

# EL NIÑO/SOUTHERN OSCILLATION (ENSO) DIAGNOSTIC DISCUSSION

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ENSO Alert System Status: **El Niño Advisory**

**Synopsis:** El Niño is anticipated to continue through the Northern Hemisphere spring (with an 80% chance during March-May 2024).

In September, equatorial sea surface temperatures (SSTs) were above average (Fig. 1), though positive anomalies weakened in the eastern Pacific. All of the latest weekly Niño index values remained in excess of +1.0°C: Niño-4 was +1.2°C, Niño-3.4 was +1.5°C, Niño-3 was +1.9°C, and Niño1+2 was +2.6°C (Fig. 2). Area-averaged subsurface temperatures anomalies decreased (Fig. 3), but remained above-average, consistent with elevated subsurface temperatures across the central and eastern equatorial Pacific Ocean (Fig. 4). Tropical atmospheric anomalies were consistent with El Niño. In areas of the central Pacific, low-level winds were anomalously westerly, while upper-level winds were anomalously easterly. Convection was enhanced around the International Date Line, stretching into the eastern Pacific, just north of the equator. Convection was suppressed near Indonesia (Fig. 5). The equatorial Southern Oscillation Index (SOI) and the traditional station-based SOI were both significantly negative. Collectively, the coupled ocean-atmosphere system reflected El Niño.

The most recent IRI plume favors El Niño to continue through the Northern Hemisphere spring 2024 (Fig. 6). Also considering recent observations and the NMME, the team favors at least a “strong” event [with a 75-85% chance](#) through November-January ( $\geq 1.5^{\circ}\text{C}$  for the seasonal average in Niño-3.4). There is a 3 in 10 chance of a “historically strong” event that rivals 2015-16 and 1997-98 (seasonal average  $\geq 2.0^{\circ}\text{C}$ ). Stronger El Niño events increase the likelihood of El Niño-related climate anomalies, but do not necessarily equate to strong impacts locally. Consider consulting [CPC seasonal outlooks](#) for probabilities of temperature and precipitation in the coming seasons. In summary, El Niño is anticipated to continue through the Northern Hemisphere spring (with an 80% chance during March-May 2024; Fig. 7).

This discussion is a consolidated effort of the National Oceanic and Atmospheric Administration (NOAA), NOAA’s National Weather Service, and their funded institutions. Oceanic and atmospheric conditions are updated weekly on the Climate Prediction Center website ([El Niño/La Niña Current Conditions and Expert Discussions](#)). Additional perspectives and analyses are also available in an [ENSO blog](#). A probabilistic strength forecast is [available here](#). The next ENSO Diagnostics Discussion is scheduled for 9 November 2023. To receive an e-mail notification when the monthly ENSO Diagnostic Discussions are released, please send an e-mail message to: [ncep.list.enso-update@noaa.gov](mailto:ncep.list.enso-update@noaa.gov).

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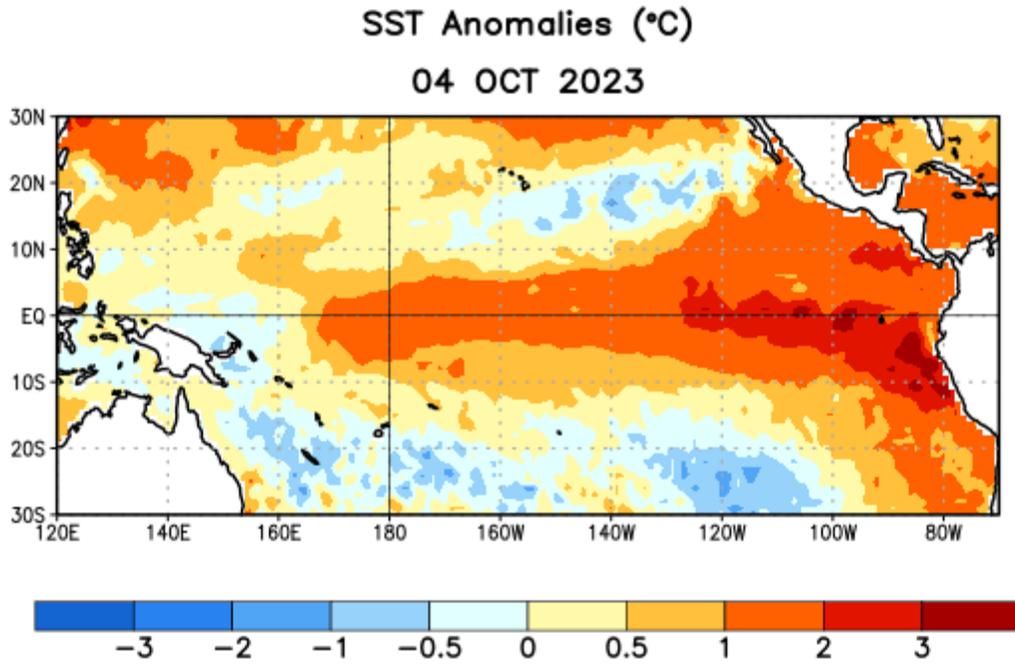


Figure 1. Average sea surface temperature (SST) anomalies (°C) for the week centered on 4 October 2023. Anomalies are computed with respect to the 1991-2020 base period weekly means.

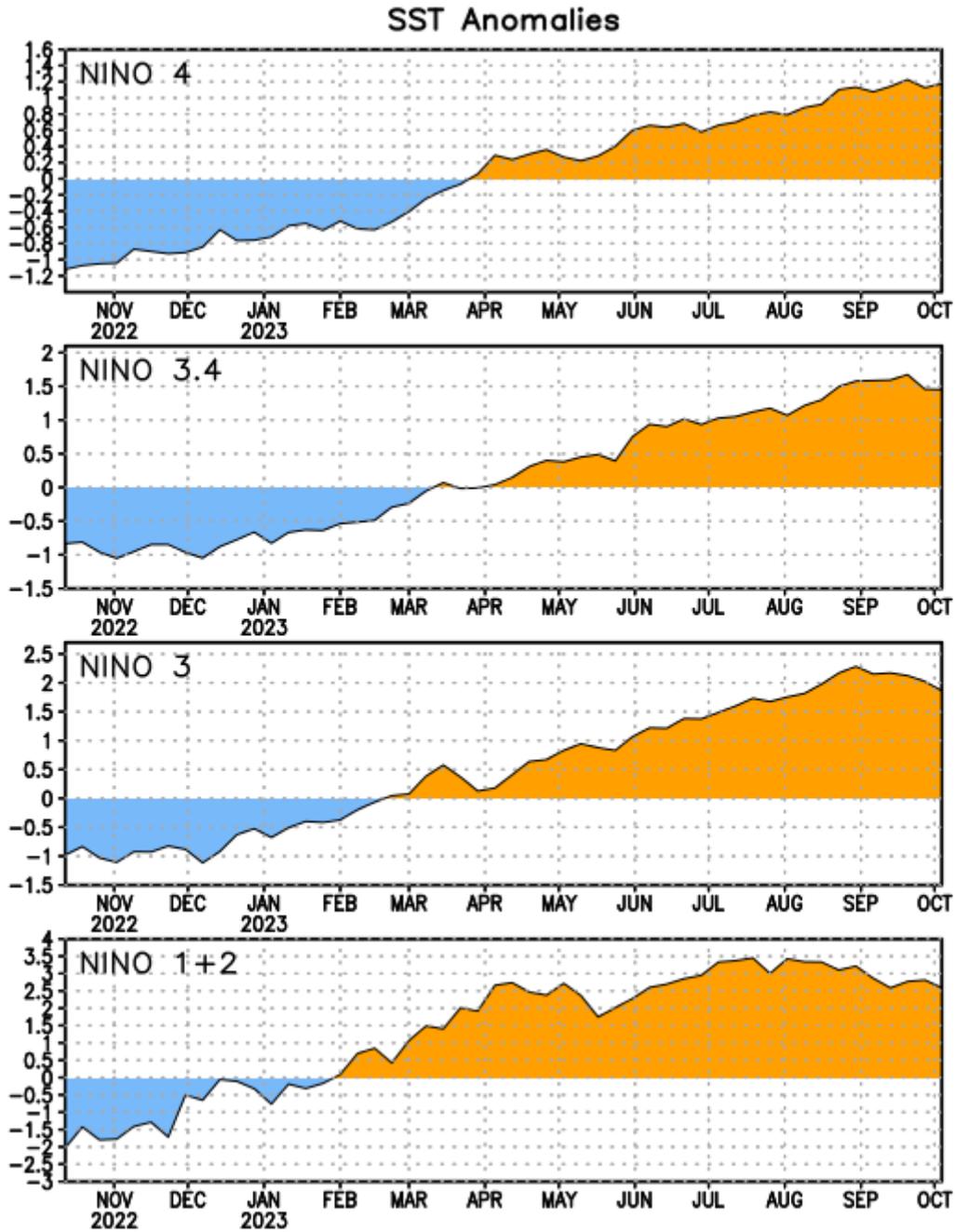


Figure 2. Time series of area-averaged sea surface temperature (SST) anomalies ( $^{\circ}\text{C}$ ) in the Niño regions [Niño-1+2 ( $0^{\circ}$ - $10^{\circ}\text{S}$ ,  $90^{\circ}\text{W}$ - $80^{\circ}\text{W}$ ), Niño-3 ( $5^{\circ}\text{N}$ - $5^{\circ}\text{S}$ ,  $150^{\circ}\text{W}$ - $90^{\circ}\text{W}$ ), Niño-3.4 ( $5^{\circ}\text{N}$ - $5^{\circ}\text{S}$ ,  $170^{\circ}\text{W}$ - $120^{\circ}\text{W}$ ), Niño-4 ( $5^{\circ}\text{N}$ - $5^{\circ}\text{S}$ ,  $150^{\circ}\text{W}$ - $160^{\circ}\text{E}$ )]. SST anomalies are departures from the 1991-2020 base period weekly means.

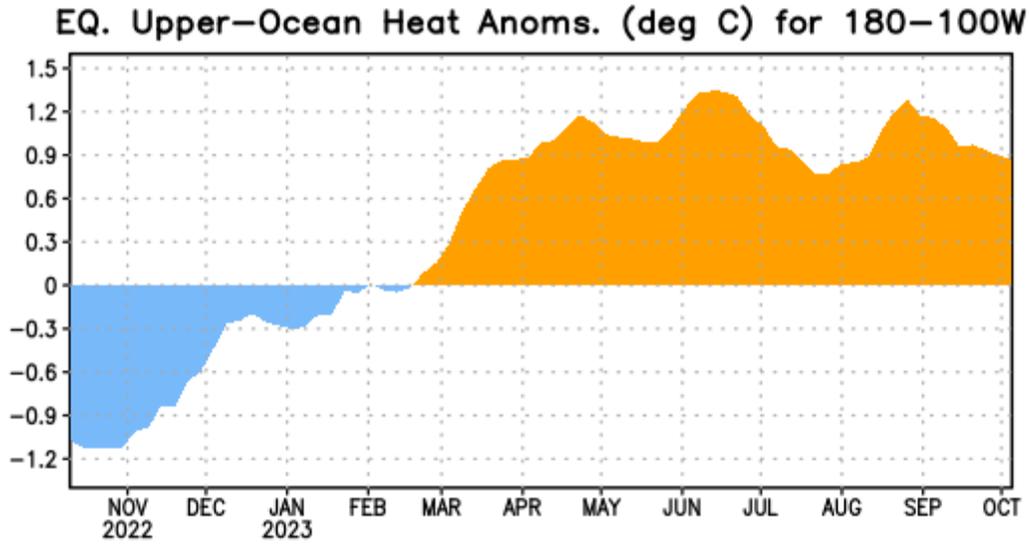


Figure 3. Area-averaged upper-ocean heat content anomaly ( $^{\circ}\text{C}$ ) in the equatorial Pacific ( $5^{\circ}\text{N}$ - $5^{\circ}\text{S}$ ,  $180^{\circ}$ - $100^{\circ}\text{W}$ ). The heat content anomaly is computed as the departure from the 1991-2020 base period pentad means.

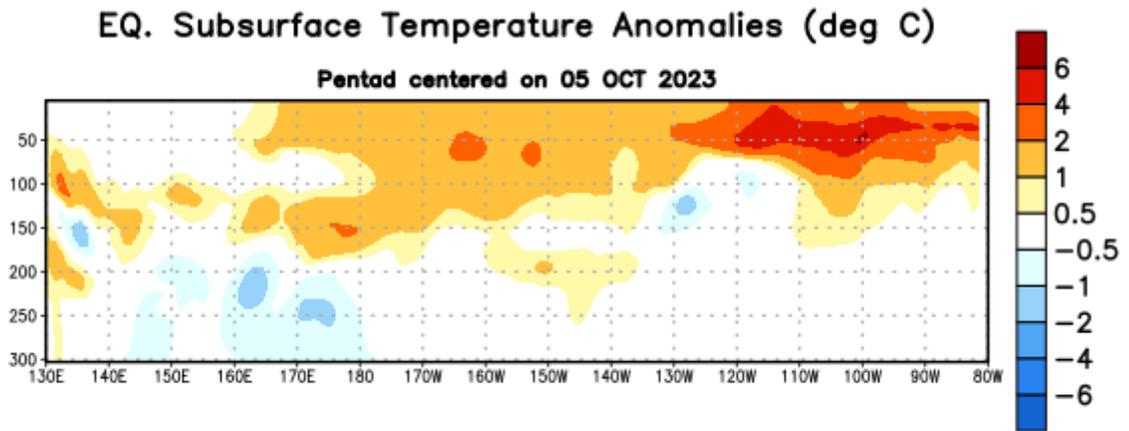


Figure 4. Depth-longitude section of equatorial Pacific upper-ocean (0-300m) temperature anomalies ( $^{\circ}\text{C}$ ) centered on the pentad of 5 October 2023. Anomalies are departures from the 1991-2020 base period pentad means.

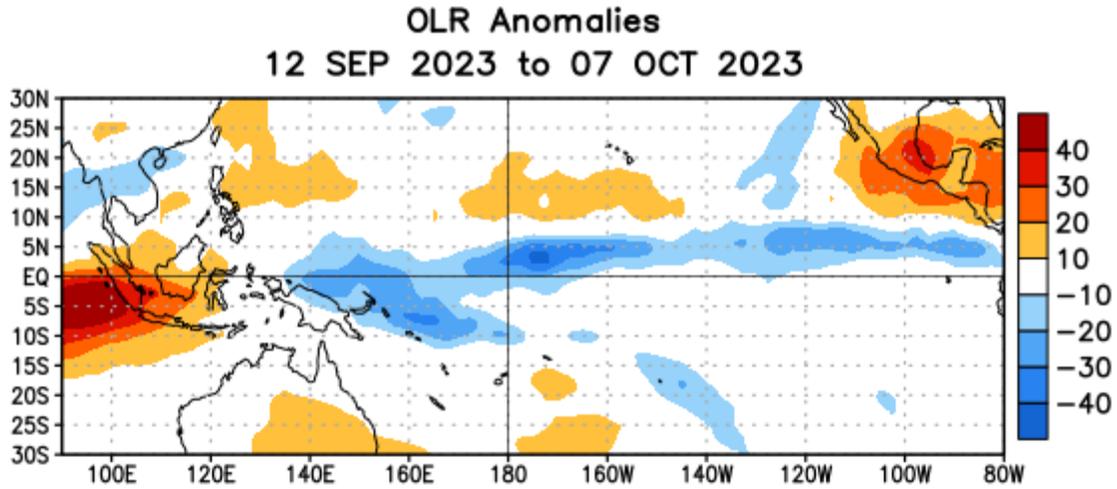


Figure 5. Average outgoing longwave radiation (OLR) anomalies ( $\text{W}/\text{m}^2$ ) for the period 12 September – 7 October 2023. OLR anomalies are computed as departures from the 1991-2020 base period pentad means.

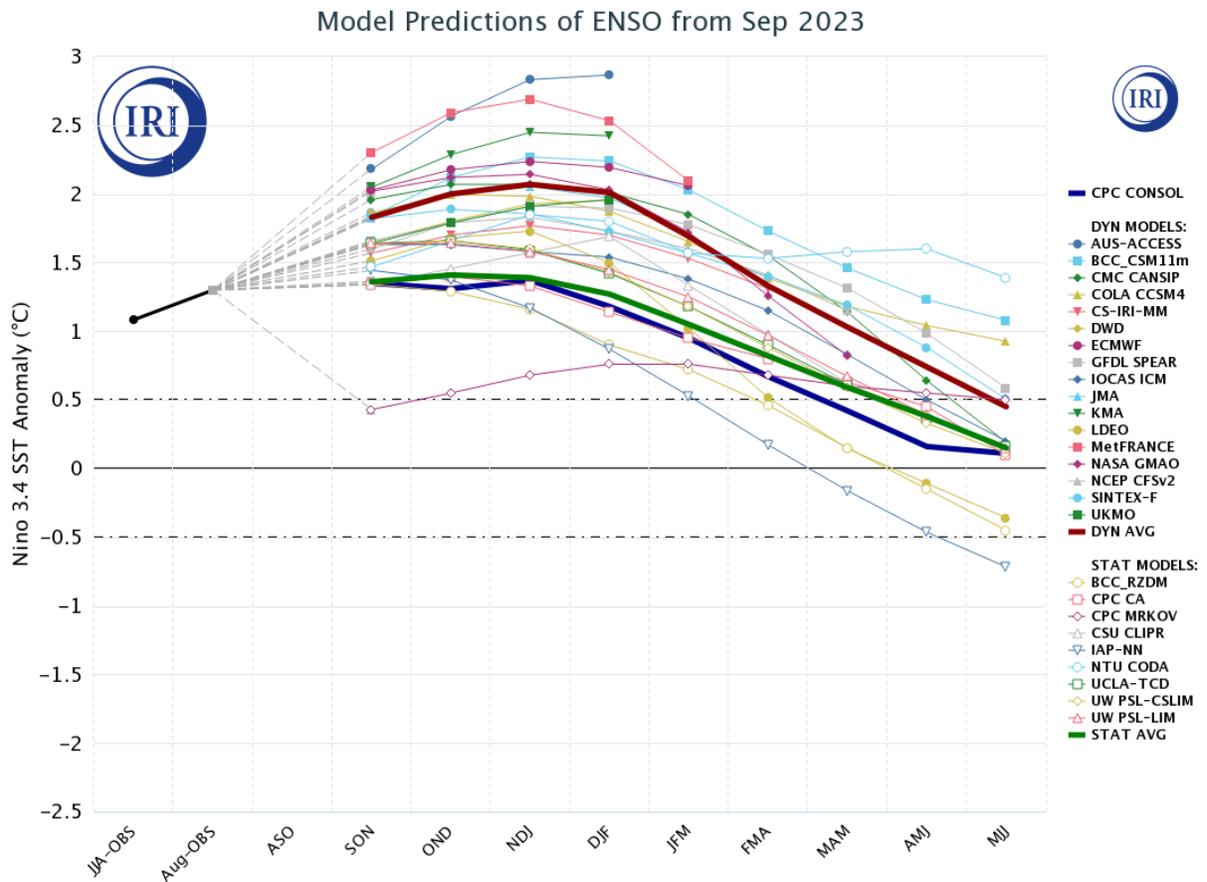


Figure 6. Forecasts of sea surface temperature (SST) anomalies for the Niño 3.4 region ( $5^{\circ}\text{N}$ - $5^{\circ}\text{S}$ ,  $120^{\circ}\text{W}$ - $170^{\circ}\text{W}$ ). Figure updated 20 September 2023 by the International Research Institute (IRI) for Climate and Society.

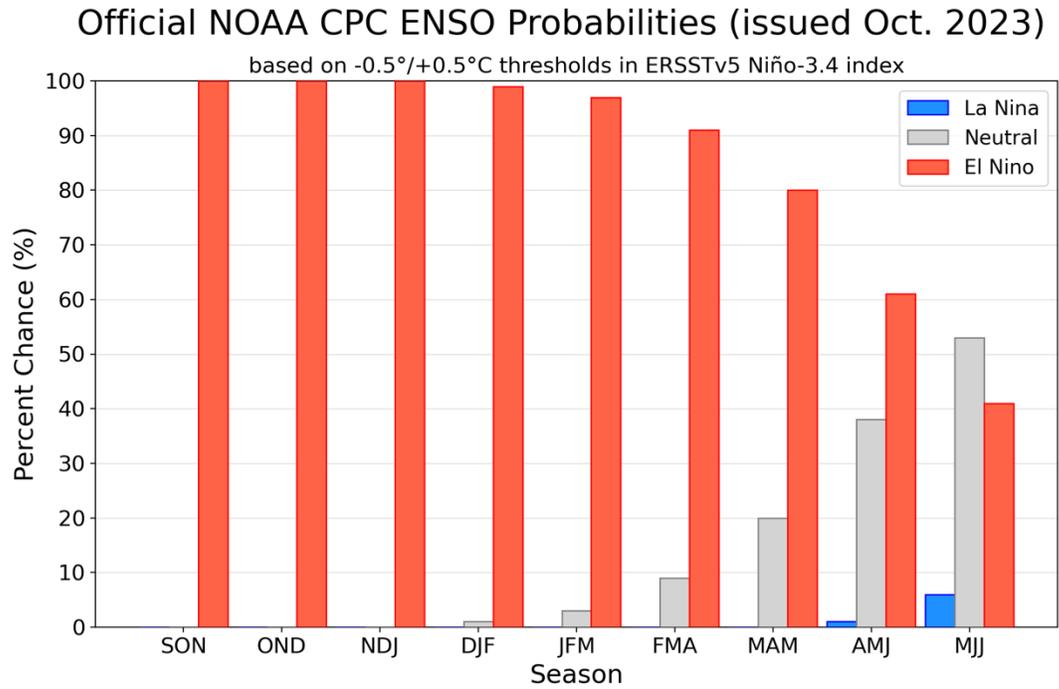


Figure 7. Official ENSO probabilities for the Niño 3.4 sea surface temperature index ( $5^{\circ}\text{N}$ - $5^{\circ}\text{S}$ ,  $120^{\circ}\text{W}$ - $170^{\circ}\text{W}$ ). Figure updated 12 October 2023.