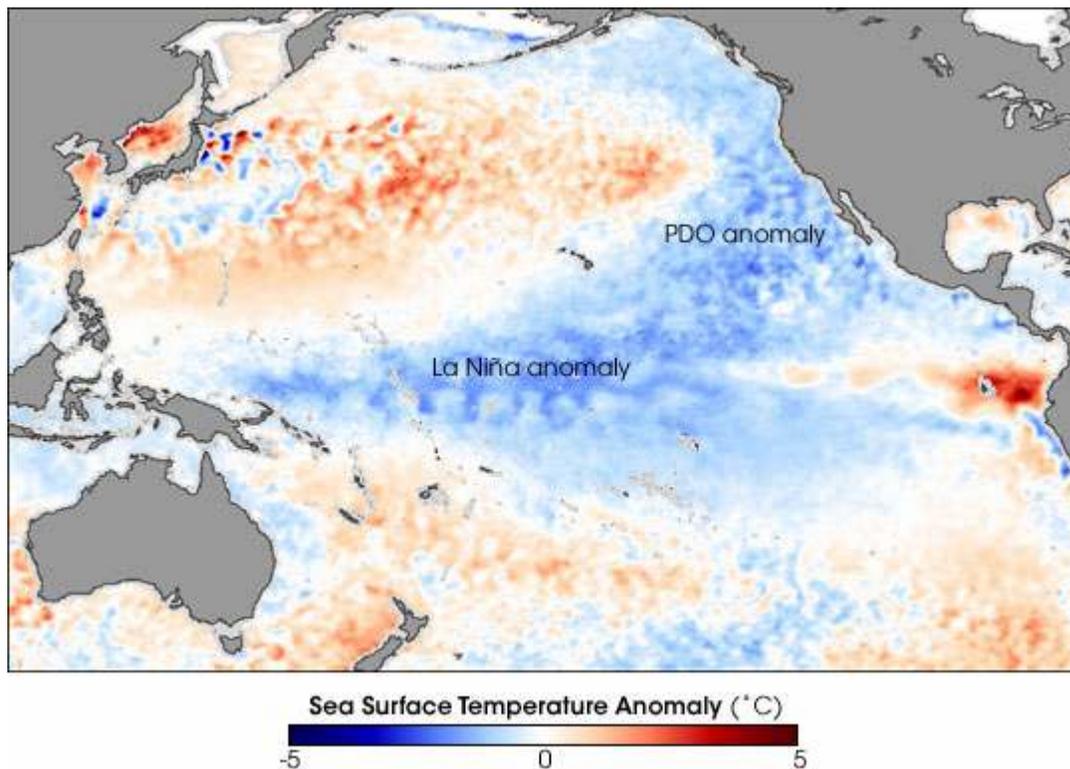


# La Nina and Pacific Decadal Oscillation (PDO)

## Cooling in the Pacific Ocean

Don J. Easterbrook, Dept. of Geology, Western Washington University, Bellingham, WA

The announcement by NASA's Jet Propulsion Laboratory that the Pacific Decadal Oscillation (PDO) had shifted to its cool phase (Fig. 1) is right on schedule as predicted by past climate and PDO changes (Easterbrook, 2001, 2006, 2007). It is *not* an oddity superimposed upon and masking the predicted severe warming by the IPCC.



**Figure 1. Cooling of the Pacific Ocean and setting up of the PDO.** Sea surface temperature anomaly in the Pacific Ocean from April 14–21, 2008. The anomaly compares the recent temperatures measured by the Advanced Microwave Scanning Radiometer for EOS (AMSR-E) on NASA's Aqua satellite with an average of data collected by the NOAA Pathfinder satellites from 1985–1997. Places where the Pacific was cooler than normal are blue, places where temperatures were average are white, and places where the ocean was warmer than normal are red. The cool water anomaly in the center of the image shows the lingering effect of the year-old La Niña. However, the much broader area of cooler-than-average water off the coast of North America from Alaska (top center) to the equator is a classic feature of the cool phase of the Pacific Decadal Oscillation (PDO). The cool waters wrap in a horseshoe shape around a core of warmer-than-average water. (In the warm phase, the pattern is reversed). Unlike El Niño and La Niña, which may occur every 3 to 7 years and last from 6 to 18 months, the PDO can remain in the same phase for 20 to 30 years. (NASA image by Jesse Allen, AMSR-E data processed and provided by Chelle Gentemann and Frank Wentz, Remote Sensing Systems. Caption by Rebecca Lindsey, adapted from a press release from NASA JPL).

As shown by the historic pattern of PDOs over the past century (Fig. 2) and by corresponding global warming and cooling, the pattern is part of ongoing warm/cool cycles that last 25-30 years.

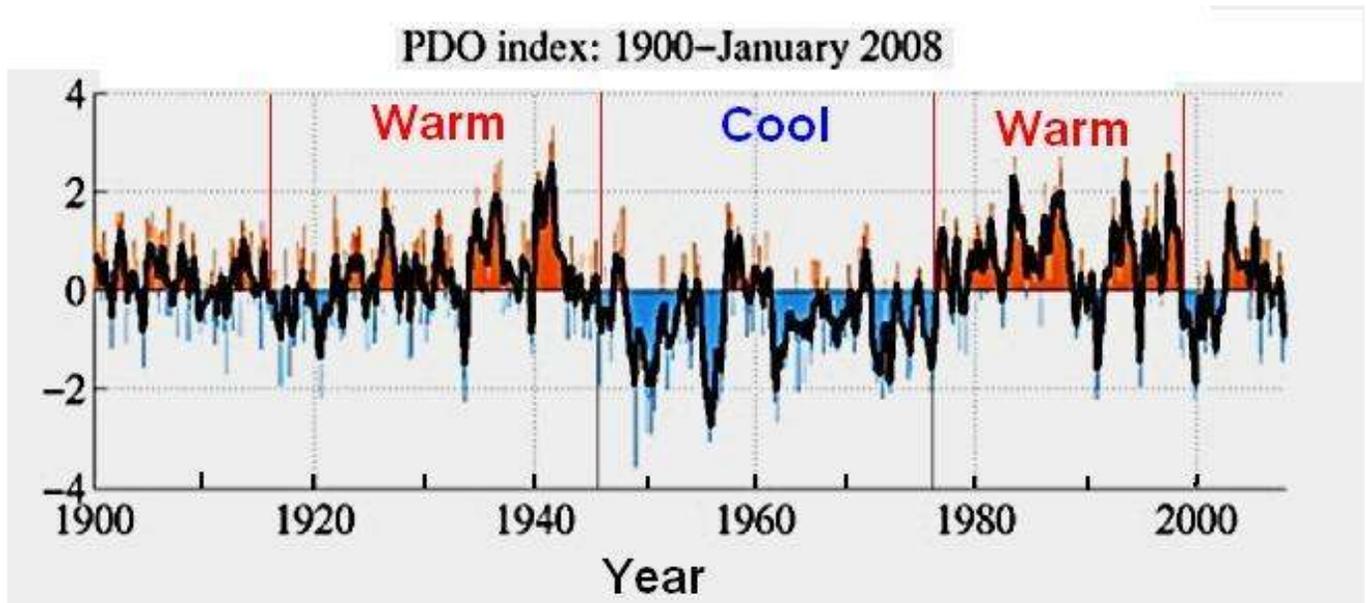
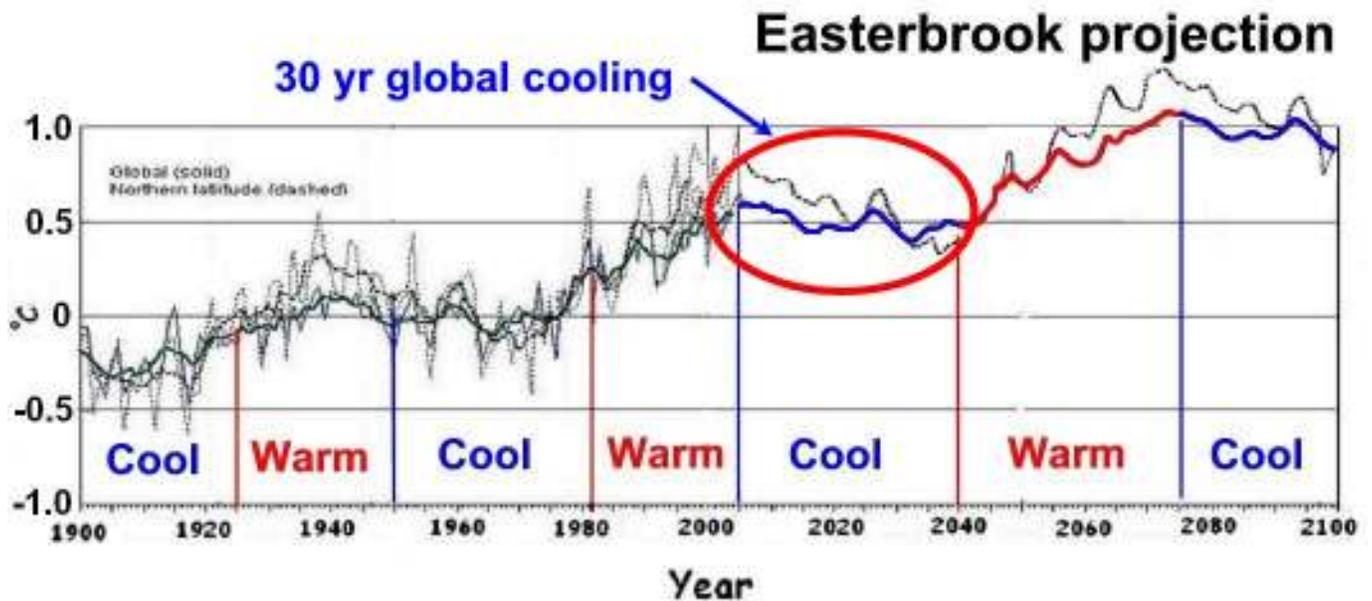


Figure 2. PDO indices, 1900

Global temperatures peaked in 1998 and have not been exceeded since then. Pacific Ocean temperatures began a cooling phase in 1999 that was briefly interrupted by El Nino and dramatic cooling in 2007-2008 appears to be a continuation of a global cooling trend set up by the PDO cool phase (Fig. 1) as predicted (Fig. 3).



Thus, we seem to be headed toward several decades of global cooling, rather than the catastrophic global warming predicted by IPCC.