

El Niño

An El Niño is a disruption in the normal ocean circulation that affects the weather worldwide. Relatively small changes in ocean temperature over large areas can make very big changes in the weather patterns. An El Niño is a natural event which occurs every 5-10 years. The term "El Niño" was first used by those who fish the waters off the coasts of Ecuador and Peru to refer to the warm current that appears around Christmastime, causing a decline in the fish population.

How does it work?

In a normal year, the easterly (westward-blowing) trade winds push warm surface water against the western boundary of the Pacific Ocean near Australia and Indonesia, while nutrient-rich cold water wells up along the west coast of South America, helping fish thrive. TOPEX/Poseidon has tracked this buildup of warm water in the western Pacific Ocean, which can be as much as 1 meter higher than that in the eastern Pacific.

An El Niño occurs when the trade winds over the equator weaken and even reverse direction; that is, they blow from west-to-east. This allows the warm "pile" of water normally held against the western shore of the Pacific to move eastward along the equator. When this bulge of warm water reaches South

America, it moves north and south along the coast for hundreds of miles. When the warm water bulge is against the shore of South America, the normal upwelling of cool nutrient-rich water is prevented. As a result, there is little for fish to eat and, in turn, few fish for people to eat. The ocean also affects the atmosphere. With the warm ocean, there is an increase in evaporation and subsequent precipitation over the mountains in that area. The effects of the El Niño reach considerably further than the area surrounding the tropical Pacific; jet streams are altered all over the world, and many places have weather that is very different from normal.

The change in the trade winds which leads to El Niño has yet to be fully understood. The trade winds are controlled by the interaction between the atmosphere and the ocean, with sea-surface temperature an especially important factor. Scientists are working to understand how and why the trade winds change so that we can better predict El Niños.

