

## CORRESPONDENCE

## Global warming: why the 2°C goal is a political delusion

SIR — The papers by Malte Meinshausen and colleagues ('Greenhouse-gas emission targets for limiting global warming to 2°C' *Nature* **458**, 1158–1162; 2009) and by Myles Allen and colleagues ('Warming caused by cumulative carbon emissions towards the trillionth tonne' *Nature* **458**, 1163–1166; 2009) suggest that society could limit global warming below the widely discussed goal of 2°C by adopting a cumulative budget for carbon emissions. Although they do underscore the difficulties, their prescriptions are only marginally relevant for policy design.

Solving the carbon problem needs international coordination. Success depends on many factors, but paramount is the credibility of promises that governments make to each other through international agreements. The trouble with the Kyoto treaty was that for pivotal countries, notably the United States, the promises were not credible. Correcting that error is a central aspect of negotiations before the climate summit in Copenhagen in December.

Credible promises will make most countries willing to do even more: a cycle of cooperation could unfold. Essentially, all successful international regulatory regimes evolve this way, starting with modest promises that, if kept, create confidence and credibility for greater efforts later on.

The problem with long-term cumulative targets such as those Allen advocates is that they cannot readily be codified into anything governments will find credible. They lack immediacy for policy if governments decide to leave costly actions to their successors.

This is partly why Kyoto's 'budgets' lasted only five years (2008–12). Nobody thought that was long enough, but it was expected to force action to smoke out credibility. (In the United States, alas, the effort failed.)

Global, cumulative emission budgets are nothing new. But they will never gain traction because a government must translate them into something it can control, such as shorter-term emission targets; it can implement these through 'cap-and-trade' schemes or other kinds of tangible policy effort, such as carbon taxes or regulatory programmes. At best, broad cumulative budgets are a general guide for policy. At worst, they distract the debate from what governments can actually achieve.

Your special issue of 30 April 2009 on 'The coming climate crunch' is also a timely reminder that the 2°C target is a political delusion. Nobody knows what is safe — in part because the climate will be sensitive in unknown ways (as Meinshausen's paper shows) and also because safety depends on circumstances. There is no simple relationship between what governments can actually control and abstract goals such as a set limit to warming. Real outcomes might be plagued by interactions that doom the planet to warming of 2°C (or more), whether or not emissions are cut. Even with a big dose of luck, the effort needed to get to 2°C would be heroic, as Allen and colleagues indicate, and probably far beyond what real governments can achieve.

Being neither achievable nor safe, the target is becoming dangerous. The new papers are a reminder of how wrong-headed such goal-setting has become.  
**David G. Victor Energy and Sustainable Development, Stanford University, Stanford, California 94305, USA**  
e-mail: dgvector@stanford.edu

## Ancient ivory figurine deserves a more thoughtful label

SIR — In his News & Views article 'Origins of the female image' (*Nature* **459**, 176–177; 2009), Paul Mellars describes the 35,000-year-old figurine of a woman, carved from a piece of mammoth ivory, as "explicitly

— and blatantly — that of a woman, with an exaggeration of sexual characteristics (large, projecting breasts, a greatly enlarged and explicit vulva, and bloated belly and thighs) that by twenty-first century standards could be seen as bordering on the pornographic".

Mellars has, of course, never been pregnant. Anyone who has would know that breasts of that size (given the unavailability of surgical intervention at the time) are evident only in the late stages of pregnancy and during lactation. Likewise, it seems a stretch to imagine that a woman who was eking out an existence many millennia ago would be carrying around so much extra body fat — unless her "bloated" belly and thighs were the result of a pregnancy. Also, a "greatly enlarged" vulva is one of the more obvious ramifications of an infant making its way through a passage narrower than its head.

For this reader, the figurine speaks across the ages of fertility, not sexuality, and certainly not of pornography. It could have been carved as a pendant in the hope that it would provide its wearer with a talismanic connection to the power and mystery of creation — and not, as media headlines have described it, as a piece of "prehistoric porn".

It is unfortunate, then, that the figure accompanying Mellars's piece is captioned "A 35,000-year-old sex object". By the time it appeared in *Nature's* video archive, its title had become the rather more risqué "Prehistoric pin-up". And when the story hit the Internet, this groundbreaking discovery of the oldest piece of figurative art known to humankind was labelled "'Porn' art in ivory, 35,000 years old".

This misguided focus on a salacious interpretation has caused a cascade effect that trivializes and coarsens a monumental scientific and artistic discovery.

**Anna McDonnell 2436 3rd Street #B, Santa Monica, California 90405, USA**  
e-mail: annamcdonnell@mac.com

## San Andreas array failure is only a temporary setback

SIR — In your News story 'Geologists suffer observatory glitches' (*Nature* **459**, 20–21; 2009), the presenter at a recent meeting (M.D.Z.) is described as having "let slip an embarrassing fact" — that an array of instrumentation deployed within the San Andreas fault zone at a depth of 2.6 kilometres became inoperable soon after installation. We disagree with this description of what was said. The status of the instrumentation was one of the principal topics of the presentation. The agencies funding the San Andreas Fault Observatory at Depth (SAFOD) — the National Science Foundation and the US Geological Survey — have known about the status of the array since it stopped working seven months ago.

The premature failure of the array deployed last September was a disappointing, but only temporary, setback. Because such instruments have never operated at depth at high temperatures and pressures for long periods of time, the array was designed to be retrieved and refurbished every few years. We shall therefore be able to recover the equipment and diagnose and correct the problems that caused it to cease operation.

The acquisition of unique data and samples from depth within the San Andreas fault zone will allow long-standing fundamental questions about earthquake processes to be addressed. We, and the hundreds of scientists and engineers from around the world who contributed to the success of SAFOD, are proud of these accomplishments.

**Mark D. Zoback Department of Geophysics, Stanford University, Stanford, California 94305, USA**  
e-mail: zoback@stanford.edu  
**William Ellsworth, Stephen Hickman US Geological Survey, 345 Middlefield Road, Menlo Park, California 94025, USA**