

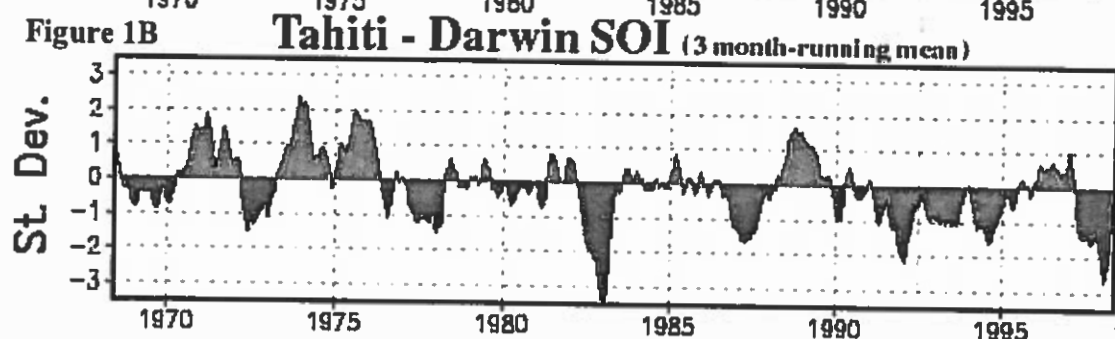
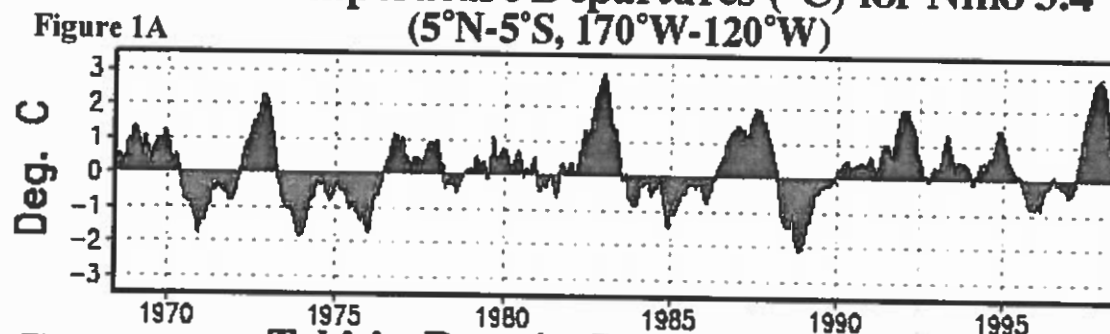
Can You Predict *El Niño*?

In 2009, scientists were concerned that 2009-2010 could be an *El Niño* year. You and your group members are a team of scientists working at NOAA. Other scientists and the media would like to know your opinion about this possibility, and what this will mean for the global weather.

Part I. The Historical Record

Figure 1A shows sea surface temperature (SST) anomalies over time for a specific region of the eastern equatorial Pacific Ocean basin (region 3.4 as referred to in the figure title). A temperature anomaly (shown on the y axis) refers to the amount the temperature is above or below a normal or average temperature, not the actual temperature itself. Figure 1B shows the Southern Oscillation Index (SOI), a measure of large-scale air pressure differences that occur between the eastern and western tropical Pacific Ocean basins, as measured between Tahiti and Darwin, Australia. Answer questions 1-5 below related to each figure.

Ocean Temperature Departures (°C) for Niño 3.4 (5°N-5°S, 170°W-120°W)



⁴ Photo: http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/ensocycle/soi.shtml; Accessed, April 2011

1. What does SST stand for?
2. Explain what SST anomaly means. Indicate what it means when the anomaly is positive and when the anomaly is negative.
3. In Figure 1A, the area before 1970, were ocean temperatures recorded as warmer or cooler than average? In 1975?
4. In Figure 1A, determine which sets of years had the five highest, positive SST anomalies in the eastern equatorial Pacific. Do you think these years are *El Niño* or *La Niña* years? Explain.
5. Examine Figure 1B for the same years you selected in question (3). What do you notice about the sign (positive or negative) and magnitude of the values of SOI on the y-axis? How do these values compare to the corresponding sea surface temperatures in Figure 1A?

Part II. Is 2009-2010 an *El Niño* year? You decide!

Next you will want to look at some data to determine whether you think an *El Niño* event is occurring in 2009-2010. Remembering what you learned earlier today, look at the SST data below you've collected at NOAA and answer the questions.

SEP 2009 SST Anomaly (°C)

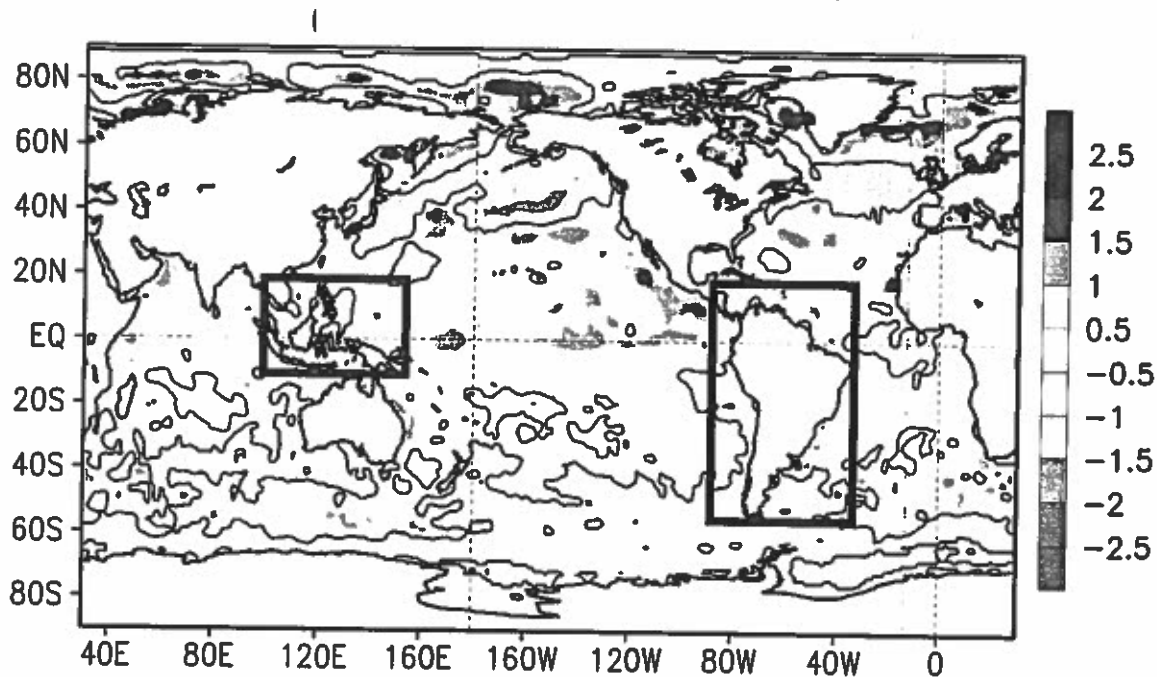


Figure 2. This graph shows temperature anomalies for the equatorial Pacific during September 2009. The horizontal axis represents the latitude of earth – the map is showing the ocean between the Americas (black square) and Western Pacific Islands (red square). The color key shows sea surface temperature anomalies.

1. Interpret the color scheme of Figure 2. What do the numbers next to each color represent? What does it mean if a place on the map is colored red, yellow or orange? What about if a place is colored blue?
2. South America is located in the black box on the map in Figure 2. Look at the temperature of the Pacific Ocean off the west coast of the Northern part of South America at the equator (line labeled EQ). Was it hotter or colder than normal in September 2009?

3. Locate the lightly dotted line that corresponds to the equator in Figure 2 (labeled EQ). Trace this line all the way across the Pacific Ocean from South America until you hit Indonesia (in the red box). Is the water you pass through for the most part hotter or colder than normal?

4. Does this temperature anomaly map in Figure 2 (Sept 2009) look more like you would expect for a normal year or an *El Niño* year? Why?

Next, use figure 3 (next page) to answer questions 5 -11 to help further determine if you think an *El Niño* event is occurring in 2009-2010.

5. Look at the part of the Figure 3 labeled JUL2009. In this month, was it mostly colder in the equatorial Pacific near South America, or mostly warmer than normal?

6. As you move down the graph from July 2009 to Sept 2009, what do you notice about the water temperature between Indonesia and South America?

7. Weakening of which wind pattern could explain the Eastward warming you are observing in Figure 3?