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Recent Evolution and Current Conditions
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Summary
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ENSO Alert System Status:  La Niña Advisory

La Niña is present.*

Equatorial sea surface temperatures (SSTs) are below average from the west-central to eastern Pacific Ocean.

The tropical atmospheric circulation is consistent with La Niña.

A transition from La Niña to ENSO-Neutral is likely in the next month or so, with an 80% chance of ENSO-neutral during May-July 2021.*

* Note: These statements are updated once a month (2nd Thursday of each month) in association with the ENSO Diagnostics Discussion, which can be found by clicking here.
Beginning in mid-May 2020, negative SST anomalies emerged in the east-central and eastern Pacific Ocean.

Since early March 2021, negative anomalies have weakened across the equatorial Pacific Ocean.
Niño Region SST Departures (°C) Recent Evolution

The latest weekly SST departures are:

- Niño 4  -0.1°C
- Niño 3.4 -0.3°C
- Niño 3  -0.4°C
- Niño 1+2 -0.8°C
In the last four weeks, equatorial SSTs were below average in the east-central and eastern Pacific Ocean.
During the last four weeks, equatorial SSTs were below average in the east-central and the eastern Pacific Ocean. SSTs were above average in the western Indian Ocean.
Weekly SST Departures during the Last Four Weeks

During the last 4 weeks, below-average SSTs weakened in the central and east-central equatorial Pacific Ocean.
Change in Weekly SST Departures over the Last Four Weeks

During the last four weeks, the changes in equatorial SST anomalies were mostly positive across the Pacific Ocean.
The basin-wide equatorial upper ocean (0-300 m) heat content is greatest prior to and during the early stages of a Pacific warm (El Niño) episode (compare top 2 panels), and least prior to and during the early stages of a cold (La Niña) episode.

The slope of the oceanic thermocline is least (greatest) during warm (cold) episodes.

Recent values of the upper-ocean heat anomalies (below average) and thermocline slope index (above average) reflect La Niña.

*The monthly thermocline slope index represents the difference in anomalous depth of the 20°C isotherm between the western Pacific (160°E-150°W) and the eastern Pacific (90°-140°W).*
Subsurface temperature anomalies decreased from March-May 2020, before weakening in June. Starting in mid-July 2020, negative temperature anomalies strengthened and persisted through early February 2021, when the negative anomalies weakened. Beginning in mid-March 2021, subsurface temperature were above average.
In the last two months, positive subsurface temperature anomalies have shifted eastward and closer to the surface in the eastern Pacific Ocean. Negative subsurface temperature anomalies linger in a thin layer at the surface across the central and eastern Pacific Ocean and also down to ~100m depth in the eastern Pacific Ocean.
Tropical OLR and Wind Anomalies During the Last 30 Days

Weak, positive OLR anomalies (suppressed convection and precipitation) remain near the Date Line. Negative OLR anomalies (enhanced convection and precipitation) were evident over the far western Pacific Ocean and around the Philippines.

Low-level (850-hPa) easterly wind anomalies were evident across most of the equatorial Pacific Ocean.

Upper-level (200-hPa) westerly wind anomalies were observed over most of the equatorial Pacific Ocean.
Intraseasonal variability in the atmosphere (wind and pressure), which is often related to the Madden-Julian Oscillation (MJO), can significantly impact surface and subsurface conditions across the Pacific Ocean.

Related to this activity:

Significant weakening of the low-level easterly winds usually initiates an eastward-propagating oceanic Kelvin wave.
Weekly Heat Content Evolution in the Equatorial Pacific

Significant equatorial oceanic Kelvin wave activity (dashed and dotted lines) has been present throughout the period shown.

During April-June and August-September 2020, negative subsurface temperature anomalies were associated with upwelling Kelvin waves.

From August 2020 to February 2021, negative subsurface temperature anomalies persisted in the eastern half of the Pacific Ocean.

Since early March 2021, positive temperature anomalies have shifted eastward in association with a downwelling Kelvin wave.

Equatorial oceanic Kelvin waves have alternating warm and cold phases. The warm phase is indicated by dashed lines. Downwelling and warming occur in the leading portion of a Kelvin wave, and upwelling and cooling occur in the trailing portion.
At times, the Madden Julian-Oscillation (MJO) has contributed to the eastward propagation of low-level wind anomalies.

From late August 2020 through present, easterly wind anomalies mostly persisted over the central and east-central equatorial Pacific Ocean.
Upper-level (200-hPa) Velocity Potential Anomalies

From the beginning of the period, anomalous divergence (green shading) has remained over Indonesia, while anomalous convergence (brown shading) persisted over the eastern Pacific Ocean.

Since early April 2021, anomalous divergence has persisted over the western and central Pacific Ocean.
From late April 2020 through March 2021, positive OLR anomalies persisted around the Date Line.

From mid-December 2020 through February 2021, negative OLR anomalies were evident over Indonesia.

From mid-March to present, negative OLR anomalies have shifted eastward from the Indian Ocean to the western Pacific Ocean.
Oceanic Niño Index (ONI)

The ONI is based on SST departures from average in the Niño 3.4 region, and is a principal measure for monitoring, assessing, and predicting ENSO.

Defined as the three-month running-mean SST departures in the Niño 3.4 region. Departures are based on a set of improved homogeneous historical SST analyses (Extended Reconstructed SST - ERSST.v5). The SST reconstruction methodology is described in Huang et al., 2017, J. Climate, vol. 30, 8179-8205.)

It is one index that helps to place current events into a historical perspective
El Niño: characterized by a positive ONI greater than or equal to +0.5°C.

La Niña: characterized by a negative ONI less than or equal to -0.5°C.

By historical standards, to be classified as a full-fledged El Niño or La Niña episode, these thresholds must be exceeded for a period of at least 5 consecutive overlapping 3-month seasons.

CPC considers El Niño or La Niña conditions to occur when the monthly Niño3.4 OISST departures meet or exceed +/- 0.5°C along with consistent atmospheric features. These anomalies must also be forecasted to persist for 3 consecutive months.
The most recent ONI value (January - March 2021) is -0.9°C.
Historical El Niño and La Niña Episodes Based on the ONI computed using ERSST.v5

Recent Pacific warm (red) and cold (blue) periods based on a threshold of +/- 0.5 °C for the Oceanic Niño Index (ONI) [3 month running mean of ERSST.v5 SST anomalies in the Nino 3.4 region (5N-5S, 120-170W)]. For historical purposes, periods of below and above normal SSTs are colored in blue and red when the threshold is met for a minimum of 5 consecutive overlapping seasons.

The ONI is one measure of the El Niño-Southern Oscillation, and other indices can confirm whether features consistent with a coupled ocean-atmosphere phenomenon accompanied these periods. The complete table going back to DJF 1950 can be found here.

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A transition to ENSO-neutral is likely in the next month or so, with ENSO-neutral then favored through September-November 2021.
The model averages predict La Niña to continue into the Northern Hemisphere spring 2021, returning to ENSO-neutral during April-June 2021 and continuing into winter 2021-22.
The CFS.v2 ensemble mean (black dashed line) predicts an imminent transition to ENSO-neutral and continuing into fall 2021. La Niña is predicted to re-emerge during the late fall or winter 2021-22.
Atmospheric anomalies over the North Pacific and North America During the Last 60 Days

During the period, anomalous ridging over the North Pacific Ocean has been associated with a retracted Asia-Pacific jet stream.

From late February to early April, above-average heights and temperatures were observed over the central and/or eastern U.S.

Since early April, below-average heights and temperatures have dominated most of the contiguous U.S.
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U.S. Temperature and Precipitation Departures During the Last 30 Days

End Date: 24 April 2021
U.S. Temperature and Precipitation Departures During the Last 90 Days

End Date: 24 April 2021
The seasonal outlooks combine the effects of long-term trends, soil moisture, and, when appropriate, ENSO.
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