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Climate slowdown means extreme rates of warming 'not as likely'

By Matt McGrath Environment correspondent, BBC News



The impacts of rising temperature are being felt particularly keenly in the polar regions

Scientists say the recent downturn in the rate of global warming will lead to lower temperature rises in the short-term.

Since 1998, there has been an unexplained "standstill" in the heating of the Earth's atmosphere.

[Writing in Nature Geoscience](#), the researchers say this will reduce predicted warming in the coming decades.

But long-term, the expected temperature rises will not alter significantly.

"The most extreme projections are looking less likely than before"

Dr Alexander Otto University of Oxford

The slowdown in the expected rate of global warming has [been studied](#) for several years now. Earlier this year, the UK Met Office [lowered](#) their five-year temperature forecast.

But this new paper gives the clearest picture yet of how any slowdown is likely to affect temperatures in both the short-term and long-term.

An international team of researchers looked at how the last decade would impact long-term, equilibrium climate sensitivity and the shorter term climate response.

Transient nature

Climate sensitivity looks to see what would happen if we doubled concentrations of CO₂ in the atmosphere and let the Earth's oceans and ice sheets respond to it over several thousand years.

Transient climate response is much shorter term calculation again based on a doubling of CO₂.

The Intergovernmental Panel on Climate Change [reported in 2007](#) that the short-term temperature rise would most likely be 1-3C (1.8-5.4F).

But in this new analysis, by only including the temperatures from the last decade, the projected range would be 0.9-2.0C.



SPL The report suggests

that warming in the near term will be less than forecast

"The hottest of the models in the medium-term, they are actually looking less likely or inconsistent with the data from the last decade alone," said Dr Alexander Otto from the University of Oxford.

"The most extreme projections are looking less likely than before."

The authors calculate that over the coming decades global average temperatures will warm about 20% more slowly than expected.

But when it comes to the longer term picture, the authors say their work is consistent with previous estimates. The IPCC said that climate sensitivity was in the range of 2.0-4.5C.

Ocean storage

This latest research, including the decade of stalled temperature rises, produces a range of 0.9-5.0C.

"It is a bigger range of uncertainty," said Dr Otto.

"But it still includes the old range. We would all like climate sensitivity to be lower but it isn't."

The researchers say the difference between the lower short-term estimate and the more consistent long-term picture can be explained by the fact that the heat from the last decade has been absorbed into and is being stored by the world's oceans.

Not everyone agrees with this perspective.

Prof Steven Sherwood, from the University of New South Wales, says the conclusion about the oceans needs to be taken with a grain of salt for now.

"There is other research out there pointing out that this storage may be part of a natural cycle that will eventually reverse, either due to El Nino or the so-called [Atlantic Multidecadal Oscillation](#), and therefore may not imply what the authors are suggesting," he said.

The authors say there are ongoing uncertainties surrounding the role of aerosols in the atmosphere and around the issue of clouds.

"We would expect a single decade to jump around a bit but the overall trend is independent of it, and people should be exactly as concerned as before about what climate change is doing," said Dr Otto.

Is there any succour in these findings for climate sceptics who say the slowdown over the past 14 years means the global warming is not real?

"None. No comfort whatsoever," he said.

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A second chance to save the climate

- 18:00 19 May 2013 by [Michael Marshall](#)
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Humanity has a second chance to stop dangerous climate change. Temperature data from the last decade offers an unexpected opportunity to stay below the agreed international target of 2 °C of global warming.

A new analysis took temperature rise in the most recent decades, and worked out what this means for the coming ones. It suggests that Earth will warm more slowly over this century than we thought it would, buying us a little more time to cut our greenhouse gas emissions and prevent dangerous climate change.

Climate scientists caution that this does not mean climate change is not real. Temperatures are [currently rising faster than they have been for 11,000 years](#).

Dangerous climate change

Governments have promised to limit the world to 2 °C of warming – the agreed threshold for dangerous climate change. On previous estimates, that meant global emissions had to peak by 2020 and then fall. With emissions shooting up, this seemed hopelessly unrealistic.

"If previous estimates [of how the climate will warm] were true, keeping the world below 2 °C would have been almost impossible however big our emission cuts," says [Piers Forster](#) of the University of Leeds in the UK, who contributed to the new study. "Now it looks like we have a chance, so we should take it."

"Prior to this, a lot of us were feeling quite gloomy that whatever we did, we'll go over 2 °C,"

says Forster's colleague Myles Allen of the University of Oxford, UK. "It's not a foregone conclusion any more." That means the UN climate negotiations could still succeed. If a deal comes into force in 2020, and leads to rapid emissions cuts, "there remains a good chance we could hit the 2 °C target", says Allen.

Slowdown

After heating rapidly in the late 20th century, [Earth warmed only slowly in the last decade](#), partly [as a result of natural cycles in the climate system](#).

[Alexander Otto](#) of the University of Oxford in the UK and colleagues have now taken this latest data into account to calculate how much fossil fuel emissions have warmed the Earth so far. They then looked at what that meant for the temperature rise over the coming few decades, and found that global warming this century will indeed be slower than thought.

The team focused on how much hotter the planet will be in the year that carbon dioxide concentrations reach double their pre-industrial value. On current trends, that will happen between 2050 and 2070. Previous studies had suggested temperatures would rise up to 1.6 °C, but Otto found a temperature increase of 1.3 °C.

"In the short term, there is maybe a bit less warming than expected," says Otto. "It might buy us five or ten years," agrees [Chris Forest](#) of Penn State University in University Park, although he cautions that the problem hasn't gone away.

Not as hot?

So much for the next few decades. How hot the planet gets in the long term depends on how sensitive the climate is to CO₂ accumulating in the atmosphere.

Lags in the climate system mean that temperatures will continue to rise after CO₂ concentrations double, even if greenhouse gas emissions stop. The 2007 report of the Intergovernmental Panel on Climate Change (IPCC) estimated that [temperatures would eventually stabilise between 2 °C and 4.5 °C above pre-industrial temperatures](#) – with a best estimate of about 3 °C – a factor known as climate sensitivity.

The large error bars on that number inject uncertainty into our projections of the effects of climate change – from changing storm patterns to [sea level rise](#).

A growing body of climatologists think that the climate is less sensitive to CO₂ than the IPCC's best estimate, so temperatures will not rise as much as feared. "I've been arguing this for a few years," says [James Annan](#) of the JAMSTEC Yokohama Institute for Earth Sciences in Yokohama, Japan.

When Otto calculated the climate sensitivity from his data, he found it was about 2 °C – with a range of 0.9 to 5 °C – well below the IPCC's best estimate of 3 °C.

"The observations are telling us one thing and the climate models are telling us another," says Forest. He thinks the most likely range is between 2.5 and 3 °C.

Saving the world

For the last few years, governments have been planning to sign a deal in 2015 that will come into force in 2020. On previous estimates of the climate sensitivity, that is far too late. But if the sensitivity really is below 3 °C, we might have a shot.

"If we are lucky and the climate sensitivity is at the low end, and we have a strong agreement in 2015, then I think we stand a chance to limit climate change to 2 °C," says [Corinne Le Quéré](#) of the Tyndall Centre for Climate Change Research in Norwich, UK. "But there's a lot of ifs."

Even if it is technically possible to limit warming to 2 °C, that does not mean it will actually happen. "I suppose it means that 2 °C isn't quite as unattainable as it was previously thought to be, but I'm not exactly holding my breath on climate negotiations," says Annan.

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