

# Water vapour caused one-third of global warming in 1990s, study reveals

Experts say their research does not undermine the scientific consensus on man-made climate change, but call for 'closer examination' of the way computer models consider water vapour

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Scientists have underestimated the role that [water](#) vapour plays in determining global temperature changes, according to a new study that could fuel further attacks on the science of [climate change](#).

The research, led by one of the world's top climate scientists, suggests that almost one-third of the global warming recorded during the 1990s was due to an increase in water vapour in the high atmosphere, not human emissions of greenhouse gases. A subsequent decline in water vapour after 2000 could explain a recent slowdown in global temperature rise, the scientists add.

The experts say their research does not undermine the scientific consensus that emissions of greenhouse gases from human activity drive global warming, but they call for "closer examination" of the way climate computer models consider water vapour.

The new research comes at a difficult time for climate scientists, who have been forced to defend their predictions in the face of an [embarrassing mistake in the 2007 report of the Intergovernmental Panel on Climate Change \(IPCC\)](#), which included false claims that Himalayan glaciers could melt away by 2035. There has also been heavy criticism over the way climate scientists at the University of East Anglia apparently [tried to prevent the release of data requested under Freedom of Information laws](#).

The new research, led by Susan Solomon, at the US National Oceanic and Atmospheric Administration, who co-chaired the 2007 IPCC report on the science of global warming, is published today in the journal *Science*, one of the most respected in the world.

Solomon said the new finding does not challenge the conclusion that human activity drives climate change. "Not to my mind it doesn't," she said. "It shows that we shouldn't over-interpret the results from a few years one way or another."

She would not comment on the mistake in the IPCC report - which was published in a separate section on likely impacts - or on calls for [Rajendra Pachauri](#), the IPCC chairman, to step down. "What I will say, is that this [new study] shows there are climate scientists round the world who are trying very hard to understand and to explain to people openly and honestly what has

happened over the last decade."

The new study analysed water vapour in the stratosphere, about 10 miles up, where it acts as a potent greenhouse gas and traps heat at the Earth's surface.

Satellite measurements were used to show that water vapour levels in the stratosphere have dropped about 10% since 2000. When the scientists fed this change into a climate model, they found it could have reduced, by about 25% over the last decade, the amount of warming expected to be caused by carbon dioxide and other greenhouse gases.

They conclude: "The decline in stratospheric water vapour after 2000 should be expected to have significantly contributed to the [flattening of the global warming trend in the last decade](#)." Solomon said: "We call this the 10, 10, 10 problem. A 10% drop in water vapour, 10 miles up has had an effect on global warming over the last 10 years." Until now, scientists have struggled to explain the temperature slowdown in the years since 2000, a problem climate sceptics have exploited.

The scientists also looked at the earlier period, from 1980 to 2000, though cautioned this was based on observations of the atmosphere made by a single weather balloon. They found likely increases in water vapour in the stratosphere, enough to enhance the rate of global warming by about 30% above what would have been expected.

"These findings show that stratospheric water vapour represents an important driver of decadal global surface climate change," the scientists say. They say it should lead to a "closer examination of the representation of stratospheric water vapour changes in climate models".

Solomon said it was not clear why the water vapour levels had swung up and down, but suggested it could be down to changes in sea surface temperature, which drives convection currents and can move air around in the high atmosphere.

She said it was not clear if the water vapour decrease after 2000 reflects a natural shift, or if it was a consequence of a warming world. If the latter is true, then more warming could see greater decreases in water vapour, acting as a negative feedback to apply the brakes on future temperature rise.