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## Fiji Meteorological Service Fiji Meteorological Service

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### *In Brief*

- ENSO neutral conditions continues to persist in the tropical Pacific Ocean.
- Sea surface temperatures in the tropical Pacific is likely to reach or exceed the La Niña threshold in the coming months.
- ENSO-neutral state is likely to transition to a La Nina state during September to November period. However, this La Niña event is favored to be weak.
- During a La Niña event, Fiji generally experiences *above average* rainfall.
- Fiji Met Service will continue to closely monitor ENSO conditions and provide updates accordingly.

## History and Current Situation

### History

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. Since then the Pacific Ocean has been consistent with a weak El-Niño event. From October 2023, the event intensified into a moderate El Niño, peaked in December, slowly decayed during the first quarter and returned to neutral state by April 2024.

### Current Situation

The El Niño–Southern Oscillation (ENSO) is currently neutral. Sea surface temperatures (SSTs) were above average in the central and western Pacific Ocean, with near to below average SSTs observed in the central-eastern and eastern Pacific Ocean. Negative subsurface temperature anomalies persisted in the eastern equatorial Pacific Ocean, extending to the surface. Below average SSTs remain at depth in the central Pacific, while above average temperatures prevail near the surface in the western Pacific.

The SOI for August 2024 was 7.8, with a 5-month running mean of 0.4. The latest 30-days average SOI until 21<sup>st</sup> September, 2024, was 4.0. Trade winds have been above average across the western and central tropical Pacific, while near-average winds were observed elsewhere. Cloudiness near the equatorial Date Line has been below average for most of September, resulting in above average outgoing longwave radiation. Overall, the oceanic and atmospheric indicators are indicative of neutral ENSO conditions.

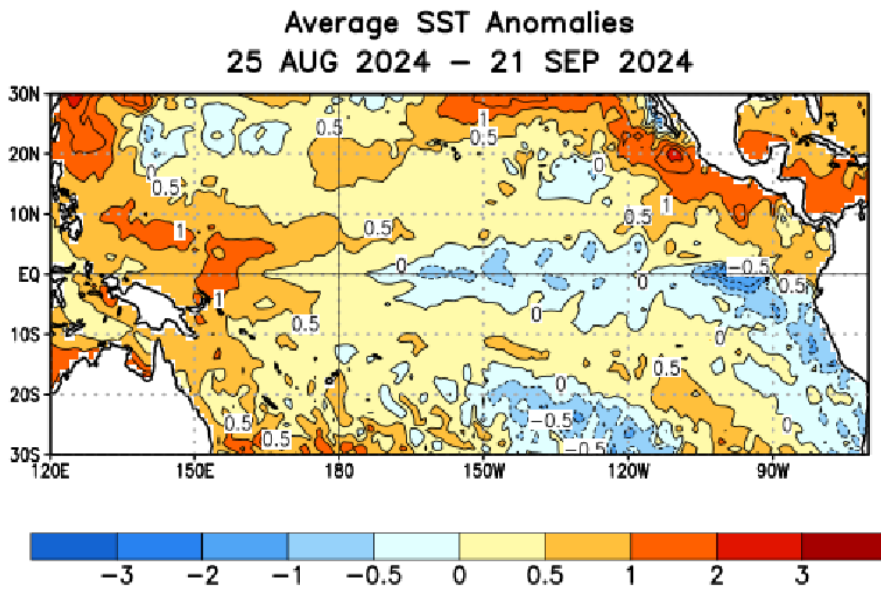
## ENSO Outlook

Sea surface temperatures in the tropical Pacific are likely to reach or exceed average levels in the coming months, with the possibility of La Niña development. Meanwhile, atmospheric indicators such as pressure, cloud cover, and trade wind patterns over the Pacific have already shown signs of becoming more La Niña-like.

The current ENSO-neutral status continues, with a transition to La Niña state likely during September to November 2024. FMS will continue to closely monitor the ENSO conditions and provide updates accordingly.

Fiji usually experiences *above normal* rainfall during an La Niña event.

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

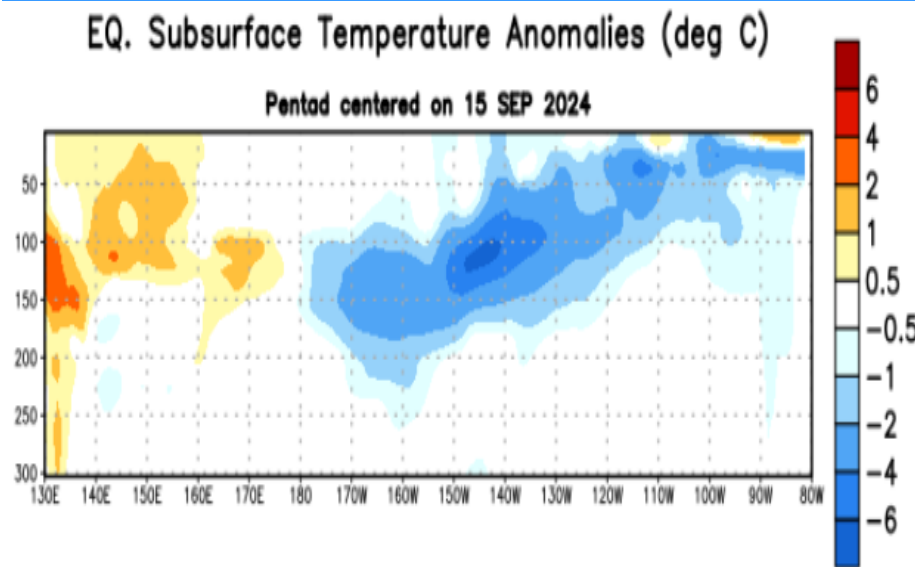


Sea surface temperatures (SSTs) were *above average* in the western and west-central Pacific Ocean. In contrast, SSTs ranged from *near to below average* in the east to central Pacific and the across the eastern Pacific Ocean.

[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

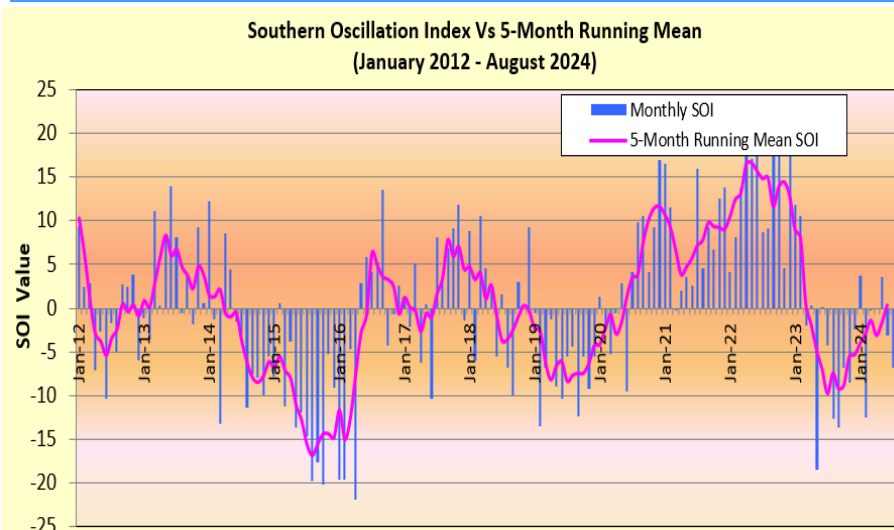


The eastern equatorial Pacific Ocean has experienced persistent negative subsurface temperature anomalies that have extended to the surface. Meanwhile, *below average* temperatures remain at depth in the central Pacific, with *above average* temperature prevailing near the surface in the western Pacific.

[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.

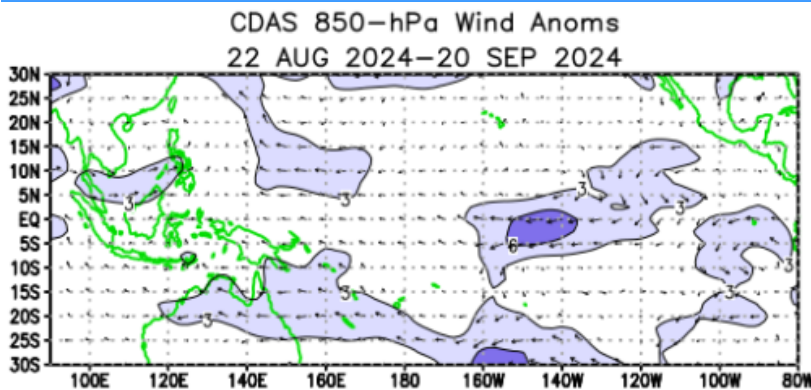
Figure 3: Southern Oscillation Index (SOI)



The SOI for August 2024 was 7.8, with the 5-month running mean of 0.4. The latest 30-days average SOI to 21<sup>st</sup> September 2024 was 4.0, which is still within the neutral category.

[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

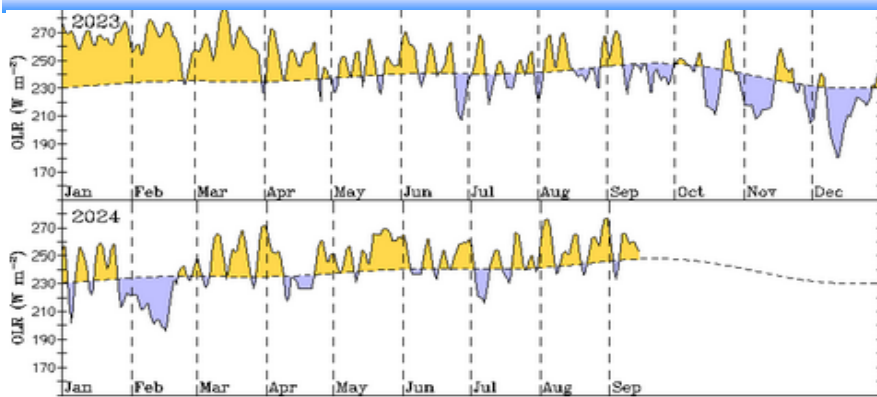


Trade winds have been above average across the western and central tropical Pacific, while elsewhere, the trade wind strength remained close to average.

[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

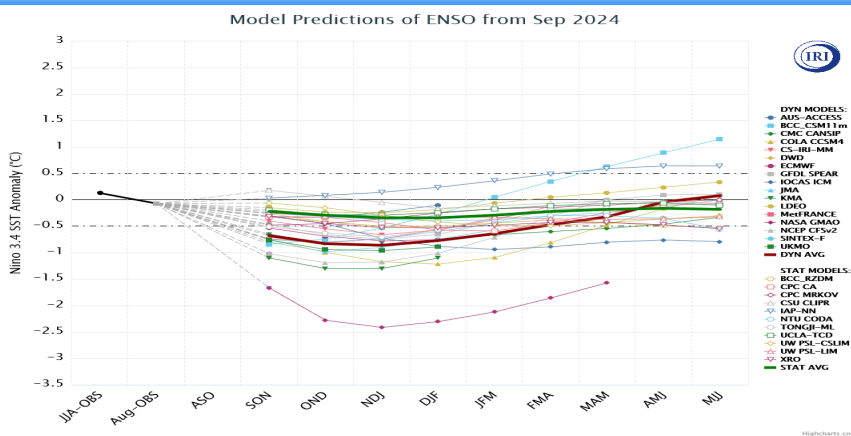


Cloudiness near the equatorial Date Line is currently below average. For most of September, cloudiness has been below average resulting in above average outgoing longwave radiation.

[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 ENSO-neutral state is likely to transition to a La Niña state during September to November 2024 period. However, these La Niña conditions are favored to be weak.

**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).