



# El Niño/La Niña Update

October 2023

## Current Situation and Outlook

***El Niño conditions in the equatorial Pacific started emerging during the Northern Hemisphere spring of 2023 and developed rapidly during summer, reaching a level consistent with a moderate El Niño by September 2023. The latest forecasts from the WMO Global Producing Centres for Long-Range Forecasts indicate a high probability (90%) of El Niño continuing throughout the upcoming Northern Hemisphere winter, with conditions at the peak of the event corresponding to a strong El Niño. Chances of a transition to ENSO-neutral are very low (10%). Drawing on evidence from historical warm Tropical Pacific episodes of similar proportions, it is anticipated that this event will have substantial and widespread effects on weather patterns through much of the tropics and beyond at least until end of 2023 and first quarter of 2024. This disruption is likely to have significant impacts on communities, economic activity or natural ecosystems in some regions. In the coming months, National Meteorological and Hydrological Services (NMHSs) will closely monitor any change in the status of ENSO and promptly provide revised assessments, as necessary.***

Average sea surface temperature in the central-eastern equatorial Pacific (Niño 3.4 region: 5°N-5°S, 120°-170°W) has warmed significantly in recent months, rising from nearly 0.5 °C above its long-term average in May 2023 to about 1.5 °C above average in September 2023. In the week centered on 18 October 2023, the Niño 3.4 anomaly continued to be about +1.6 °C. These estimates are relative to the 1991-2020 period, using the latest version of the Optimum Interpolation Sea Surface Temperature (OISST) dataset.

As of mid-October 2023, sea surface temperatures and other atmospheric and oceanic indicators in the central-eastern tropical Pacific are consistent with El Niño, the warm phase of El Niño/Southern Oscillation (ENSO). In the atmosphere, cloudiness and rainfall are greater than normal over the equatorial Pacific Ocean, with westerly winds prevailing across the western Pacific, while easterly winds over the eastern Pacific have weakened. The Southern Oscillation Index (SOI: defined by the standardized Tahiti minus Darwin sea-level pressure difference),

which had shown a significant increase recently (according to Bureau of Meteorology SOI datasets) is within the range usually observed during El Niño. Positive subsurface temperature anomalies dominate most of the equatorial Pacific Ocean. In addition, there are recent indications that the positive subsurface temperature anomalies have weakened around 130°W-120°W, with negative anomalies emerging at depth (50-150m).

Using recent observations as the starting point for their dynamical seasonal prediction systems, the WMO Global Producing Centres for Long-Range Forecasts routinely issue global-scale climate forecasts for the coming months. Their most recent forecasts and expert assessment suggest as highly likely (90%) that the El Niño will persist during the upcoming six months (November 2023-April 2024). Furthermore, the conditions at the peak of this event are expected to align with a strong El Niño. The current El Niño is expected to gradually weaken during Northern Hemisphere spring of 2024. The forecast indicates a 10% possibility of ENSO-neutral conditions developing during the mentioned period, and the chances of La Niña are near zero.

Historically, El Niño events, and in particular strong events such as the one forecast this year, have been associated with large-scale redistribution of weather patterns in the tropics and beyond. This can present significant hazards associated with the shift of weather and climate patterns, such as flooding, landslides, drought, heatwaves and wildfires, leading to significant impacts on communities, agriculture, economic activity or natural ecosystems in some regions. Nevertheless, it is important to note that El Niño and La Niña are not the only factors that drive global and regional climate patterns, and further that the magnitudes of ENSO indicators do not always directly correspond to the magnitudes of their effects. At the regional level, seasonal outlooks need to assess the relative effects of both the ENSO state and other locally relevant climate drivers. Regionally and locally applicable information is made available via regional and national seasonal climate outlooks, such as those produced by WMO Regional Climate Centres (RCCs), Regional Climate Outlook Forums (RCOFs) and National Meteorological and Hydrological Services (NMHSs).

### **In summary:**

- Sea surface temperatures in the central-eastern equatorial Pacific were at a moderate El Niño level in September 2023.
- Sub-surface ocean temperatures across the eastern equatorial Pacific have been well above average. This higher than usual heat content has promoted steady increases in sea surface temperatures over the last four months, and is likely to lead to further (albeit smaller) sea surface temperatures increases in

the coming months, depending to some degree on the strength and nature of the atmospheric-oceanic feedbacks.

- Based on model predictions and expert assessment, there is a very high likelihood (approximately 90% chance) of the El Niño event continuing during the forecast period (November 2023-April 2024).
- Drawing from historical warm episodes and the most recent long-range forecasts, the gradual weakening of the El Niño is anticipated during the 2024 Northern Hemisphere spring.
- The likelihood of ENSO-neutral conditions is estimated to be about 10% during the forecast period. The chance of La Niña is near zero.

The state of ENSO will continue to be carefully monitored by WMO Members and partners. More detailed interpretations of the implications for regional climate variability will be carried out routinely by the climate forecasting community over the coming months and will be made available through the National Meteorological and Hydrological Services.

For web links of the National Meteorological Hydrological Services, please visit:

<https://public.wmo.int/en/about-us/members>

For information and web links to WMO Regional Climate Centres (RCCs) please visit:

<https://public.wmo.int/en/our-mandate/climate/regional-climate-centres>

For information and web links to Regional Climate Outlook Forums (RCOFs) please visit:

<https://public.wmo.int/en/our-mandate/climate/regional-climate-outlook-products>

For the latest Global Seasonal Climate Update (GSCU) based on WMO Global Producing Centres of Long-Range Forecasts, please visit:

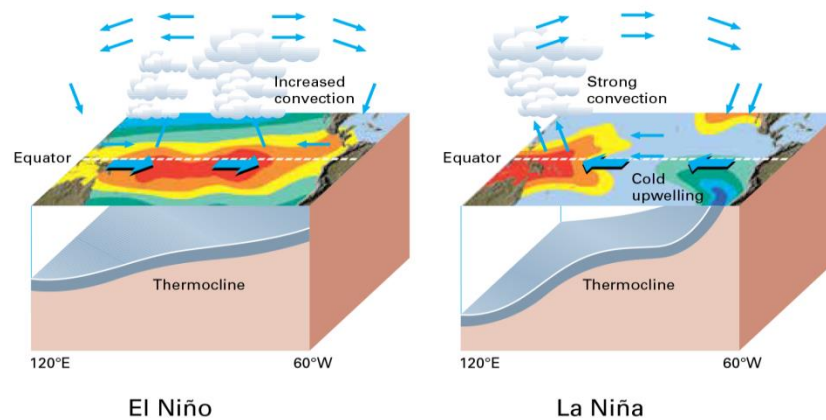
<https://www.wmolc.org/gscuBoard/list>

An archive of all WMO El Niño/La Niña Updates issued so far, including this one, is available at:

<https://community.wmo.int/activity-areas/climate/wmo-el-ninola-nina-updates>



## El Niño/La Niña Background



Typical circulation patterns during El Niño/La Niña (Source: WMO, 2003, “Climate into the 21<sup>st</sup> Century”).

### Climate Patterns in the Pacific

Research conducted over recent decades has shed considerable light on the important role played by interactions between the atmosphere and ocean in the tropical belt of the Pacific Ocean in altering global weather and climate patterns. During El Niño events, sea surface temperatures in the central and eastern tropical Pacific Ocean become substantially warmer than normal. In contrast, during La Niña events, the sea surface temperatures in these regions become colder than normal. These temperature changes are strongly linked to major climate fluctuations around the globe and, once initiated, such events can last for 12 months or more. The strong El Niño event of 1997–1998 was followed by a prolonged La Niña phase that extended from mid-1998 to early 2001. El Niño/La Niña events change the likelihood of particular climate patterns around the globe, but the outcomes of each event are never exactly the same. Furthermore, while there is generally a relationship between the global impacts of an El Niño/La Niña event and its intensity, there is always potential for an event to generate serious impacts in some regions irrespective of its intensity.

### Forecasting and Monitoring the El Niño/La Niña Phenomenon

The forecasting of Pacific Ocean developments is undertaken in a number of ways. Complex dynamical models project the evolution of the tropical Pacific Ocean from its currently observed state. Statistical forecast models can also capture some of the precursors of such developments. Expert analysis of the current situation adds further value, especially in interpreting the implications of the evolving situation below the ocean surface. All forecast methods try to incorporate

### Acknowledgements

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the effects of ocean-atmosphere interactions within the climate system. The meteorological and oceanographic data that allow El Niño and La Niña episodes to be monitored and forecast are drawn from national and international observing systems. The exchange and processing of the data are carried out under programmes coordinated by the WMO.

### WMO El Niño/La Niña Update

The WMO El Niño/La Niña Update is prepared on a quasi-regular basis (approximately every three months) through a collaborative effort between WMO and the International Research Institute for Climate and Society (IRI) as a contribution to the United Nations Inter-Agency Task Force on Natural Disaster Reduction. It is based on contributions from the leading centres around the world monitoring and predicting this phenomenon and expert consensus facilitated by WMO and IRI.

For more information on the Update and related aspects, please visit:

<https://public.wmo.int/en/our-mandate/climate/el-niñola-niña-update>