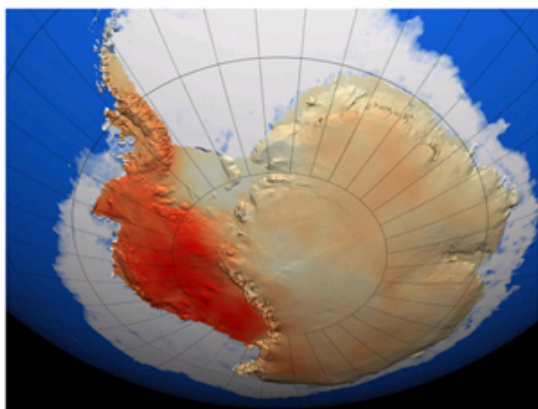


Earth Institute News

posted: 2009-01-23

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Nearly All of Antarctica Is Warming New Study Shows Steady 50-Year Rise



Warming (in red) across Antarctica, 1957-2007. Darker reds show more warming.

Courtesy, NASA Goddard Space Flight Center/University of Washington/US Geological Survey

Antarctica is getting warmer, a new study shows. Though scientists already knew fast-collapsing ice shelves on the continent's northerly peninsula were the result of rapid warming, evidence on the far vaster interior was unclear, and some thought the interior might actually be cooling. The new research shows temperatures are rising almost everywhere, at about the same average pace as the rest of the world, consistent with rising levels of greenhouse gases in the air. [The study](#) is the cover article in the Jan. 22 issue of the leading scientific journal Nature.

In its report last year, the Intergovernmental Panel on Climate Change said that six of the world's seven continents were getting hotter, but that Antarctica still needed more investigation. Skeptics of manmade climate change have used the idea that the interior might be cooling to argue that global warming is a myth. But the scientists now say the new research shows with a high degree of certainty that over the past 50 years, the continent as a whole has warmed nearly as fast as the rest of the world—about 1°F (.5°) on average. The western part has warmed even more rapidly over the same period—nearly 1.6°F (.85°C). The West Antarctic ice sheet is particularly susceptible to warming because much of it lies at low elevation. The size of Alaska, Texas, California and Kansas, West Antarctica alone would raise global sea levels by three to five meters if it were to melt completely.

"We're almost certain that increases in greenhouse gases on other continents are contributing to this warming in Antarctica," said study coauthor [Drew Shindell](#), a scientist at NASA's [Goddard Institute for Space Studies](#), an affiliate of Columbia University's Earth Institute.

Incomplete weather records led scientists to think that much of the world's coldest continent—average temperature, around minus 58° F—was cooling. About 100 manned and unmanned Antarctic weather stations have been working since 1957, but most are on the coast or the peninsula that juts toward South America, leaving most of the vast, inaccessible interior uncovered. Since 1981, satellite-generated data measuring the amount of infrared light reflected by snow gave a fuller picture. By correlating the weather station data with the satellite data, the scientists were able to reconstruct temperatures over the whole continent for the last 50 years. The extended view allowed them to see beyond recent cooling documented in parts of eastern Antarctica, and conclude that the long-term trend is toward warming almost everywhere, said the study's lead author Eric Steig, a glaciologist and geochemist at the University of Washington.

" While some areas have been cooling for a long time the evidence shows the continent as a whole is getting warmer," Steig [told CNN](#).

It was Shindell's role to figure out what might be causing the continent to heat up. By

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plugging observed sea ice changes into a climate model, Shindell reproduced the warming trend that Steig and his colleagues found, especially in West Antarctica. That finding leads scientists to think that the retreat of sea ice off West Antarctica may be key to explaining the warming.

Much of the west Antarctic ice sheet is grounded below sea level, surrounded by huge floating ice shelves that are subject to ocean currents. The scientists speculate that stronger winds from the Pacific are bringing warm air to West Antarctica, and that the warmer air is preventing new sea ice from forming. The warm winds are causing temperatures to rise on West Antarctica; and, as the ice disappears, additional heat is released into the air.

“ One study is never really the last word,” said Shindell. “But I think it’ll be much harder for [skeptics] to argue against global warming, based on Antarctica doing something different. Now it appears that Antarctica, like the other continents, is following the expected response to greenhouse gases.”

After the study came out, Michael Oppenheimer, a professor of geosciences at Princeton University not involved in the research [told The New York Times](#): “Obviously the situation is complex, resulting from a combination of man-made factors and natural variability. But the idea of long-term cooling is pretty clearly debunked.”

In addition to Steig and Shindell, the study was coauthored by David Schneider of the National Center for Atmospheric Research; Scott Rutherford of Roger Williams University; Michael Mann of Pennsylvania State University; and Josefino Comiso of NASA.

