



This is the print version of the [Skeptical Science](http://sks.to/pdo) article '[It's Pacific Decadal Oscillation](http://sks.to/pdo)', which can be found at <http://sks.to/pdo>.

What The Science Says:

The PDO shows no trend, and therefore the PDO is not responsible for the trend of global warming.

Climate Myth: It's Pacific Decadal Oscillation

"The Pacific Decadal Oscillation (PDO) is a temperature pattern in the Pacific Ocean that spends roughly 20-30 years in the cool phase or the warm phase. In 1905, PDO switched to a warm phase. In 1946, PDO switched to a cool phase. In 1977, PDO switched to a warm phase. In 1998, PDO showed a few cool years. Note that the cool phases seem to coincide with the periods of cooling (1946-1977) and the warm phases seem to coincide with periods of warming (1905-1946, 1977-1998)." ([The Reference Frame](#))

The Pacific Decadal Oscillation (PDO) is a climate phenomenon that occurs primarily in the North Pacific Ocean. The "oscillation" happens between warm phases (positive values) and cool phases (negative values) that last anywhere from 10 to 40 years. The phases are associated with changes in sea surface temperatures (SST). While the causes of the PDO are still unknown, the primary effects seem to be changes in northeast Pacific marine ecosystems and a changing jet stream path.

Important to note, however, is that the phases are not set in stone; there are frequently short sets of 1-5 warm years during a cool phase and vice-versa. Secondly, the "warm" and "cool" phases are less descriptive than they would appear. The cool period, for instance, is actually associated with extremely high sea surface temperatures in the Northern Pacific (see image below).

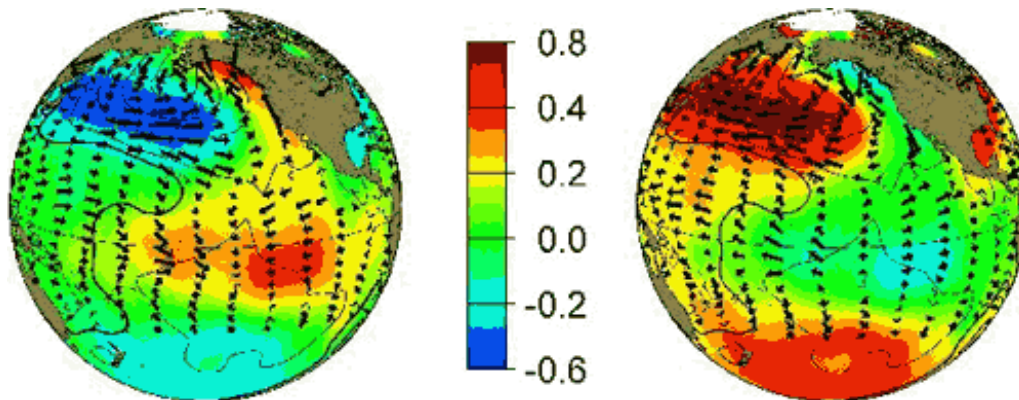


Figure 1: PDO warm phase (left) and cool phase (right). Image courtesy of [JISAO](#).

One way to test this skeptic theory is to plot the Global Temperature Anomaly alongside the PDO Index (shown below). What we find is that although the PDO index appears to influence short-term temperature changes, global temperatures have a distinct upward trend, while the PDO Index does not.

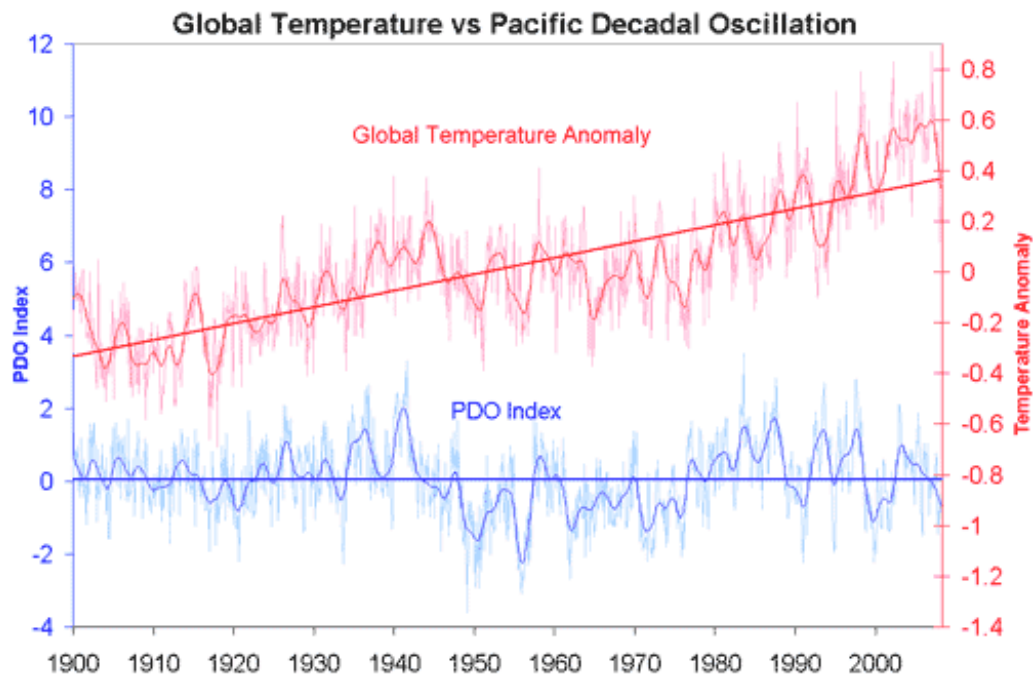


Figure 2: Pacific Decadal Oscillation index (blue, [University of Washington](#)) versus Global Temperature Anomaly (Red - [GISS Temp](#)). Smoothed data (thicker blue and red lines) and trend lines (thick straight line) are added.

Natural oscillations like PDO simply move heat around from oceans to air and vice-versa. They don't have the ability to either create or retain heat, therefore they're not capable of causing a long-term warming trend, just short-term temperature variations. Basically they're an example of internal variability, not an external radiative forcing. If PDO were responsible for warming the surface, the oceans would be cooling, which [is not the case](#).

These results are expected. The [long term warming trend](#) is a result of an energy imbalance [caused primarily by an increase of greenhouse gases in the atmosphere](#). In contrast, the PDO is an internal process and does not increase or decrease the total energy in the climate system.



Skeptical Science explains the science of global warming and examines climate misinformation through the lens of peer-reviewed research. The website won the Australian Museum 2011 Eureka Prize for the Advancement of Climate Change Knowledge. Members of the Skeptical Science team have authored peer-reviewed papers, a [college textbook on climate change](#) and the book [Climate Change Denial: Heads in the Sand](#). Skeptical Science content has been used in university courses, textbooks, government reports on climate change, television documentaries and numerous books.



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