Climate Services Division

ENSO Update

El-Niño likely past its peak period

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Fiji Meteorological Service

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Content

In Brief

- *El-Niño continues to persist within the tropical Pacific Ocean.*
- *Sea surface temperatures in the central tropical Pacific have peaked and are now declining.*
- *El Niño is likely to continue through the March to May 2024 period.*
- *A transition to ENSO-neutral state is likely during April to June 2024.*
- *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

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 onwards, the event intensified to a moderate El-Nino.

Current Situation

The moderate El-Niño event continued to persist within the tropical Pacific Ocean. The sea surface temperatures are warmer than average across the central and eastern tropical Pacific Ocean. Positive subsurface temperature anomalies dominate most of the equatorial Pacific Ocean, but have been gradually weakening in the western and central Pacific. Negative subsurface temperature anomalies have strengthened in the western Pacific Ocean and expanded to the eastern Pacific.

The SOI for December 2023 was –2.4, with the 5-month running mean of –8.8. The latest 30-days average SOI to 21st January 2024 was +8.0. Trade winds have been generally close to average to stronger than average over the equatorial Pacific. Equatorial cloudiness near the Date Line has been above average since starting of 2024, indicating decreased cloudiness. This is an indication that the atmospheric impacts of El Niño are weakening in the tropical Pacific. However, overall, the atmospheric and oceanic indicators are still consistent with the presence of an El Niño event.

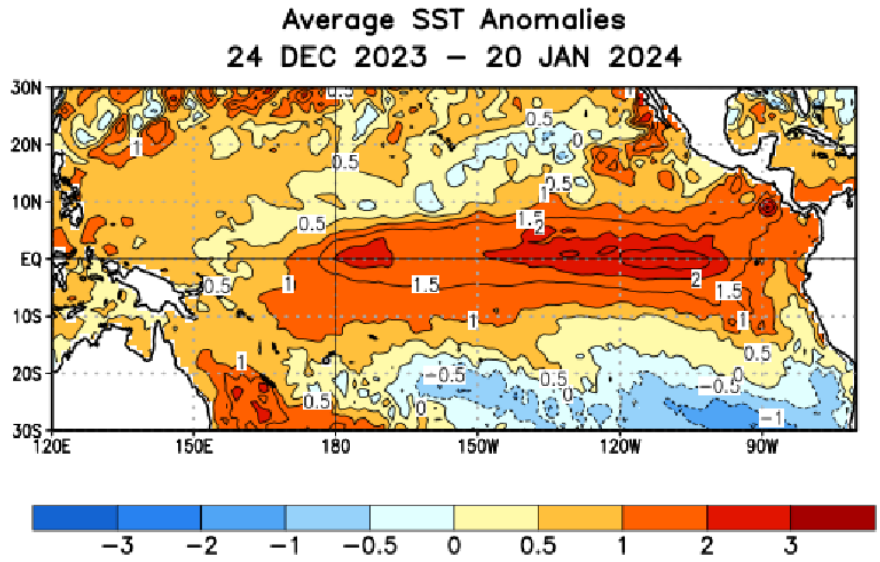
ENSO Outlook

Sea surface temperatures in the tropical Pacific are likely to return to neutral ENSO levels around the March to May 2024 period.

The current El Niño have likely passed its peak, with the event likely to continue through the March to May 2024 period and then transition to ENSO-neutral state during April to June 2024. 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

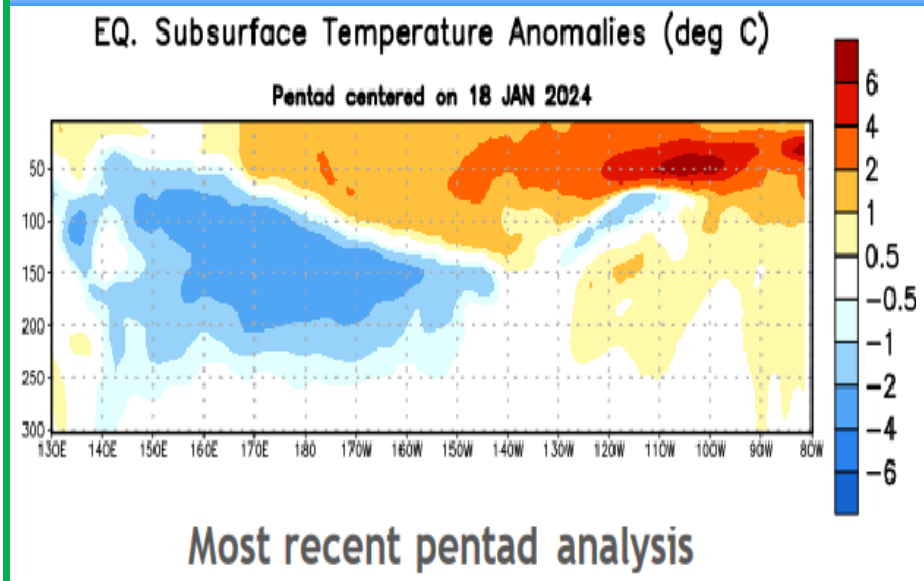


SSTs were above average across the Pacific Ocean, with the largest anomalies in the central and east-central Pacific Ocean.

[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

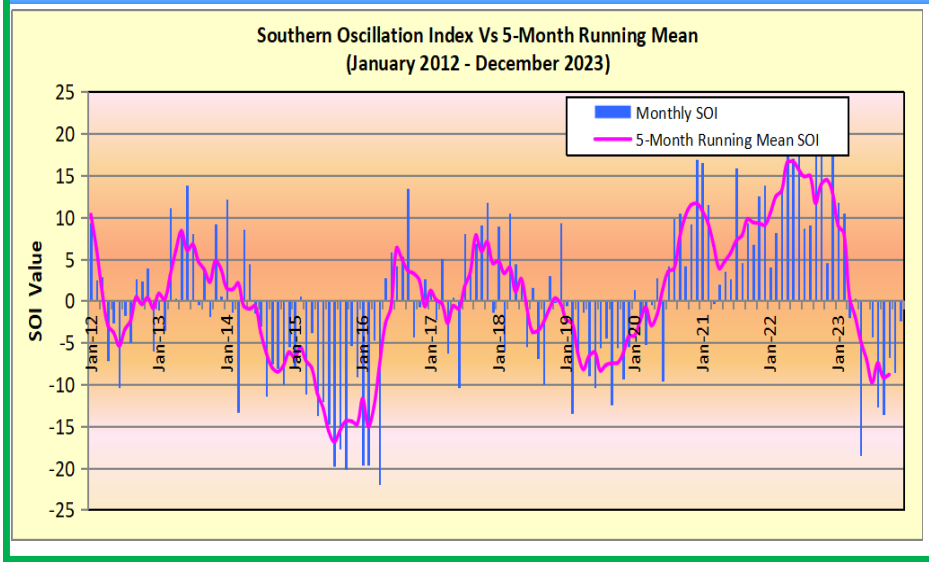


Positive subsurface temperature anomalies dominate most of the equatorial Pacific Ocean, but have been gradually weakening in the western and central Pacific. Negative subsurface temperature anomalies have strengthened in the western Pacific Ocean and expanded to the eastern Pacific, while remaining at depth.

[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.

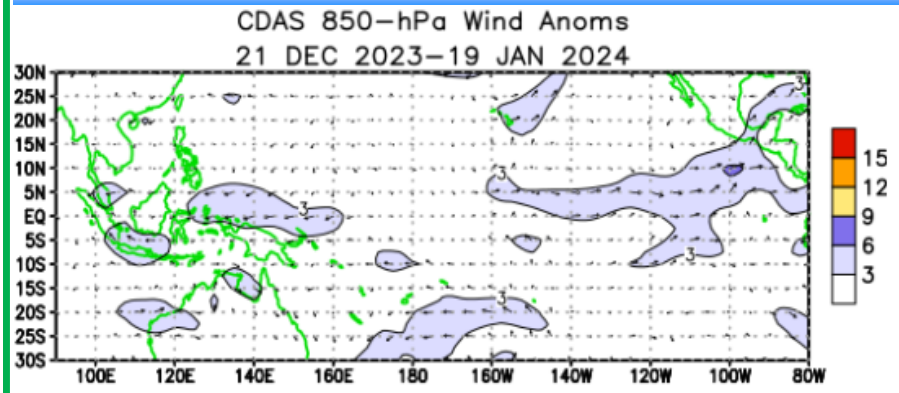
Figure 3: Southern Oscillation Index (SOI)



The SOI for December 2023 was –2.4, with the 5-month running mean of –8.8. The latest 30-days average SOI to 21st January 2024 was +8.0.

[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

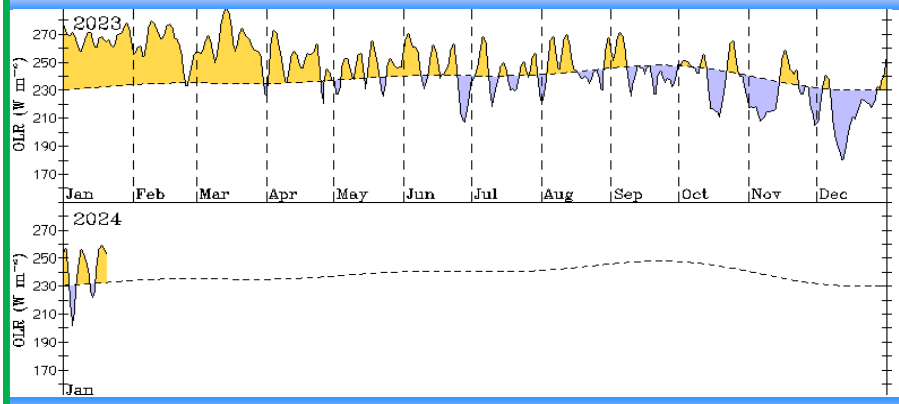


Trade winds have been generally close to average to stronger than average over the equatorial Pacific.

[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

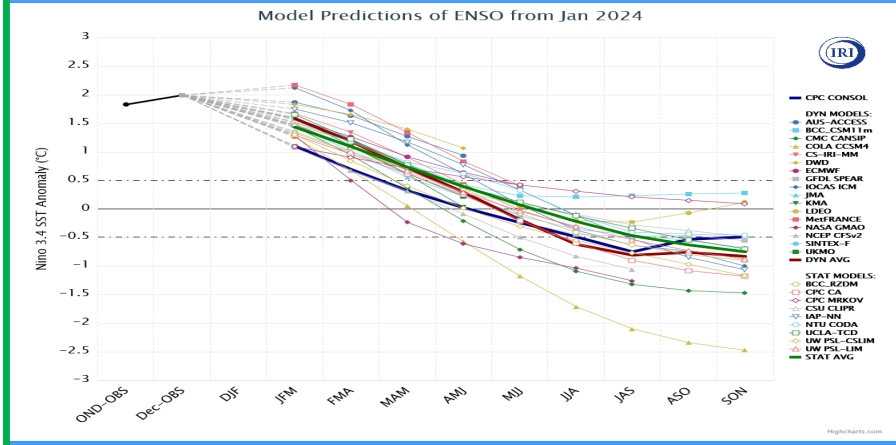


Cloudiness near the Date Line has been above average since starting of 2024, indicating decreased cloudiness. This is an indication that the atmospheric impacts of El Niño are weakening in the Pacific.

[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 will persist through March to May 2024 and then transition to ENSO-neutral state during April to June 2024.

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).