

Ocean Warming Model Again Points to a Human Touch

Climate researchers concerned that their model might have overlooked something have retested the links between the burning of fossil fuels, greenhouse warming, and the warming of the deep oceans. A closer look at the evidence, they

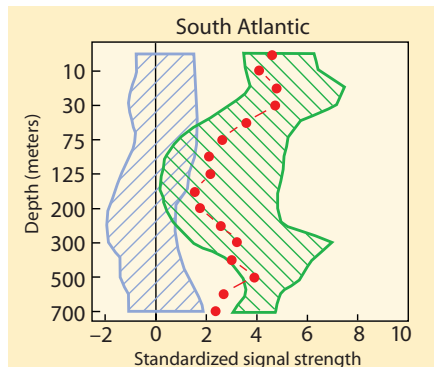
ONLINE COVERAGE

For additional stories from the AAAS meeting, see *ScienceNOW* (sciencemag.org)

say, has bolstered their earlier conclusion: Humans are indeed warming the world, right down to thousands of meters deep in the oceans.

The high statistical significance of the new study reported at the AAAS meeting “should wipe out much of the uncertainty about the reality of global warming,” says the study’s lead author, climate researcher Tim P. Barnett of Scripps Institution of Oceanography in La Jolla, California.

For a 2001 study (*Science*, 13 April 2001, p. 270), Barnett and colleagues ran a state-of-the-art climate model that traced where and when atmospheric heat trapped by rising greenhouse gases of the past century would



A match. A model’s warming (green) fits the actual warming (red) and exceeds climate noise (blue).

have entered the oceans. When they compared the model’s simulation to actual measurements of ocean temperature, they found a good match. With a confidence of 95%, they calculated, human-produced greenhouse gases are behind real-world warming. Three additional studies using three other models have yielded similar results.

WASHINGTON, D.C.—Befitting its location in the nation’s capital, this year’s meeting of AAAS (publisher of *Science*) from 17–21 February addressed the nexus of science and society. More than 9000 attendees heard about great strides in robotics (*Science*, 18 February 2005, p. 1082), celebrated the Year of Physics and Einstein’s legacy (*Science*, 11 February 2005, p. 865), and presented research that spanned science, medicine, and politics.

Barnett and colleagues at Scripps and Lawrence Livermore National Laboratory in California, have now checked the model against better data, paying more attention to possible uncertainties in the model. They used a revised and updated set of ocean observations, this time avoiding a quirk in the data processing that had skewed temperatures in the data-poor Southern Hemisphere. To take account of variations among models, they compared detailed results from a second, independent model and studied how ocean warming in eight other models would affect the results. Unlike most other studies, they also followed the heat deep into separate ocean basins. In the end, the two main models “absolutely nailed the greenhouse signal” seen in the ocean, Barnett says. This time, statistical confidence is much greater than 95%, he says.

Most climate scientists are reassured. “The fact that multiple models simulate a comparable [ocean] warming gives a robustness to the results,” says climate modeler Thomas Delworth of the Geophysical Fluid Dynamics Laboratory in Princeton, New Jersey. But climate researcher and modeler Gerald North of Texas A&M University in College Station still wonders whether the models have realistic enough oceans. More tests no doubt await.

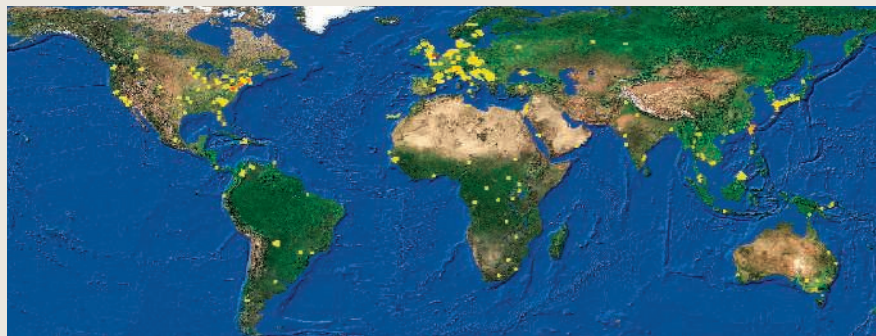
—RICHARD A. KERR

Whaling Endangers More Than Whales

For more than a decade, scientists have gone to great depths to study the unusual deep-ocean communities known as whale falls. When a whale dies, its carcass sinks to the sea floor and provides a long-lived home to worms, clams, mussels, and many other creatures. New results presented at the AAAS meeting suggest that commercial whaling, even at so-called sustainable levels, would drive many of the novel species found at these cetacean gravesites to extinction.

In 1987, while surveying the sea floor in the submersible *Alvin*, biological oceanographer Craig Smith, now at the University of Hawaii, Manoa, and co-workers came

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More Infectious Diseases Emerge in North

A preview of a new global map of emerging infectious diseases turns a common assumption on its head. The map, presented in D.C. by Peter Daszak of the Consortium for Conservation Medicine at Wildlife Trust in New York City, spans the years 1940 to 2004 and indicates roughly 500 locations around the world where specific diseases first emerged. (Red indicates multiple events.) The map suggests that the majority of emerging diseases originated in Europe, North America, and Japan—a result that appears to hold up after correcting for reporting biases, according to Daszak and his co-workers. The media and funding organizations tend to assume that most infectious diseases emerge in the tropics because AIDS, severe acute respiratory syndrome, Ebola, and other high-profile diseases began there, says Daszak. But the preliminary map suggests that food-borne infections and drug-resistant microbes in the northern industrialized countries—the result of factors such as agricultural practices, the overuse of antibiotics, and international travel—are a more significant public health threat. “It’s very counterintuitive to what most people think about emerging diseases,” says Joshua Rosenthal of the Fogarty International Center at the National Institutes of Health.

—JOCELYN KAISER