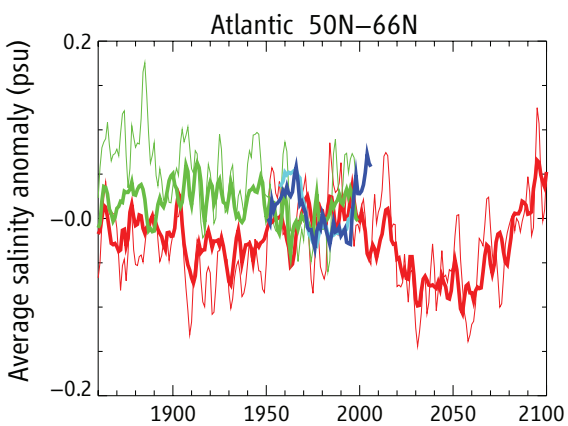
OCEANOGRAPHY

Global Warming Throws Some Curves in the Atlantic Ocean

It was an ominous if subtle shift in the far North Atlantic. For 30 years, waters off southern Greenland and Iceland had been growing less and less salty, oceanographers reported in late 2003. It looked as if global warming could be freshening high-latitude Atlantic waters (*Science*, 2 January 2004, p. 35). If the trend continued, they worried, it could throw a monkey wrench into the "conveyor belt" of currents that warms the far North Atlantic, as is wildly overdone in the movie *The Day After Tomorrow*. New analyses have now shown that global warming is indeed messing with the Atlantic's salinity, although not as dramatically as Hollywood envisioned.

The first explicit link between global warming and ocean salinity changes comes in a study in press in *Geophysical Research Letters*. Modeler Peter Stott of the Met Office Hadley Centre in Exeter, U. K., and his colleagues simulated changing ocean salinity in the center's HadCM3 climate model with and without increasing greenhouse gases. Under past global warming conditions, the model produced salinity changes around the world much like those seen. But only in the subtropics and mid-latitudes of the North Atlantic—between 20°N and 50°N—did salinity change significantly more than the natural jigglings of the climate system would have changed it.



No biggie, yet. With (red) or without (green) greenhouse conditions, a model produced much the same variations in ocean salinity as observed (blue), but the variability could increase.

CREDIT: ADAPTED FROM P. A. STOTT *ET AL.*, *GEOPHYSICAL RESEARCH LETTERS*, IN PRESS

The increase in salinity in North Atlantic mid-latitudes thus carries the "fingerprint" of human influence left by the effects of human-generated greenhouse gases, the group concludes. Greenhouse warming there apparently removed more water by evaporation while precipitation decreased, concentrating seawater's salts. "It looks convincing to me," says climate modeler Gabriele Hegerl of the University of Edinburgh, U. K. The signal is only now emerging, she adds, but "it looks very consistent with what is expected." She and others would like to see additional models replicate the fingerprinting, just to be sure.

Although global warming seems able to alter even the saltiness of the sea, it hasn't noticeably freshened the high latitudes of the North Atlantic, as some researchers thought it might be doing back in 2003. When run without rising greenhouse gases, the Hadley model produces so many salinity swings up and down through natural processes built into the climate system that any greenhouse fingerprint would have been smudged beyond recognition, the group found.

But global warming isn't finished with the far North Atlantic, at least according to the Hadley model. Run out to the end of the century under a strengthening greenhouse, it simulates a precipitous dip in northern salinity from a recent upturn and then a rapid recovery by 2100 (see figure). That roller-coaster ride "rings true," says physical oceanographer Ruth Curry of Woods Hole Oceanographic Institution in Massachusetts. Since publishing the observed freshening trend in 2003, she has come to understand that natural swings in atmospheric circulation over the North Atlantic—the so-called North Atlantic Oscillation (NAO)—have alternately driven fresher water from the Arctic and then saltier water from low latitudes into the far North Atlantic. Those shifts, rather than global warming, have dominated high-latitude salinity, with an NAO-driven switch from fresher to saltier coming in the mid-1990s.

The next decades-long swing in northern salinity will be large because global warming is increasing the stores of fresher water in the Arctic and of saltier water in the far south, Curry says. "I would expect some weakening of [conveyor belt] currents" as the next freshening sets in, she says, "but that's not the biggest worry." The biggest worry, she says, is losing all Arctic sea ice to global warming.

–RICHARD A. KERR

Bug Hunters, Unite

Scientists working to map the microbes that naturally live in and on the human body have agreed to coordinate their efforts. Last week, representatives from nine countries announced the formation of the International Human Microbiome Consortium. The alliance will enable researchers who are sampling the microbial communities that inhabit the skin, gut, mouth, and reproductive tract of humans to deposit their data in a central repository, freely available online. Consortium members will conform to common data standards, avoid overlap in their efforts to sequence the genomes of different microbes, and follow common informed-consent and privacy standards. The consortium will give researchers from around the world the chance to directly and efficiently compare their data, says molecular biologist Jane Peterson of the National Human Genome Research Institute in Bethesda, Maryland, who represented the U.S. National Institutes of Health at the Heidelberg, Germany, meeting at which the agreement was worked out. That could allow researchers to compare, for example, the gut microbes of people in China who follow a traditional diet with those of people in Europe and North America.

–GRETCHEN VOGEL

Scientific Science Policy

Researchers will gather in Washington, D.C., in early December to bolster a White House–led effort across the government to improve how science agencies make policy decisions. The "Science of Science Policy" effort, begun in 2006 and funded mostly by the U.S. National Science Foundation, is subsidizing more than $15 million per year in work that analyzes research trends, gauges scientific progress, and develops modeling and forecasting techniques. The government's goal is to "make more informed, defensible policy decisions," says the U.S. Department of Energy's Bill Valdez.

–ELI KINTISCH

SLAC Plays a Name Game

After a spat with its owner, the U.S. Department of Energy (DOE), the Stanford Linear Accelerator Center has tweaked its name. The new appellation, SLAC National Accelerator Laboratory, resolves a disagreement between DOE, which wanted to trademark the name of its Menlo Park, California, lab, and Stanford University in Palo Alto, California, which sought to protect its own moniker. Officials say the new name also reflects a shift from just particle physics to work in an array of disciplines, including astrophysics and x-ray studies.

–ADRIAN CHO

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