Pacific, there was a reversal in the mean direction of winds from the typical easterly to a westerly. Equatorial cloudiness near the Date Line has been mostly above average since mid-September 2023.

Overall, the atmospheric and oceanic indicators are indicative of a moderate El Niño.

### El Niño-Southern Oscillation and Monasavu Climate Predictions

#### El-Niño Southern Oscillation Prediction

Climate models on average show that the current El Niño is likely to reach its peak period during the December 2023 to February 2024 period.

#### Minimum & Maximum Air Temperature Predictions - December & December to February 2024:

Minimum air temperatures are likely to be *below normal* to *above normal* across most parts of the country, while *near normal* to *above average* day time temperatures are favored during December and December to February 2024 period (Figure 3).

#### Rainfall Predictions: Fortnightly: 3<sup>rd</sup> - 16<sup>th</sup> December & 10<sup>th</sup> - 23<sup>rd</sup> December

Rainfall across Viti Levu is expected to be above median from the 3<sup>rd</sup> to the 16<sup>th</sup> of December and below median from the 10<sup>th</sup> to the 23<sup>rd</sup> of December.

#### December 2023

There is 75% chance of receiving at least 96mm of

rainfall at Nadarivatu station, 75% chance of at least 106mm of rainfall at Nadarivatu Dam and Monasavu, and 75% chance of at least 116mm of rainfall at Wailoa. There is good confidence in this forecast (Table 1).

#### December to February 2024

For the December to February 2024 period, there is 75% chance of receiving at least 586mm of rainfall at Nadarivatu station and 75% chance of at least 609mm of rainfall at Nadarivatu Dam and Monasavu, and 75% chance of receiving at least 648mm of rainfall at Wailoa. There is very high skill on the generated outlook (Table 1).

#### Summary

Considering the ongoing El Niño event, Viti Levu is expected to have drier conditions in December and from December to February 2024. However, as we are now in tropical cyclone season and the potential for more weather activity in our region, any developments near Fiji are likely to lead to *normal* to *above average* rainfall.

Figure 1

Monthly Rainfall Distribution at Monasavu until 27th November 2023

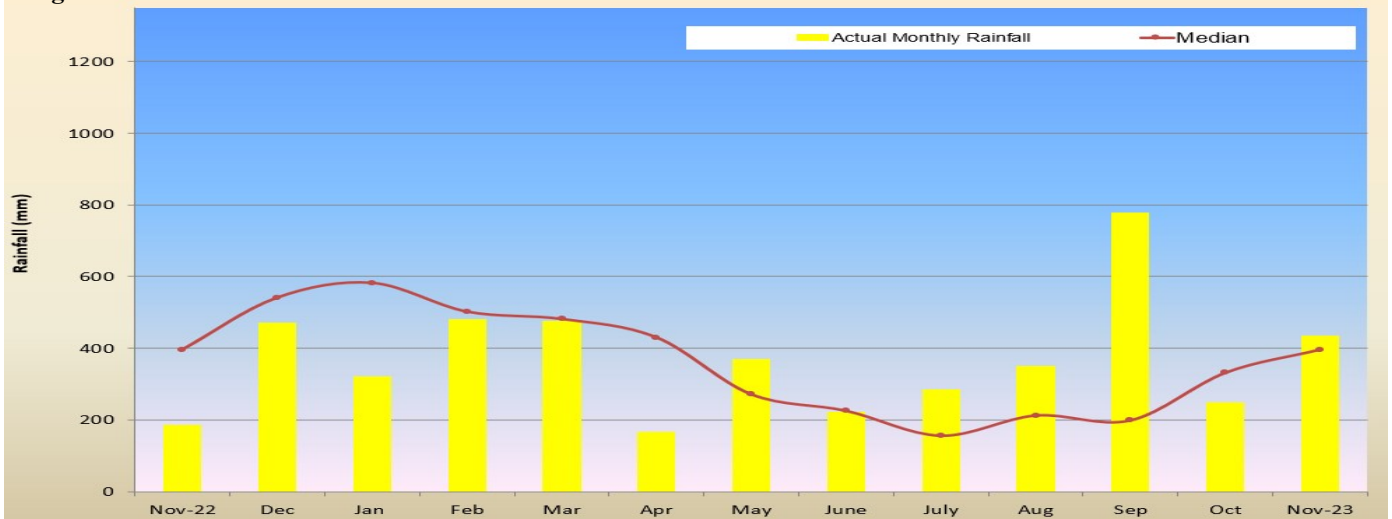
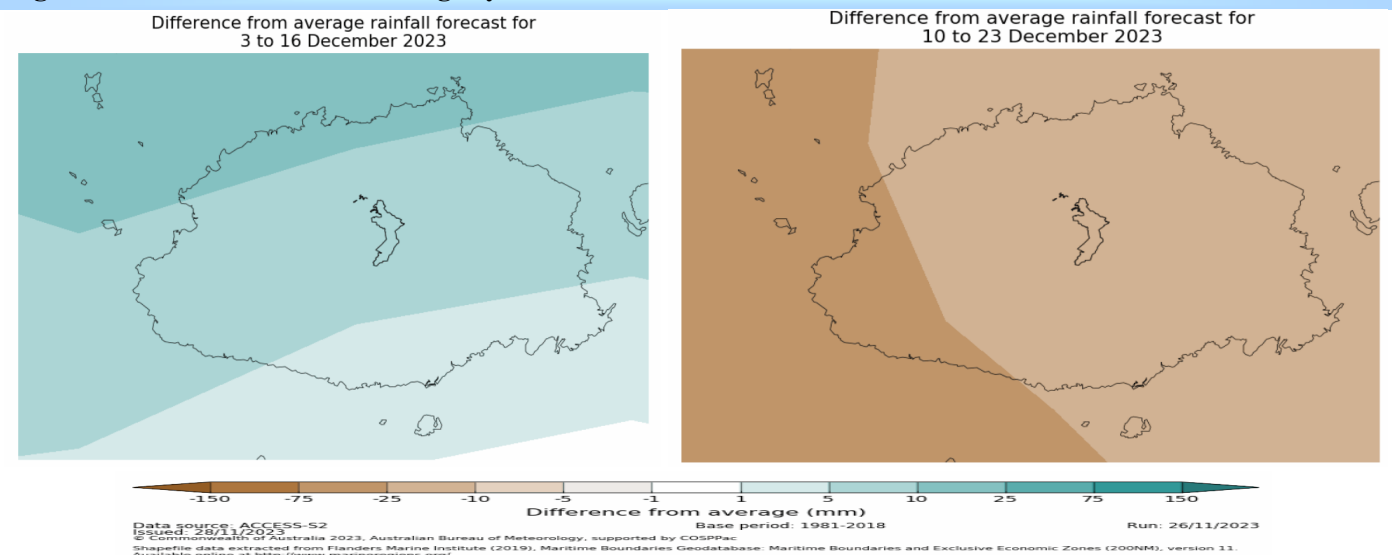


Table 1: Rainfall Outlook: December 2023 & December - February 2024

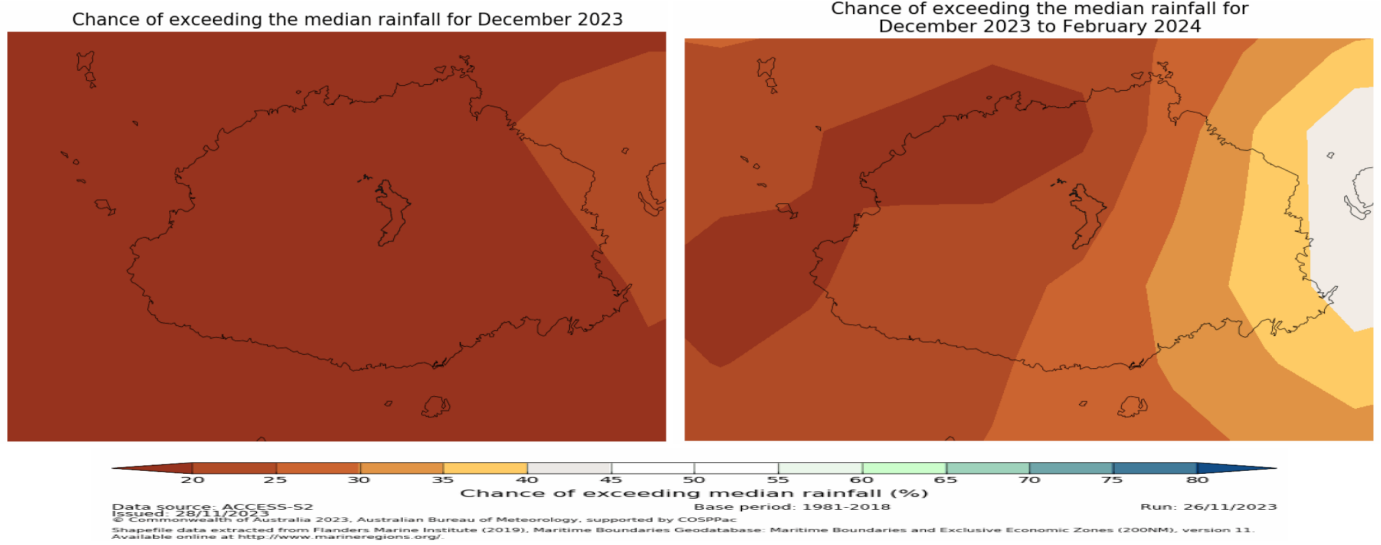
November Outlook				
	25% chance of at least (mm)	50% chance of at least (mm)	75% chance of at least (mm)	Forecast Confidence
Nadarivatu station	232	148	96	Good
Nadarivatu Dam	234	158	106	Good
Monasavu Dam	234	158	106	Good
Wailoa	237	155	116	Good
December to February	Outlook			
	25% chance of at least (mm)	50% chance of at least (mm)	75% chance of at least (mm)	Forecast Confidence
Nadarivatu station	1027	752	586	Very high
Nadarivatu Dam	1117	799	609	Very high
Monasavu Dam	1117	799	609	Very high
Wailoa	1171	901	648	Very high

The table above provides 25%, 50% and 75% chances of each station receiving the amount of rainfall mentioned above.

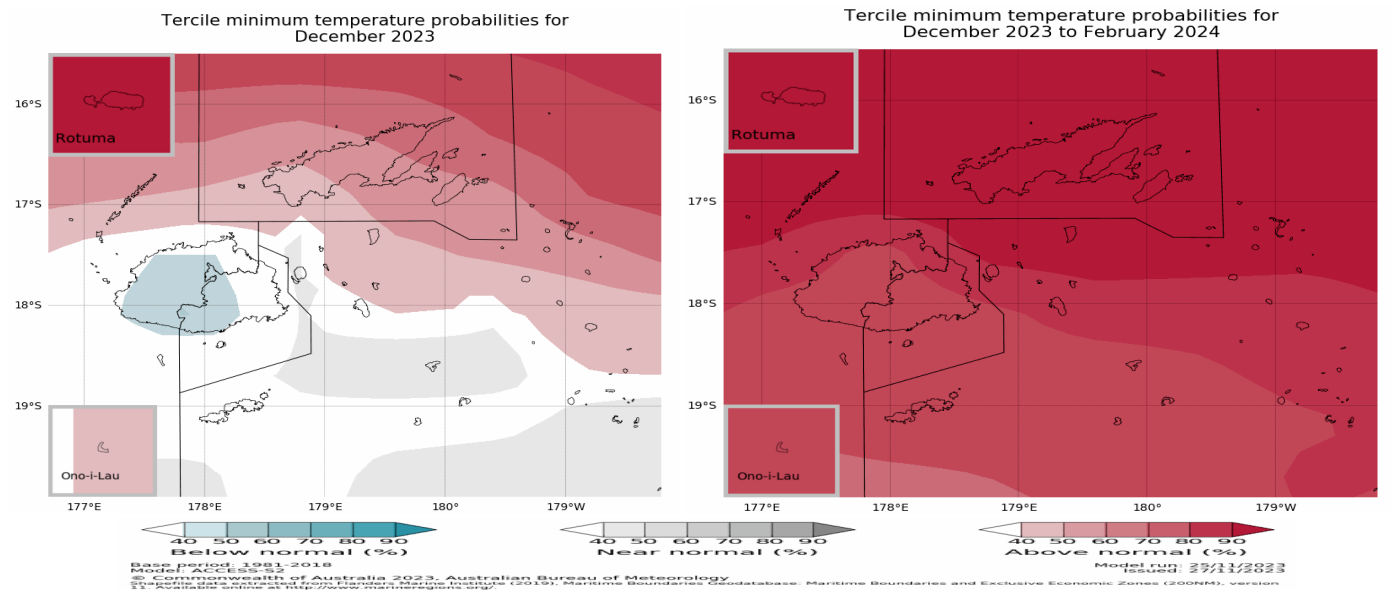
Figure 1: Rainfall Outlook: Fortnightly; 3<sup>rd</sup> - 16<sup>th</sup> December & 10<sup>th</sup> - 23<sup>rd</sup> December



**Figure 2: Rainfall Outlook: December & December to February 2024**

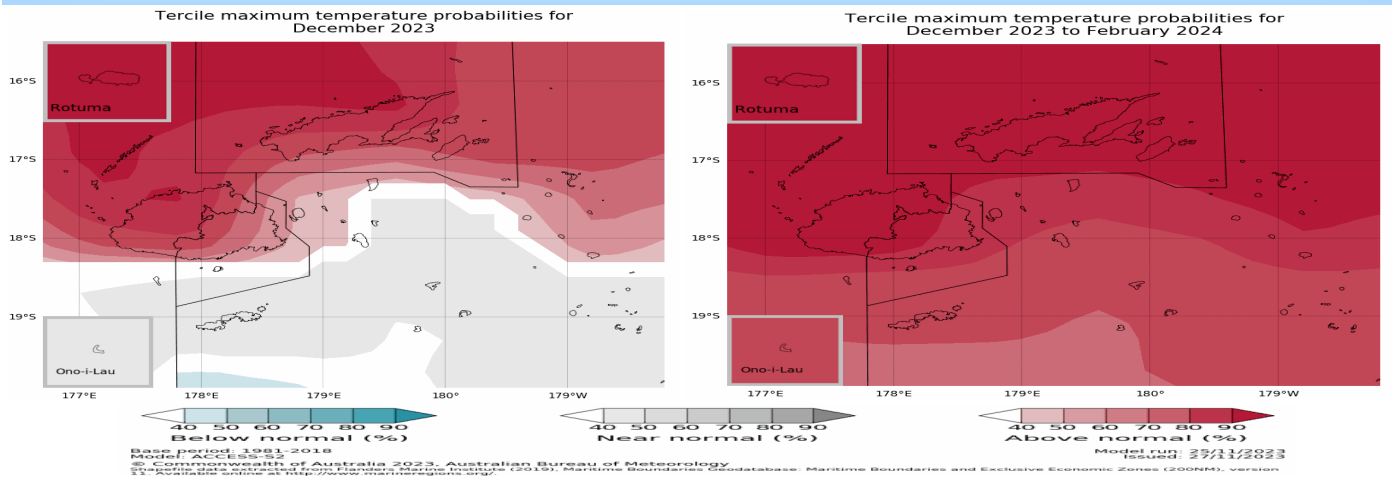


**Figure 3: Minimum Air Temperature Predictions: December & December to February 2024**



Minimum air temperatures are expected to be *below normal* to *above normal* across Viti Levu and Vanua Levu, during December and December to February 2024 period. *Source: ACCESS-S2 Model.*

**Figure 3: Maximum Air Temperature Predictions: December & December to February 2024**



Maximum air temperatures are likely to be *above normal* across Viti Levu and Vanua Levu, during December and December to February 2024 period. *Source: ACCESS-S2 Model.*

## Explanatory Notes

Climate Outlook for Hydro-electricity Generation is produced to provide advisories to Energy Fiji Limited (EFL). It aims to provide advanced warning on climate abnormalities for planning on economic generation mix and hydro-storage optimization.

### Climate (Rainfall/Air Temperature) Outlook

**Above normal** – indicates that the rainfall/temperature value lies in the highest third of observation recorded in the standard 30 year normal period.

**Near normal** – indicates that the rainfall/temperature value lies in the middle third of observation recorded in the standard 30 year normal period.

**Below normal** – indicates that the rainfall/temperature value lies in the lowest third of observation recorded in the standard 30 year normal period.

**Climatology** – means that there are equal chances of receiving below normal, normal and above normal rainfall.

**Median** – rainfall value which marks the level dividing the ranked data set in half, that is, the midpoint of the ordered (lowest to highest) monthly or yearly rainfall totals.

**Above Median** – rainfall value that lies above the median value.

**Below Median** – rainfall value that lies below the median value.

### El Niño Southern Oscillation (ENSO)

ENSO is the principal driver of the year-to-year variability of Fiji's climate. There are three phases of this phenomenon, *El Niño*, *La Niña* and *Neutral* conditions. El Niño or La Niña events are a natural part of the global climate system and usually recur after every 2 to 7 years. It normally develops around April to June, attains peak intensity between December to February and usually starts to decay around April to June period the following year. While most events last for a year, some have persisted for up to 2 years. It should be also noted that no two El Niño or La Niña events are the same. Different events have different impacts, but most exhibit some common climate characteristics.

Usually there is a lag effect on Fiji's climate with ENSO events, that is, once an El Niño or La Niña event is established in the tropical Pacific, it may take 2-6 months before its impact is seen on Fiji. Similarly, once an event finishes, it can take 2-6 months for climate to normalise.

**El Niño** events are associated with warming of the central and eastern tropical Pacific. El Niño events usually result in reduction of Fiji's rainfall. Often the whole of Fiji is affected in varying degrees and it is quite unusual for one part of the country to experience a prolonged dry spell, while the other is in a wet spell. The relationship and level of rainfall suppression is greater in the Dry Zone than in the Wet Zone. It is the suppression of rainfall during the Cool/Dry Season (May to October) that is normally of most concern. A reduction in Cool/Dry Season rainfall in the Dry Zone results in little or no rainfall until the next Wet Season. While usually the strength of an ENSO event is proportional to its impact on Fiji, at times weak event can also have a significant impact.

**La Niña** events are associated with cooling of the central and eastern tropical Pacific. Usually La Niña results in wetter than normal conditions for Fiji, occasionally leading to flooding during the Warm/Wet Season (November to April).

During *Neutral* condition, neither El Niño nor La Niña is present, it has little effect on global climate, meaning other climate influences are more likely to dominate.

**Lag effects** – means that there is a delay in a change of some aspect of climate due to influence of other factors that is acting slowly.

Climate bulletins that can be viewed together with this bulletin include:

- 1) *Fiji Climate Summary* at <https://www.met.gov.fj/index.php?page=FijiClimateSummary> (issued monthly)
- 2) *Fiji Climate Outlook* at <https://www.met.gov.fj/index.php?page=ClimateOutlook> (issued monthly)

*This information is prepared as soon as ENSO, climate and oceanographic data is received from recording stations around Fiji and Meteorological Agencies around the world. While every effort is made to verify observational data, Fiji Meteorological Service does not guarantee the accuracy and reliability of the analyses presented, and accepts no liability for any losses incurred through the use of this information and its contents. The information may be freely disseminated provided the source is acknowledged. For further clarification and expert advice, please contact the Fiji Meteorological Service HQ, Namaka, Nadi.*

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