



Reconstructing boundaries and reason in the climate debate

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ABSTRACT

In this article I argue that the climate controversies of 2009 and 2010 should be seen as a contest about the boundaries of science; a contest which sociologists argue has long been important in establishing claims about the nature and authority of science. This boundary typically comes under pressure where science is asked to contribute to public policy. Three changes appear to have brought pressure on this boundary, and therefore on the authority of science, in the domain climate change: public scrutiny of practices in science, such as peer review; the intensification of climate politics, especially around the 2009 Copenhagen climate summit; and the opportunities provided by new media for dissident opinions to play a role in the international public discourse about climate change. These changes explain the intensity of the recent climate controversies. They seem to confront climate science and science generally with uncomfortable questions about its own procedures, about the status of scientific knowledge claims in the public realm and about the role of expertise. At the end of the article I speculate about how to reconstruct a more open and interactive boundary between science and public discourse as a basis for more reasoned debate about climate change.

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1. Introduction

Science has many uses; but it does not always lead to more reasoned public debate. This is the bitter lesson that the linked controversies surrounding the publication on the Web of e-mails illegally accessed from the Climatic Research Unit (CRU, November 2009) and errors revealed in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, January 2010) have taught environmental researchers. While it is still too early to provide a full account of these controversies (they are still unfolding), or to assess their potential consequences, it is already clear that these two cases mark a significant moment in the international climate debate. It is important to see the CRU and IPCC cases as illustrations of a long-standing debate about the authority of science, and about the relationship between science, policy and public discourse. They are not a cause of this debate, but a symptom of a current phase of it. But even though the challenges they represent are not new, the controversy they have generated does appear to have profound implications for the practice of climate science (in the broadest sense), for the status of expertise and for the ways in which knowledge claims about climate change are contested in the public arena. Climate science needs to understand what has happened in order to learn and to adapt.

In this short article I argue that the climate controversies of 2009/10 can be seen as a contest about the boundaries of science and society, which sociologists argue has long been important in establishing claims about the nature and authority of science, and which typically come under pressure where science is asked to contribute to policy. I start by briefly describing the two separate, but related, controversies surrounding the CRU and the IPCC. I then argue that three changes have occurred that explain why these controversies have come to symbolise a deep challenge to the boundaries between climate science, and the broader public and political discourse about climate change. First, science practice has been opened to public scrutiny. Second, climate politics intensified around the 2009 Copenhagen climate summit. And third, the Internet and the Web have enabled important new voices to play a significant role in the climate debate. These changes appear to be shifting the boundaries between science and society, with consequences for scientific norms, attitudes and practices. At the end of the article I speculate on what these shifts might mean for climate science and policy.

2. Contested boundaries

Following Gieryn et al. (1985), Jasanoff (1987) argued that much of the authority of science in the twentieth century rested on the claim that science alone could provide an authoritative picture and explanation of reality. This claim rested on a belief that Mertonian norms operated in science, generating practices that ensured openness, objectivity, disinterestedness and scepticism.

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The exclusivity accorded to scientists was jealously and successfully guarded, underpinning the public image of science and warding off competing claims from religion, pseudo-science and lay experts. But Jasanoff also makes clear that the authority of science is endangered when scientists are called upon to participate in public policy, and in the public discourses that surround it.

'Regulation of risks to health and environment. . . involves issues at the frontiers of current scientific knowledge, where consensus among scientists is fragile. Both science and regulation seek to establish facts. But the adversarial processes of rule-making. . . presume that 'truth' emerges from an open and ritualised clash of opinions rather than from the delicate and informal negotiations that characterise fact-finding in science. . . The policy process, however, simultaneously casts doubt on the disinterestedness and the certainty of science.' (Jasanoff, 1987: 197–198).

Sociologists and historians have long been critical of the idea that Mertonian norms held in science and that science has an uncontested authority in society. Instead they argue that much effort is put into defending the boundaries between science and society. Nevertheless, the image that many scientists, politicians and publics have of science continues to draw on the classical notions of disinterested, organised scepticism.

The recent controversies about climate change operate across a continuum of the boundary between science, policy and public discourse, and it is important to distinguish between them. The CRU case relates to the practice of science itself, and only marginally to its interaction with policy. The IPCC case concerns the practice of an international assessment expressly designed to act as a bridge between science and policy making. While the CRU case goes to the authority of science, the IPCC case deals with the ways in which scientific knowledge claims are framed and condensed as they are translated into the public realm. In both cases, the provenance of the original allegations remains unclear at the time of writing, but that they precipitated a very public, global controversy about climate change and science is beyond doubt.¹

3. The CRU case

The CRU² case concerns about 1000 e-mails sent by researchers at CRU in the period 1996–2009, which were illegally made public, fuelling allegations about the integrity of the institute's work, the reliability of climate science generally and the conclusions of the IPCC (Russell, 2010). The e-mails covered a wide range of issues, but in the course of a debate conducted in the Press and media, in a diversity of internet blogs and in a series of UK parliamentary and university enquiries (House of Commons Science and Technology Committee, 2010; Oxburgh, 2010; Russell, 2010), the lines of controversy crystallised around four sets of issues: access to data by critical scientists; the interpretation of palaeoclimatic data; the operation of peer review; and question of influence of the IPCC assessment process.

The allegations suggested that the behaviour of CRU scientists contravened at least three of the Mertonian norms: communalism (in not demonstrating full openness and transparency); disinterestedness (in attempts to bias findings towards pre-existing beliefs or

commitments); and scepticism (in intervening in the fair operation of peer review). For this reason they represented a deep challenge to the credibility of CRU's work and, by extension, to climate science in general. Although the Science and Technology Committee, Oxburgh and Russell reviews all found that CRU scientists had been honest and rigorous, they also found that CRU scientists had not displayed a proper degree of openness (Russell, 2010: 11). It seems likely that the public perception of the affair will be more critical than the formal reviews. A leading British journalist, Fred Pearce, commenting on the Russell review, argued that CRU had been, ' . . . generally honest but frequently secretive; rigorous in their dealings with fellow scientists but often "unhelpful and defensive"; and sometimes downright "misleading" when explaining themselves to the wider world' (Pearce, 2010: 7). Whether this is a fair assessment is perhaps less relevant than that it is a perception that is likely to endure.

4. The IPCC case

The IPCC case relates to publicity in early 2010 about a number of errors in its Fourth Assessment Report published in 2007 (IPCC, 2007). While a range of errors have been alleged in various media, the most significant concerned a statement in the Asian regional chapter of the Working Group II report (Impacts, Adaptation and Vulnerability) suggesting that Himalayan glaciers could disappear by 2035 and perhaps sooner (IPCC, 2007, WG 2: 493). The IPCC errors case also produced a series of official reviews. To date the most significant has been an assessment of conclusions based on the IPCC Fourth Assessment regional chapters carried out by the Dutch Environmental Assessment Agency for the Dutch Minister of Environment (PBL, 2010). A further review is being carried out on behalf of the IPCC itself by the InterAcademy Council³ and is due to report in late 2010.

The IPCC controversy was also complex and messy. A range of issues were at stake, including the reliability of statements made in the assessment reports, the transparency with which statements were underpinned by evidence from the scientific literature, the role of expert judgement in assessing the scientific literature, and the thoroughness of the IPCC's own peer review procedures. Given that the IPCC has come to be seen as the key global assessment of the state of knowledge about climate change, it can be viewed as an enactment of the boundary between science and the public realm; at once establishing the authority of science in the climate debate while designed to inform and influence that debate with scientifically validated knowledge claims.

In another parallel with the CRU case, the official PBL review found the IPCC's conclusions to be ' . . . well founded and none were found to contain any significant errors' (PBL, 2010: 9). Nevertheless, the PBL review argued that more care should be taken in future to make the scientific foundations of summary statements more transparent; thereby questioning the role of expert judgement. Behind this, and other criticisms that have surfaced about the IPCC, lies the allegation that experts taking part in the IPCC assessments were not always fully disinterested, but that they chose to privilege certain evidence over others with the aim of supporting the main claim of the fourth IPCC report: that anthropogenic forcing of the climate is very likely the cause of observable changes in climate that generate impacts which will be serious for many societies and places globally. In this controversy too, the Mertonian norms of communalism, disinterestedness and scepticism appeared to be at stake.

5. What changed?

There continues to be a widely held view among scientists and amongst the public and politicians that science, as an institution

¹ Oreskes and Conway (2010a) argue that a small group of eminent dissident scientists with links to right-wing US think tanks have been at the heart of attacks on science underpinning health and environmental policy over the past 25 years or so.

² The Climatic Research Unit (CRU) at the University of East Anglia (UK) is a small research institute that has played a leading role developing climate science over 30 years, particularly in developing global temperature records.

³ An international consortium of national academies of science.

with its own self-correcting system of organised scepticism and peer review, produces authoritative knowledge claims can inform public and policy debates. Indeed, the notion of a social contract between science and society makes an assumption that science should be relevant to societal needs (Hessels et al., 2009). But knowledge claims in science need to be translated, channelled and simplified before they can become germane to public and policy discourses. This translation is not straightforward: facts and values are inextricably mixed-up in so-called 'wicked' environmental problems; additional work is often needed to turn partial and fragmented scientific knowledge into streams of knowledge claims that are useful to the practice of decisions; and communities of advocates in the public and private sphere use knowledge claims strategically to confirm prior positions (Dryzek, 1997). Sociologists of science have long understood that science is not the only source of truth spoken to power, but that it is a resource of often ambiguous quality employed by actors in the social contest for opinion and power (Hoppe, 1999). But science has continued to hold a privileged position, able to a large extent to set its own rules, regulating itself, able to defend its autonomy, project authority and define the terms of its engagement with public debates.

The recent international uproar around science and climate change appears to signal a rupture in such commonly held assumptions about science and the privileged position it has held. It throws up uncomfortable questions about procedures in science, the status of scientific knowledge claims in the public realm and on the role of expertise. Most of all it challenges us to think again about the conditions for reasoned debate about climate change, and the extent to which these conditions have become redefined by new demands on science to be open and transparent and to engage with experts who are not defined as scientists.⁴ Collective action in a democracy assumes that open and reasoned debate is possible; that a contest of ideas takes place in public and that the most persuasive argument wins. Democratic theory predicts that the greater the range of opinions aired and the wider the participation, the better and more broadly accepted will be the public choices made. This is despite the evident danger that the orderly accumulation of evidence and argument so central to a common-sense view of science can be easily disrupted by the disorder generated by interest-based disputations by those with something to lose. The key question then is, how can the public discourse about climate be put together again so that it is possible to secure collective action that meets the interests of the many?

There are many painful ironies in the CRU and IPCC cases. For instance, over many years environmental social scientists have been working on participative approaches to assessing and responding to environmental problems (van der Kerkhof, 2004). This work has the explicit aim of deepening public discourse by bringing a wide range of perspectives and values to bear on environmental problems and choices. An underlying assumption of this work has been that through the creation of a Habermasian 'discourse ethics' (Habermas, 1990), in which participants are open to alternative views and willing to adjust prior positions, it should be possible to create the conditions for learning and for better, more legitimate collective decision-making. The CRU and IPCC cases appear to demonstrate the opposite; that when debates about science reach the front pages, parliaments and the blogosphere they can often result in an unedifying bout mudslinging and character-assassination serving only to generate confusion and mistrust. A true nadir was reached in the Dutch parliamentary debate on the IPCC AR4 report when its authors were accused of being liars, fraudsters and profiteers (Calmthout, 2010).

So what has changed? At least three important shifts appear to have taken place in science, politics and the media, and in their relationship to each other; so setting the scene for the current crisis in the climate debate. First, procedures within climate science (and climate assessments) have been opened to public scrutiny. Second, the politicisation of climate science has entered a new phase. And third, the new media has enabled the entry of powerful new voices into the public debate about science and climate change. These shifts challenge our standard model of the relationship between environmental science and society, and force us to reconsider the conditions for reasoned debate in the future.

5.1. Science practice

The authority of science rests on the assumption that its own procedures for self-regulation – rigorous training and apprenticeship, publication in the open literature, peer review and promotion on merit – are being consistently and fairly applied. For the most part, these procedures never become the subject of public debate. And why should they? Just as any other professional society, science applies its own rules scrupulously nearly all of the time. Review and feedback are part of the culture of science. But it is clear that these processes of peer review are often partial and imperfect, and fostered within informal networks that control the diffusion of scientific knowledge. The choice of reviewers and the handling of reviewers' comments is a craft that is frequently carried out under conditions of paradigmatic and institutional contest. Moreover the benefits of peer review have themselves been a matter of scholarly debate (cf. Jefferson et al., 2002; DeMaria, 2010).

What both the CRU and IPCC cases have shown in different ways is that the procedures of peer review are imperfect in their operation, both in their capacity to filter-out error and in the apparent fairness with which they are applied. That none of the allegations made of error or impropriety (about temperature record reconstructions, Himalayan glacier melt and so on) have proven to be either significant or correct is beside the point. Authority is based on the perception that checks and balances are being applied effectively and fairly, not on the plausibility of the knowledge claims themselves. Here the perception has been created that climate science and climate assessments have been found wanting in their own procedures, so weakening a central claim through which science's autonomy and authority has been secured. The potential consequences are profound. If science cannot be seen to keep its own house in order, the danger is that oversight will be imposed from outside. Such 'social regulation' has emerged for most other professional institutions with a clear social role, including doctors, lawyers and accountants.

A recurring theme in the critiques of CRU and IPCC has been a call for greater openness, not only in the way review procedures are carried out, but also in access to data and computer models that underpin scientific knowledge claims. Even though some of these claims were sometimes scurrilous or misinformed,⁵ the notion that scientific data and methods should be open to other scientists is also part of the Mertonian norm of communalism. Many pressures militate against the exercise of the norm, in particular the informal or formal desire to protect intellectual property. Two deep trends appear to be responsible. First, growing competition in science makes scientists more jealous of the data and other resources they have built-up. Second, a growing commodification of science – part of the societal drive to extract more economic value from investments in science and monitoring – often has the effect of

⁴ Here I take a pragmatic definition of a scientist as someone who works professionally in a scientific institution, like a university.

⁵ The Russell review demonstrated that it could develop a global temperature reconstruction that strongly resembled the CRUTEM reconstruction on the basis of publicly available data and less than 2 days programming effort by a competent researcher (Russell, 2010: 49–51).

reducing, rather than enhancing, general access to data. Openness remains a norm, but is frequently no longer the practice in science, especially where economic or political interests are at stake. There is a deep predicament here without a straightforward resolution.

5.2. *Climate politics*

The second shift is that as responses to climate change begin to penetrate more deeply across economies and societies, the use of climate science has become increasingly politicised. As larger commitments are made to climate policy, whether to reduce greenhouse emissions or to limit climate-influenced vulnerabilities, policymakers demand a higher level of confidence, while critics of climate policies become more avid in their attacks on the scientific basis for political decisions. Science can become the easy victim in such a struggle, on the one hand blamed for not providing enough clarity, and on the other accused of over-claiming. Politics in the media-age, detached as it is from ideological anchors, has become more volatile. And this applies to its handling of complex knowledge-based environmental issues as well. Scientific uncertainty itself becomes a resource in what might be termed the 'precautionary dilemma': whether to argue for action or inaction on the basis of not knowing for sure.

In the brutal new politics of climate, universities and scientists are ill-equipped to take part in the public battle for opinion, in which quite different codes of discourse hold. Indeed, science has little capacity to determine its own place in the debate. The touch-paper for the controversies about the 2007 IPCC reports in some European countries⁶ appears to have been the nervous response of some political leaders, followed by the response of the media. Without an uncertain political response there could have been no wider political narrative for the media to run with. Parts of the media, after the failure of politics to deliver a decisive result at the Copenhagen climate summit (December 2009), were also looking for a new way of portraying the climate change story. A mediated politics, fed by short-lived conflictual discourses, now frames and determines how climate science engages with the public realm, not the other way around.

5.3. *The (new) media*

The third shift is the appearance of Web 2.0⁷ in the climate debate. The news media have long been seen as an intermediary in the relationship between science and society, working across a relatively stable and uncontested boundary between the two. Even if journalists and media organisations have long played an active role in promoting certain kinds of scientific knowledge claims and in agenda-setting on the environment, the underlying image held of science communication. The media was not seen as an actor in its own right in scientific debates, much less in the practice of science. The Press tended to reflect the state of scientific opinion, including the different sides of the argument. The New Media is not about rapportage, but about participation. The Web, blogs, Wikipedia and social networking has created a new actor in environment, science and society discourses. An increasingly well-educated, well-informed, global and entitled range of voices (including people calling themselves journalists) have transformed science and environment debates; destabilising them, making them more confused and adversarial, undermining the authority of

scientific expertise, but also adding new passion, incisiveness and breadth. Web 2.0 has given these voices a visibility and standing that they could not have achieved through the 'old' media.

6. Early conclusions

It is possible to take an agnostic position and to argue that it is inevitable that there will be disagreements about climate change (Hulme, 2009).⁸ In a post-modern world, the authority of science has increasingly come to be questioned across many fields, ranging from public disquiet about the risks of mobile phone use and child vaccination. We also know that there are values at stake in the climate debate that have nothing to do with radiative forcing and carbon cycle feedbacks. Such cultural and political values make the climate debate complicated and contested. But the anthropogenic forcing of climate change is now about as well-established a fact as anything in modern science.⁹ This means that societies need to grapple with the problem of how to respond to climate change, rather than remain hostage to a disabling framing of the problem as being about believers and sceptics. For that we badly need a public debate based on reasonable argument in which the codes of free and open debate are upheld. Science cannot expect an uncritical audience amongst the public, but it is clear that new codes need to emerge so that reliable knowledge claims can play their proper role in the public discussion about climate change. Without a reasoned public discussion there is less likely to be political action with all the attendant risks for vulnerable groups that this implies.

Responding to the challenges to science practice, from politics and in the new media requires change on all sides. For science it means becoming more open in its own procedures and in its relationships with bodies of expertise that lie beyond the boundaries of formal science. It is important not to make a fetish of peer review. Peer review is a vital, but incomplete process. It can only work in the context of trust within science that codes of disinterestedness and scepticism are being applied (hence the continuing importance of the Mertonian norms) and in the conviction that the reputational cost of not living up to these norms will be high. This is one of the problems of the blogosphere—talk is cheap and the costs of getting in wrong are negligible. But (climate) science also needs to do more to foster trust outside science that peer review is being rigorously applied. The right response is to make the process more transparent. Illustrative examples include journals (see for instance, *Climate of the Past* <http://www.climate-of-the-past.net/home.html>) which publish peer review comments on unpublished papers and allow open commentary on these. Science, as one model for a reasoning agora, can provide an example in opening up its own processes, helping to demystify them and building a broader understanding of science in practice. Science also needs to remain modest about its own role in the public debate.

The volatility of media-politics and the strains it places on the interactions between science and policy are less straightforward to address. Avoiding the public arena is not an alternative. Instead, science needs to become even more attentive to the tone and nature of public debate, seeking to find ways of responding to societally defined questions. One example of this more interactive approach to agenda-setting in science in the Dutch Knowledge for Climate programme,¹⁰ which has worked actively with stake-

⁶ Although no formal analysis of media coverage of the CRU and IPCC controversies has been done internationally, it appears that far more media attention was given in the UK, the US, Australia and The Netherlands than, for instance, in the Scandinavian countries.

⁷ By Web 2.0 is meant the second phase in the development of the World Wide Web from a collection of websites, to a platform for interactive web-applications for end-users. Well-known examples are Facebook, YouTube and LinkedIn.

⁸ Hulme argues, for instance, that '...the ultimate significance of climate change is ideological and symbolic rather than physical and substantive...' (Hulme, 2009: 329).

⁹ Oreskes and Conway make the argument that climate change should now be labeled as a 'fact' (Oreskes and Conway, 2010b).

¹⁰ See http://knowledgeforclimate.climate-research-netherlands.nl/templates/dispatcher.asp?page_id=25222734.

holders in regional 'hotspots' to formulate research questions on climate vulnerability and adaptation, including an active stake in distributing central Government funding to different research themes. On the other hand, it seems likely that the growing institutionalisation of climate – in expectations, practices and policies – will also dampen the peaks and troughs in discourses about climate change. As climate is integrated and mainstreamed, a process reinforced by evidence and experience of the impacts of climate change, the move to action will seem increasingly normal and satisfying. That is why there is no reason to believe that the current crisis will do lasting damage to collective and international action on climate change.

Finally on the new media we can say that this is a double-edged sword. A true 'knowledge democracy' (Gaventa, 1991) requires empowered and engaged participants in a public realm. Science will have to find ways of engaging with expertise operating on the margins of, or completely outside, science. This also includes exciting new possibilities for bringing this expertise into the practice of science. For instance, amateur monitoring of biodiversity and environmental quality are already being greatly enabled by cheaper electronic devices and the Web. The defensive posture of old needs to be replaced by an embracing of the potentials for positive new collaborations and interaction. But this also requires that new codes and norms leading to reliable knowledge claims are widely accepted and policed. The practice and validation of science will not change in its principles, only in the ways in which these principles are applied in social practices in science. Finding a way to redefine the contested boundaries will be a continuing process. More than anything we need to continue to uphold the highest standards within science. A free and open science is fundamental to a free and open society.

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