

Climate change: Fresh doubt over global warming 'pause'

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Glaciers have continued to melt at increasing rates over the past 20 years despite the supposed pause

A controversial study that found there has been no slowdown in global warming has been supported by new research.

Many researchers had accepted that the rate of global warming had slowed in the first 15 years of this century.

But **new analysis in the journal Science Advances** replicates findings that scientists have underestimated ocean temperatures over the past two decades.

With the revised data the apparent pause in temperature rises between 1998 and 2014 disappears.

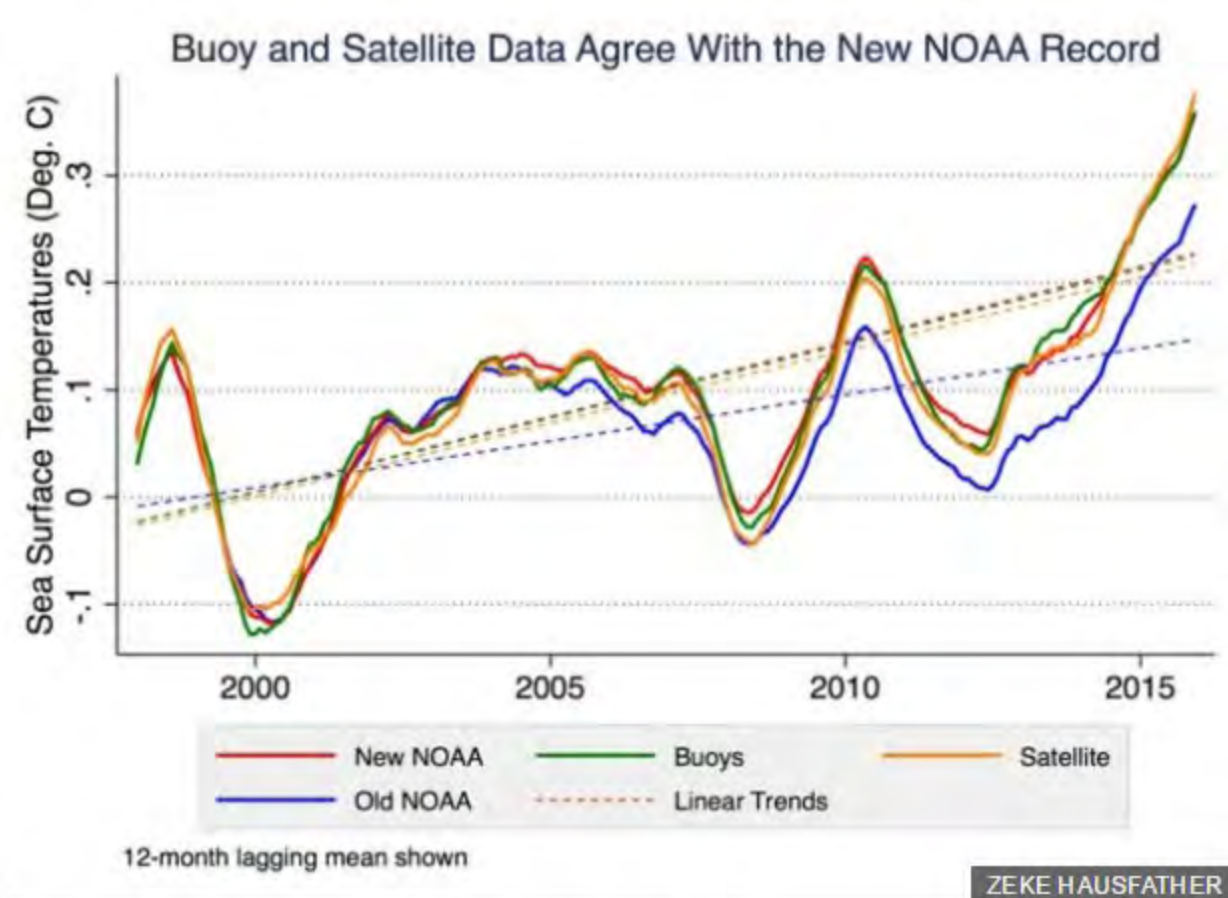
The idea of a pause had gained support in recent years with even the Intergovernmental Panel on Climate Change (IPCC) reporting in 2013 that the global surface temperature "has shown a much smaller increasing linear trend over the past 15 years than over the past 30 to 60 years".

But that consensus was brought into question by a number of studies, of which **a report by the the US National Oceanic and Atmospheric Administration (Noaa) published in Science last year** was the most significant.

Researchers from Noaa suggested that the temperatures of the oceans were being consistently underestimated by the main global climate models.

The authors showed that the ocean buoys used to measure sea temperatures tend to report slightly cooler temperatures than the older ship-based systems.

Back in the 1990s, ship measurements made up the vast majority of the data, whereas now the more accurate and consistent buoys account for 85% of measurements.



The new analysis of buoy and satellite data shows that ocean temperatures have increased steadily since the 1990s

When the researchers corrected the data to take this "cold bias" into account, they concluded that the oceans had warmed 0.12C per decade since 2000, nearly twice as fast as previous estimates of 0.07 degrees.

As a result, the authors said that the warming experienced in the first 15 years of the 21st Century was "virtually indistinguishable" from the rate of warming between 1950-99, a time generally acknowledged to have seen significant rates of warming from human emissions of CO2.

The study did not go down well with climate sceptics. Members of the US House of Representatives subpoenaed the author's emails which Noaa refused to hand over.

However, this new analysis supports the findings of the Noaa report. The scientists involved believe the problems in the original temperature estimates for the oceans came from attempting to mesh together data from ships and buoys.

"Only a small fraction of the ocean measurement data is being used by climate monitoring groups, and they are trying to smush together data from different instruments, which leads to a lot of judgement calls about how you weight one versus the other, and how you adjust for the transition from one to another," said Zeke Hausfather, the new paper's lead author.

Hausfather and colleagues decided to put together three independent data sets from satellites, buoys and robotic floats to find the true scale of ocean warming, so there was no mixing or matching of data.

"Our approach was to create three separate ocean temperature records from the three different instruments, and it turns out that all three agree really well with the new Noaa record," he said.

"The conclusion is that Noaa got it right, the scientists at Noaa were not cooking the books or manipulating the data in any way and that three independent sets of data back up their results."

The controversy that surrounded the original paper proved a strong motivation for attempting to replicate the findings says another author, Dr Kevin Cowtan from the University of York.

"We were initially sceptical of the Noaa result, because it showed faster warming than a previous updated record from the UK Met Office. So we set out to test it for ourselves, using different methods and different data. We now think Noaa got it right, and a new dataset from the Japan Meteorological Agency also agrees."

The new study is unlikely to quieten sceptics but the authors say their new work shows that the rate of warming in the last two decades is no different from the rate of warming since 1970 or from 1950.

As for attempts by politicians to subpoena emails in an attempt to suggest that scientists are committing fraud, the idea gets short shrift from the new paper's authors.

"If people disagree with things they should ask other scientists to look into it rather than demanding access to scientists' emails," said Zeke Hausfather.

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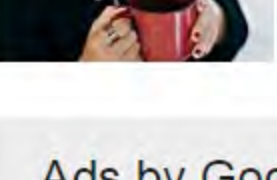
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