Opinion: Can scientists rebuild the public trust in climate science?

By Physics Today on February 24, 2010 5:18 PM | 11 Comments | No TrackBacks

Editor's Note: Judith Curry from the Georgia Institute of Technology has offered the following essay for publication. The essay has been mildly edited to add hyperlinks to backup or add context to some parts of the essay, and to follow *Physics Today*'s style guide when appropriate. This essay does not reflect the views of *Physics Today* or the American Institute of Physics, but of the opinion writer.

Judith Curry:

I am trying something new, a blogospheric experiment, if you will. I have been a fairly active participant in the blogosphere since 2006, and recently posted two essays on climategate, one at climateaudit.org and the other at climateprogress.org. Both essays were subsequently picked up by other blogs, and the diversity of opinions expressed at the different blogs was quite interesting. Hence I am distributing this essay to a number of different blogs simultaneously with the hope of demonstrating the collective power of the blogosphere to generate ideas and debate them. I look forward to a stimulating discussion on this important topic.

Losing the Public's Trust

Climategate has now become broadened in scope to extend beyond the University of East Anglia's climate research unit (CRU) emails to include glaciergate and a host of other issues associated with the Intergovernmental Panel on Climate Change (IPCC).

In responding to climategate, the climate research establishment has appealed to its own authority and failed to understand that climategate is primarily a crisis of trust. Finally, we have an editorial published in *Science* on 5 February from Ralph Cicerone, President of the National Academy of Science, that begins to articulate the trust issue:

"This view reflects the fragile nature of trust between science and society, demonstrating that the perceived misbehavior of even a few scientists can diminish the credibility of science as a whole. What needs to be done? Two aspects need urgent attention: the general practice of science and the personal behaviors of scientists."

While I applaud loudly Cicerone's statement, I wish it had been made earlier and had not been isolated from the public by publishing the statement behind paywall at *Science*. Unfortunately, the void of substantive statements from our institutions has been filled in ways that have made the situation much worse.

Credibility is a combination of expertise and trust. While scientists persist in thinking that they should be trusted because of their expertise, climategate has made it clear that expertise itself is not a sufficient basis for public trust. The fallout from climategate is much broader than the allegations of misconduct by scientists at two universities. Of greatest importance is the reduced credibility of the IPCC assessment reports, which are providing the scientific basis for international policies on climate change. Recent disclosures about the IPCC have brought up a

host of concerns about the IPCC that had been festering in the background: involvement of IPCC scientists in explicit climate policy advocacy; tribalism that excluded skeptics; hubris of scientists with regards to a noble (Nobel) cause; alarmism; and inadequate attention to the statistics of uncertainty and the complexity of alternative interpretations.

The scientists involved in the CRU emails and the IPCC have been defended as scientists with the best of intentions trying to do their work in a very difficult environment. They blame the alleged hacking incident on the "climate denial machine." They are described as fighting a valiant war to keep misinformation from the public that is being pushed by skeptics with links to the oil industry. They are focused on moving the science forward, rather than the janitorial work of record keeping, data archival, etc. They have had to adopt unconventional strategies to fight off what they thought was malicious interference. They defend their science based upon their years of experience and their expertise.

Scientists are claiming that the scientific content of the IPCC reports is not compromised by climategate. The jury is still out on the specific fallout from climategate in terms of the historical and paleotemperature records. There are larger concerns (raised by glaciergate, etc.) particularly with regards to the IPCC Assessment Report on Impacts (Working Group II): has a combination of groupthink, political advocacy and a noble cause syndrome stifled scientific debate, slowed down scientific progress and corrupted the assessment process? If institutions are doing their jobs, then misconduct by a few individual scientists should be quickly identified, and the impacts of the misconduct should be confined and quickly rectified. Institutions need to look in the mirror and ask the question as to how they enabled this situation and what opportunities they missed to forestall such substantial loss of public trust in climate research and the major assessment reports.

In their misguided war against the skeptics, the CRU emails reveal that core research values became compromised. Much has been said about the role of the highly politicized environment in providing an extremely difficult environment in which to conduct science that produces a lot of stress for the scientists. There is no question that this environment is not conducive to science and scientists need more support from their institutions in dealing with it. However, there is nothing in this crazy environment that is worth sacrificing your personal or professional integrity. And when your science receives this kind of attention, it means that the science is really important to the public. Therefore scientists need to do everything possible to make sure that they effectively communicate uncertainty, risk, probability and complexity, and provide a context that includes alternative and competing scientific viewpoints. This is an important responsibility that individual scientists and particularly the institutions need to take very seriously.

Both individual scientists and the institutions need to look in the mirror and really understand how this happened. Climategate isn't going to go away until these issues are resolved. Science is ultimately a self-correcting process, but with a major international treaty and far-reaching domestic legislation on the table, the stakes couldn't be higher.

The Changing Nature of Skepticism about Global Warming

Over the last few months, I have been trying to understand how this insane environment for climate research developed. In my informal investigations, I have been listening to the perspectives of a broad range of people that have been labeled as "skeptics" or even "deniers". I have come to understand that global warming skepticism is very different now than it was five years ago. Here is my take on how global warming skepticism has evolved over the past several decades.

In the 1980's, James E. Hansen and Steven Schneider led the charge in informing the public of the risks of potential anthropogenic climate change. Sir John Houghton and Bert Bolin played

similar roles in Europe. This charge was embraced by the environmental advocacy groups, and global warming alarmism was born. During this period I was skeptical that global warming was detectable in the temperature record and that it would have dire consequences. The traditional foes of the environmental movement worked to counter the alarmism of the environmental movement, but this was mostly a war between advocacy groups and not an issue that had taken hold in the mainstream media and the public consciousness. In the first few years of the 21st century, the stakes became higher and we saw the birth of what some have called a "monolithic climate denial machine". Skeptical research published by academics provided fodder for the think tanks and advocacy groups, which were fed by money provided by the oil industry. This was all amplified by talk radio and cable news.

In 2006 and 2007, things changed as a result of Al Gore's movie "*An Inconvenient Truth*" plus the IPCC 4th Assessment Report, and global warming became a seemingly unstoppable juggernaut. The reason that the IPCC 4th Assessment Report was so influential is that people trusted the process the IPCC described: participation of a thousand scientists from 100 different countries, who worked for several years to produce 3000 pages with thousands of peer reviewed scientific references, with extensive peer review. Further, the process was undertaken with the participation of policy makers under the watchful eyes of advocacy groups with a broad range of conflicting interests. As a result of the IPCC influence, scientific skepticism by academic researchers became vastly diminished and it became easier to embellish the IPCC findings rather than to buck the juggernaut. Big oil funding for contrary views mostly dried up and the mainstream media supported the IPCC consensus. But there was a new movement in the blogosphere, which I refer to as the "climate auditors", started by Steve McIntyre. The climate change establishment failed to understand this changing dynamic, and continued to blame skepticism on the denial machine funded by big oil.

Climate Auditors and the Blogosphere

McIntyre started the blog climateaudit.org so that he could defend himself against claims being made at the blog realclimate.org with regards to his critique of the "hockey stick" since he was unable to post his comments there. Climateaudit has focused on auditing topics related to the paleoclimate reconstructions over the past millennia (in particular the so called "hockey stick") and also the software being used by climate researchers to fix data problems due to poor quality surface weather stations in the historical climate data record. McIntyre's "auditing" became very popular not only with the skeptics, but also with the progressive "open source" community, and there are now a number of such blogs. The blog with the largest public audience is wattsupwiththat.com, led by weatherman Anthony Watts, with over 2 million unique visitors each month.

So who are the climate auditors? They are technically educated people, mostly outside of academia. Several individuals have developed substantial expertise in aspects of climate science, although they mainly audit rather than produce original scientific research. They tend to be watchdogs rather than deniers; many of them classify themselves as "lukewarmers". They are independent of oil industry influence. They have found a collective voice in the blogosphere and their posts are often picked up by the mainstream media. They are demanding greater accountability and transparency of climate research and assessment reports.

So what motivated their freedom of information requests requests of the CRU at the University of East Anglia? Last weekend, I was part of a discussion on this issue at the Blackboard. Among the participants in this discussion was Steven Mosher, who broke the climategate story and has already written a book on it. They are concerned about inadvertent introduction of bias into the CRU temperature data by having the same people who create the dataset use the dataset in research and in verifying climate models; this concern applies to both Hansen's group at NASA and the connection between CRU and the UK's Meteorological Office's Hadley Centre. This

concern is exacerbated by the choice of Hansen to become a policy advocate, and his forecasts of forthcoming "warmest years."

Medical research has long been concerned with the introduction of such bias, which is why they conduct double blind studies when testing the efficacy of a medical treatment. Any such bias could be checked by independent analyses of the data; however, people outside the inner circle were unable to obtain access to the information required to link the raw data to the final analyzed product. Further, creation of the surface data sets was treated like a research project, with no emphasis on data quality analysis, and there was no independent oversight. Given the importance of these data sets both to scientific research and public policy, they feel that greater public accountability is required. [**Editor's note**: Some of the datasets at CRU are not owned by the university, nor do they have permission to release proprietary information into the public domain. However, the announcement today that the world's major meteorological organizations are going to open access to some of their climate data may reduce the likelihood that this will happen in future.]

So why do the mainstream climate researchers have such a problem with the climate auditors? The scientists involved in the CRU emails seem to regard Steve McIntyre as their arch-nemesis (a term coined by Roger Pielke Jr's, who is also skeptical of some claims by climate researchers). Steve McIntyre's early critiques of the hockey stick were dismissed and he was characterized as a shill for the oil industry. Academic/blogospheric guerilla warfare ensued, as the academic researchers tried to prevent access of the climate auditors to publishing in scientific journals and presenting their work at professional conferences, and tried to deny them access to published research data and computer programs. The bloggers countered with highly critical posts in the blogosphere and FOIA requests. And climategate was the result.

So how did this group of bloggers succeed in publicly bringing the climate establishment to its knees (whether or not the climate establishment realizes yet that this has happened)? Again, trust plays a big role; it was pretty easy to follow the money trail associated with the "denial machine". On the other hand, the climate auditors have no apparent political agenda, are doing this work for free, and have been playing a watchdog role, which has engendered the trust of a large segment of the population.

Towards Rebuilding Trust

Rebuilding trust with the public on the subject of climate research starts with Ralph Cicerone's statement "Two aspects need urgent attention: the general practice of science and the personal behaviors of scientists." Much has been written about the need for greater transparency, reforms to peer review, etc. and I am hopeful that the relevant institutions will respond appropriately. Investigations of misconduct are being conducted at the University of East Anglia and at Penn State. Here I would like to bring up some broader issues that will require substantial reflection by the institutions and also by individual scientists.

Climate research and its institutions have not yet adapted to its high policy relevance. How scientists can most effectively and appropriately engage with the policy process is a topic that has not been adequately discussed, and climate researchers are poorly informed in this regard. The result has been reflexive support for policies proposed by the United Nations Framework Convention on Climate Change (UNFCC) such as carbon cap and trade by many climate researchers that are involved in the public debate, which they believe follows logically from the findings of the IPCC.

The policy advocacy by this group of climate scientists has played a role in the political polarization of this issue. The interface between science and policy is a muddy issue, but it is very important that scientists have guidance in navigating the potential pitfalls. Improving this situation

could help defuse the hostile environment that scientists involved in the public debate have to deal with, and would also help restore the public trust of climate scientists.

The failure of the public and policy makers to understand the truth as presented by the IPCC is often blamed on difficulties of communicating such a complex topic to a relatively uneducated public that is referred to as "unscientific America" by Chris Mooney. Efforts are made to "dumb down" the message and to frame the message to respond to issues that are salient to the audience. People have heard the alarm, but they remain unconvinced because of a perceived political agenda and lack of trust of the message and the messengers. At the same time, there is a large group of educated and evidence driven people (e.g. the libertarians, people that read the technical skeptic blogs, not to mention policy makers) who want to understand the risk and uncertainties associated with climate change, without being told what kinds of policies they should be supporting (**Editors note**: See also NPR's "belief in climate change hinges on worldview" for a counter-viewpoint).

More effective communication strategies can be devised by recognizing that there are two groups with different levels of base knowledge about the topic. But building trust through public communication on this topic requires that uncertainty be acknowledged. My own experience in making public presentations about climate change has found that discussing the uncertainties increases the public trust in what scientists are trying to convey and doesn't detract from the receptivity to understanding climate change risks (they distrust alarmism). Trust can also be rebuilt by discussing broad choices rather than focusing on specific policies.

And finally, the blogosphere can be a very powerful tool for increasing the credibility of climate research. "Dueling blogs" (e.g. climateprogress.org versus wattsupwiththat.com and realclimate.org versus climateaudit.org) can actually enhance public trust in the science as they see both sides of the arguments being discussed.

Debating science with skeptics should be the spice of academic life, but many climate researchers lost this somehow by mistakenly thinking that skeptical arguments would diminish the public trust in the message coming from the climate research establishment (Editor's note: see Climate skepticism 'on the rise', BBC poll shows for an alternative view). Such debate is alive and well in the blogosphere, but few mainstream climate researchers participate in the blogospheric debate.

The climate researchers at realclimate.org were the pioneers in this, and other academic climate researchers hosting blogs include Roy Spencer, Roger Pielke Sr and Jr, Richard Rood, and Andrew Dessler. The blogs that are most effective are those that allow comments from both sides of the debate (many blogs are heavily moderated).

While the blogosphere has a "wild west" aspect to it, I have certainly learned a lot by participating in the blogospheric debate including how to sharpen my thinking and improve the rhetoric of my arguments.

Additional scientific voices entering the public debate particularly in the blogosphere would help in the broader communication efforts and in rebuilding trust.

And we need to acknowledge the emerging auditing and open source movements in the in the internet-enabled world, and put them to productive use. The openness and democratization of knowledge enabled by the internet can be a tremendous tool for building public understanding of climate science and also trust in climate research. No one really believes that the "science is 100% settled" or that "the debate is over." Scientists and others that say this seem to want to advance a particular agenda. There is nothing more detrimental to public trust than such statements.

And finally, I hope that this blogospheric experiment will demonstrate how the diversity of the different blogs can be used collectively to generate ideas and debate them, towards bringing some sanity to this whole situation surrounding the politicization of climate science and rebuilding trust with the public.

Categories:

- Climate change,
- Science and Society

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11 Comments

Kaintuck | February 26, 2010 2:16 AM | Reply

Credibility is lost when Phil Jones supports his claim of unprecedented warming in the BBC interview by citing the significance of temperatures to the thousandths of a degree Celsius.

Such exquisite precision, yet he can't seem to find the papers in his office containing the data that support his "science".

Jim Wauwatosa | February 26, 2010 10:42 AM | Reply

I paid little attention to Global Warming till the Climategate emails. I'm a computer programmer and in Graduate School took a number of courses in Advanced Econometrics.

I really doubt Climate Science can get it's Mojo back. The process has been totally corrupted by politics.

Maybe a start would be a discussion of what a Climate Scientist is, and what disiplines are required and included.

Chris Ryan | February 26, 2010 1:55 PM | Reply

I think the author is correct in some areas. Efforts to "dumb-down" the data and or communications tend to look like lies even when they aren't.

It will be very, very hard to rebuild any trust in this field.

Aron McCart | February 28, 2010 8:19 PM | Reply

It's unfortunate that the public's lack of a basic understanding of how science works can allow for such nonsense as climate denialism in the first place. I don't think we should be focusing our efforts on rebuilding trust. We should be focusing our efforts on understanding how and why this trust was even allowed to be eroded and fixing the underlying causes.

Weston Davis | March 1, 2010 1:32 AM | Reply

Your essay touches upon a more wide spread problem than just the mistrust of science in the public. Every profession that is fact driven has lost its ability to control its members bias. We see it in journalism, health care, in judges and in our teachers. The "high" professions were supposed to be beyond bias (oxymoron I know) and only concerned with the findings of their study. In modern times some individuals in these professions have given way to grand standing for personal glory, cooking of the books for personal gain, and fact fabrication for personal validation.

The only way to regain trust is to foster skepticism and embrace the academic argument again, no matter how ludicrous we may think the counter-argument to be. Its not the role of the scientist or any other profession to make people believe, just present the facts as we find them and give outlet to the arguments against.

Terry Goldman | March 1, 2010 7:28 PM | Reply

When measurements are not accompanied by error estimates, when models are not accompanied by estimates of systematic uncertainties, the material presented is not science, let alone trustworthy science.

Robert Foster | March 2, 2010 12:30 PM | Reply

When high-profile politicians make films to influence public attitudes, isn't it likely that the public will start to view those issues in a political context?

Today, we like the concept of freedom of expression, but just so long as the other person shares our viewpoint. If an individual were to question why they should agree with the facts supporting Global Warming, they increasingly encountered hostile responses.

Without respect, there will be no dialogue, nor the formation of trust.

Thank you to the author for an interesting article.

Mohammad Firoz Khan | March 3, 2010 4:51 AM | Reply

Whether prediction/projection with the flaws in adopted methodology of simulation are correct or incorrect does not matter in this part of the world (India). To us climate change is a hard fact as we are experiencing its heat day in day out. To most of us,like many so-called socio-cultural and scientific notions floated by a small population or established facts "scientifically" disproved are to serve the economic interests of this small population and give it a ground to step back from its commitments to undo whatever wrong it has done to the world. It does not who is proving or disproving and propagating it from which part of the world.

David Marchant | March 3, 2010 12:18 PM | Reply

Supper essay Ms. Currey. Well researched and thought through.

David Tofsted | March 6, 2010 8:49 PM | Reply

In her blog, Judy Curry argues that the primary problem in climategate is a crisis of trust. Presumably the climate research community has lost a measure of credibility with the public. She says, "scientists persist in thinking that they should be trusted because of their expertise." This reduced credibility has then tainted the IPCC assessment reports as well.

In particular she cites a series of faultlines that sceptics have identified: "Recent disclosures about the IPCC have brought up a host of concerns about the IPCC that had been festering in the background: involvement of IPCC scientists in explicit climate policy advocacy; tribalism that excluded skeptics; hubris of scientists with regards to a noble (Nobel) cause; alarmism; and inadequate attention to the statistics of uncertainty and the complexity of alternative interpretations."

While Dr. Curry has identified certain aspects of behavior by climate scientists as troublesome, she is still of the opinion that these researchers must be viewed as the experts in their fields. In this view any lack of "trust" in these researchers is due to their personal foibles or perhaps a lack of communication skills, but not due to the methods used in arriving at the material in the IPCC AR4 itself.

As a result, I believe that Ms. Curry misses a key point. Much of the blogs are not focused per se on the character of the researchers. In fact most of the material is focused on issues related to the content of the documents themselves. Ms. Curry claims that the IPCC reports were thoroughly peer reviewed, but this process was a political one. The senior editors controlled the review process and ignored sceptical criticisms. How else could reference citations to World Wildlife Fund reports be included?

Rather than simply questioning credibility, critics, such as Sonja Boehmer-Christiansen point out that “climate science was generously funded and required to support rather than to question ... policy objectives." While much of the early criticism was directed from oil companies, Ms. Curry fails to mention that most of the support for global warming arises from "university research units [that] have almost become wholly-owned subsidiaries of Government Departments. Their survival, and the livelihoods of their employees, depends on delivering what policy makers think they want. It becomes hazardous to speak truth to power."

In addition to this toxic environment for independent research, we find examples of data manipulation that raise questions of the validity of the work. As just a few examples, Anthony Watts raises the "Darwin Zero" case, dropped Russian data sites that are still in operation, and the mishandling of Antartic data.

Ms. Curry represents these cases as attempting to handle a sparse data set, but this point is belied by the Darwin Zero case in particular. There, five local temperature readings which indicated overlapping results were effectively dismissed in lieu of data collected some 500 km away indicating a rise in temperature. The devil is in the details, and in this case those details tell a story of manipulative gerrymandering of the base data set on which the entire global warming story is built.

Bojkov | March 14, 2010 12:36 PM | Reply

This article demonstrates the lack of understanding of the basic physical facts that the climate is changing! The IPCC report has few (less than handful) errors however the Report in its entirety is documenting the fact that the climate is warming. The sceptics are usualy picking up half-truths and missinterpreting facts of changing nature, they use stolen e-mails, quote them out of context and do not use solid scientific arguments. Ms. Curry demonstrates same weaknesses.