

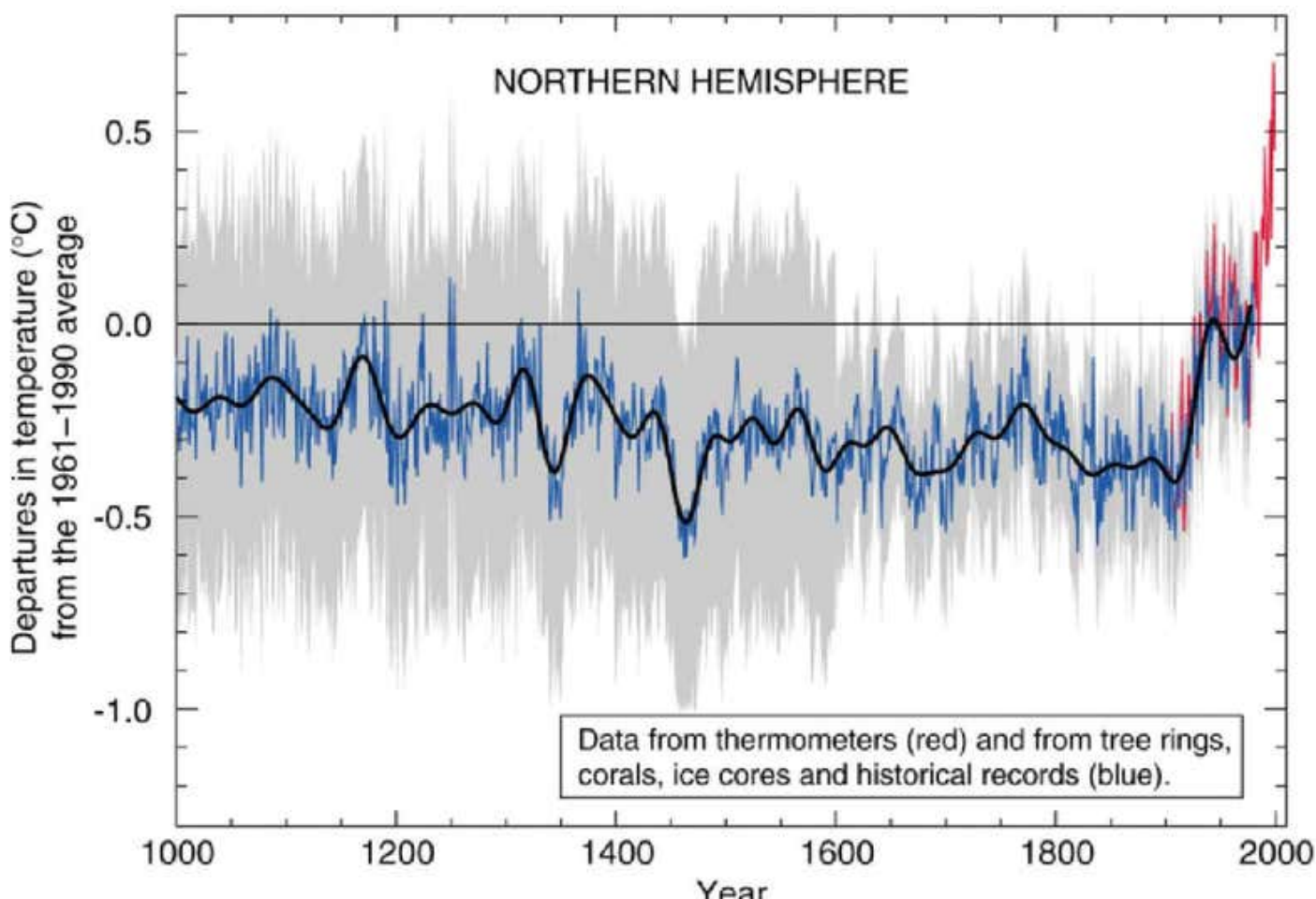
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## Why the hockey stick graph will always be climate science's icon

Two decades after it was first published, the chart linking carbon emissions and global warming is as relevant as ever, says **Olive Heffernan**

**EARTH** | COMMENT 23 April 2018

By **Olive Heffernan**



### The famous hockey stick graph

IPCC and Michael Mann/Penn State

Today is the 20th anniversary of one of the most iconic images in science. On 23 April 1998, US climate scientist Michael Mann and two colleagues [published a paper in \*Nature\*](#). Central to it was a graph that would become known as the “[hockey stick](#)”.

This graph was fairly simple, but its implications were monumental. Unlike any image before, it showed that Earth’s temperature had been relatively stable for 500 years, only to suddenly spike in the 20th century.

The hockey stick – named for its long flat line with a sharp upturn – was a strong visual aid that bolstered mounting evidence for human-produced greenhouse gases warming the climate.

A year later, Mann and his colleagues extended their analysis further back, showing that the 20th century was hotter than any other time in the past millennium.

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Seized on by the media, the hockey stick became a global news story. It also became the cornerstone of a bitter political debate, one that would change Mann’s life.

## All-out assault

[Climate sceptics](#) with a vested interest in denying the hockey stick’s central message – that use of fossil fuels is harming the environment – waged an all-out war to discredit Mann and the group’s findings.

First, they went after the science. To reconstruct climate going back 500 or 1000 years – long before weather stations or satellites existed – the scientists had to use other indicators of temperature, such as tree rings in long-lived species and ice cores. They also had to develop

a new statistical approach to translate such data into annual surface temperatures for the northern hemisphere.

As with all scientific analyses, there were uncertainties in the data and Mann and his colleagues had to make judgements on how best to handle them. [Sceptics seized on those uncertainties](#) to claim the graph was an artefact, and that using certain proxy data – especially from bristlecone pine trees – biased the results.

Then, Mann's adversaries went after him personally. Writing [in Scientific American](#), Mann described how he was vilified on the editorial pages of *The Wall Street Journal*, had his e-mails stolen, and has received multiple death threats since the hockey stick article was published.

## A new era

Congress eventually asked the US National Academy of Sciences to weigh in with an independent review. [Published in 2006](#), this endorsed Mann's findings but had the scientists repeat the analysis with more and better data.

Since then, numerous studies have reiterated the [hockey stick's](#) central conclusion: globally, it's hotter now than it has been in 1000 years, and according to one analysis, [it's possibly hotter now than it has been for more than 10,000 years](#).

More importantly, the hockey stick is now just one piece of a much broader picture of climate change in which impacts are far outpacing the predictions of models. From the rapid [melting of polar ice caps](#) to the [slowing of global ocean circulation](#), it's pretty clear that we're entering a new environmental era.

Through all of this, one remarkable fact is that Mann has been as enduring as his science. Despite an ongoing battle with his adversaries – now largely played out on Twitter – he remains hopeful that we can prevent climate change becoming the disaster it could be. But the clock is ticking.

**Read more:** [Climate myths: The 'hockey stick' graph has been proven wrong](#)

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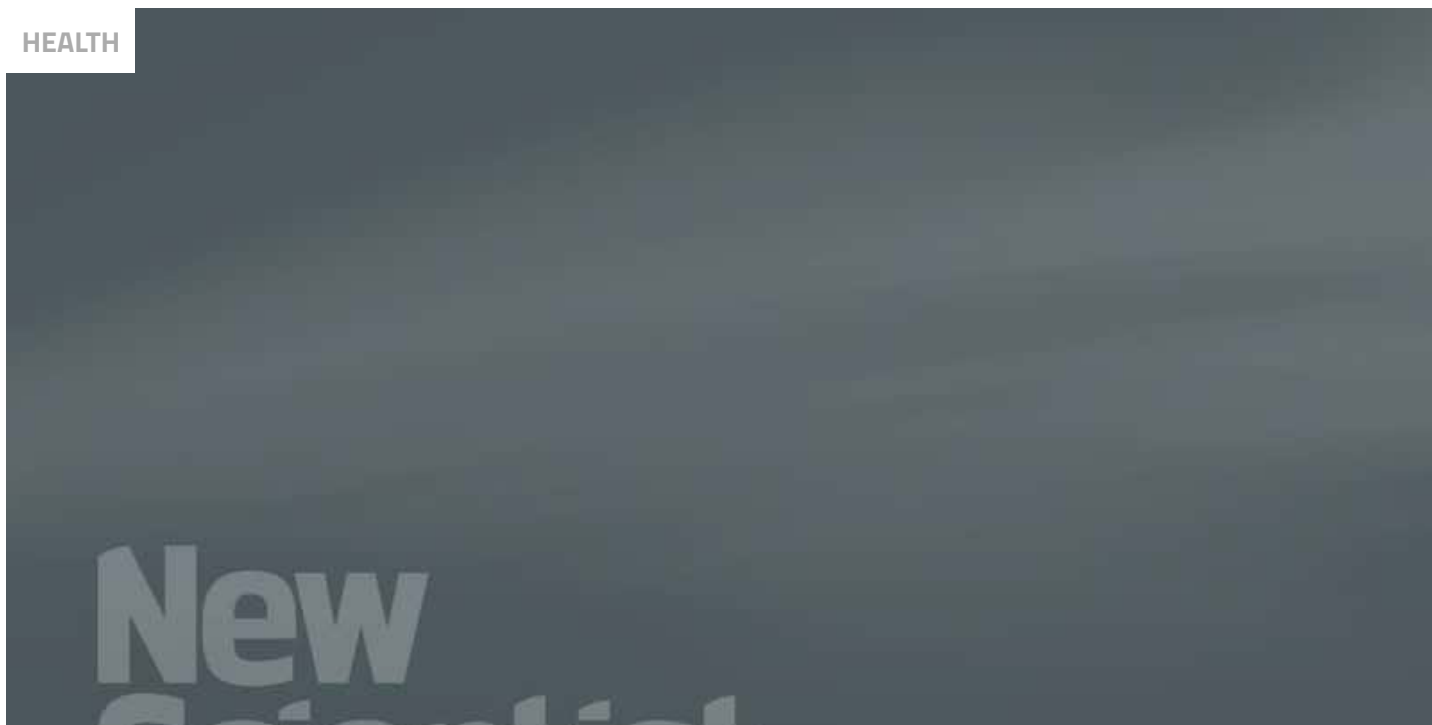
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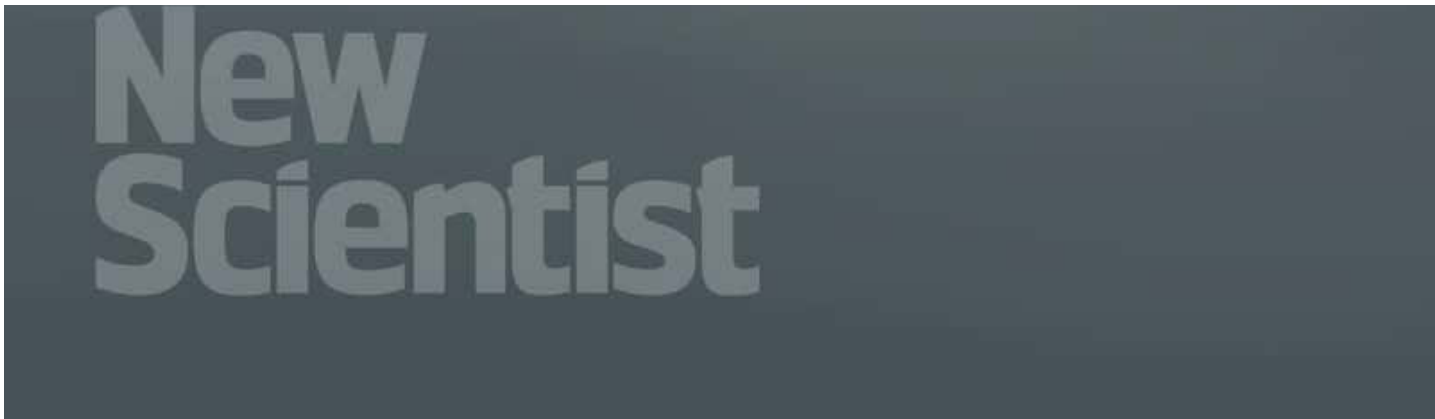
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