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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 atmospheric indicators are responding to the pattern of SSTs in the tropical Pacific and there is clear coupling between the ocean and atmosphere.
- 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.
- Fiji Met Service will continue to monitor the ENSO conditions closely and provide updates accordingly.

## History and Current Situation

### History

Since September 2022, the Pacific Ocean has been consistent with a weak La Niña event. At around mid March 2023, ENSO-neutral state was established. From March onwards, ENSO-neutral condition prevailed with some climate indicators favoring development of an El Niño event. The sea surface temperatures in the central and eastern equatorial Pacific Ocean warmed during July 2023, with most oceanic and atmospheric indicators implying an establishment of a weak El-Niño event.

### Current Situation

A weak El-Niño event continues to persist 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 most of the equatorial Pacific Ocean. Weak negative subsurface temperature anomalies have emerged near the Date Line, but remain at depth of 150-300m.

The Southern Oscillation Index (SOI) for August 2023 was  $-12.7$ , with the 5-month running mean of  $-7.0$ . The latest 30-days average SOI until 23<sup>rd</sup> September 2023 was  $-16.5$ . Trade wind strength has been generally close to average, but was slightly weaker than average across the tropical Pacific. 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.

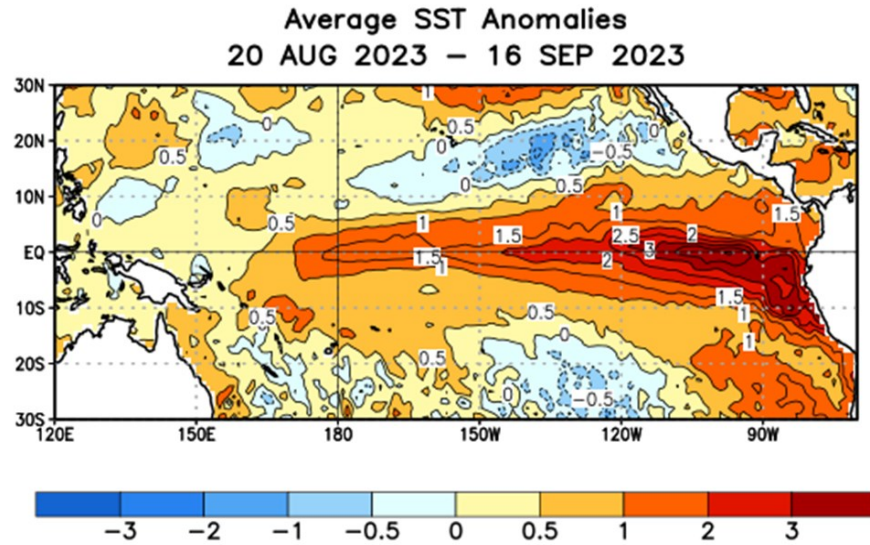
## ENSO Outlook

Weak El Niño has become established in the tropical Pacific. Sea surface temperatures in the central and eastern Pacific continue to exceed 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. The atmospheric indicators are responding to the pattern of SSTs in the tropical Pacific and there is clear coupling between the ocean and atmosphere.

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

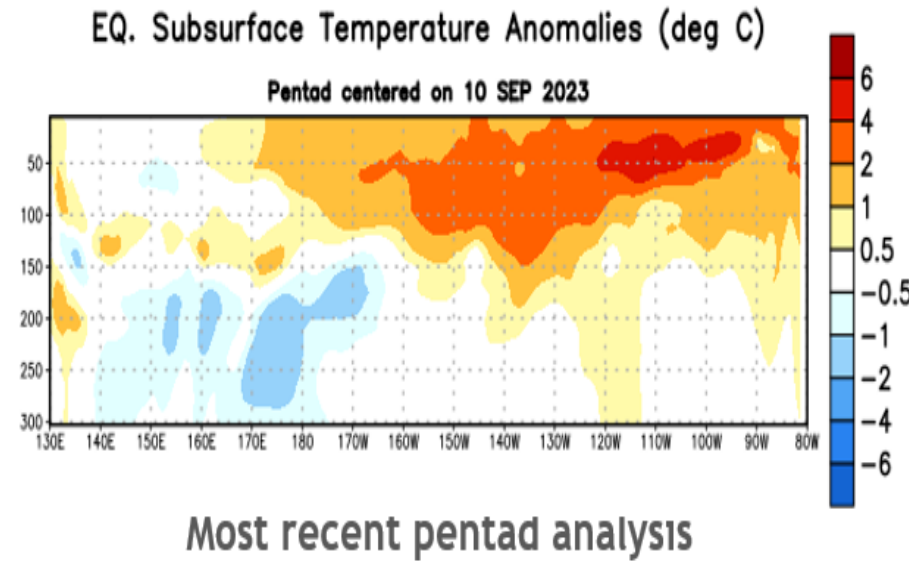


SSTs were above average across most of the Pacific Ocean, with near average SSTs present in the Western Pacific Ocean.

[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

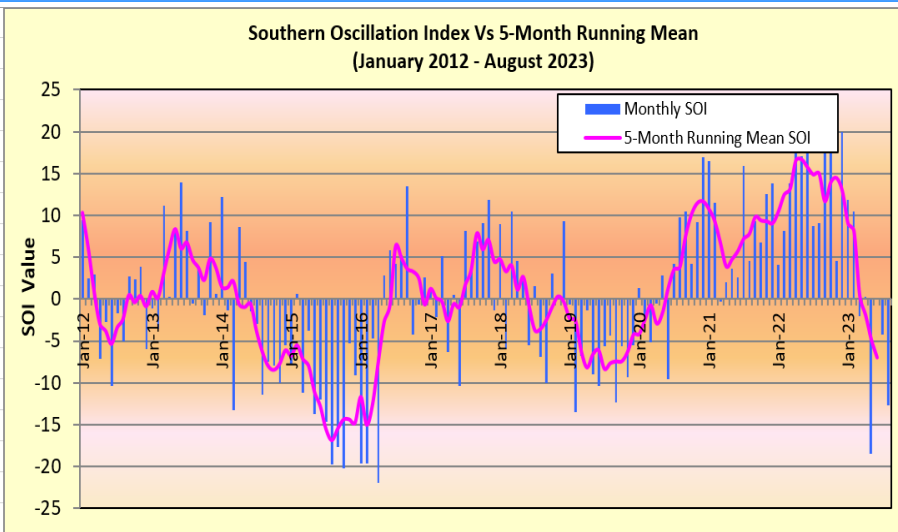


Positive subsurface temperature anomalies dominate most of the equatorial Pacific Ocean. Positive subsurface temperature anomalies have weakened in the western equatorial Pacific, with negative anomalies emerging at depth of 150-300m.

[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.

Figure 3: Southern Oscillation Index (SOI)

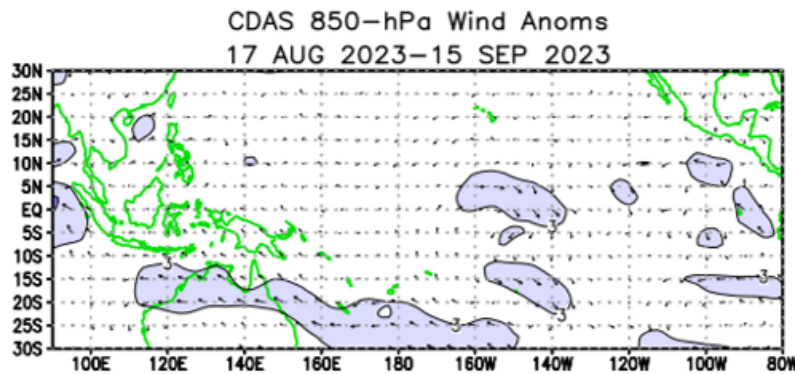


The SOI for August 2023 was  $-12.7$ , with the 5-month running mean of  $-7.0$ .

The latest 30-days average SOI to 23<sup>rd</sup> September 2023 was  $-16.5$ .

[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

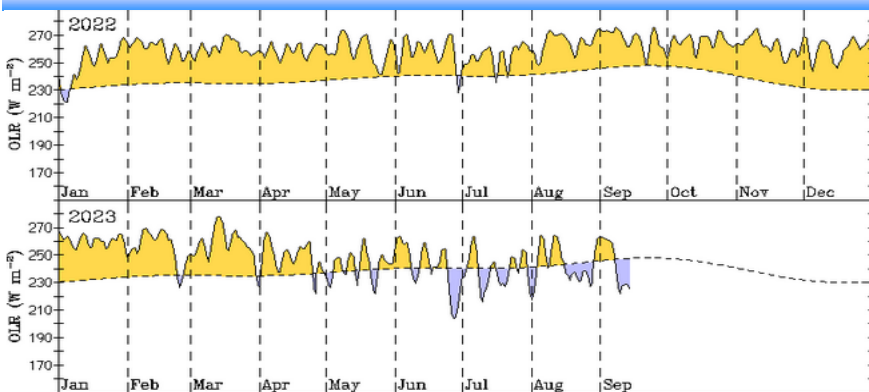


Trade wind strength has been generally close to average, but was slightly weaker than average across the tropical Pacific in August 2023 for the first time since January 2020.

[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

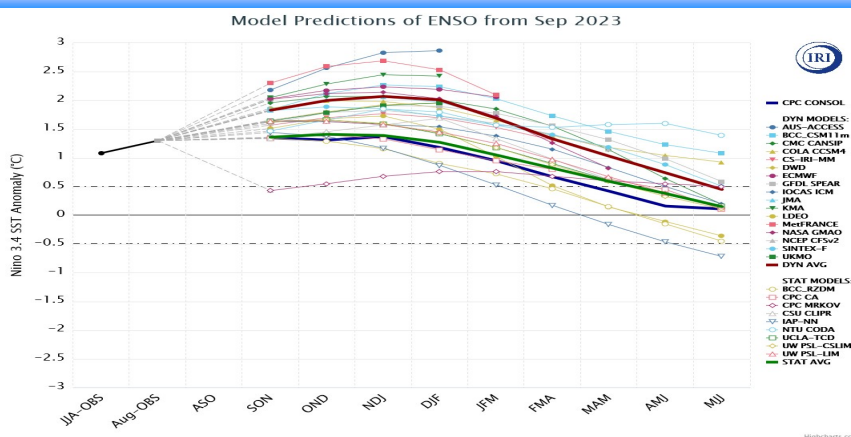


Cloudiness near the Date Line has alternated between brief periods of above and below average values since late April.

[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).