

## CLIMATE CHANGE

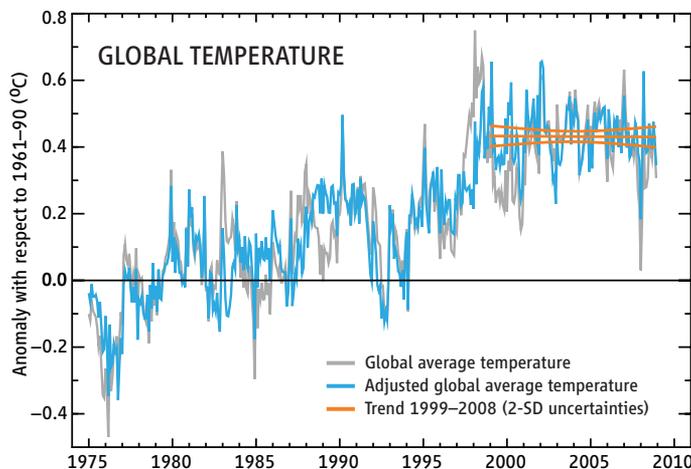
# What Happened to Global Warming? Scientists Say Just Wait a Bit

The blogosphere has been having a field day with global warming's apparent decade-long stagnation. Negotiators are working toward an international global warming agreement to be signed in Copenhagen in December, yet there hasn't been any warming for a decade. What's the point, bloggers ask?

Climate researchers are beginning to answer back in their preferred venue, the peer-reviewed literature. The pause in warming is real enough, but it's just temporary, they argue from their analyses. A natural swing in climate to the cool side has been holding greenhouse warming back, and such swings don't last forever. "In the end, global warming will prevail," says climate scientist Gavin Schmidt of NASA's Goddard Institute for Space Studies (GISS) in New York City.

The latest response from the

climate community comes in *State of the Climate in 2008*, a special supplement to the current (August) issue of the *Bulletin of the American Meteorological Society*. Climate researcher Jeff Knight and eight colleagues at the Met Office Hadley Centre in Exeter, U.K.,



first establish that—at least in one leading temperature record—greenhouse warming has been stopped in its tracks for the past 10 years. In the HadCRUT3 temperature record, the world warmed by  $0.07^{\circ}\text{C} \pm 0.07^{\circ}\text{C}$  from 1999 through 2008, not the  $0.20^{\circ}\text{C}$  expected by the Intergovernmental Panel on Climate Change. Corrected for the natural temperature effects of El Niño and its sister climate event La Niña, the decade's trend is a perfectly flat  $0.00^{\circ}\text{C}$ .

So contrarian bloggers are right: There's been no increase in greenhouse warming lately. That result came as no surprise to Knight and his colleagues or, for that matter, to most climate scientists. But the Hadley Centre group took the next step, using climate modeling to try to quantify how unusual a 10-year warming pause might be. In 10 modeling runs of 21st century climate totaling 700 years worth of simulation, long-term warming proceeded about as expected:  $2.0^{\circ}\text{C}$  by the end of the century. But along the

**Steady as she goes.** The global average temperature (gray line; adjusted in blue) has remained steady the past 10 years, as shown by the orange trend lines.

## BIOSECURITY

## Lawmakers Signal Tougher Controls on Pathogen Research

In the 8 years since the 2001 anthrax letter attacks, new biocontainment labs have sprung up around the United States as part of a massive national effort to counter bioterrorism threats. Now, a crescendo of concerns over the security of these labs, voiced by lawmakers and experts at two congressional hearings last week, threatens to slow the booming biodefense industry.

Both hearings—in the House of Representatives and in the Senate—featured testimony from Nancy Kingsbury of the Government Accountability Office (GAO), whose agency released a report on 21 September that calls for entrusting a single federal entity with determining whether any more biocontainment labs are needed; what standards of design, maintenance, and operation such labs must meet; and how they should be overseen. Those recommendations dovetail with a bill introduced by senators Joe Lieberman (I-CT) and Susan Collins (R-ME) on 9 September, under which the Department of

Homeland Security (DHS) would be charged with establishing and enforcing new security standards for biocontainment labs. Currently, labs where researchers work with select agents—a subset of the broader universe of dangerous pathogens and toxins—are overseen by the select agent program, administered by the Department of Health and Human Services (HHS) and the U.S. Department of Agriculture (USDA).

GAO does not think the current system is adequate. "The number of BSL [biosafety level]-3 and BSL-4 labs has been proliferating at a considerable rate since the anthrax attacks because the government has been throwing money at this kind of research, but there's nobody in charge," Kingsbury told *Science*. She says the number of labs registered under the select agent program has more than tripled since 2004, to 1362 as of 2008.

"We need to know whether we need more of these labs or whether we already have too many," Kingsbury said. She was especially

concerned that an increase in the number of researchers working with hazardous pathogens would "inevitably" lead to an amplified risk of a bioterrorist attack perpetrated by a scientist working at a biocontainment facility. (In August 2008, the Federal Bureau of Investigation implicated U.S. Army researcher Bruce Ivins in the 2001 anthrax attacks [*Science*, 8 August 2008, p. 754].)

At the Senate hearing, lawmakers and officials from the Department of Defense and DHS spoke favorably of a tiered system for pathogens in which facilities and researchers dealing with the most dangerous microorganisms would be subject to the most stringent controls. The bill introduced by Lieberman and Collins calls for exactly such a classification. Under it, over a dozen pathogens, including anthrax, smallpox, and ebola, would be governed by tougher security standards than are required by the select agent rules. Rules for a second tier of select agents would be more lenient than they are now. Labs working

CREDIT: ADAPTED FROM J. KNIGHT ET AL., BULL. AMER. METEOR. SOC., 90 (SUPPL.), S22-S23 (AUGUST 2009)

Downloaded from www.sciencemag.org on October 1, 2009

way in the 700 years of simulation, about 17 separate 10-year intervals had temperature trends resembling that of the past decade—that is, more or less flat.

From this result, the group concludes that the model can reproduce natural jostlings of the climate system—perhaps a shift in heat-carrying ocean currents—that can cool the world and hold off greenhouse warming for a decade. But natural climate variability in the model has its limits. Pauses as long as 15 years are rare in the simulations, and “we expect that [real-world] warming will resume in the next few years,” the Hadley Centre group writes. And that resumption could come as a bit of a jolt, says Adam Scaife of the group, as the temperature catches up with the greenhouse gases added during the pause.

Pinning the pause on natural variability makes sense to most researchers. “That goes without saying,” writes climate researcher Stefan Rahmstorf of Potsdam Institute for Climate Impact Research in Germany by e-mail. “We’ve made [that point] several times on RealClimate,” a blog. Solar physicist Judith Lean of the Naval Research Laboratory in Washington, D.C., and climate modeler David Rind of GISS reached the same conclusion in a peer-reviewed 15 August paper in *Geophysical Research Letters*. They broke down recent

temperature variation into components attributable to greenhouse gases, pollutant aerosols, volcanic aerosols, El Niño/La Niña, and solar variability. Combined, those influences explain all of the observed variability, by Lean and Rind’s accounting. But unlike the Hadley Centre’s model-based analysis, this assessment attributes a good deal of climate variability to variability in solar activity. That’s because most models can’t translate solar variability into climate variability the way the actual climate system can (*Science*, 28 August, p. 1058), Rind says.

Researchers may differ about exactly what’s behind recent natural climate variability, but they agree that no sort of natural variability can hold off greenhouse warming much longer. “Our prediction is that if past is prologue, the solar component will turn around and lead to rapid warming in the next 5 years,” says Rind. Climate modeler David Smith of the Hadley Centre, who was not involved in the *State of the Climate* analysis, says his group’s climate model forecasts—made much the way weather forecasts are made—are still calling for warming to resume in the next few years as ocean influences reverse (*Science*, 10 August 2007, p. 746). Whether that’s in time to boost climate negotiations is anyone’s guess.

—RICHARD A. KERR

with a third tier of pathogens would have to register with the government to help coordinate a rapid response in case of an outbreak.

Many in the biodefense research community oppose more regulations or a change from the status quo. Ronald Atlas of the University of Louisville in Kentucky, who testified before the House panel on behalf of the American Society for Microbiology (ASM), says he supports the idea of tiering but wants HHS and USDA to remain in charge. “There is concern that the expertise at DHS is not sufficient in the life sciences,” Atlas says. Gerald Epstein of the Center for Strategic and International Studies in Washington, D.C., says that DHS’s system of ensuring the reliability of its own employees is so “dysfunctional and byzantine” that “it does not have any business” screening researchers working at other biocontainment labs.

As to how many labs are enough, Atlas says: “There would be value in having federal



**Over capacity.** GAO’s Kingsbury asks whether the United States already has too many biocontainment labs.

coordination with regard to the federal investment in such labs. But that sort of oversight should not interfere with the ability of private and academic institutions to construct containment labs using other sources of funding as long as those labs meet biosafety standards.”

ASM is urging Congress to hold off on passing any biosecurity legislation until an interagency task force on securing labs and countering the insider threat releases its recommendations later in the fall. Meanwhile, the biodefense enterprise

is continuing to grow. In August, the U.S. Army Medical Research Institute of Infectious Diseases broke ground in Frederick, Maryland, for a new facility that will expand the institute’s BSL-3 and BSL-4 lab space. At the same time, a National Research Council panel is studying whether safety and security practices at USAMRIID—from where the anthrax attacks were purportedly launched—are adequate.

—YUDHIJIT BHATTACHARJEE

## ScienceInsider

### From the Science Policy Blog



The U.S. **Food and Drug Administration** has admitted that “unprecedented” pressure from New Jersey politicians led it to approve a **medical device** that its scientists said was flawed.

**Roger Beachy** has been chosen to head the **National Institute of Food and Agriculture**, which replaces the Cooperative State Research, Education, and Extension Service at the U.S. Department of Agriculture. Beachy is director of the Donald Danforth Plant Science Center in St. Louis, Missouri. **Arun Majumdar** has been nominated to run the new **Advanced Research Projects Agency–Energy** at the Department of Energy (DOE). The materials scientist comes from Lawrence Berkeley National Laboratory, and his new boss at DOE is his old boss at the lab—Energy Secretary Steven Chu.

A new online journal, *Nature Communications*, will allow authors to pay a fee so that their paper will be freely available online the moment it’s published. The journal will cover all disciplines and debuts this month.

A lavishly equipped graduate university with a multibillion-dollar endowment from the king officially opened last week along the shores of the Red Sea in Saudi Arabia. **King Abdullah University of Science and Technology** touted its Western-style approach to graduate education and research in a gala inauguration.

A case of **fabricated data** has caused upheavals at Switzerland’s top university, **ETH Zürich**. An internal investigation exonerated its vice president for research, in whose lab the fabrication occurred, but he nevertheless resigned his post. The investigation pointed to a former graduate student who is now suing ETH Zürich to block publication of the report.

Last week’s 1-day U.N. General Assembly **summit on climate change** gave **Chinese President Hu Jintao** a chance to tell the world that China stands ready to negotiate.

For more science policy news, visit [blogs.sciencemag.org/scienceinsider](http://blogs.sciencemag.org/scienceinsider).