

THIS WEEK

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Bolstering the link

Two papers in Nature this week highlight the extent to which human activity is influencing global climate, and underline the need for continued scrutiny of the problem.

The United States gave Old King Coal a bloody nose last week, with proposals to regulate fossil-fuel emissions that would effectively ban new coal-fired power plants unless they come equipped with technology to capture and store carbon dioxide. The impact in the short term may be minimal: protests against plans for individual new coal power stations and the dash for shale gas as an alternative energy source have forced coal back in the energy pecking order. But, with federal inaction on the climate-change question likely to continue, the move by the Environmental Protection Agency is a welcome one. The agency is finally using the power given to it by the Supreme Court in 2007 to treat carbon dioxide as a pollutant. At the same time, the United Kingdom, which likes to think of itself as an international leader on global warming, seems to be weakening its resolve at home. The Conservative–Liberal Democrat coalition has loosened similar plans to restrict greenhouse-gas emissions from gas-powered electricity generation, although rules that effectively force carbon capture on new British coal power stations remain in place. And, given the government's concomitant failure to announce new mandatory carbon reporting for British business, as required by the 2008 Climate Change Act, it is clear that voters in Britain who were told that they were getting the greenest government ever have been misled.

As the politics of global warming swirls, climate science marches on. This week, two papers in *Nature* underscore what we thought we knew about the problem, as well as offering the kind of surprising result that shows why research must continue apace.

First, as Jeremy Shakun at Harvard University in Cambridge, Massachusetts, and his colleagues show on page 49, carbon dioxide does drive atmospheric warming. Uncontroversial stuff, perhaps, yet the link continues to be questioned by people who would play down the risks of human greenhouse-gas emissions. The queries re-emerged in 2006, when former US vice-president Al Gore showed a graph of historical carbon dioxide levels and temperature in his movie, *An Inconvenient Truth*, and was accused of glossing over the relationship between the two. So let there be no confusion now: the new study confirms that, as Earth emerged from the last ice age some 19,000 to 10,000 years ago, rising global temperatures were preceded by increased global carbon dioxide in the atmosphere — a result that emphasizes the role of carbon dioxide in driving global change in the present day. This relationship is a foundation stone of climate science and of policies to regulate greenhouse-gas emissions, and it is solid.

Quelle surprise! the climate sceptics may shout — scientists find proxy data and use a computer model to get the answer they wanted, to seal the conspiracy. Then let the second paper this week show that modern science does anything but offer self-serving results to support existing ideas. For, in a paper published online, Ben Booth and his colleagues at the Met Office Hadley Centre in Exeter, UK, use a different model to question conventional wisdom on how the climate of the North Atlantic Ocean operates (B. B. Booth *et al.* *Nature*

<http://dx.doi.org/10.1038/nature10946>; 2012).

This study looks at the impact of aerosols — such as sulphur dioxide particles ejected by volcanoes and linked to the burning of coal — on sea surface temperatures there. Aerosols that reflect sunlight and can promote brighter cloud formation have been known for some time to affect climate, but the idea has gained appeal in the media during the past decade, under the tag 'global dimming'.

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The study suggests that global dimming could underlie warm and cool periods observed in the North Atlantic basin in the twentieth century — a variability known as the Atlantic Multidecadal Oscillation (AMO). And because the AMO has been implicated in global processes, such as the frequency of Atlantic hurricanes and drought in the Sahel region of Africa in the 1980s, the findings greatly extend the possible reach of human activity on global climate. Moreover, if correct, the study effectively does away with the AMO as it is currently posited, in that the multidecadal oscillation is neither truly oscillatory nor multidecadal.

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Creative tensions

Scientists must find ways to improve academic efficiency if they are to keep their independence.

True scientific creativity is often presumed to be the preserve of independent investigators operating in an environment with none of the practical or political concerns that dog many other workers. In truth, far from being creative, most scientists spend much of their time worrying about funding, sitting in meetings and dealing with administrative bureaucracy.

But, in many ways, academics do live very sheltered lives by today's standards — how many other careers offer tenure or employment for life? And, frequently, an individual's insistence on working as free from tethers as possible can be taken too far, forcing everyone and everything around them to accommodate their needs. This becomes a waste of time and effort — in other words, of money. In this age of economic austerity, has the concept of absolute academic autonomy become a luxury that the scientific enterprise can no longer afford?

A series of Comment articles this week tackles this thorny issue head-on. On page 27, consultant Thomas Marty describes how, in some