

ATMOSPHERIC SCIENCE

Water vapour warming



NASA

Science doi:10.1126/science.1182488 (2010)
A loss of water vapour in the Earth's upper atmosphere may have slowed the rate of global warming over the past decade, suggests new research. Although the decade 2000–2009 was the warmest on record, average global temperatures levelled off during this period despite a continued rise in greenhouse gas emissions.

Now a team led by Susan Solomon of the US National Oceanic and Atmospheric Administration in Boulder,

Colorado, reports that water vapour concentrations in the stratosphere fell by 10 per cent from 2000, offsetting — by 25 per cent — the warming that would otherwise have occurred since then. The team used an atmospheric model and a range of recent observations of stratospheric water vapour to reach their conclusion. Using more limited data, they also found that water vapour in the stratosphere probably increased between 1980 and 2000, a period of rapid warming. The increase in water vapour between 1990 and 2000 may have amplified the rapid warming of that period by as much as 30 per cent, they say.

The study confirms earlier work showing that water vapour has an important role in warming. It also partly explains the drop in warming over the past decade.

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in the United States where the history of disturbances was known, together with 100 years of local climate data. They found that in 78 per cent of the forest plots, increases in forest biomass over the past two decades have outpaced increases predicted from natural recovery by an average of 4.15 tonnes per hectare per year. The increase in growth was independent of stand age and year of sampling, found the authors, who attribute the growth spurt to a combination of increasing temperatures, longer growing seasons and higher concentrations of atmospheric carbon dioxide.

Continuous monitoring of forests worldwide will be necessary to decipher exactly which of these factors is the most influential, say the authors.

Anna Armstrong

CLIMATE PREDICTION

Clarity on clouds



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Geophys. Res. Lett. **37**, L01702 (2010)
Clouds are one of the largest sources of uncertainty in climate models. That's because global climate models cannot explicitly capture cloud formation. Instead they use a series of equations to describe the average conditions under which clouds form and decay, a technique called parameterization.

Now a team of researchers led by Cristiana Stan of the Center for Ocean-Land-Atmosphere Studies in Calverton, Maryland, has simulated the Earth's climate using a model that explicitly represents cloud processes. Stan and colleagues analysed simulations from a standard coupled climate model. They then replaced the cloud parameterization in their model with an embedded two-dimensional cloud

process-resolving model and ran the simulation again. They found that when clouds were explicitly represented in the model, the climate simulation improved in several respects, including more accurate depiction of seasonal precipitation patterns and of several important climatic phenomena, such as the Madden-Julian Oscillation, the Asian monsoon and the El Niño/Southern Oscillation.

The study suggests that clouds should be explicitly represented in climate models for more accurate simulations of the climate.

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BIODIVERSITY AND ECOLOGY

Flourishing forests

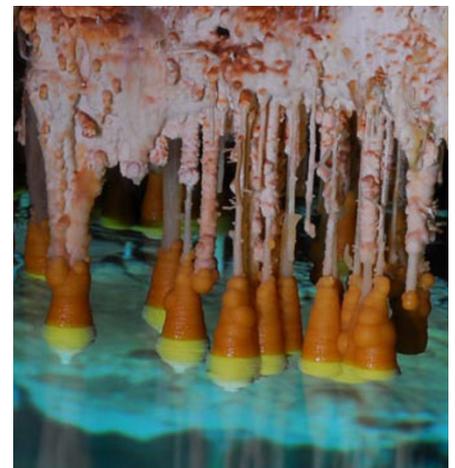
Proc. Natl Acad. Sci. USA
doi:10.1073/pnas.0912376107 (2010)

A recent growth spurt among forests in the Northern Hemisphere may be the result of climate change, suggests new research. Until now, regrowth as a part of natural ecosystem recovery after disturbances such as logging or clearing has obscured the influence of climate change on recent boosts in forest biomass.

Sean McMahon of the Smithsonian Environmental Research Center, Edgewater, Maryland, and colleagues analysed changes in biomass over the past 22 years in 55 temperate deciduous forest plots

PALEOCLIMATE

Sea level spike



BOGDAN P. ONAC

Science **327**, 860–863 (2010)
Conventional wisdom holds that as ice sheets grew over Europe and North America during the last glacial period — about 120,000 to 20,000 years ago — sea level fell in bumpy fits and starts, eventually dropping to about 130 metres below today's levels. Scientists now report that 81,000 years ago, sea levels