WORLD METEOROLOGICAL ORGANIZATION

El Niño Outlook

December 2002

Current Situation and Outlook

The last statement (issued 29 August 2002) reported agreement among forecasters that the climate system was in the early phase of an El Niño event that was expected to continue into early 2003. This prediction has become firmer and more confident. Beyond the timeframe of June 2003, predictions are sufficiently uncertain such that additional guidance cannot be provided at this time, and further updates will be provided as new information becomes available.

Since late May, sea surface temperature across much of the Central Equatorial Pacific has been greater than 1 degree Celsius above normal. These temperatures were around 1 degree Celsius above normal up to August. Since August there has been some continued further warming with temperatures now typically about 1.5 to 2 degrees Celsius above normal and the warmth has spread eastwards to affect the coast in October. This warmth is expected to continue through early 2003 with this El Niño event. Although weaker than the 1997/98 event, which featured sea surface temperature anomalies as much as 3-4 degrees Celsius above normal over the central and eastern Pacific, this is already a moderate El Niño event and its impacts are already apparent.

As with most El Niño events, the climate system has responded to this unusual warmth in the tropical Pacific, with shifts in rainfall and weather patterns from “normal”. These changes include the unusual nature of the summer monsoon season across the Indian Subcontinent, the dry conditions over Indonesia and across large tracts of the Australian continent, and the recent enhancement of rainfall in SE USA and south-eastern South America (southern Brazil, Uruguay and northern Argentina).

Interpretation by forecasters of the prevailing climate patterns and model predictions are all in good agreement that the approximate magnitude of the current sea surface temperature anomaly in the central and eastern Equatorial Pacific will continue into early 2003. Boreal Spring is known to be the usual time of year for rapid developments in the tropical Pacific. Historical records show that from a prevailing El Niño in December many different outcomes are possible by the end of the boreal spring period, including the development of La Niña conditions, a slow decay of El Niño conditions, or a continuation of El Niño into a second year. The latter evolution is least likely based on the historical records. However, it is too early for climate models to make reliable projections for the middle of 2003 and beyond.

Therefore, from now until approximately April-May 2003, there will be a tendency for climate patterns, broadly consistent with previous El Niño events. Central and eastern Equatorial Pacific sea surface temperatures are not expected to reach the level of the last, very strong El Niño event of 1997/98, when they were several degrees above normal. However, conditions in the tropical Pacific are expected to be sufficiently anomalous to continue to create significant consequences in some regions.

No two El Niño events are identical and the evolution of this event has had its share of distinguishing features. One of these has been the tendency since late May for the tropical Pacific warming to be less intense, at least so far, in the extreme eastern Pacific close to South America. The far western tropical Pacific is typically colder than normal once El Niño conditions are established. A more recent distinguishing feature is the pattern of unusual warmth in the

far western tropical Pacific and eastern Indian Ocean, that has developed during November, and which could become an additional factor in the climate of this region in the coming months.

Therefore, when considering response strategies, it will be important to consult National Meteorological Services for detailed interpretations of possible regional consequences of the current El Niño event. These interpretations will take into account that local and regional seasonal climate fluctuations may have many additional causes, involving patterns of sea surface temperature (SST) beyond the Pacific and factors other than SST. For example, regional climate fluctuations can be driven by SST patterns in the tropical Atlantic and tropical Indian Oceans.

However, it must be emphasised that 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:

- Sea-surface temperatures across the vast region of the Central and Eastern Equatorial Pacific are now about 1.5 to 2 degrees Celsius above normal, a level that is in the middle of the range experienced during past El Niño events.

- This pattern in the tropical Pacific, together with analysis of current conditions beneath the surface of the ocean and forecast projections from models, indicate that we are approaching the mature stages of an El Niño event that will persist through to at least the early months of 2003.

- Any decay of the warming during January-February is not expected to be substantial, and a tendency for climate patterns typical of El Niño should be anticipated to at least April-May 2003. The warming in the tropical Pacific is not expected to reach levels that were experienced in 1997/98. Nonetheless, severe consequences in particular regions are to be expected.

- Some unusual climate patterns observed since May 2002 are related at least in part to the basin-wide El Niño that is underway in the tropical Pacific. However, especially away from the tropical Pactlic and nearby regions, the climate system functions by integrating many factors in addition to El Niño. Thus, while some atypical climate patterns in the immediate vicinity of the tropical Pacific can be attributed with high confidence to the prevailing El Niño conditions, for more distant climate patterns, the role of El Niño may be better viewed as an influencing factor.

- From a prevailing El Niño state in early boreal winter (as is current now), historical records show that many different outcomes are possible by the end of the boreal spring period, including the development of La Niña conditions, a slow decay of El Niño conditions, or a continuation of El Niño into a second year. Historical records show the latter outcome to be the least likely. However, forecast models are not reliable at projecting such developments at this time of year, and forecasters will in the next few months be watching for any early signs of conditions to expect in the middle of 2003.

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

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 higher than normal. During La Niña events, the sea surface temperatures in these regions become lower 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. Furthermore, while there is generally a relationship between the global impacts of an El Niño event and its intensity, there is always potential for an event to generate serious impacts in particular regions irrespective of its intensity.

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 Niiio and La Niiia 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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