



El Niño/La Niña Update

May 2021

Current Situation and Outlook

The 2020-2021 La Niña event has concluded, according to both oceanic and atmospheric indicators. The latest forecasts from the WMO Global Producing Centers of Long-Range Forecasts indicate that neutral conditions are likely to dominate the tropical Pacific through the boreal summer: with a 78% chance of neutral for May-July, decreasing to 55% by August-October. ENSO-neutral remains the most likely outcome for the rest of the calendar year. The outlook for the second half of the year, however, contains considerable uncertainty with some suggestions of either a transition to El Niño or a re-emergence of La Niña conditions later this year. National Meteorological and Hydrological Services will closely monitor changes in the state of El Niño/Southern Oscillation (ENSO) over the coming months and provide updated outlooks.

La Niña conditions were established in August-September 2020, according to both atmospheric and oceanic indicators. The sea surface temperature anomalies in the central/eastern-central equatorial Pacific reached peak magnitude during October-November 2020. In 2021, the sea surface temperature anomalies in the eastern-central Pacific weakened, leading to the currently prevailing weak cool anomalies that are not cold enough to meet the La Niña threshold. Cooler than normal sub-surface anomalies also weakened considerably in February and began to show positive anomalies in March.

Since late March, active surface-wind variability allowed the remaining cool surface anomalies to decay more slowly than the sub-surface ocean adjustment would suggest. The equatorial sea surface temperatures off the South American coast have been quite variable and are currently much colder than the rest of the tropical Pacific, which may present localized effects.

Enhanced trade wind anomalies and stronger-than-average upper-level westerly winds were present in the tropical Pacific since mid-2020. The enhanced trade wind anomalies near the surface are now weak and lack spatial structure. The upper-level westerly winds are also much weaker. Cloudiness and rainfall indicators have returned to normal. No longer present are the below-average cloudiness over the central and west-central tropical Pacific, nor is the rainfall around the Maritime Continent above average any longer. The Southern Oscillation Index (represented by standardized Tahiti minus Darwin sea-level pressure difference) also returned to the neutral range in March and has remained there. These ocean patterns and corresponding atmospheric anomalies are typical of the transition out of a La Niña event. Past observations show that the ENSO conditions typically transition sometime during April to June.

The recent conditions from April and May are the starting point for climate models from the WMO Global Producing Centres of Long-Range Forecasts to produce global-scale ENSO forecasts for the coming months. The predictions for May-July 2021 indicate a 78% likelihood that neutral conditions will remain in place, a 19% likelihood for La Niña, and only a 3% likelihood for El Niño conditions. The range of possible central-eastern Pacific sea surface temperatures predicted for May-July 2021 span the values of -0.6 to +0.3 degrees Celsius. Through the August-October 2021 season ENSO-neutral is the most likely outcome, with probabilities over 50%, and central-eastern Pacific sea surface temperature values predicted to be within -0.8 to +0.8 degrees Celsius deviation from average. After that, while ENSO-neutral conditions are more probable than either El Niño or La Niña, the uncertainty is greater. Forecasts at long leads, and in particular those that extend through the boreal spring, tend to be less accurate. The so-called “spring prediction barrier” has nearly passed, but greater clarity is yet to emerge in the forecasts for the end of the year. At forecast lead times extending through the end of the year, nearly half indicate the persistence of ENSO-neutral conditions, and the remaining half indicate either a re-emergence of La Niña or development of El Niño.

It is important to note that El Niño and La Niña are not the only factors that drive global and regional climate patterns, and that the magnitudes of ENSO indicators do not 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:

- La Niña has ended in May 2021, based on both oceanic and atmospheric indicators.
- Model predictions and expert assessment indicate a relatively higher likelihood for ENSO-neutral conditions to prevail over the next five months, with a probability of 78% during May-July 2021 and 55% during August-October 2021.
- For the second half of the year, model predictions differ considerably on whether ENSO-neutral will remain, La Niña conditions redevelop, or El Niño conditions develop. ENSO-neutral conditions are currently predicted as more likely than either El Niño or La Niña.
- Sea surface temperatures in the eastern-central Pacific are predicted to be below- to slightly above-average during May-July 2021, in the range of -0.6 to +0.3 degrees Celsius. For August-October 2021, they are predicted to range between -0.8 to +0.8 degrees Celsius deviation from the average.

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>

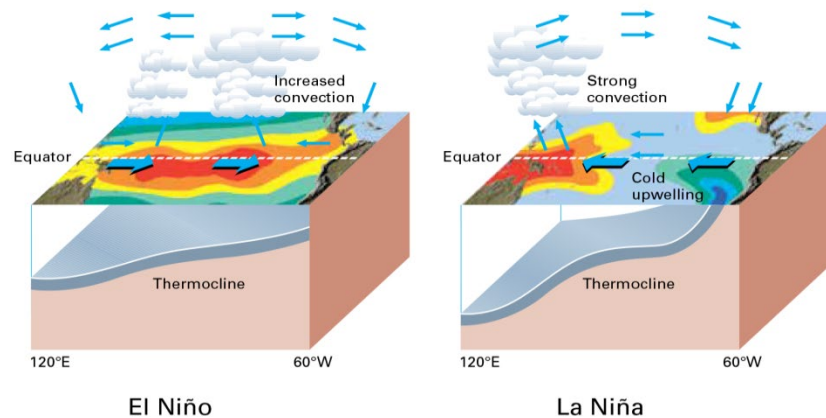
An archive of all WMO El Niño/La Niña Updates issued so far, including this one, is available at:

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

Acknowledgements

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El Niño/La Niña Background



Typical circulation patterns during El Niño/La Niña (Source: WMO, 2003, “Climate into the 21st 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 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>