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IRI

International Research Institute
For Climate Prediction

World Meteorological Organization

EL-NIÑO OUTLOOK

El Niño Outlook

Climate Patterns in the Pacific

Research conducted over the past few decades has thrown 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 temperature at the surface in the central and eastern tropical Pacific Ocean becomes substantially warmer than normal. During La Niña events, the sea surface temperatures in these regions become colder than normal. These temperature changes can drive major climate fluctuations around the globe and once initiated, such events can last for 12 months or more. The last El Niño event occurred during 1997-1998 and was followed by a prolonged La Niña phase that extended from mid-1998 to early 2001. El Niño events change the likelihood of particular climate patterns around the globe, but the events are never exactly the same.

Current Situation and Outlook

Historical records show the approximate March-June period to be a favoured one for transitions to El Niño or La Niña, and hence considerable discussion can be expected around this time of the year regarding possible developments in the tropical Pacific. This year the discussion is especially intense and while most expert interpretations indicate that the likelihood of an El Niño onset in 2002 is the largest it has been since the 1997/98 El Niño event, the prediction of El Niño is still a maturing science. There is currently a range of expert opinion on just how certain continuing El Niño development is, with a few believing that development into a Pacific basin-wide El Niño is most likely but the majority believing such development is only slightly more likely than not, and therefore emphasizing that uncertainty still exists.

During February, as anticipated in the last statement (issued Feb. 6), warm water emerged at the surface along the coast of South America and the easternmost parts of the Equatorial Pacific. This has strongly impacted climate patterns in surrounding areas including enhanced precipitation in coastal regions of Peru and Ecuador. For example, OCHA reported that heavy rainfall caused floods and landslides, with loss of life and substantial impacts on agriculture and power supply.

The question forecasters are now considering is whether this warming will spread over the whole central and eastern tropical Pacific and lead to the development of a Pacific basin-wide El Niño. A further westerly wind burst in the Equatorial western Pacific occurred during February and is likely to kick the ocean further toward El Niño conditions, though the burst was not as strong as the one in December, that was believed to be responsible for the current warming off the coast of South America.

Indications continue to be uncertain at this time from forecast models on whether the situation will develop further over the coming months into an El Niño event. The current conditions beneath the

tropical Pacific are still generally thought to be insufficient alone to guarantee onset of an El Niño, and further developments will be watched for in the next few weeks and months. Existing unusually warm conditions in the Equatorial Pacific near the dateline continue to be a factor that could contribute to developments.

Even if El Niño conditions do not develop, it is still possible for significant climate fluctuations to occur in the next several months in different parts of the globe, including the Pacific. For example, sea surface temperatures (SST) along the equator around the dateline are currently warmer than normal, which is having an effect on the atmospheric circulation in this region and further afield. Furthermore, seasonal climate fluctuations have many causes, involving patterns of SST beyond the Pacific and factors other than sea-surface temperature. For example, regional climate fluctuations can be driven by SST patterns in the tropical Atlantic and tropical Indian Oceans. However, forecasts of SST patterns in these ocean basins currently have very limited skill. This is largely due to inadequate observations of conditions beneath the ocean surface, and the lack of understanding of the mechanisms of systematic SST changes in these ocean basins.

In summary:

- As anticipated in the last statement, warm water has appeared at the surface close to the coast of South America and is now also evident extending along the Equator into the easternmost parts of the Pacific Ocean.
- The large-scale situation remains favourable for El Niño, and a westerly wind burst during February in the Equatorial western Pacific is a further favourable factor.
- Unusually warm waters over a large area already exist near the dateline and are influencing tropical circulation there.
- Different computer models still vary on whether the situation will develop further into what is commonly referred to as an El Niño event.
- While most expert opinions see some increase in the likelihood of El Niño since the last statement on Feb. 6, most emphasize that uncertainty exists, though with the development of an El Niño in 2002 now slightly more likely than not.
- No evidence of substance is available on the likely strength of El Niño, should it develop. It should be remembered that the 1997/98 event was by many measures, the strongest event during the 20th Century.
- More information on the risk of El Niño development for 2002 is expected to become available over the next couple of months.

The situation in the tropical Pacific will therefore continue to be carefully monitored and further advisories will be issued. More detailed interpretations for regional climate fluctuations are likely to be generated routinely by the climate forecasting community over the coming months and will be made available through National Meteorological Services.

Monitoring and Forecasting the El Niño/La Niña Phenomenon

The forecasting of Pacific Ocean developments is undertaken in a number of ways. Complex computer 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.

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