18 February 2016

World Meteorological Organization

EL NIÑO/LA NIÑA UPDATE

Current Situation and Outlook

The 2015-16 El Niño has passed its peak strength, but remains strong and continues to influence global climate patterns. It is expected to continue to weaken over the coming months, with models indicating a return to ENSO-neutral during the second quarter of 2016. Eastern and central tropical Pacific Ocean surface temperatures clearly exceeded 2 degrees Celsius above average in late 2015, providing evidence that the 2015-16 El Niño is one of the strongest on record, comparable with the 1997-98 and 1982-83 events. National Meteorological and Hydrological Services will continue to monitor the decline of this El Niño, and assess likely local impacts.

During January and early February 2016, eastern and central tropical Pacific Ocean surface temperatures were in excess of +2.0 degrees Celsius above average, signifying a very strong El Niño event. As is typically observed, the El Niño reached its peak ocean temperature departure from average during November and December, but has since declined by about half a degree.

Atmospheric indicators of El Niño have remained strong and consistent during recent months. This includes lower atmospheric pressure across the central and eastern Pacific Ocean, weakened low-level Pacific trade winds, and above-average cloudiness and increased rainfall near and east of the International Date Line. Historically, El Niño events reach maximum strength between October in the year of onset and January of the following year, and often persist through much of the first quarter of that year before returning to neutral conditions. This El Niño has been following a similar timeline, but because of its strength it will likely continue well into the second quarter of 2016.

During the past nine months, temperatures below the surface of the tropical Pacific to the east of the international dateline have been substantially above average in response to several periods of weakened trade winds. During the most recent couple of months, these subsurface temperatures

have declined after the El Niño peaked, but still remain well above average. The remaining excess subsurface heat is expected to maintain sea surface temperatures at well above average levels during the first quarter of 2016. During January 2016, a particularly marked weakening of the trade winds in the central tropical Pacific Ocean caused a slight resurgence of the temperatures below the surface. This additional subsurface heating could lead to an increase in sea surface temperatures in the far eastern tropical Pacific Ocean in late February or March.

Currently, all of the dynamical and statistical prediction models surveyed predict 3-month average sea surface temperatures in the east-central tropical Pacific to decline in the coming months, but three-quarters of the models predict 3-month average temperatures to remain at least +1.0 degrees Celsius above average through the March-May season. There is a high likelihood that the current above-average ocean temperatures in the east-central tropical Pacific will decline but continue at moderate to strong El Niño levels through February and into part of March, before declining to weak to moderate El Niño levels through April and into May.

The peak 3-month mean strength, as indicated by the sea surface temperature of over 2 degrees Celsius above average during the last months of 2015, make this El Niño comparable to the previous very strong events of 1982-83 and 1997-98. While the peak ocean temperatures themselves were approximately as strong as those of the 1997-98 event, some other aspects of this El Niño have been somewhat less exceptional, such as the sea surface temperature in the eastern one-third of the tropical Pacific and the eastward extent of enhanced cloudiness and rainfall along the equator. A more detailed retrospective analysis of the oceanic and atmospheric characteristics of this El Niño is required to more comprehensively establish its strength relative to the other strongest past events. Nonetheless, overall this event is considered very strong. A careful watch will be maintained on the oceanic and atmospheric conditions over the tropical Pacific in the coming months to better assess its rate of dissipation.

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 an El Niño event does not necessarily closely correspond to its effects on regional climate. At the regional level, seasonal outlooks need to assess the relative impacts of both the El Niño/La Niña state and other locally relevant climate drivers. For example, the state of the Indian Ocean, the south-eastern Pacific or the tropical Atlantic sea surface temperature are capable of affecting the climate in adjacent land areas. Regionally and locally applicable information is available via regional/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:

- As of February 2016, both the ocean and atmosphere over the tropical Pacific indicate the continued presence of a strong El Niño, but poised towards a gradual decline;
- The majority of the models surveyed and expert opinion suggest the 2015-16 El Niño will remain strong through much of the first quarter of 2016, and will not return to neutral until well into the second quarter;
- The peak 3-month average strength of this El Niño, in terms of sea surface temperature anomalies observed during the final quarter of 2015, make this event comparable to the very strong 1982-83 and 1997-98 El Niño events;
- Impacts in some regions are expected to continue even during the decline of El Niño events, especially for strong events such as this one. Such impacts in the affected regions are expected through the first quarter and well into the second quarter of 2016.

The situation in the tropical Pacific 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 the NMHSs. For web links of the NMHSs, please visit:

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

For information and web links to WMO RCCs 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 in 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

Acknowledgements

The WMO El Niño/La Niña Update is prepared through a collaborative effort between the WMO and the International Research Institute for Climate and Society (IRI), USA, and is based on contributions from experts worldwide, *inter alia*, of the following institutions: African Centre of Meteorological Applications for Development (ACMAD), Armenian State Hydrometeorological and Monitoring Service (ARMSTATEHYDROMET), Asia-Pacific Economic Cooperation (APEC) Climate Centre (APCC), Australian Bureau of Meteorology (BoM), Australian Centre for Sustainable Catchments of the University of Southern Queensland, Badan Meteorologi Klimatologi dan Geofisika (BMKG) – the Meteorological, Climatological and Geophysical Agency of Indonesia, Centro Internacional para la Investigación del Fenómeno El Niño (CIIFEN), China Meteorological Administration (CMA), Climate Prediction Center (CPC) and Pacific ENSO Applications Centre (PEAC) of the National Oceanic and Atmospheric Administration (NOAA) of the United States of America (USA), Climate Variability and Predictability (CLIVAR) project of the World Climate Research Programme (WCRP), Comisión Permanente del Pacífico Sur (CPPS), El Comité Multisectorial Encargado del Estudio Nacional del Fenómeno El Niño (ENFEN) of Peru, European Centre for Medium Range Weather Forecasts (ECMWF), Météo-France, Fiji Meteorological Service, IGAD (Inter-Governmental Authority on Development) Climate Prediction and Applications Centre (ICPAC), Instituto Nacional de Meteorologia e Hidrologia (INAMHI) of Ecuador, the IRI, Japan Meteorological Agency (JMA), Korea Meteorological Administration (KMA), Mauritius Meteorological Services (MMS), Met Office in the United Kingdom (UKMO), National Center for Atmospheric Research (NCAR) of the USA, Southern African Development Community Climate Services Centre (SADC-CSC), Tasmanian Institute of Agriculture, Australia, and the University of Colorado, USA.