Opinion

The legacy of climategate: undermining or revitalizing climate science and policy?

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In mid-November 2009, emails were removed without authorization from a University of East Anglia server and posted to the internet; within 24 h an international scandal was born—alleging fraud by leading climate scientists—which almost immediately became known as climategate. Multiple investigations concluded that no fraud or scientific misconduct had occurred. Despite the exonerations, however, the email controversy has had impacts, both negative and positive. On the negative side, a small minority of the American public and a somewhat larger minority of American TV news professionals—mostly political conservatives—indicated that the controversy made them more certain that climate change is not happening, and undermined their trust in climate scientists. Conservative organizations and politicians continue to cite the controversy in justifying their opposition to government action on climate change. On the positive side, the controversy impressed upon the climate science community the need for improved communication and public engagement efforts, and many individuals and organizations have begun to address these needs. It also reminded the climate science community of the importance of transparency, data availability, and strong quality assurance procedures, stimulating many organizations to review their data management practices. Although it is too soon to gauge the lasting legacy of the controversy, if the climate science community takes it as an opportunity to improve its already high standards of scientific conduct—as well as improve its less well-developed approach to public engagement—the long-term prognosis is good.

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INTRODUCTION

On November 17, 2009, thousands of personal emails and research documents were copied without authorization from a server at University of East Anglia's (UEA) Climatic Research Unit (CRU) in the UK. By early afternoon two days later, the content had been posted to two conservative blog sites. By late afternoon, a commenter at one of the blogs asked 'Hmmm how long before this is dubbed Climategate?' Shortly after nightfall, another commenter suggested the following summary as a means to educate the media about the significance of the event: 'Climategate! Leak of secret emails shows top climate scientists engaged in massive fraud! Global warming was hoax designed to enrich politicians and researchers!' The next morning, a blogger for UK newspaper The Telegraph published a piece titled 'Climategate: the final nail in the coffin of

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"Anthropogenic Global Warming?'" Minutes later, the BBC reported their first story on the event, and by the end of the hour, the first tweet referring to the event as climategate had been sent.[1] Thus, in the span of less than 24 h (a period of time too brief for any real analysis of the emails), an international scandal was born—alleging fraud on the part of leading climate scientists in the UK and US—based almost exclusively on a naming and framing of the event that emerged in a seemingly organic manner on a small number of blogs.[2] Within a week, the first efforts to rename and reframe the issue emerged; however, they were too little, too late.[3] Although the total amount of news media coverage of the event was relatively small, it did influence coverage of the Copenhagen COP 15 negotiations in December 2009, and in a variety of ways has continued to influence media reporting.[4]

Six independent, high-level scientific and governmental commissions were organized to investigate these allegations—in both the UK and US—all of which concluded that no fraud or scientific misconduct had occurred. One of the reports, however, concluded 'there has been a consistent pattern of failing to display the proper degree of openness, both on the part of CRU scientists and on the part of UEA, who failed to recognize not only the significance of statutory requirements but also the risk to the reputation of the University and, indeed, to the credibility of UK climate science'.[5]

The exoneration of the climate scientists involved, however, does not mean that the CRU email controversy had no impact. In this article, we assess those impacts, both negative and positive.

NEGATIVE IMPACTS

Beliefs

The impact of the CRU email controversy on public beliefs about human-caused climate change and trust in climate scientists is the main aspect of the controversy that has, thus far, been investigated in the peer-reviewed literature.[a] Using data from two nationally representative surveys of American adults conducted in late 2008 and early January 2010, Leiserowitz and colleagues found relatively low rates of awareness of 'controversial emails between climate scientists in the UK and the US… which some news organizations have called "climategate"' (29% of Americans were aware of the story, and 25% followed the story 'a little' or more closely).[6] Among the 25% who had followed the story, however, 47% (approximately 58 million people) said it made them somewhat (18%) or much more certain (29%) that 'global warming is not happening', while only 11% said the story made them somewhat (8%) or much more certain (3%) that global warming is happening. Over half (53%) of the people who followed the story said the event caused them to have somewhat less (24%) or much less (29%) trust in climate scientists, while only 5% said it enhanced their trust. Thus, in total, approximately 6 weeks after the story first broke, nearly 13% of American adults said that the event made them more certain that global warming is not happening, and reduced their trust in climate scientists. It is important to note, however, that these responses were most common among political conservatives, less common among moderates, and nearly absent among liberals. Consistent with this finding, a subsequent national survey conducted by Leiserowitz and colleagues in May 2011 found that while overall awareness of climategate had dropped to 23% (from 29% in January 2010), Americans who consider themselves members of the Tea Party (45%) were far more likely than Democrats (16%), Independents (27%), and Republicans (20%) to be aware of the event.[7]

Early in 2010, Maibach and colleagues surveyed American TV weathercasters[8] and TV news directors.[9] The impact of climategate on these news professionals was similar to that found among the public. Unlike the relatively low rates of story awareness among the public, large majorities of weathercasters (82%) and news directors (76%) were aware of the story. Of these, 42% and 39% respectively said that the story made them more certain that global warming is not happening, therefore the net negative impact among these media professionals was larger than among members of the general public. Similar to the public, politically conservative weathercasters (57%) were far more likely than moderates (33%) or liberals (15%) to report that climategate had made them more certain that global warming is not happening.[8] In a subsequent January 2011 survey of TV weathercasters, Maibach and colleagues found that most of the relatively small minority of weathercasters who are currently still undecided whether climate change is happening or not (8%), and those who are convinced that the climate is not changing (9%), hold beliefs consistent with the allegations: 'Climate scientists have been caught conspiring to suppress research results that they disagree with' (73% and 74%, respectively); and 'Climate scientists have been caught changing their results to make climate change appear more certain than it is' (59% and 82%).[10]

Political Dynamics and Policy Processes

In the 2 years since the controversy over the CRU emails first erupted, American efforts to enact climate

policy at the national level have been undermined by a confluence of events—from the emergence of the Tea Party movement, to a new Republican majority in the US House of Representatives in the 112th Congress, and the 2012 US Presidential election campaign—which have created a political movement that denies the reality of anthropogenic global warming and its potential impacts, rejects climate legislation, and aims to weaken environmental regulations and the agencies that enforce them.

The email controversy provided a useful weapon for organizations that wanted to sow doubts about climate change in the public's mind.[11] The ground was already fertile: Americans tended to view even established facts about climate change as uncertain and open to debate, possibly in part as a result of years of news coverage that erroneously suggested disagreement among climate scientists.[4,12]

Exploiting this public uncertainty, Republican-controlled state governments, led by Texas and Virginia[13] and supported by petitions from the US Chamber of Commerce,[14] cited climategate in a challenge to EPA's December 2009 Endangerment Finding, a finding which determined that climate change caused by greenhouse gas emissions endangers human health and welfare and requires regulation under the Clean Air Act. The Virginia Tea Party followed suit stating that climategate confirmed that cap-and-trade legislation was a political non-starter,[15] while the Texas Tea Party called climategate a 'disgraceful scientific chronicle', adding that climate scientists had failed to prove that carbon dioxide causes warming and climate change.[16]

The Tea Party's small-government, anti-federalism ideology aligned with and amplified mainstream Republican opposition to climate policies. Rick Perry, Republican Governor of Texas, and a presidential candidate, sued the EPA over its decision to regulate greenhouse gas emissions saying he was defending Texas against federal overreach, citing climategate as evidence that regulation was unwarranted.[17] These themes have also played out among Republican presidential candidates, with Newt Gingrich calling for the elimination of the EPA,[18] Michelle Bachmann pledging to have EPA's doors locked and lights turned off,[19] and even mainstream Republicans calling the EPA a job-killer.[20] Presidential contenders Rick Perry and Michelle Bachman each called climate change a hoax,[21] and front runner for the Republication nomination, Mitt Romney, radically altered his position from acknowledging human-caused climate change and supporting reduction of greenhouse gases to stating that the cause of climate change is unknown and opposing high cost measures to reduce CO_2 emissions.

POSITIVE IMPACTS

Improved Communication and Public Engagement Practices

The continued use of scientific misinformation to undermine public and policy dialogue about climate change has impressed upon the climate science community the need for improved communication and public engagement. In the past few years, climate scientists, scientific associations, NGOs, and governments have begun to address these needs. Although some initiatives were underway or planned before the release of the CRU emails, the incident nonetheless inspired a greater sense of urgency for these efforts. Some examples include:

- The Climate Science Rapid Response Team (CSSRT) was formed to provide journalists and lawmakers who want reliable information concerning climate science with direct access to experts in all areas of climate; 140 climate scientists are currently participating in the initiative. Planning for the CSSRT preceded the CRU incident, but the breaking story 'sealed the deal' according to CSSRT co-founder Scott Mandia (Mandia S, personal communication).
- In March 2011, the American Geophysical Union hosted a 'Leadership Summit on Climate Science Communication' that brought together presidents, executive directors, and public policy staff from 17 science organizations to engage with experts in the social sciences regarding effective communication of climate science. The workshop participants identified a list of action items to pursue collaboratively as a means to enhance public understanding of science and climate change.[22]
- In 2010, several philanthropic foundations jointly funded Climatecommunication.org, a web-based initiative that seeks to help climate scientists become more effective communicators and 'publicize and illuminate the latest climate research in plain language, making the science more accessible to the public and policy makers'.
- Currently, the US National Climate Assessment (NCA) aims to create a stakeholder engagement process that includes many, varied, and repeated opportunities for stakeholders to express their concerns and information needs and contribute valuable information, data, and knowledge to the preparation of national assessment reports and more focused products that are of use to

decision-makers. To achieve this vision, a public engagement and communication strategy has been developed by the NCA.

Many climate scientists devote a portion of their time to promoting public understanding through these sorts of collaborative efforts, as well as through individual activities. Some climate scientists have even attempted to engage constructively with climate 'skeptics'. Climate scientist Judith Curry—through her blog Climate Etc.—has engaged with (and encouraged other climate scientists to engage with) interested members of the public, including climate skeptics;[23] similarly, atmospheric scientist Scott Denning presented at the 2011 Heartland Institute conference on climate change (a leading conference of climate skeptics).[24] Although Curry's efforts pre-dated the CRU incident, she cites it as a key reason to increase openness and dialogue in climate science.[25] Both Curry and Denning conclude that such efforts help to build trust and promote thoughtful issue engagement.

Scientific and professional societies whose members deal with climate change issues are not immune to the conflicts about climate change that play out in society at large; dealing productively with those conflicts has been challenging. In 2010, the American Meteorological Association and the National Weather Association began using conflict resolution techniques to promote dialogue and engagement among their membership, providing them an opportunity to share their differing perspectives and experiences, with the aim of reducing conflict between groups who hold strong, but divergent opinions about climate change. These efforts at conflict resolution—conflicts that pre-dated but were exacerbated by the CRU email controversy—are not intended to change members' perspectives on climate change, but rather to support dialogue between members who hold differing perspectives, which in turn creates the opportunity for exchange, learning, and collaboration.

The Practice of Climate Science

In response to the CRU email controversy, Ralph Cicerone, President of the US National Academy of Sciences emphasized that 'clarity and transparency must be reinforced' and urged the climate science community to 'make standards for analyzing, reporting, providing access to, and stewardship of research data operational'.[25] We informally interviewed some individual climate scientists and representatives of scientific and government organizations to learn whether Dr. Cicerone's recommendation is being heeded.[a,b] Most of the people we interviewed reported that the incident had prompted them to review their own data management practices and reminded the community of the importance of transparency, data availability, and strong quality assurance procedures.

In response to the incident and subsequent investigations, the UK Met Office and the Climatic Research Unit have expedited the release of most of the small amount of weather station data that had been withheld to comply with nondisclosure agreements imposed by other countries, and hired a staff member dedicated to fielding FOIA requests. The Intergovernmental Panel on Climate Change has also moved toward increased transparency and better quality assurance in the areas of institutional management and communication, author selection procedures, conflict of interest, descriptions of uncertainty, citations of non-peer-reviewed literature, and error corrections.[26]

In terms of openness and transparency even before the CRU email controversy, climate science was relatively advanced compared to many other scientific disciplines. For example, most of the major climate-related observational data sets have long been publicly available from NOAA's National Climatic Data Center (NCDC).[27] Similarly, the federally sponsored National Center for Atmospheric Research works with a 'community science' model and has always made its computer codes and output available.[28] More recently, the National Science Foundation began requiring all potential grantees to submit data management plans with research proposals, a policy that had been under development before the CRU incident.

Although few actions are traceable directly to the CRU email controversy, we found anecdotal support for the notion that the incident has affected attitudes and, to some extent, practices in the climate science community. For example, a NCDC employee reported an increase in the amount of data being submitted to NCDC archives after climategate, perhaps suggesting that climate scientists are placing more emphasis on openness in the aftermath. The US NCA, whose third Assessment is slated for release in 2013, is being guided by a new Peer Review and Data Management Working Group and is placing great emphasis on quality assurance and data accessibility. This policy cannot be traced directly to the CRU controversy, but an NCA representative reported that the CRU incident clarified the need for a formal and stringent check on data quality, transparency, and accessibility.

Several individual scientists we interviewed said the controversy gave them a deeper understanding

of the microscope under which climate science is now conducted and reported paying more attention to communication issues. However, several of them emphasized that many individual scientists and universities are ill-equipped to handle the burdens of making large amounts of data publicly accessible or fielding large numbers of FOIA requests. These tasks require dedicated personnel and IT infrastructure that are not covered by federal research grants or current university budgets. None of the people we interviewed were aware of any plans to address this limitation within their own institutions or elsewhere.

CONCLUSION

The CRU email controversy appears to have contributed to the widening divide in America between those who are convinced that climate change is real, human-caused and serious and those who remain unconvinced. This should not come as a surprise; the human tendency to interpret events and issues in ways that are consistent with—and reinforce—one's prior beliefs and values is deep and pervasive.[29,30] It is important to note, however, that the majority of the US public continues to believe that the climate is changing, although slightly less than half accept human activity as a significant cause.[31]

The controversy also appears to have contributed to an increasing disavowal of climate change and rejection of climate policy in the Republican Party, at the state and federal levels and among 2012 presidential candidates. Although the CRU email controversy primarily served to invigorate a minority of voters who strongly oppose climate policy for economic or ideological reasons, this segment of the population is highly active in the political process, and especially in the Republican Party presidential and congressional nomination process. Consequently, they are currently having a disproportionate impact on the policy debate surrounding climate change. At a minimum, this is making it more difficult for the climate science community to engage constructively with conservative policymakers.

Despite the difficulties, the climate science community must enhance its efforts to engage with both policymakers and the broader public. Some climate science organizations and scientists appear to have responded to the CRU email controversy by increasing their public engagement efforts, engaging in dialogue with skeptics, and implementing conflict resolution among divided professional groups. Additionally, the IPCC and the US NCA have taken significant steps to enhance transparency, data traceability, and quality assurance. However, our informal survey of individual scientists found little evidence that university-based researchers are considering major changes to their institutional data management practices. If such efforts are underway, members of the community are not widely aware of them; it would benefit the climate science community to organize initiatives to share data management strategies and best practices.

Now that the formal inquiries are closed, and the scientists involved in the CRU incident have been cleared of scientific misconduct, one hopes that the community has the courage and confidence to distil and heed the lessons of climategate and other attacks on the integrity of climate science. Universities, funders, and journals are the likely focal points of implementation and enforcement of best practices, but any cultural or procedural shifts that may be warranted will require leadership from within the climate science community and the institutions that support the field. We suggest that professional scientific societies should study the issues raised by this controversy, develop a set of recommendations, and set the agenda to improve data transparency, availability, and quality control, as well as stronger efforts to engage the public and policymakers.

NOTE

[a]For other examples, see the companion WIREs Climate Change opinion article: Grundmann R. The legacy of climategate: revitalizing or undermining climate science and policy *WIREs Clim Change* 2012. doi: 10.1002/wcc.166.

[b]Informal interviews were conducted with Bruce Bauer, National Atmospheric and Oceanic Administration's National Climatic Data Center; Raymond Bradley, University of Massachusetts Amherst; Matthew Collins, Hadley Center, UK Met Office; Judith Curry, Georgia Tech; Chris Elfring, Director of the Board on Atmospheric Sciences and Climate, National Academy of Sciences; Greg Holland, National Center for Atmospheric Research; Katherine Jacobs, Director of the National Climate Assessment, Office of Science and Technology Policy; Fabien Laurier, U.S. Global Change Research Program; Michael Mann, Penn State University; Philip Mote, Oregon State University; David Verardo, National Science Foundation.

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FURTHER READING

Grundmann R. The legacy of climategate: revitalizing or undermining climate science and policy. *WIREs Clim Change* 2012. doi:10.1002/wcc.166.