16 March 2015

World Meteorological Organization

EL NIÑO/LA NIÑA UPDATE

Current Situation and Outlook

Since late October 2014, sea surface temperatures in the tropical Pacific Ocean have remained at near-borderline to weak El Niño levels. However, many atmospheric features of El Niño have displayed only weak or short-lived responses to the warming. For example, the pattern of cloudiness and rainfall anomalies has not been well defined. Models and expert opinion suggest a continuation of warm-neutral to weak El Niño conditions through April and May of 2015.

Most models suggest tropical Pacific temperatures will exceed El Niño thresholds toward the middle of the year. However, many models currently show a substantial spread in their outlooks for tropical Pacific Ocean temperatures, consistent with the known period of lower skill in longer lead predictions made at this time of year. This spread indicates that a range of outcomes remain possible, from neutral to a substantial El Niño event. This spread will narrow in the coming months as skill levels increase. National Meteorological and Hydrological Services and other agencies will continue to monitor Pacific Ocean conditions for further El Niño developments, and will assess the most likely local impacts.

As of early March, there have been more than five months when east-central tropical Pacific Ocean surface temperatures have ranged been 0.5° to 1.0° Celsius above average, which would typically indicate borderline to weak El Niño ocean conditions. However, despite this oceanic warmth, atmospheric indicators of El Niño have been weak or have appeared only intermittently. For example, the pattern of cloudiness and rainfall failed to show an El Niño-like pattern until early February, and even then the response was short-lived. This indicator is important because above average rainfall in the vicinity of the international dateline is considered essential in triggering El Niño's global climate impacts. Recently, temperatures below the surface of the tropical Pacific have increased in response to a weakening of the trade winds. This excess subsurface heat has the potential to further warm the tropical Pacific sea surface in the coming several months. On the other hand, March and April are usually months of dissipation of El Niño and La Niña episodes, decreasing the likelihood of El Niño ocean conditions emerging during these months.

The latest outlooks from climate models and expert opinion suggest approximately equal chances for either warm-neutral or weak El Niño ocean conditions from March through May 2015. Toward the middle of the year, a majority of models suggest El Niño conditions, while some models predict only warm-neutral tropical Pacific sea surface temperatures. It is important to note that longer range forecasts made during the first quarter are known to have lower skill than forecasts made at other times of year, as the Pacific ocean-atmosphere system is in a markedly fluid state between April and June. Hence, outlooks tend to have a higher degree of spread at this time, suggesting

2015 outcomes could range from neutral to strong El Niño conditions. As a result, while current forecasts imply that a careful watch must be kept on the tropical Pacific Ocean temperatures, it is too early to assess the strength of any potential event.

It is important to note that El Niño and La Niña are not the only factors that drive global climate patterns. 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 Dipole, or the Tropical Atlantic SST Dipole, may impact the climate in the adjacent land areas. 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:

- Tropical Pacific Ocean surface temperature anomalies from October 2014 to present have been 0.5°to 1.0° Celsius above normal, which have approached or exceeded various El Niño thresholds. Some atmospheric indicators have also reached El Niño thresholds for brief periods, while others have remained neutral during the recent several months;
- An important atmospheric variable that has not shown a pattern indicative of El Niño is cloudiness and rainfall, which has remained near average across the central and eastern tropical Pacific during most of the recent months;
- As of early March 2015, model outlooks suggest ocean temperatures will remain warmer than average, and possibly in excess of weak El Niño thresholds, into the second quarter of 2015;
- A majority of models predicts El Niño to develop around mid-year. However, forecasts made during the first quarter have less skill than forecasts made at other times of year; hence current outlooks range from warm-neutral to various strengths of El Niño.

The situation in the tropical Pacific and Indian Ocean 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 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 on WMO Regional Climate Centres (RCCs) and links 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 once 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.