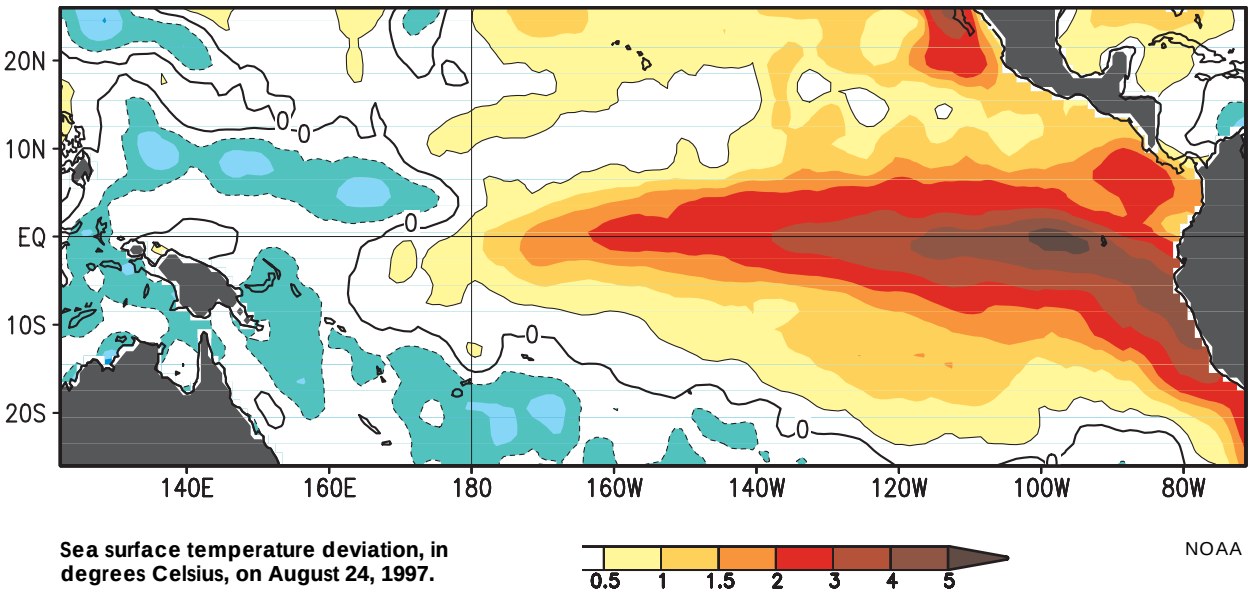
THE
ATMOSPHERIC RESERVOIR
Examining the Atmosphere and Atmospheric Resource Management

The El Niño Southern Oscillation



Sea surface temperature deviation, in degrees Celsius, on August 24, 1997.

by Bruce Boe

For some years now, we've been hearing the term *El Niño* (pronounced el-NEEN-yo). We've come to associate the El Niño with unusual weather patterns—some say drought, others say excessive precipitation. Now, with another particularly strong El Niño in progress, speculation once again abounds about what we should expect. But, before we get to the "what to expect" part, we need to understand the phenomenon.

The El Niño is a marked warming of the sea surface water in the Pacific Ocean off the coasts of Peru and Ecuador. Fishermen who ply those waters have known for centuries of the phenomenon, which often occurs during the months of December and January. For this reason, the South American fishermen have called the phenomenon the El Niño, which is Spanish for "The Child," because it is frequently manifested about the time of the celebration of the Christ Child's birth. Today, climatologists often call it the El Niño Southern Oscillation, or ENSO.

In normal years, when there is no El Niño, the equatorial trade winds tend to blow from east to west across the coastal waters of the eastern Pacific (off the coast of South America). These winds tend to drag the surface waters westward, which in turn allow colder, deeper water to rise to the surface along the coast. This *upwelling* of deep ocean waters bring with it nutrients upon which the surface fish population depends for survival.

In an El Niño, the westward trade winds weaken, and the upwelling of cool water ceases. The consequent warming of the sea surface further weakens the trade winds and strengthens El Niño. Without upwelling, the nutrients which feed the fish are no longer available, and the fishing industry is ended until normal conditions return.

The resulting changes in sea surface temperature in turn affect the weather patterns, which may have a "ripple effect" worldwide. A typical El Niño, which lasts only a few months, may not have such dramatic impacts, but longer, more pronounced events are thought to be responsible for droughts in some areas, and excessive moisture, heat, or cold in others.

Because, like other weather patterns, no two El Niños are quite the same, the exact impact is difficult to predict. However, experts agree that there are some generalizations that can be made. Stronger El Niños tend to result in wetter than average winter weather in the southeast United States, and warmer than average temperatures in the northern Great Plains. The present episode is fairly strong, but may be beginning to wane. ■

Atmospheric Resource Board
North Dakota State Water Commission
900 East Boulevard, Bismarck, ND 58505
701) 328-2788
Internet: http://www.swc.state.nd.us/ARB/

ND Weather Modification Association
PO Box 2599, Bismarck, ND 58502
701) 223-4232