

Fiji Meteorological Service

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In Brief

- *A weak El-Niño event continues to persist within the tropical Pacific Ocean.*
- *Sea surface temperatures are further likely to warm and remain above El Niño thresholds until at least the end of the year.*
- *The current El Niño is expected to gradually strengthen through to the December 2023 to February 2024 period.*
- *Fiji usually experiences below normal rainfall during an El Niño event.*
- *The model predictions for later part of the year at this time have lower accuracy. Thus, it is difficult to ascertain with accuracy the ENSO state for later half of the year;*
- *Fiji Met Service will continue to monitor the ENSO conditions closely and provide updates accordingly.*

History and Current Situation

History

The tropical Pacific Ocean was in an ENSO-neutral state from July until early September 2022. However, the sea surface temperatures in the central and eastern equatorial Pacific Ocean cooled during September 2022 with a clear coupling between atmospheric and oceanic indicators implying establishment of a weak La Niña event. Since then the Pacific Ocean has been consistent with a weak La Niña event. At around mid March, ENSO-neutral state was established. From March onwards, ENSO-neutral condition prevailed with some climate indicators favoring development of an El Niño event.

Current Situation

A weak El-Niño event currently persists within the tropical Pacific Ocean. The sea surface temperatures are warmer than average across most of the Pacific Ocean and are near average in the Western Pacific Ocean. Positive subsurface temperature anomalies dominate the equatorial Pacific Ocean. Weak negative subsurface temperature anomalies have emerged near the Date Line, but remain at depth greater than 150 meters.

The Southern Oscillation Index (SOI) for June 2023 was +0.2, with the 5-month running mean of -1.9. The latest 30-days average SOI until 18th July 2023 is 3.3. Trade winds were close to average over most of the tropical Pacific Ocean. Equatorial cloudiness near the Date Line has alternated between brief periods of above and below average values since late April. Overall, the atmospheric and oceanic indicators are indicative of a weak El Niño.

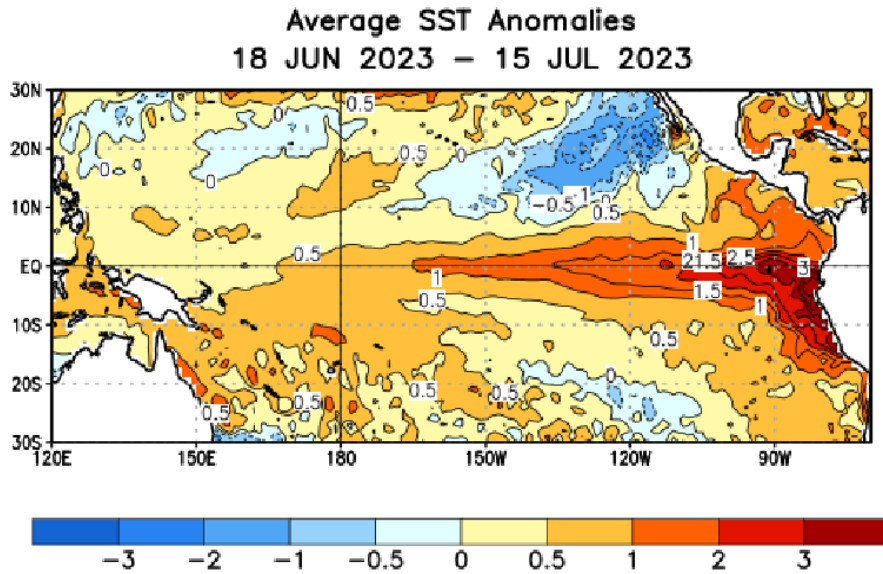
ENSO Outlook

Weak El Niño has become established in the tropical Pacific. Sea surface temperatures in central and eastern Pacific are exceeding El Niño thresholds. Sea surface temperatures are further likely to warm and remain above El Niño thresholds until at least the end of the year.

Climate models on average indicate that the current El Niño is expected to gradually strengthen through to the December 2023 to February 2024 period. The model predictions for later part of the year at this time have lower accuracy. Thus, it is difficult to ascertain with accuracy the ENSO state for later half of the year. FMS will continue to monitor the ENSO conditions closely and provide updates accordingly.

Fiji usually experiences below normal rainfall during an El Niño event.

Figure 1: Sea Surface Temperatures (SSTs) in the Pacific Ocean

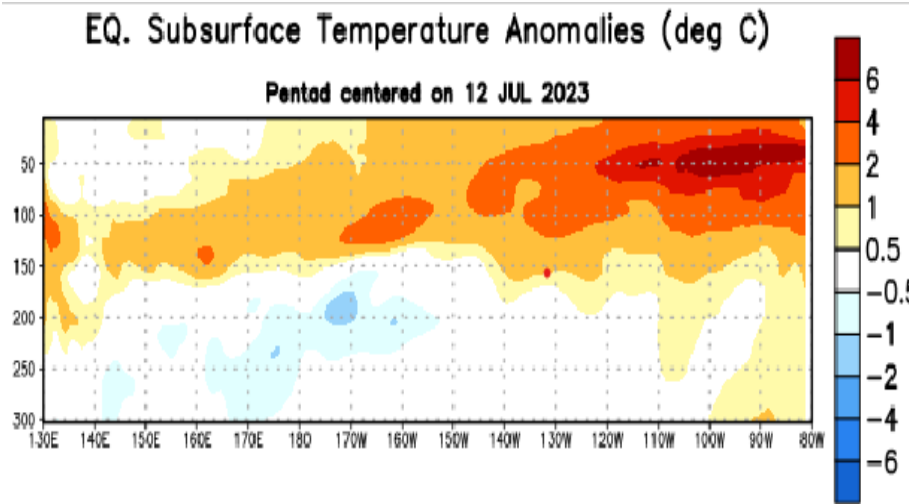


SSTs were above average across most of the Pacific Ocean and were near average in the Western Pacific Ocean.

[Sustained warm SSTs in the equatorial Pacific Ocean are associated with El Niño events and cool anomalies with La Niña events].

Image source: USA's National Oceanic and Atmospheric Administration (NOAA).

Figure 2: Sub-surface Waters in the Equatorial Pacific Ocean



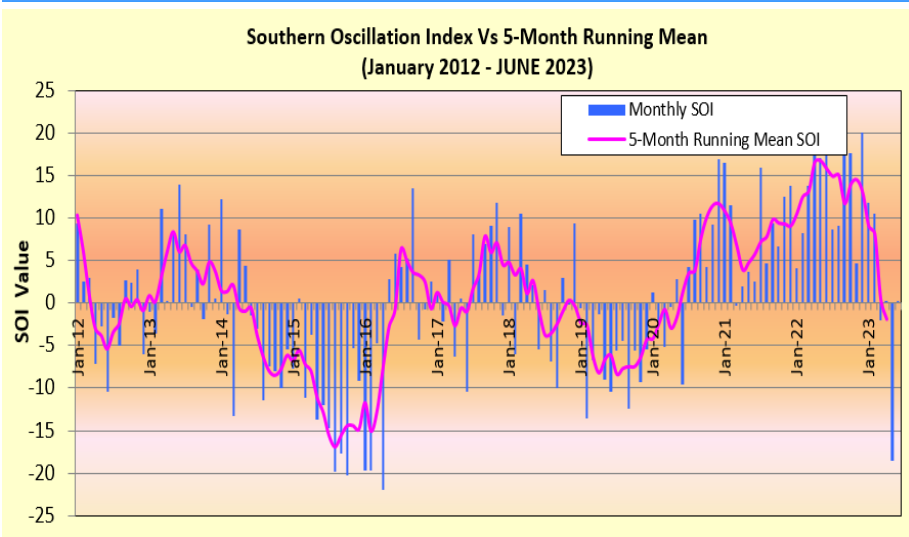
Positive subsurface temperature anomalies dominate the equatorial Pacific Ocean. Weak negative subsurface temperature anomalies have emerged near the Date Line, but remain at depth greater than 150 meters.

[Waters below the surface of the Ocean are good indicator of what may eventually happen at the surface in the coming months].

Image source: NOAA.

Most recent pentad analysis

Figure 3: Southern Oscillation Index (SOI)

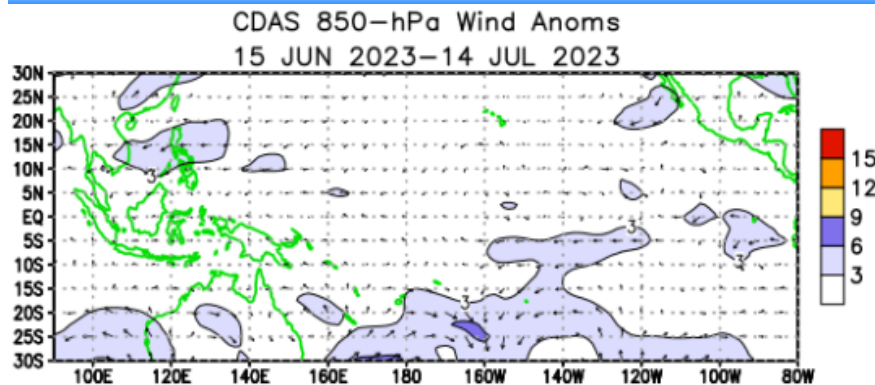


The SOI for June 2023 was +0.2, with the 5-month running mean of -1.9.

The latest 30-days average SOI to 18th July 2023 was 3.3.

[Sustained values of SOI above +7 indicate presence of La Niña event and sustained values below -7 signify El Niño event].

Figure 4 : Near surface winds in the Pacific Ocean

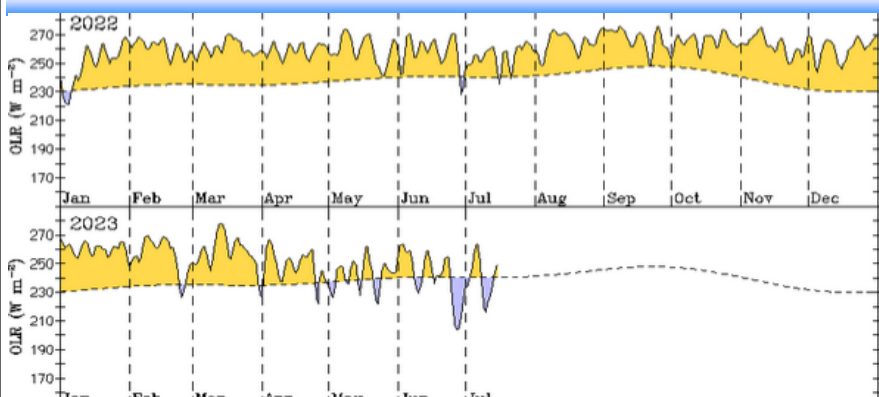


Trade winds for the 5 days ending 16 July, were close to average over most of the tropical Pacific.

[During El Niño there is a sustained weakening, or reversal, of the trade winds across much of the tropical Pacific. Conversely, during La Niña, there is a sustained strengthening of the Trade winds].

Image source: NOAA.

Figure 5 : Cloudiness near the Dateline

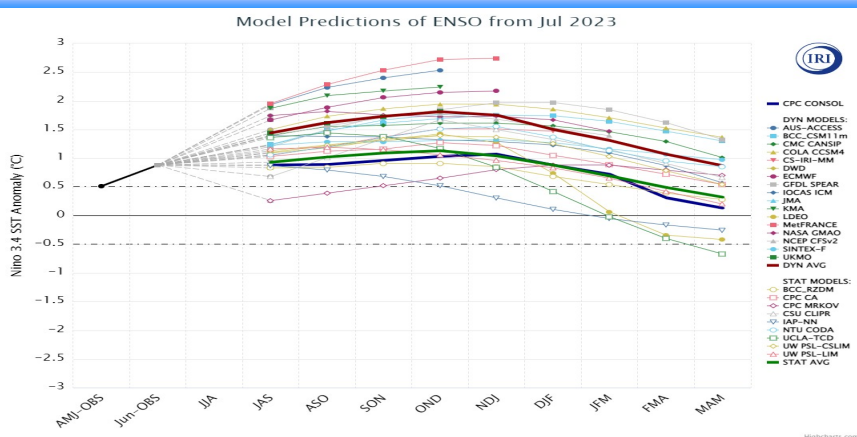


Cloudiness near the Date Line has alternated between brief periods of above and below average values since late April.

[Equatorial cloudiness near the Date Line typically increases during El Niño (negative OLR anomalies) and decreases during La Niña (positive OLR anomalies)].

Image source: Australian Bureau of Meteorology.

Figure 6: Climate Model Predictions of ENSO



Climate models on average show that the current El Niño is expected to gradually strengthen through to the December 2023 to February 2024 period.

Image source: International Research Institute for Climate and Society.

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).