

# Missing data from Arctic one reason for 'pause' in global temperature rise – study

by Paige Ogburn, Environment and Energy Publishing, 11-18-13

Tracking the planet's temperature is no easy task

Scientists responsible for such long-term data sets, usually government institutions, know they have to account for seasonal variations to keep a consistent measurement of temperatures through time. Without that, it is difficult to know how our world is changing

Modern thermometers are not the same as those 100 years ago. The time of day that temperature measurements are taken has changed. Then there's the issue of coverage-- where, exactly, those thermometers are located. In more remote places, there are fewer measurements

The study finds that some of those missing measurements, particularly in the Arctic, which has warmed faster than any other part of the world, may have affected the trajectory of global temperature data series

"Most measurements only cover about five-sixths of the globe," said Kevin Cowtan, a computational scientist at the University of York

The data series Cowtan examined is put out by the United Kingdom's Met Office Hadley Centre and referred to as HadCRUT4. At first glance, a graph of HadCRUT4 temperature anomalies over the past 130 years or so does not show a clear trend

From about 1910 onward, the Earth gets warmer. And warmer. And warmer

But around 2000, the steadily marching black line of temperature anomalies reaches a plateau. It stays flat until now, sometimes even appearing to trend in a negative direction

What is commonly referred to as "the pause".

Most climate scientists agree that 15 years is too short a time to draw any meaningful conclusions about the fluctuation of global temperatures, and that the oceans have continued to take up ever more of the Earth's heat. So we'd like to know more about why this slowdown is occurring

Thanks to satellites

is is not easy, though

urface temperature is measured at about 6 feet above the ground, the satellite temperature measurements wanted to use came from higher up in the atmosphere and gave different readings

lack of a one-to-one correspondence meant the scientists couldn't simply add that data into the global temperature data sets

they had to figure out the relationship between what satellites measured and what a ground-based instrument would measure, and use that to fill in the missing Arctic temperatures.

One way of putting it is simply that we calculated an offset between the satellite data and the observations we used that to guide the interpolation," said Robert Way, a cryospheric scientist and doctoral student at the University of Ottawa who was a co-author on the paper.

The researchers tested whether this approach worked by removing measured temperatures from the data set and comparing them with predictions guided by the satellite temperatures and making sure their results were the same.

"Using this satellite method, we had then proven that it seems really good at projecting what the temperature would be at a given location if we had taken away the observations," Way said

### **a 'cold bias**

When they filled in temperature data for the Arctic and other poorly measured locales, the HadCRUT4 temperature lost what the researchers call its "cold bias."

"There are lots of sources of evidence for a fast-warming Arctic, but no one had a good method of combining satellite data with the surface temperatures to create a global record before," Cowtan said

In the new version of the HadCRUT4 temperature series, the average warming trend per decade jumps from 0.07 degrees Celsius in the period of 1997-2012 to 0.12 C per decade, the same as it has been since the 1950s.

The new temperature data set by NASA also bears out this finding, the researchers said

The new global temperature series, known as GISTEMP, has its own way of adding back in Arctic temperatures that were not measured due to the lack of temperature stations

The new NASA series's temperature increases are a little lower than the adjusted ones from Way and Cowtan, but that can be explained by the fact that the series has not yet added in an ocean measurement adjustment that