



World Meteorological Organization

EL NIÑO/LA NIÑA UPDATE

Current Situation and Outlook

Since July 2016, tropical Pacific Ocean surface temperatures have approached or marginally exceeded weak La Niña levels. However, a clear atmospheric component of the El Niño/Southern Oscillation (ENSO) pattern has not become evident until recent weeks. Since early October trade winds have strengthened over the tropical Pacific Ocean, indicating that a La Niña-like atmospheric circulation pattern may be developing.

Around half of the climate models surveyed predict that weak La Niña conditions will develop during the last quarter of 2016, while the remaining models suggest a weakening to more clearly defined ENSO-neutral conditions. On the whole, model outlooks and expert opinion indicate that there is a 50-60% probability of weak La Niña conditions forming in the last quarter of 2016, and persisting into the first quarter of 2017. National Meteorological and Hydrological Services will continue to closely monitor changes in the state of ENSO over the coming months.

Following near-average ocean temperatures in the central and eastern tropical Pacific Ocean during May and June 2016, temperatures cooled to about 0.5 degrees Celsius below average by early July and have remained close to that level through early October. This slightly below-average ocean temperature is near the threshold of weak La Niña. However, until late September the atmospheric indicators were mixed, with some suggesting weak La Niña and others indicating neutral conditions. Most notably, low-level trade winds had not been consistently stronger than average over substantial portions of the tropical Pacific as would be expected during La Niña.

However, as a result of an active phase of the Madden Julian Oscillation, a tropical disturbance of clouds, rainfall, winds, and pressure that propagates eastward around the global tropics, recent weeks have seen somewhat stronger than average trade winds re-emerge in the central-west tropical Pacific Ocean.

The recently enhanced trade wind strength increases the potential for enhanced ocean-atmosphere coupling that could maintain, or further strengthen La Niña patterns. Hence if the recently strengthened trade winds persist and extend farther east in the tropical Pacific basin, there is a far greater chance for the strengthening of the coupling needed for La Niña to more clearly develop and continue into early 2017.

Around one half of the dynamical and statistical prediction models surveyed predict 3-month average sea surface temperatures in the east-central tropical Pacific Ocean to remain at least one-half degree Celsius below average during the fourth quarter of 2016, with some models predicting further cooling to near 1.0 degree Celsius below average. However, other models predict the temperatures to slowly return towards average between now and early 2017. This variation among the predictions reflects some model differences in the degree of predicted participation of the atmosphere, and the extent and time duration over which the temperature of the water below the surface will remain below average. Current estimations of probabilities for La Niña conditions in late 2016 range from 35 to 75%, with an average near 50-60%. Models indicate virtually no chance of development of El Niño during 2016 or the earliest months of 2017.

A careful watch will be maintained on the oceanic and atmospheric conditions in the tropical Pacific Ocean in the coming months to assess the possible transition to La Niña.

It is important to note that El Niño and La Niña are not the only factors that drive global climate patterns. Further, the strength of a La Niña event may not necessarily closely correspond to its climate impacts occurring in various regions of the world. At the regional level, seasonal outlooks need to assess the relative impacts of El Niño/La Niña state and other locally relevant climate drivers. For example, the sea surface temperature of the Indian Ocean, the southeastern Pacific Ocean and the Tropical Atlantic Ocean are also known to influence the climate in the adjacent land areas. Regionally and locally applicable information is 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:

- The tropical Pacific Ocean has slowly cooled to La Niña thresholds during September and October. However, it is only in recent weeks that a La Niña-like pattern in the atmosphere has become evident.
- Models surveyed and expert opinion suggest that La Niña is approximately 50-60% likely during the last quarter of 2016, persisting into early 2017.
- The most likely strength of La Niña, if it prevails, is weak; however, further strengthening to moderate levels cannot be ruled out.
- There is virtually no chance of El Niño re-development in 2016 or early 2017.

The state of ENSO will be carefully monitored. More detailed interpretations of regional climate variability will be generated 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:

http://www.wmo.int/pages/members/members_en.html

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

<http://www.wmo.int/pages/prog/wcp/wcasp/RCCs.html>

El Niño/La Niña Background

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, for example, sea temperatures at the surface 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 World Meteorological Organization (WMO).

WMO El Niño/La Niña Update

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:

http://www.wmo.int/pages/prog/wcp/wcasp/wcasp_home_en.html

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