

La Niña follows El Niño, the GLOBE El Niño Experiment continues

A La Niña is occurring!

In April 1997, a major El Niño event began in the equatorial Pacific. A mass of warm water, larger in volume than the entire Great Lakes of North America, shifted eastward toward the coast of South America and began to alter weather patterns all over the world.

GLOBE students have used their atmospheric measurements to track the effects of El Niño on their local weather. The El Niño event is now over, but the opposite climate phenomenon – La Niña – is now underway. Once again, GLOBE students had the opportunity to track the effects of this major climatic event and to help scientists better understand this phenomenon.

What is a La Niña?

Like El Niño, La Niña is a major shift in the ocean-atmosphere system in the tropical Pacific. The atmosphere and oceans of our planet are always in motion, and these motions generally follow general circulation patterns. In the equatorial Pacific Ocean, there are three patterns – a normal pattern, an El Niño or warm pattern, and a cold pattern sometimes called La Niña, which is Spanish for "the girl." The warm and cold terms describe conditions in the eastern tropical Pacific Ocean. La Niña's effects on the world's climate seem to be the opposite of El Niño's, but it is unclear how exactly the two are related. Often, but not always, La Niña events follow an El Niño.

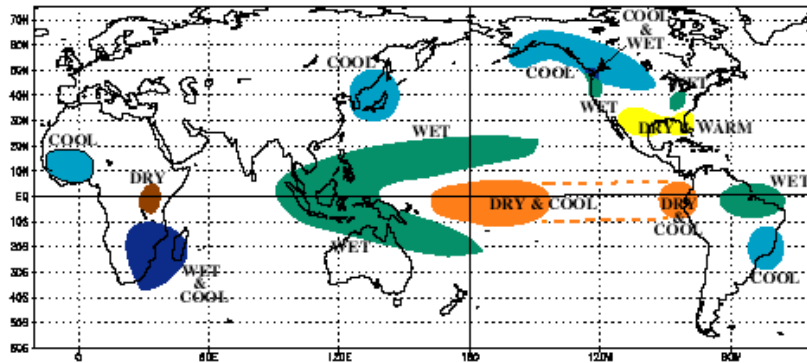
Using buoys, satellites, and island monitoring stations, scientists observed a shift to a La Niña pattern beginning in July 1998. This shift is expected to affect the circulation patterns in other regions as well. Scientists call this overall phenomenon the El Niño Southern Oscillation or ENSO for short.

What are the effects of La Niña?

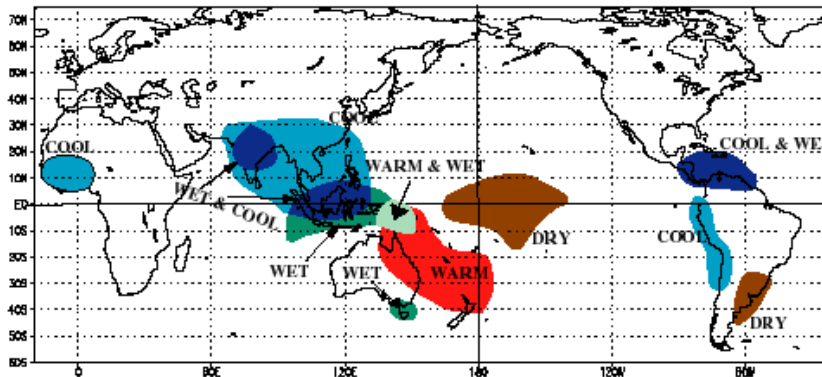
The effects of a La Niña event are first noticed in the countries near the equator bordering the Pacific Ocean. For example, northern Australia and Indonesia experience severe rains and flooding while much of the coastal regions of Peru and Chile experience droughts. After a few months, the regions affected grow to include the temperate zones, particularly the subtropics.

Based on past ENSO patterns and on models of the general circulation of the atmosphere and oceans, scientists are predicting abnormally wet, dry, warm, or cold conditions for different regions at different times. These predictions are really hypotheses that can be tested by observing what actually happens to air temperature, precipitation, soil temperature and moisture, and other environmental properties. The maps below show one set of predictions based on past events. Maps of historical data and model predictions also are available as special GLOBE visualizations.

COLD EPISODE RELATIONSHIPS DECEMBER - FEBRUARY



COLD EPISODE RELATIONSHIPS JUNE - AUGUST



Cold Episode Relationships; courtesy NOAA Climate Prediction Center NCEP

During a La Niña event (cold episode), trade winds pick up, pushing even more warm water toward Indonesia and the western Pacific. Temperatures in the Tropical Pacific drop to below normal. As a result wetter than normal conditions are predicted over northern Australia and Indonesia during the northern winter season (December-February). Wetter than normal conditions are also expected over southeastern Africa and northern Brazil during these months. However, drier than normal conditions are expected along the west coast of tropical South America during their winter season. In the United States, La Niña events usually result in wetter than normal conditions across the Pacific Northwest and drier and warmer than normal conditions across much of the south.

If the La Niña event is strong enough to effect the jet streams - a major component of the global wind pattern - its effects are often more volatile than El Niño's. For example, while El Niño influenced jet stream patterns often help keep hurricanes away from the eastern coast of the United States, hurricanes during La Niña could become more frequent and intense.

How did students participate in the on-going GLOBE El Niño-Southern Oscillation Experiment?

As with El Niño, GLOBE students helped test the La Niña predictions or hypotheses for their areas by taking GLOBE measurements faithfully and carefully. The predictions given in the maps above focus on temperature and moisture, therefore special effort was devoted to measurements of air, surface water,

and soil temperature, solid and liquid precipitation, and soil moisture. Other GLOBE measurements remain important as well and provided additional opportunities to help scientists understand the full effects of La Niña.