

Long story. A lengthy sediment core tells of an early thaw.



## CLIMATE CHANGE

## A Far-South Start for Ice Age's End

Where was the thermostat switch that, once thrown, began to thaw the world out of the last ice age? Paleooceanographers long assumed that it lay in the North Atlantic Ocean somewhere; then the tropical ocean gained popularity in some quarters. But now, strong new evidence from the tropics places the start yet farther south, in the waters around Antarctica. The result “is all very solid, very hard to question,” says paleooceanographer William Ruddiman, professor emeritus at the University of Virginia, Charlottesville. “But it also tells us things are complicated. There are just layers of complexity to this.”

Finding where it all started “comes down to timing,” says paleooceanographer Lowell Stott of the University of Southern California in Los Angeles. But determining the timing of climate events can be tough when, say, warming in the tropics is recorded in marine sediment, whereas warming in Antarctica is recorded in glacial ice. Those are dated by entirely different methods, which injects an uncomfortable amount of uncertainty.

Stott and colleagues Axel Timmermann, a modeler at the University of Hawaii, Manoa, and paleooceanographer Robert Thunell of the University of South Carolina, Columbia, eliminated that uncertainty, at least, by gauging changing temperature in western Pacific

surface waters and in Antarctic waters in a single sediment core recovered just west of the Philippine island of Mindanao. At any point in the core, microfossils that had fallen from western Pacific surface waters recorded temperature there in their oxygen isotopic composition, whereas microfossils that always lived on the sea floor recorded the temperature of bottom water that had sunk from the surface of the Southern Ocean near Antarctica. Then the group radiocarbon-dated the sediment.

The results, reported online at [www.sciencemag.org/cgi/content/abstract/1143791](http://www.sciencemag.org/cgi/content/abstract/1143791), were startling. In an earlier *Science* paper, Thunell and Stott had concluded that the tropical Pacific had warmed first, presumably causing glacial ice to begin melting. But their new analysis shows that more than 18,000 years ago, Antarctic waters warmed 1000 to 1300 years before tropical waters.

Starting from that timing and drawing on other dated records, Stott and colleagues spin a tale of how the ice started melting. First, predictable variations in Earth's orbit and tilt increased the amount of sunlight hitting high southern latitudes during austral spring. That warmed things up locally and shrank the sea ice back toward Antarctica, uncapping the Southern Ocean and freeing much of its carbon dioxide to begin warming the whole world.

Nice story, other researchers say, and the starting point at least seems fairly solid. “I think they make a convincing case that something is happening at high southern latitudes before tropical temperatures change,” says paleooceanographer Jean Lynch-Stieglitz of Georgia Institute of Technology in Atlanta. But, as she and Ruddiman both note, putting together the deglaciation story is “a tricky business.” And there are dissenting voices. Paleooceanographer David Lea of the University of California, Santa Barbara, says it isn't so clear polar warming preceded tropical warming, given the difficulty of picking out exactly when the tropical warming began. All agree that finishing up the story in the Northern Hemisphere—where most ice melting eventually occurred—will take much more work.

—RICHARD A. KERR

### Bank Withdrawal

Both U.S. senators from New York—Hillary Clinton (D) and Charles Schumer (D)—are demanding that the U.S. Department of Veterans Affairs (VA) create a gene bank at the University at Albany in New York state. The pair argues that the project was approved but that the VA never followed through. The idea has enormous potential: More than 7 million veterans could donate DNA. But for now it is tangled in controversy. After inking an agreement with the university nearly 4 years ago, the VA began to pursue a gene bank project on its own, upsetting the Albany group, which is led by cancer biologist Paulette McCormick (*Science*, 29 July 2005, p. 684). Last week Clinton and Schumer took up the case, suggesting in a letter to VA Secretary R. James Nicholson that “the Department may be using the concepts developed by Dr. McCormick to establish a gene bank in another location.” They urged the VA to set up a gene bank at SUNY-Albany.

Joel Kupersmith, the VA's chief research and development officer, declined to comment on the dispute. But he says that although VA researchers are only collecting specimens for individual projects now, “our plan in the long run” is to assemble a vast store that could be used by outside investigators.

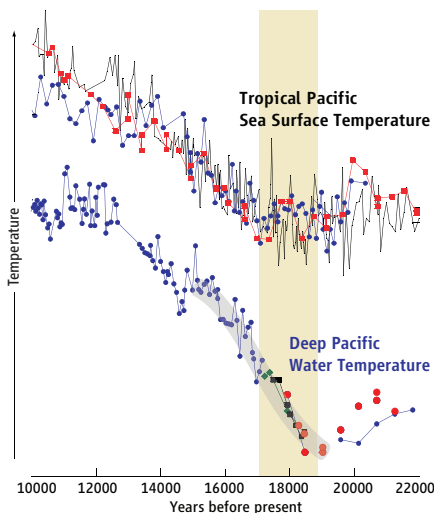
—JENNIFER COUZIN

### NuSTAR Is Reborn

NASA resurrected a mission to study black holes last week and now plans to orbit the spacecraft by 2011. The Nuclear Spectroscopic Telescope Array (NuSTAR) will use high-energy x-rays to image the areas around black holes that congregate at the center of galaxies. The space agency killed the idea in 2006 because of funding constraints. But NASA science chief S. Alan Stern said in a statement that he reversed that decision because “we're getting more and more from the science budget we have, and the restart of the highly valued NuSTAR mission is an example of that.” That's music to the ears of the researchers who thought all was lost for a mission originally slated for launch this year. “I'm personally incredibly excited,” says Caltech physicist Fiona Harrison, the principal investigator on the project.

Not every project got good news last week. Stern also approved a plan to reduce the number and complexity of instruments on the Mars Science Laboratory because of cost overruns. That is raising howls from Mars exploration advocates. The Pasadena, California-based Planetary Society called the move “penny-wise and pound foolish.”

—ANDREW LAWLER



**A southerly start.** Water from near Antarctica (bottom) warmed before the tropics (top).

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