



# Climate of opinion

It may be bad science, but Hollywood's latest disaster epic could still be good for the planet.  
**Deborah Smith reports.**

**C**OULD *The Day after Tomorrow* do for climate research what *Top Gun* did for air force pilot recruitment? Even though scientists dismiss the movie about a sudden ice age as mostly science fiction, that's what some of them hope.

And, right on cue, the real-life equivalents of the expert on ancient climate, portrayed in the movie by Dennis Quaid, have come up with some big finds that draw attention to an occupation that few were familiar with before the Hollywood blockbuster.

On Thursday European scientists revealed they had obtained an ice core from Antarctica that extends back 740,000 years, nearly twice as long as any previous ice-core record. It spans eight previous ice ages and eight warmer interglacial periods.

Then on Friday Australian researchers reported they had drilled deep into marine sediments off the coast off Christchurch that were deposited by glaciers in the New Zealand alps. This record of climate change goes back much further than the ice core, almost 4 million years. "It's a beautifully faithful record of the waxing and waning of the mid-latitude ice cap," says Professor Bob Carter, of James Cook University in Townsville.

Understanding what happened in the past to the climate is the only way to predict its future accurately. Carter is scathing of the movie, with its message that sudden global disaster could ensue if greenhouse gases are not reduced. "It's sheer propaganda ... socially irresponsible," he says. "They are influencing people deliberately in the way they want, with no scientific basis."

However, an Oxford University physicist, Professor Myles Allen, says scientific critics should "lighten up" because viewers know it's not an accurate forecast. "I'm sure the world's teenagers can work out that this is hardly exam revision material. And if it inspires a few of them to stick with physics for a couple more years and perhaps con-

sider a university course in the geosciences, then it will have more than justified its special-effects budget."

Mike Craven, of the Australian Antarctic Division, who regularly drills ice cores in Antarctica, says the movie has at least got the Australian public asking questions about climate issues.

Most information about past climate change has come from research at the poles. But glaciers in temperate regions like New Zealand were very sensitive to climate fluctuations over the millenniums, Carter says. "What we were drilling into [off Christchurch] was the mud which came down the rivers when the ice melted from the mountains."

The work was done on a specially equipped ship as part of the Ocean Drilling Program, an international scientific endeavour to which Australia used to, but no longer, belongs. Carter's team compared the mud core with an ice core from Vostok in Antarctica stretching back 370,000 years and found an "amazingly" close match in the climate record. "In essence, New Zealand climate dances to the hymn of Antarctica," the Australian researchers conclude in an article in the journal *Science*. This means the mud core can serve as a "proxy" record for climate change at the southern pole for the millions of years that ice cores are not available, Carter says.

The close tie between New Zealand and Antarctic records suggests climate change may propagate quickly through the atmosphere, rather than more slowly through the ocean currents, as many scientists believe. More than a million years ago, ice ages waxed and waned on a 40,000-year cycle. In the past half a million years the cycles have become about 100,000 years long, with colder glacials and much warmer interglacials lasting only about 10,000 years.

A 10-centimetre thick and three-kilometre deep ice core that spans the past 750,000 years that was recovered from "Dome C" in eastern Antarctica will help throw light on why this shift occurred. It covers a period 430,000 years ago (which the Vostok ice core doesn't) when the Earth was in an orbit around the sun like the one it is on now. The interglacial then was unusually long, at 28,000 years.

The European team's analysis of the core at this period, published in the journal *Nature*, shows this transition is similar in other ways to the shift 12,000 years ago from an ice age to today's

warm climate. On this basis the researchers have estimated the next ice age is not due for another 15,000 years. The complicating factor, of course, is human intervention and the increasing levels of greenhouse gases, which means "we may have a heat wave", says the team leader, Dr Eric Wolff, of the British Antarctic Survey.

THE scientists collecting the Dome C core had to be as hardy as Quaid's character, travelling thousands of kilometres by tractor through blizzards, and drilling at temperatures of 40C below. And they express a similar passion. "It's very exciting to see ice that fell as snow three-quarters of a million years ago," says Wolff.

Ice cores also have ancient air trapped in them, revealing past levels of greenhouse gases such as carbon dioxide and methane. Scientists need as much information as possible to feed into complex computer models of the world's climate to better predict the future. A scene in the movie where a new hurricane feature is added to their climate model in 48 hours is unrealistic, says Allen, in the journal *Nature*. "But perhaps it is wise not to tell the teenagers what climate modelling actually involves until after they have signed up," he jokes.

As on the big screen, a tidal wave could hit New York, but it would be much more likely to be caused by a landslide under the ocean rather than a storm surge. The movie focuses on disaster in the northern hemisphere, but scientific evidence so far suggests climate change during the past 100,000 years has started in the southern hemisphere 1500 to 3000 years before the north, says Carter.

Like scientists in the film, the CSIRO monitors the ocean currents. Computer models suggest the ocean conveyor belt that takes warm water north and heats Europe could slow down significantly by 2100 as a result of greenhouse warming and increased rainfall that decreases the ocean's salinity.

This means global warming *could* lead to regional cooling. But not enough is known about the vulnerability of the climate system to accurately predict the conditions that would push it across the threshold to a colder climate, says the CSIRO. Even if the ocean conveyor does slow, Australia will be hotter by 2030 as a result of the greenhouse effect, with annual



average temperatures 0.4 to 2 degrees greater than in 1990, the CSIRO says.



**Creep chills ... a scene from *The Day After Tomorrow*, a section of an ice core, left, and right, the Taylor Glacier in Antarctica.**

Photos:  
British Antarctic Survey/Professor Robert Carter

