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International Research Institute  
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# EL-NIÑO OUTLOOK

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## 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 modulating 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.

### **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. Most expert interpretations indicate that it is rather early in the year for a confident El Niño outlook to be made for the remainder of 2002. However, both the slow evolution of the tropical Pacific over the last several seasons and recent developments over the last couple of months are leading the experts to watch the situation very closely and to remain alert.

The conditions beneath the surface of the Equatorial Pacific that have attracted attention were largely triggered by a burst of westerly winds in the Equatorial western Pacific during December. This burst created a pulse of warmer than normal water beneath the surface that is currently migrating toward the eastern Pacific and is expected to rise to the surface during February.

The indications are very uncertain at this time from forecast models on whether the appearance of this warm mass of water at the surface might develop further over the coming months into an El Niño event. The current conditions beneath the tropical Pacific are generally thought to be not sufficient alone to trigger an El Niño, and further developments will be watched for in the next few weeks and months. A feature that could enhance the development of an El Niño would be the onset of further westerly wind bursts in the Equatorial western Pacific. Existing unusually warm conditions in the Equatorial Pacific near the dateline could also 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:

- Warm water is expected to appear at the surface in the eastern Equatorial Pacific in February.
- Unusually warm waters over a large area already exist near the dateline and are influencing tropical convection.
- Different computer models vary on whether the situation will develop further into what is commonly referred to as an El Niño event.
- The potential for the onset of El Niño events in the past has generally been clearer towards the end of the first quarter of the year.

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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