

Storm Brews Over Global Warming

By RICHARD MONASTERSKY

Hans von Storch did not have time to start his job before sitting down to write his resignation letter. Just four days before becoming editor in chief of the journal *Climate Research*, he ended up quitting over a paper that has many scientists hot under the collar. The study -- by researchers at the Harvard-Smithsonian Center for Astrophysics -- has ignited a fierce scientific and political debate that spilled into the U.S. Senate and could influence American energy policy and international relations.

All that over what the world's weather was like in the Middle Ages: Was the medieval climate warmer, or cooler, than today's?

The consensus of top international researchers is that the 1990s were most likely the warmest decade of the millennium in the Northern Hemisphere, and that humans have probably caused most of the warming observed in the past 50 years. But the Harvard-Smithsonian report, written by Willie Soon and Sallie Baliunas, lets humanity off the hook by arguing that the Middle Ages were warmer than the 20th century.

Scientists and politicians who are skeptical about global warming have trumpeted that assessment. "The 1,000-year climate study that the Harvard-Smithsonian Center for Astrophysics has compiled is a powerful new work of science," said Sen. James M. Inhofe (R.-Okla.), during a hearing he called in late July to debate the issue. But at the hearing, Michael E. Mann, an assistant professor of environmental sciences at the University of Virginia, attacked the study in language unusually blunt for a scientist. "I believe it is the mainstream view of just about every scientist in my field that I have talked to that there is little that is valid in that paper," he said. "They got just about everything wrong."

The rhetoric made for good political theater but did little to illuminate the key scientific issues in the debate. Nor did it explain why a single paper had caused Mr. von Storch and, eventually, three other editors to resign from the editorial board of *Climate Research*. The uproar over the paper raises questions about how far editors must go in evaluating controversial research claims.

The paper, "Proxy Climatic and Environmental Changes of the Past 1,000 Years," is actually a literature review. Mr. Soon and Ms. Baliunas looked at some 240 previously published studies that evaluated how climate has changed over many centuries. Because reliable thermometer recordings go back only as far as the 19th century, longer-term studies rely on so-called proxy records -- such as tree rings, sea sediments, and glacier layers -- that track climatic variables.

In particular, the researchers looked for widespread evidence

of two climate swings that markedly changed temperatures in Europe. In the Middle Ages, unusual warmth in the North Atlantic region allowed Vikings to settle in Greenland. But that "Medieval Warm Period" gave way a few centuries later to a "Little Ice Age." The canals of Holland regularly froze over then, as in the skating scenes made famous by the painter Pieter Brueghel.

The Harvard-Smithsonian astrophysicists examined proxy climate records from many sites around the world to determine if those periods of extreme weather had affected broad swaths of the globe. They also studied the records to see if the 20th century stood out as warmer than any other era, notably the Medieval Warm Period.

Mr. Soon and Ms. Baliunas -- who have previously studied solar effects on earth's climate and have voiced skepticism about humanity's role in warming the globe -- reported that very few of the proxy records indicated unusual warmth in the 20th century. "When you compare the 20th century to the previous nine centuries, you do not see the change in the 20th century as anything unusual or unprecedented," Mr. Soon told The Chronicle.

The bulk of the support for their work came from government agencies, but the scientists also received \$53,000 -- about 5 percent of their total research dollars -- from the American Petroleum Institute. In addition, both Mr. Soon and Ms. Baliunas are paid consulting fees by the George C. Marshall Institute, a nonprofit organization in Washington that is critical of international efforts to curb emissions of carbon-dioxide gas.

Journal Politics

When the two researchers finished writing their report last year, they sent it halfway around the world to Chris de Freitas, an associate professor in the school of geography and environmental science at the University of Auckland, in New Zealand. He is on the editorial board of *Climate Research*, a relatively obscure journal owned by a small German publishing company, Inter-Research.

Mr. de Freitas has often expressed the view that human activity is not causing any climatic danger, and that nations should not take steps to curb carbon-dioxide emissions. But he says he handled his job as editor of the paper appropriately. He consulted with a paleoclimatologist and selected five specialists to review the submission. "None were from what some might [term] 'the other side' or are individuals who might be known for their opposition to the notion that humans are significantly altering global climate," he said in an e-mail message.

Four of the scientists reviewed the paper. After the authors had dealt with the reviewers' comments, Mr. de Freitas accepted it for publication. The report appeared in the January 31 issue.

That's when the criticism started to rain down. Otto Kinne, publisher of Climate Research, says the paper elicited an unusual amount of correspondence from scientists who criticized the methods used by Mr. Soon and Ms. Baliunas.

The two researchers, with three additional co-authors, published a longer version of the paper this spring in Energy and Environment, a journal geared mainly to social scientists. The journal's editor, Sonja Boehmer-Christiansen, a reader in geography at the University of Hull, in England, says she sometimes publishes scientific papers challenging the view that global warming is a problem, because that position is often stifled in other outlets. "I'm following my political agenda -- a bit, anyway," she says. "But isn't that the right of the editor?"

The two papers apparently attracted notice high in the Bush administration. According to internal documents from the U.S. Environmental Protection Agency, made public by the National Wildlife Federation, the administration fought to include mention of the studies in an agency report on the state of the environment, a move that EPA staff members blocked by deleting all mention of climate change.

Flood of Complaints

Given the high-level attention that the papers were drawing, 13 scientists took the unusual step of publishing in July an extended rebuttal in the American Geophysical Union's house journal, Eos. They first took issue with how Mr. Soon and Ms. Baliunas defined evidence for a Medieval Warm Period: as any 50-year period of warmth, wetness, or drought between the years 800 and 1300.

It is absurd to take wetness or dryness as proof of abnormal warmth, the critics argue. "A paper using that kind of methodology could not be published in any legitimate climate-research journal unless something was severely wrong or suspicious with the review process," says Virginia's Mr. Mann, lead author of the Eos paper, whose own studies on climate were heavily criticized by Mr. Soon's team in the Energy and Environment paper.

Mr. Mann and his colleagues also find fault with the Soon-Baliunas definition of a climatic event. Under their method, warmth in China in 850, drought in Africa in 1000, and wet conditions in England in 1200 all would qualify as part of the Medieval Warm Period, even though they happened centuries apart.

And the critics say that the Harvard-Smithsonian team set up a straw man in comparing conditions during the 20th century with those in earlier centuries. The greatest warming has happened during the past few decades, and so taking an average of the entire century, or even half of it, washes out the recent trend, says Mr. Mann. What's more, many of the climate records examined by the team do not include the most recent decades.

Mr. Soon and Ms. Baliunas improperly used data sets compiled

by other researchers, says Mr. Mann. "Many people feel betrayed by the misrepresentation of their data."

Indeed, scientists contacted by The Chronicle complained about the way their work was cited by the Harvard-Smithsonian team. Peter deMenocal, an associate professor at Columbia University's Lamont-Doherty Earth Observatory, used sediment records off the coast of Africa as a proxy for ocean-surface temperatures. He says Mr. Soon and his colleagues could not justify their conclusions that the African record showed the 20th century as being unexceptional.

"My record has no business being used to address that question," the Columbia scientist says. "It displays some ignorance putting it in there to address that question."

David E. Black, an assistant professor of geology at the University of Akron, says Mr. Soon's group did not use his data properly in concluding that the Middle Ages were warm and the 20th century ordinary. Mr. Black's record of plankton in ocean sediment collected off Venezuela provides a proxy record of the strength of trade winds from 1150 to 1989. But "winds don't meet their definition of warm, wet, or dry," he points out.

Contrary to what Mr. Soon's team claims about the Venezuelan data, Mr. Black says he found no 50-year period of medieval extremes in his record. "I think they stretched the data to fit what they wanted to see," he says.

Mr. Soon defends his study and says the critics have mischaracterized his work. "Some of the proxy information doesn't contain directly the temperature information," he acknowledges, "but it fits the general description of the medieval warm climatic anomaly."

He says he included information about precipitation because too many scientists have focused on temperature, which is not the only measure of climate. "This is a first-order study to try to collect as much data as possible and try not to make the pretension that we know how to separate the information in the proxy."

Damaged Reputation

When the paper in *Climate Research* began attracting criticism, Mr. Kinne, the publisher, created the editor in chief position and gave it to Mr. von Storch, who had served as an editor of the journal for nearly a decade and had done more to improve its standing than most other editors, Mr. Kinne says.

At first, Mr. von Storch said, he was not particularly interested in the widespread criticism of the Harvard-Smithsonian paper. He thought that those with objections should take the normal route of writing a comment that the journal would then consider for publication. But when he saw a preprint of the *Eos* rebuttal, he decided that the paper was seriously flawed and that the journal must take action. "We should say that we have a problem here, that the

manuscript was flawed, that the manuscript should not have been published in this way," he says. "The problem is that the conclusions are not supported by the evidence presented in the paper."

Mr. de Freitas, the paper's editor, had approved a few other papers by skeptics of global warming that had also drawn criticism from scientists, so Mr. von Storch decided to change the system. He drafted an editorial in which he said that the review process at the journal had failed in certain ways, and that all new manuscripts should henceforth be sent directly to the editor in chief rather than to individual editors, each of whom operates independently.

Mr. Kinne agreed that the journal should not have published the paper by the Harvard-Smithsonian team as written, and that the reviewers had failed to detect methodological flaws. But the publisher did not accept Mr. von Storch's proposed changes to the editorial process and asked him to delay running the editorial and to get approval first from other editors on the board.

Mr. von Storch, however, found that some editors on the board still viewed the Harvard-Smithsonian paper as fine. "I concluded that we have different standards," he says. "Some are doing [the editing] in a rather sloppy way."

He says he suspects that "some of the skeptics had identified Climate Research as a journal where some editors were not as rigorous in the review process as is otherwise common." So he resigned from the board, as did three other members.

One of them is Clare M. Goodess, a senior research associate at the Climate Research Unit at the University of East Anglia, in England. "Along with Hans," she says, "I tried to do as much as I could to protect the reputation of the journal. Ultimately, I think, we failed."

Mr. von Storch and other editors had built up the quality of the journal, and it was starting to receive more manuscripts, she adds. "I think it's a shame that a controversy over just a few papers has caused such damage to the journal."

But Mr. Kinne argues that every journal makes mistakes, and that a rare problem does not warrant major changes.

As someone who did not know about the controversial paper until contacted recently by a reporter, Akron's Mr. Black now says the Harvard-Smithsonian study has shaken his faith in the system. "I always tell myself and my students that science is self-correcting," he says. "But this is one case that makes you wonder about the peer-review process."