

# Heatwave underlines climate-model failures

Declan Butler, Paris

Researchers are unsure whether this summer's European heatwave — which may have caused 3,000 deaths in France alone, according to government estimates — can be attributed to global warming. But there's one thing they do agree on: that it demonstrates the need for better regional climate models, to help climatologists get to grips with the processes that drive extreme weather.

Existing models of the global climate system simulate observed, long-term changes in mean temperature reasonably well, researchers say. But models of regions such as Europe are less well developed, says Simon Brown, who studies climate extremes at the UK Met Office's Hadley Centre for Climate Prediction and Research in Berkshire. Researchers blame this weakness on a lack of resources to build the models, and a lack of understanding of the processes that underlie the weather.

Global climate models are made up of data points in a three-dimensional grid from the depths of the oceans to the upper reaches of the atmosphere. The ocean, atmosphere, land surface and ice components are linked by the fluxes between them.

But even the most powerful global models are not sufficiently fine-grained to yield useful signals for regional prediction. The global models' grid points are about 2.5 degrees of latitude apart; for regional simulations, climate researchers would like to zoom down to 0.5 degrees, at least. So researchers who model local effects have to select regions of interest for higher-resolution grids, and nest these within the global models.

This is suboptimal, points out Howard Cattle, who runs the climate-change programme at the Geneva-based World Climate Research Programme. "If you force a regional model with boundary conditions from a coarse resolution model, you aren't giving it



Cold comfort: doctors in Paris try to protect elderly patients from the effects of Europe's heatwave.

information at the boundaries that is consistent with its internal dynamics," he says. "It's a 'rubbish in, rubbish out' situation."

An even bigger problem is a lack of understanding of the atmospheric processes that generate extreme climate events. The prolonged presence of a high-pressure anticyclone, which has characterized the current heatwave, is a common feature of European latitudes, says Hervé Le Treut, head of the lab of Dynamic Meteorology at the Ecole Normale Supérieure in Paris. But little is known about what controls the anticyclone's intensity, or what encourages it to hang around.

Europe's climate is particularly unpredictable, the researchers say. The El Niño effect can have a decisive effect on short-term climate trends in the United States, for example, but the influence of the Gulf Stream, say, on Europe's climate is tougher to untangle.

The fact that weather events create more

'noise' at a regional level than at a global level "makes it very hard to detect a climate-change signal" from regional data, says Ulrich Cubasch, a climate modeller at the Free University of Berlin, Germany.

The difficulty is compounded by the relatively meagre effort made to refine regional models. "Simulations by regional climate models have not been validated and analysed anywhere near as much as the global climate model simulations," says Tim Osborn, a researcher at the University of East Anglia's Climatic Research Unit in Norwich, UK.

In these circumstances, it is difficult for anyone to figure out how far this summer's heatwave in Europe reflects the wider phenomenon of global warming. But data from the heatwave will at least help researchers to test and refine their models. "We should be looking at current extremes to test the models' ability," Osborn says. ■

## Europe insists fusion-project race remains wide open

Declan Butler, Paris

Officials at the European Commission have rebutted claims that an expert panel favours Spain as the potential host for ITER, the proposed international fusion experiment.

Two sites — one at Cadarache in France, the other at Vandellòs near Barcelona in Spain — are vying to be picked as Europe's candidate to host the US\$5-billion project.

The commission set up the committee of seven industrialists and scientists in May to advise Europe's ministers, who this autumn will choose just one site as the European candidate to compete with Canada and Japan to host ITER.

Reports leaked earlier this month that the panel, chaired by David King, the UK government's science adviser, preferred Vandellòs (see *Nature* 424, 606; 2003) were confirmed at the time by separate sources. But they may have reflected wishful thinking, says a source close to the panel. In reality the committee is "deeply divided", he says, and its report, scheduled for mid-summer, is unlikely to be ready until early next month.

The committee has "not been given the remit to produce a verdict", a commission official says — only to provide an impartial assessment of both sites on the basis of such

criteria as scientific and industrial expertise and site-specific costs.

The final choice of site will come not from the committee or from the commission, but from the European Council of Ministers, which is scheduled to meet at the end of September, says the committee source.

The choice of site is politically delicate, the official notes. The partners working on the research reactor — the European Union, Canada, Japan, Russia, China and the United States — hope to select a site by the end of the year. The United States has signalled its opposition to France as the site for ITER (see *Nature* 423, 211; 2003). ■