

Course Correction: Pielke Calls for New Direction in Climate Science

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Roger Pielke, Sr. is something of a lightning rod in the climate science community.

He says that current climate models are not reliable enough to accurately forecast future climate. He says biases in the thousands of ground-based weather stations around the world make them unsuitable to accurately track Earth's surface temperature. He doesn't believe greenhouse gas emissions are the main driver of climate change.

Furthermore, he says the largest and most sustained effort to synthesize what scientists know and agree on regarding climate change—the Intergovernmental Panel on Climate Change—is seriously flawed.

Pielke, a senior research scientist at the Cooperative Institute for Research in the Environmental Sciences located at the University of Colorado at Boulder, spoke to a group of scientists and students in the Boyd Auditorium at the Jackson School of Geosciences on January 23.

“People spend lots of time and money trying to estimate how temperature and so on will change,” said Pielke. “I think it's almost irrelevant because we don't live in a globally averaged world, we live in a specific place.”

He has ruffled the feathers of some mainstream climate scientists who say that yes, there are uncertainties in the climate models and in observations, but the vast preponderance of evidence supports the notion that burning fossil fuels is a major driver of climate change and that the amount of change we'll see in this century will be large, if not devastating.

Pielke said climate scientists need to move in a different direction: Stop focusing on Earth's surface temperature as an indicator of how climate is changing, he said. Instead, look at the heat content of the oceans, which some research suggests has experienced a short period of cooling recently. And, he added, stop obsessing over greenhouse gas emissions. Instead, recognize that climate change has multiple causes including land-cover changes and start thinking about how to address societal and environmental vulnerabilities.

Skeptic, Heretic or Prophet?

While at times out of step with his climate colleagues, Roger Pielke, Sr. is hard to dismiss. He has published over 300 papers in peer-reviewed journals (including Science, Geophysical Research Letters, Journal of Geophysical Research, Journal of Atmospheric Science, and EOS), written 50 chapters in books, and co-edited 9 books. He was elected a fellow of the American Meteorological Society in 1982 and a fellow of the American Geophysical Union in 2004. He served as Colorado's state climatologist from 1999 to 2006.

“The thing I like about Roger and respect is that he publishes in the peer reviewed literature as a standard way of communication,” said Terry Quinn, a climate researcher at the Jackson School of Geosciences at The University of Texas at Austin. “He is a highly regarded scientist with a strong track record. So I take what he says seriously.”

Enlarged Images

“When we go out, we find problems such as this,” said Pielke as he flashed a series of slides showing weather stations around the world, including this one from Leitchfield2N station in Kentucky. Some were located near homes, sidewalks, shrubs and in one case, a heater vent. “The shrubs and so on change over the years. We have all these biases in these temperature records.”

One of Pielke’s favorite targets is the Intergovernmental Panel on Climate Change. He said the process by which they create assessment reports is seriously flawed. He charged that the panel’s editors often review their own research, a situation he said is a clear conflict of interest because they inevitably promote their own work and disregard the work of others that has reached different conclusions. He pointed to changes he recommended in earlier IPCC reports that he claimed were ignored. Because of his frustration with the process, he no longer participates.

Supporters of the IPCC acknowledge it is an imperfect system, but say it is the best that can be done given the enormity of the task of getting thousands of scientists to reach something approaching consensus on climate change.

Pielke agrees that Earth’s climate is changing and that humans are the main driver of those changes. But, he told the audience, he thinks an intensifying greenhouse effect due to human emissions of carbon dioxide is only responsible for about a quarter of the change.

Other climate scientists estimate that human produced CO₂ accounts for about half of current global warming.

Pielke said his research shows that human activities such as increased fertilizer use, increased aerosol pollution and changing land cover—combined with natural changes in volcanic activity and solar output—are impacting Earth’s climate more than emissions of greenhouse gases.

“We shouldn’t ignore the fact that there’s increasing CO₂ in the atmosphere,” he said. “I don’t think it’s a good thing. But if you’re basing a policy on that, I think you’re leaving out some important things.”

Instead, he said, the scientific community should focus on vulnerabilities. First, identify the resources that are important to you, such as water. And try to determine what the potential stressors and vulnerabilities are for that resource.

“A vulnerability paradigm,” said Pielke, “is a more inclusive, useful, and scientifically robust framework to interact with policymakers, than is the focus on global multi-decadal climate predictions which are downscaled to the regional and local scales.” He said such a paradigm would cover the entire spectrum of risks to society and the environment, not just climate change.

To help his students grasp the concept of a vulnerability paradigm, Pielke said he likes to ask this question, “If you were given \$100 million to spend on environmental benefits in Colorado, where would you use the money?”

Pielke’s views have occasionally garnered him the title “climate skeptic.” But Quinn said that label is a bit unfair.

“I recognize that the term ‘climate skeptic’ has developed a pejorative tone, but I think skepticism in science is healthy and that’s how it should be,” said Quinn. “In that respect, he’s doing a good job, he publishes results, he adds to the debate. He is highly respected and I was happy we were able to bring him here.”

Global Cooling?

Pielke said biases in many ground-based weather stations around the world make them unsuitable to accurately track Earth's surface temperature.

"When we go out, we find problems such as this," said Pielke as he flashed a series of slides showing weather stations in Colorado, Kentucky, Mexico and Mongolia. Some were located near homes, sidewalks, shrubs and in one case, a heater vent. "The shrubs and so on change over the years. We have all these biases in these temperature records."

He said a more reliable metric for gauging climate change would be ocean heat content.

"The ocean is a big heat capacitor," he said. "It's like heating up a pot of water—turn the burner off, it stops warming. There's no 'unrealized heat.'"

He cited a study published last September by NASA and NOAA researchers which found that the near surface waters of Earth's oceans cooled slightly from 2003 to 2005.

"None of the models have picked up on the fact that there has been global cooling in the oceans," said Pielke. "Neither has the media."

Quinn said in his opinion Pielke was telling only part of the story by focusing on the last couple of years in the record of ocean heat content.

According to a NASA press release about the study, "Although the average temperature of the upper oceans has significantly cooled since 2003, the decline is a fraction of the total ocean warming over the previous 48 years."

"This research suggests global warming isn't always steady, but happens with occasional 'speed bumps'," said Josh Willis, a co-author of the study at NASA's Jet Propulsion Laboratory, Pasadena, California. "This cooling is probably natural climate variability. The oceans today are still warmer than they were during the 1980s, and most scientists expect the oceans will eventually continue to warm in response to human-induced climate change."

Quinn noted that sea levels have continued to rise even during this brief period of cooling.

"So the issue is even more staggering in its implications," he said. "If the ocean is cooling, sea level should actually be falling because of thermal contraction. The fact that sea level is rising tells you that something is compensating for it. And it's probably increased fresh water flow from melting glaciers and ice sheets."

In the Q&A session after Pielke's presentation, Quinn pointed out that ocean heat content has been historically difficult to measure and that the record only extends back a few decades.

"On the other hand, at least we have the data on surface temperatures going back for over a century," said Quinn. "It's imperfect, but why shouldn't we use the data we have?"

Pielke replied that it doesn't take decades of data to see the oceans are cooling and that he trusts those measurements more than surface measurements.

by Marc Airhart

For more information about the Jackson School contact J.B. Bird at jbird@jsg.utexas.edu, 512-232-9623.