

Interaction of Atlantic and Pacific oscillations caused 'false pause' in warming

February 26 2015

The recent slowdown in climate warming is due, at least in part, to natural oscillations in the climate, according to a team of climate scientists, who add that these oscillations represent variability internal to the climate system. They do not signal any slowdown in human-caused global warming.

"We know that it is important to distinguish between human-caused and natural [climate](#) variability so we can assess the impact of human-caused [climate change](#) on a variety of phenomena including drought and weather extremes," said Michael Mann, Distinguished Professor of Meteorology, Penn State. "The North Atlantic and North Pacific oceans appear to be drivers of substantial natural, internal climate variability on timescales of decades."

Mann, Byron A. Steinman, assistant professor of geological sciences, University of Minnesota-Duluth and a former Penn State National Science Foundation postdoctoral fellow and Penn State researcher Sonya K. Miller looked at a combination of real-world observational data and state-of-the-art climate model simulations used in the most recent report of the Intergovernmental Panel on Climate Change to understand the competing contributions to climate variability in the Northern Hemisphere during the historic era. They report their results today (Feb 26) in *Science*.

The Atlantic Multidecadal Oscillation (AMO) describes how North Atlantic sea-surface temperatures tend to oscillate with a periodicity of

about 50 to 70 years. The Pacific Decadal Oscillation (PDO) varies over a broader range of timescales. The researchers looked only at the portion of the PDO that was multidecadal—what they term the Pacific multidecadal oscillation (PMO).

Using a wide variety of climate simulations, the researchers found that the AMO and PMO are not significantly correlated; they are not part of the global "stadium wave" oscillation, as some researchers had claimed. What they found was that the Northern Hemisphere was warming more slowly, not because of the AMO—which has been relatively flat—but because of a sharply down-trending PMO.

The researchers conclude that the down-trending PMO and the unusual slowing of warming over the past decade are tied to heat burial beneath the tropical Pacific and a tendency for sustained La Niña type conditions. While there is paleoclimate data suggesting that this type of response could come from subtle features of climate change itself that climate models do not currently capture, the researchers note that the most likely explanation is the random excursions of the AMO.

"Our findings have strong implications for the attribution of recent climate changes," said Mann. "Internal multidecadal variability in Northern Hemisphere temperatures likely offset anthropogenic warming over the past decade."

The researchers conclude that given past historical patterns of variation in the AMO and PMO, this situation will likely reverse and add to human induced warming in the future.

More information: [www.sciencemag.org/lookup/doi/ ... 1126/science.1257856](http://www.sciencemag.org/lookup/doi/10.1126/science.1257856)

Provided by Pennsylvania State University

Citation: Interaction of Atlantic and Pacific oscillations caused 'false pause' in warming (2015, February 26) retrieved 20 March 2024 from <https://phys.org/news/2015-02-interaction-atlantic-pacific-oscillations-false.html>

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