NATURE | NEWS

Climate-change ‘hiatus’ disappears with new data

US agency’s updated temperature records suggest that global warming continues apace.

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An apparent pause in global warming might have been a temporary mirage, according to recent analysis. Global average temperatures have continued to rise throughout the first part of the twenty-first century, researchers report on 5 June in *Science*[1].

That finding, which contradicts the 2013 report of the Intergovernmental Panel on Climate Change (IPCC), is based on an update of the global temperature records maintained by the US National Oceanic and Atmospheric Administration (NOAA). The previous version of the NOAA data set had showed less warming during the first decade of the millennium.

Researchers revised the NOAA data set to correct for known biases in sea-surface-temperature records and to incorporate data from new land-based monitoring stations that extend into the Arctic — an area where observations are sparse. The updated NOAA data set also includes observations from 2013 and 2014; the latter ranked as the warmest year on record.

“The bottom line is that the IPCC reported that the rate of warming was less in the last 15 years than it was in the previous 30–60 years,” says Tom Karl, the study's lead author and the director of the National Centers for Environmental Information in Asheville, North Carolina. “That is no longer valid according to our data.”

The analysis follows a raft of papers that seek to explain why global temperatures seemed to level off around the turn of the millennium. NOAA's updated temperature record still shows cooler observed conditions than those projected by most climate models for the same period. But Karl says that the warming trend is clear up to the end of 2014. That holds true even if researchers choose 1998, which saw extreme heat associated with an El Niño weather pattern in the tropical Pacific Ocean, as the starting point for such an analysis.

“Tom Karl and colleagues have done solid work here, but they’ve mostly just confirmed what we already knew,” says Michael Mann, a climatologist at Pennsylvania State University in University Park. “There is no true ‘pause’ or ‘hiatus’ in warming.”

Hot seat

The biggest change to the NOAA records comes from a correction to ocean-temperature readings, to account for differences in measurements from ships and buoys. Scientists have long known that ships log slightly warmer ocean temperatures than do buoys operating in the same location. The influx of data from an expansion of buoys during the past two decades has reduced the apparent rate of ocean warming. NOAA has now adjusted for this effect, in line with similar changes that the UK Met Office made to its global temperature record.

The NOAA data set had previously been modified to account for a shift in the way that ships measure ocean temperatures. After the Second World War, ships began to monitor sea water directly through engine intakes, instead of sampling it with buckets. Karl's team adjusted the data to account for new information suggesting that some ships have continued bucket measurements.

Finally, the researchers made use of a new database of land-based temperature readings, which more than doubled the number of stations available to NOAA. It also extended coverage further into the Arctic, which has warmed faster than the rest of the globe in recent decades.

All told, Karl's team finds that global temperatures increased at a rate of 0.116°C a decade in 2000–14, compared to a rate of 0.113°C in 1950–99. And Karl says that rate will probably go up once his team calculates the temperature increase for the entirety of the rapidly warming Arctic. Researchers found in 2013 that gaps in Arctic observations artificially cooled the Met Office temperature record[2].

The latest study only resolved part of the question. Climate models used by the IPCC still project warming to continue, but scientists have documented various factors for which the models have not accounted, resulting in suppressed temperatures. These contributors include weak solar irradiation, volcanic aerosols that block sunlight and ocean circulation[3].

“Once you take into account the slight forcing errors, the actual occurrence of El Niños, et cetera, there is very little left to explain,” says Gavin Schmidt, director of NASA’s Goddard Institute for Space Studies in New York City.

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References

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