WORLD METEOROLOGICAL ORGANIZATION

El Niño/La Niña Update
November 2018

Current Situation and Outlook

Sea surface temperatures in the east-central tropical Pacific have been at weak El Niño levels since October 2018. However, most overlying atmospheric indicators have not yet responded, and remain at ENSO-neutral (neither El Niño nor La Niña) levels. The lack of a coupled atmosphere and ocean pattern means El Niño has not yet become established. Most forecast models predict ocean temperatures will remain at El Niño levels through the remainder of 2018 and into the first quarter of 2019. The chance of a full-fledged El Niño to be established during December 2018 - February 2019 is estimated to be about 75-80%. National Meteorological and Hydrological Services will continue to closely monitor changes in the state of ENSO over the coming months.

Since October 2018, sea surface temperatures across the east-central tropical Pacific have reached weak El Niño levels. However, the atmosphere has failed to respond to this additional warmth, and hence has not yet coupled to the ocean in a manner typically associated with an El Niño event. For example, the upper level winds, cloud and sea level pressure patterns in the tropical Pacific do not yet reflect El Niño features. Since October, trade winds in the eastern tropical Pacific Ocean have briefly weakened to El Niño levels, but have not been consistently weaker than normal. An El Niño event is considered to have occurred when the tropical Pacific Ocean and the overlying atmosphere act in unison and reinforce each other, acting as a key driver for changes in global weather and climate patterns. For example, without above-average cloudiness and rainfall near and eastward of the International Date Line along the equator, the upper atmospheric heating, that triggers the atmospheric circulation changes and climate impacts away from the tropics, will not occur.

The temperature of waters below the surface of the tropical Pacific, from the west-central Pacific eastward and extending to several hundred meters below the surface, have been above average since April 2018, and most strongly so since October. This deeper warm water now extends to the surface, and is likely to sustain surface waters at El Niño-level temperatures in the coming months. El Niño-level sea surface temperatures currently observed could persist through the remainder of 2018 and into the first quarter of 2019.

Although the current El Niño condition has been limited to the ocean, model forecasts suggest that the atmosphere will begin coupling to the ocean within the coming month or two, resulting in a full-fledged El Niño that will likely endure through the first quarter of 2019.

About 90% of the models surveyed predict that the sea surface temperatures in the east-central tropical Pacific Ocean will remain at El Niño levels at least through 2018 and into the first quarter of 2019. Model predictions of the strength of the El Niño ranges from just a warm-neutral condition through to a moderate strength El Niño event, with sea surface temperatures peaking at approximately 0.8 to 1.2 degrees Celsius
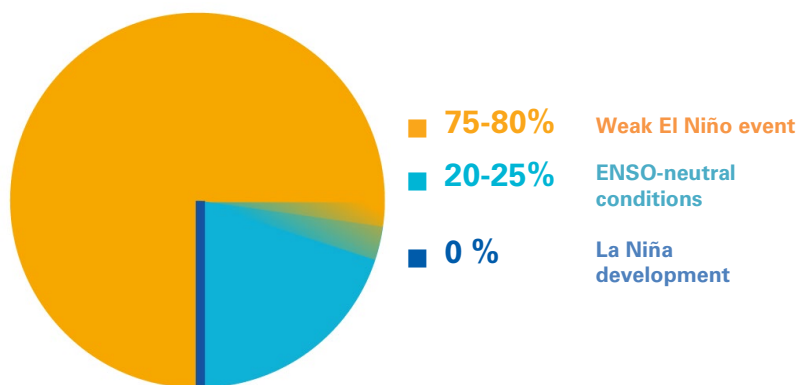
above average. Based on the model predictions and expert assessment, the probability for an El Niño event to occur is estimated to be about 75-80% for December-February, and about 60% for February-April 2019. Even if ocean conditions do remain at El Niño levels for the next several months, the chance for a strong event (sea surface temperatures in the east-central tropical Pacific rising to at least 1.5 degrees Celsius above average) is currently low.

It is important to note that El Niño and La Niña are not the only factors that drive global climate patterns, and that the strength of El Niño/Southern Oscillation (ENSO) does not automatically correspond to the strength of its effects. At the regional level, seasonal outlooks need to assess the relative effects of both the ENSO state and other locally relevant climate drivers. For example, sea surface temperatures 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:

ESTIMATED PROBABILITIES
FOR DECEMBER 2018-FEBRUARY 2019

- ■ **75-80%** **Weak El Niño event**
- ■ **20-25%** **ENSO-neutral conditions**
- ■ **0 %** **La Niña development**

- Conditions in the tropical Pacific Ocean have been at a weak El Niño level since October 2018, but the corresponding El Niño patterns have not developed in the atmosphere.
- Model predictions and expert opinion indicate a 75-80% chance that the ocean and atmosphere will couple, leading to the occurrence of an El Niño during the period December 2018-February 2019. Odds are about 60% for El Niño to continue through February-April 2019.
- Model predictions and expert opinion also lead us to expect a weak to moderate El Niño event, with sea surface temperatures of about 0.8 to 1.2 degrees Celsius above average in the east-central tropical Pacific for the December 2018-February 2019 season. A strong El Niño event appears unlikely at this stage.
- Through Northern Hemisphere spring 2019, the development of La Niña is highly unlikely.

The state of ENSO will continue to 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 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 please visit:
http://www.wmo.int/pages/prog/wcp/wcasp/RCCs.html

An archive of all WMO El Niño/La Niña Updates issued so far, including this one, is available at:
http://www.wmo.int/pages/prog/wcp/wcasp/enso_updates.html

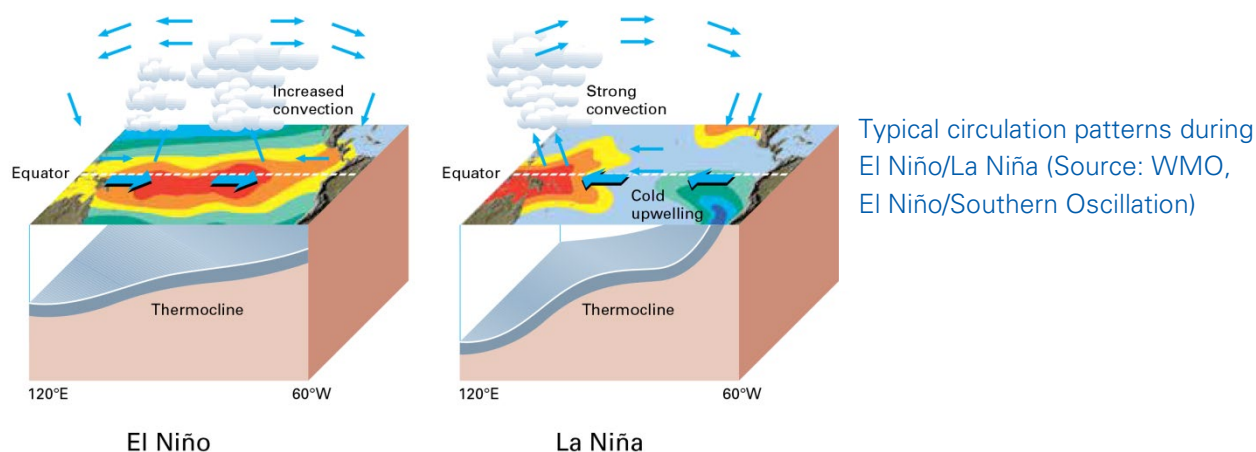For information and web links to WMO Regional Climate Outlook Forums please visit:
https://public.wmo.int/en/our-mandate/climate/regional-climate-outlook-products

Multi-model ensemble long-range predictions of global precipitation and surface temperature patterns, based on WMO Global Producing Centres of Long Range Forecasts, are available at this link for the season September through November 2018:
http://www.wmo.int/pages/prog/wcp/wcasp/LC-LRFMME/index.php

Acknowledgements

El Niño/La Niña Background

El Niño   La Niña

Typical circulation patterns during El Niño/La Niña (Source: WMO, El Niño/Southern Oscillation)

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 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