Article:
Raman, S. and Pearce, W. orcid.org/0000-0001-6884-3854 (2020) Learning the lessons of Climategate: A cosmopolitan moment in the public life of climate science. WIREs Climate Change, 11 (6). e672. ISSN 1757-7780

https://doi.org/10.1002/wcc.672

Learning the lessons of Climategate: A cosmopolitan moment in the public life of climate science

Sujatha Raman[1] & Warren Pearce[2]

[1]Australian National University, Canberra
[2]University of Sheffield, Sheffield

Email: warren.pearce@sheffield.ac.uk

This is the peer reviewed version of the following article: *Learning the lessons of Climategate: A cosmopolitan moment in the public life of climate science*, which has been published in final form at dx.doi.org/10.1002/wcc.672 This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Use of Self-Archived Versions.

Abstract

A decade after Climategate, climate change may be established as a social fact, yet the after-effects live on. This Advanced Review assesses the impact of Climategate on public talk about climate change in the last decade. Reviewing academic articles, blogs, reports, books, and media articles, we identify three norms that set the foundations for Climategate to be seen as a scandal: (a) using scientific consensus to justify climate policy; (b) that openness is fundamental to validating scientific knowledge; (c) that the public was conceived as passive recipients of scientific knowledge rather than participants in dialogue. We then review developments since Climategate, that have seen some groups attempting to shore up these norms, while others have seen an opportunity to change the boundaries of public engagement around climate science. We describe this as a *cosmopolitan moment* in the public life of science: an opportunity to forge a public culture comfortable with the epistemic diversity and ambiguity inherent to climate change, and yet a culture that can also rea- son together in the public good. Finally, we assess the implications of Climategate's mixed legacy on contemporary climate change debates, emphasizing that cosmopolitan knowledge provides a means to craft effective, open, and fruitful approaches to public engagement around climate change.

1. INTRODUCTION

A decade ago, a large cache of emails from the University of East Anglia's Climatic Research Unit (CRU) was released into the public domain without authorization. The affair came to be known as "Climategate", the "-gate" suffix implying a scandalous event in which the previously unseen or hidden was revealed, as critics claimed that the emails "revealed a global conspiracy by scientists to dupe the world about man-made climate change" (F. Pearce, 2010, p. 4). A frenzy of analysis, claim, and counterclaim, first in the blogosphere then the mainstream media, placed key climate scientists such as Phil Jones and Michael Mann under unprecedented levels of public scrutiny and pressure, with some suffering sustained abuse and even death threats (F. Pearce, 2010, pp. 180–181). The emails illuminated behaviour falling short of cultural expectations of how scientists assess data and certainly not meant for public display. Criticism of the scientists focused on attempts to block access to temperature datasets, a professed desire to interfere with peer-review processes to influence an

IPCC report and alleged data manipulation by the scientists to "hide the decline" in global temperatures.

Criticism of CRU was widespread, coming not only from established climate sceptics (Montford, 2010b) but also from environmentalists (Monbiot, 2009), scientists from other disciplines (Matthews, 2013), the editor of *The Lancet* (Horton, 2010), the head of the Science Media Centre (Monbiot et al., 2010) and even the UK Government's Chief Scientific Adviser (Jha & Pearce, 2010). Opinion polls conducted soon after the event began to unfold in November 2009 suggested declining public trust in climate scientists (Leiserowitz, Maibach, Roser-Renouf, Smith, & Dawson, 2013) prompting fears that the case for climate action would be irreparably damaged. As the Climategate moniker stuck, the revelations seemed destined to signify a scandal in which the exposure of scientific malpractice would prove the "final nail in the coffin" for climate science and, by extension, hopes for climate policy (Delingpole, 2009).

Ten years on, the fate of climate change is more mixed than might have been predicted at the time. The public prominence of climate change is stronger than ever with the rise of new youth movements (Evensen, 2019), visibility in the arts (Cameron, Hodge, & Salazar, 2013; Trexler & Johns-Putra, 2011) and a central role in policy debates. Over this decade, climate activists, scientists, and other experts have gradually reframed climate change from a phenomenon affecting future generations to one whose effects are unfolding in the present (Climate Change Impacts, 2019; Rogers, 2018). The 2019–2020 bushfires in Australia have given fresh impetus to this framing. Climate change, it might be said, is now a "social fact" that occupies a major reference point in public and political discourse 2019. Yet, despite a plethora of climate action initiatives, the transformative change they envision seems elusive, and political polarization endures. Climate activists criticize governments for failing to act on "the" science while critics condemn scientists and activists for advocating "alarmist" science.

So has the renewal of climate change as social fact been a consequence of lessons learned from Climategate in the conduct of science, communication, and policymaking? Or are there clues in the various responses to Climategate that reflect enduring predicaments of polarization and limited progress in climate action? In short, what kind of event was Climategate and what is its legacy?[1] A preliminary assessment was offered on the first anniversary of Climategate in a *Nature* editorial (Closing the Climategate, 2010):

> "Never mind that almost all of the accusations thrown at the researchers involved have been proven baseless… And never mind that the scientific basis for the global-warming problem remains as solid as it was a year ago. Huge damage has been done to the reputation of climate science, and arguably to science as a whole. That impact deserves to be assessed and the necessary lessons need to be learned."

A decade on, we take a longer perspective on the lessons to be learned from Climategate. We argue that the CRU emails became a public scandal only because of an embedded assumption that science must set the terms of debate on biophysical matters that become politically significant. This assumption underpins three tacit norms that have habitually shaped how science, policy, and the public are supposed to engage. Drawing on major commentaries on Climategate, we show why these three norms became brittle. First, advocates for particular forms of policy action (or inaction[2]) often justify their case based on a settled scientific consensus (or exposure of a lack of such consensus).

Ironically, both climate change spokespersons and sceptics reinforced this norm, revealing the limitations of relying on either scientific consensus or disagreement as political arbiter. Second, science that is called upon as the basis of policy engagement is expected to have been validated within the scientific community alone, notably through established peer review procedures. Third, the wider public is expected to provide democratic authorization for policy action by merely receiving and trusting the science. These three norms came to be challenged by new demands for openness and public engagement, posed not only by sceptics but also by others sympathetic to the climate cause.

Overall, whether climate science was being attacked or defended, matters related to science became the currency of debate on climate change in the early response to Climategate. This science-led framing did not serve the climate science community well. It militated against the established scientific convention of openly discussing uncertainties. At least initially, it also inhibited climate scientists' ability to respond to demands for wider public engagement emerging from a new digital information environment. We argue that this legacy continues in the enduring polarization that is evident in climate debate.

Yet today, there are signs of an alternative logic with the potential to renegotiate the terms on which climate action is imagined and prosecuted. We dub this a *cosmopolitan moment* in the public life of science: an opportunity to forge a public culture comfortable with epistemic diversity and ambiguity, and yet also able to reason together critically in the public good. In offering this definition, we build on the concept of cosmopolitan knowledge (S. Beck, 2012; Hulme, 2010a, 2010b; Jasanoff, 2011b) that climate change scholars put forward in the aftermath of Climategate. Drawing on a large body of literature on science/society and science/public relations, these scholars made the case for taking a cosmopolitan stance towards knowledge in the face of biophysical, cultural, and political complexity that climate change exemplifies. Climate change scholars have previously appealed to cosmopolitan ideas to develop arguments about climate justice (Caney, 2005) and global interconnectedness (U. Beck, 2010). However, the notion of cosmopolitan knowledge and expertise is distinctive for drawing attention to the epistemic foundations on which climate action is commonly imagined to rest. Cosmopolitan scholars argue for recognizing justifiable diversity not only in *what* people know but *how* and *when* they know (what counts as relevant and valid knowledge or ways of knowing in particular settings) and their judgments about what we *need* to know to justify acting in particular ways.

Until recently, such arguments for cosmopolitan knowledge on climate were largely played out as a critical riposte to familiar science-led terms of engagement that defined Climategate as a scandal. They drew on empirical observations highlighting different forms of epistemic diversity across science and science policy institutions, and not just between science and publics. These include reasonable variations in how different sciences investigate reality (Sarewitz, 2000); what different institutions at the science/policy interface take to be relevant and credible scientific accounts of reality (S. Beck, 2012) and how these institutions manage scientific uncertainties as they address the public good (Jasanoff, 2011a). Turning these into a normative case for diversity acknowledges that some of these differences may be entirely valid, while leaving open the possibility that specific epistemic norms may well be contested in particular instances for good reasons.

At this point, we can point to a growing number of examples where the conventional terms of science/public engagement are being troubled not just in theory but also in practice; we argue they

offer new openings for reimagining our climate predicament. Some of these changes can be traced back to lessons learned from Climategate as climate scientists sought to engage in public debate through new media. Such debates sometimes depart from traditional one-way communication where scientists were responsible for putting forward facts and non-scientists their opinions or values, thus allowing for more open discussion of diversity and ambiguity. Other examples involve efforts to bridge the abstract universals of climate science with locally grounded knowledge, efforts that seemed out of reach just 10 years ago (Jasanoff, 2010). Some publics, including scientists, rely on experiential knowledge as they seek to make the abstractions of climate change concrete, while others appropriate science to make political arguments that are not on terms sanctioned by scientific consensus. Alternatively, some scientists and other publics are engaging closely and critically with specific scientific claims in unexpected ways, not all of which can be readily put down to interests driven by the fossil fuel industry. These examples may still be in the minority and none of them is without its own dilemmas. Nonetheless, they offer an opportunity to craft the language of climate communication anew. Fulfilling this cosmopolitan moment in practice will require efforts to extend, refine, and amplify these renewed terms of engagement on climate change.

To develop these arguments further, we begin by reviewing major commentaries and responses to Climategate. We elaborate on the three key norms that have structured the public life of science, and climate science in particular, in terms of justifying public policy, validating science, and engaging publics. We then outline the promise of a cosmopolitan conception of knowledge that is better able to grapple with the limits of these norms that Climategate laid bare, and to amplify the impact of the promising developments that are also part of Climategate's legacy. In our concluding reflections on the lessons from Climategate, we suggest that these might represent a cosmopolitan moment in the public life of climate science.

2. METHODOLOGY

The objective of this Advanced Review is to carry out an "issue review" that assesses the impact and legacy of Climategate on public debate over climate change (Hulme, 2018). To obtain relevant literature, we used a two-pronged strategy. First, we used "Climategate" as a search term in Scopus (by Article Title, Abstract, Keywords) and Google Scholar (by Title). While both are academic databases, we found that the results included a significant number of media articles (Brahic, 2010; Guteri, 2010; M. E. Mann, 2009; Sheppard, 2011; Trenberth et al., 2012), reports (McKitrick, 2010; Montford, 2010a) and blog posts (Broder, 2010; Hoggan, 2010) by climate journalists, scientists and sceptics. Second, we drew on our own archives accumulated during the *Making Science Public* (Nerlich, Hartley, Raman, & Smith, 2018) and *Making Climate Social* (W. Pearce, Niederer, Özkula, & Sánchez Querubín, 2019) research programs to supplement the database searches with relevant material that did not mention the term "Climategate" directly. This widened the source material to include radio programs (*Climategate* Revisited, 2012), TV programs (O'Hagan, 2019), and the official reports that followed Climategate in 2010 (House of Commons Science and Technology Committee, 2011). After removing items we found to be insufficiently relevant, we were left with 184 items which we reviewed within the context of identifying the impact of Climategate on the public life of climate science (see Supporting Information for a full list). We note that the material collected is almost exclusively from English-speaking countries, suggesting that Climategate was not necessarily a global phenomenon.[3]

3 CLIMATEGATE: THREE NORMS THAT SPAWNED A SCANDAL

In this section, we identify three sets of established practices and norms in the public life of climate science that together helped construct the event that we know of as Climategate. While we focus here on climate, these norms apply more broadly to similarly challenging interfaces at the interface of science and policy action.

First, *how do advocates publicly justify climate policy preferences*? In Section 3.1, we explore how Climategate exposed the fragility of an unwritten, but established, norm of policymakers and advocates using scientific consensus to under- pin their arguments. Climategate was widely greeted as a scandal because it seemed to uproot the carefully established consensus in climate science. We argue that this was only possible because of a cultural ethos in which the case for cli- mate action could only be prosecuted—or challenged—on the existence or otherwise of such a scientific consensus. We show the pressure this ethos continues to put on science, creating an urgent need to explore more diverse forms of acceptable reasoning for climate policy, as suggested in Section 4 by the notion of cosmopolitan knowledge.

Second, *how is the science used to justify climate policy meant to be validated*? Scientific claims are normally expected to be justified through an ethos of openness that allows other scientists to test their validity. In the struggle to counter Climategate's association with a loss of credibility for climate science, calls for greater openness became a major theme as the blogosphere and extended peer review transformed the conditions in which science is practiced. We unpack some key tensions, however, in this response with the Russell Review (Russell, Boulton, Clarke, Eyton, & Norton, 2010) presenting openness largely as a "technical fix" for clearer communication of climate science to the public. Taken in isolation, presenting extended peer review as a solution implicitly reinforces a linear model where climate action follows from a public demonstration of scientific facts. In contrast, social science readings of openness point to alternative assessments of science's role in climate change debates, laying the basis for the cosmopolitan stance that we go on to advocate.

BOX 1 Cosmopolitan knowledge and the IPCC

The IPCC has continued to produce consensus reports, a means of establishing expert authority seen in other domains of science advice 2000. Although recent years have seen more visible questioning of the IPCC's purpose and future (S. Beck et al., 2014; S. Beck & Mahony, 2017; Ford et al., 2016; Hughes & Paterson, 2017; Hulme, Zorita, Stocker, Price, & Christy, 2010)[8]*, the main structure of its Assessment Reports remains unchanged. The numerical and chronological primacy given to physical science through Working Group 1 (WG1) has been shown to have material effects on the public communication of climate change. Saffron O'Neill, Williams, Kurz, Wiersma, and Boykoff (2015) found that in the release of the IPCC's Fifth Assessment Report much more media attention was given to WG1 than WG3, despite the latter containing much more potential for public discussion about political responses to climate change. They argued that this sequential release of IPCC reports was detrimental to WG3, and that there was also an absence of narratives and visuals linked to the political questions underpinning WG3. The IPCC's presentation of climate knowledge as "science-first" is understandable in terms of its attempts to establish the evidence for a phenomenon that is not amenable to human perception and crosses space and time at unfamiliar scales (Jasanoff, 2010). Yet this framing is now long past its "use by" date. IPCC reports have amassed significant*

symbolic power and remain crucial in directing political and media attention towards climate change. Such attention opportunities are infrequent. To capitalize on them, the IPCC should reconstitute climate knowledge away from a focus on "settled-science" toward an approach that prioritizes a wider range of questions and knowledge most relevant to human responses to climate change, rather than those questions of atmospheric physics around which narrow agreement can be found. To do so would be to learn a key les- son of Climategate: that justifying climate policy needs arguments more than a narrow set of scientific data and consensus if it is to prevent another decade of polarized debate.

Third, *how do publics and scientists engage around scientific matters of public/policy significance*? Here, the dominant position is again rooted in the linear model with publics primarily understood as the passive recipients of scientific knowledge which they come to trust to greater or lesser degrees. Their trust in this science is then deemed to be the basis for democratic endorsement (or rejection) of the policies in question. We find that early reports and responses to Climategate reproduced this norm, with publics notable by their absence beyond generic invocations of a loss of public trust. The only exception was in commentaries on those publics who helped constitute the Climategate "scandal" in the first place via sceptical engagements with climate science (Holliman, 2011; Trench, 2012).

Ten years on, publics beyond the sceptical blogosphere have been crucial to establishing climate change as a social fact as new social movements have mobilized (Doherty, De Moor, & Hayes, 2018) and others have seen the signs of cli- mate change within changing local weather patterns (Callison, 2014; Rudiak-Gould, 2013). Scientists have contributed to these trends through their own experimentation with newly cosmopolitan forms of engagement including blogs and social media (Hawkins, Edwards, & McNeall, 2014; W. Pearce et al., 2019 p. 7), in part a reaction to the role of new media in disseminating and accelerating Climategate (Holliman, 2011). However, the success of climate movements has created tensions between the claims these mobilised publics advance and some scientists' own assumptions about what can or cannot be claimed based on science (Asayama, Bellamy, Geden, Pearce, & Hulme, 2019). We argue that these tensions can only be negotiated through public reasoning, the terms of which cannot be dictated by science alone. The cosmopolitan perspective that we develop in Section 4 offers a basis for such a renegotiation.

3.1 Justifying public policy: The role of scientific consensus

We now unpack the expectations for scientific consensus that allowed Climategate to be initially represented as a scandalous event and put pressure on everyday scientific practice. Such expectations did not simply reflect wider public or journalistic (mis)understandings of how science is supposed to work; they were also constituted through repeated invocations by many scientists and spokespersons for science (including in this case, the IPCC). As such, they reflect a culturally shared norm of how public policy actions (and public arguments for action) are meant to be justified in domains where science has made a mark.

Climate change's journey from a policy issue emerging on the global stage in 1988 (Jaspal & Nerlich, 2012) to the high-stakes UN summit in Copenhagen in 2009 was made possible by the incremental establishment of scientific consensus around anthropogenic climate change. While there is plenty to be said for the IPCC's wide-ranging assessments and synthesis of research from a vast

range of scientific disciplines, such innovative endeavors were not undertaken for purely scientific ends. Rather, the history of the IPCC from its inception was to inform global policy, providing policy-neutral consensus reports (W. Pearce, Mahony, & Raman, 2018). Underpinning this dynamic is an assumption about the relationship between science and policy; namely that "science compels action" through a linear sequence in which scientific knowledge is "settled" through the IPCC process to form the foundation for policy decisions (S. Beck, 2012). In this model, policy progress rests upon settled science; so, unsettling the science also means unsettling the foundations for policy.

However, these high policy stakes have created tensions between scientific norms that encourage open discussion of uncertainties, and the norms of science-for-policy that demanded consensus. For example, Tim Barnett, who led a chapter on human influences on climate change for the IPCC's Second Assessment Report, reported that scientists had to work hard to retain a number of caveats that the IPCC recommended deleting (F. Pearce, 2010). Likewise, the post- Climategate Oxburgh report into research carried out by CRU noted that discrepancies between instrumental and proxy-based temperature records discussed in the peer-reviewed literature were sometimes omitted in the final summaries of the IPCC (2010, p. 5). These dynamics placed significant pressure on climate science, with the importance afforded to consensus as a lever for political progress coming into conflict with the need to robustly report the limits of scientific knowledge (Ryghaug & Skjølsvold, 2010).

Such tensions help to explain why some of the scientists involved in Climategate apparently diverted from the Mertonian scientific norm of "communalism" by refusing to share data with critics from outside the scientific community (Grundmann, 2013). The priority seemed to become protecting the knowledge claims already made, rather than making the claims more robust through (extended) peer review and exposure to critics (F. Pearce, 2010, pp. 144–150; Ravetz, 2011). This was perhaps best exemplified by Phil Jones's comment to freelance scientist Warwick Hughes: "why should I make the data available to you, when your aim is to try and find something wrong with it? (F. Pearce, 2010, p.xv)

Yet, the emails do also show some climate scientists supporting data disclosure. For example, Tom Wigley prioritized the benefits of data disclosure to science over any concerns about upholding the scientific consensus (F. Pearce, 2010, p. 123), while Stephen Schneider made a case for publishing data sources and methods, although not personal computer codes (F. Pearce, 2010, p. 151).

Responses to the damage done to scientific consensus by Climategate fell into three broad categories (Ramírez-i-Ollé, 2015b). First, an emphasis on other sources of scientific consensus left untarnished by Climategate; for example, the strong agreement around temperature records as compared to the proxy-based reconstructions underpinning the "hockey-stick" graph (e.g., von Storch & Allen, 2009). A second set of responses dismissed critics as either lacking specialist knowledge or as akin to rogue contrarians in other areas of settled science such as smoking or HIV/AIDS (e.g., Trenberth et al., 2012). Third, attacks on scientific consensus have been used as evidence of flaws in individuals' reasoning. In a series of psychology experiments, participants have been informed about the scientific consensus on one specific aspect of climate change, human influence on the climate, to discover whether or not such information has an effect on support for climate policies (Russill, 2018). This shift to psychological testing has not served the scientific enterprise well, as they preclude engagement with questions that cannot be easily quantified in terms of scientific agreement (Cook & Pearce, 2019) (Pearce et al., 2017a, 2017b). While all these efforts were perhaps logical in

isolation, they reinforce an idealized view of science and its role in underpinning climate policy, unwittingly making climate science more vulnerable to charges of corruption (Monbiot et al., 2010).

Campaigns to amplify doubt in climate science for narrowly political ends depend on the maintenance of science as the principal authority on which public policy can be based (Wynne, 2010). The Russell Review opened the door to a critical reckoning with this assumption, calling attention to a "widespread misconception that science produces unequivocal and absolutely precise answers" (Russell et al., 2010, p. 38). The Review also highlighted a need for clarity on the nature and sources of uncertainties associated with specific scientific results (van der Sluijs, van Est, & Riphagen, 2010). But the repeated public representation of climate science in consensual terms—and the institutional pressures that drive such representations—made it harder to openly talk about which uncertainties do or do not matter and why (Ravetz, 2011). By reinforcing the demand for public clarity on scientific uncertainties the Russell Review again put science center-stage, failing to provide succour to efforts to craft more diverse forms of advocacy for climate action.

However, the pressures on climate science laid bare by Climategate calls into question any future reliance on science as the bedrock for public reasoning. Rhetorical scholar Lynda Walsh (2010), traces the origins of this mode to a distinctive 20th-century ethos that governs the public pronouncements of scientists. Climategate, Walsh argues, illustrated a fundamental paradox faced by (American) policy scientists, namely, that they are called upon to pronounce on policy matters, but in doing so they cannot transgress an imagined boundary between facts and values, "is" and "ought." In the 19th century, scientists were expected to engage in matters of moral and public import associated with their theories of nature. However, in the aftermath of World War II the "is/ought stricture" and value-neutral science became defining themes as definitions of good science came to be reconstructed after the Manhattan project and the role of the biological sciences in Nazi and other Western eugenic projects (Douglas, 2009). Scientists were now supposed to simply deliver the (neutral) facts for others to then decide the implications. Yet, this separation has ended up producing a mode of democratic reasoning in which statements of fact "generate policy-level statements via the power of implication" (Walsh, 2010, p. 42). In the end, Climategate reinforced the power of this ethos despite possible openings for rethinking its basis.

In sum, Climategate exposed the frailties of scientific consensus as a means of justifying policy action. Yet the range of responses merely proved the durability of this norm as many scientists and their spokespeople sought to shore up the idea of consensus. We now turn to the role of openness in science, another powerful scientific norm that shaped the response to Climategate.

3.2 Validating science: The role of openness

If scandal was the defining storyline at the start of Climategate, it was openness which public bodies, scientific institutions, journalists, and some social scientists used to reinterpret the terms of the debate. Key climate scientists were heavily criticized on these grounds, highlighting a potential re-examination of fundamental assumptions about the public validation of scientific knowledge. Contrary to commentary that implies one can meaningfully distinguish between scientific practices and their reported results (F. Pearce, 2010, p. 188), practices and results were taken together as constituting the credibility of experts, with a reticence to share data playing a key role in the reputational damage to climate science.

The Russell Review exonerated the scientists of dishonest behaviour or lack of scientific rigor but did find "that that there has been a consistent pattern of failing to display the proper degree of openness, both on the part of the CRU scientists and on the part of the UEA" (Russell et al., 2010, p. 11). In noting the roles of both individuals and institutions, the Russell Review placed the factors that shape credibility center-stage (Hilgartner, 2020). The Review gave fresh stimulus to an emerging account of Climategate that highlighted a significant transformation in how scientific knowledge of public importance is authorized. In this view, Climategate was first and foremost a new media phenomenon, emerging out of a blogosphere in which new scientific research was being debated and access to data was being demanded by people beyond specialist scientific communities (Ramírez-i-Ollé, 2015b, p. 399). Part of Climategate's historic significance was the speed with which the key scientists involved lost credibility (Holliman, 2011; Ravetz, 2011). The Russell Review took this to be the new reality which scientists needed to accept and consequently transform their practices accordingly with a new technology-driven openness. Other commentaries seemed to echo the argument that scientists should embrace openness (Lahsen, 2012; Maibach et al., 2012; Ryghaug & Skjølsvold, 2010). Yet, looking more closely, we find that the idea of scientific openness held three distinct meanings.

First, for the Russell Review and subsequent Royal Society report (Royal Society, 2012), openness meant the scientific community ensuring that their *datasets were openly available*. Where openness was once considered to apply only to how scientists behaved within their own expert communities (Shapin, 1988), in this new era, the public were thought of as both the audience and beneficiaries of open science. In this view, opening up datasets would be part of the public communication of science. It would improve the self-correction of science, enabling "anybody" to test and judge the veracity of scientific claims (Ramírez-i-Ollé, 2015b). However, the Royal Society (2012) did go on to acknowledge that opening up datasets would not be sufficient for "open science." Rather, scientists needed to communicate directly with the public to make their science intelligible and trustworthy.[4]

A related second vision of openness imagined *a role for publics in the validation of science*. "Show your working" argued Hulme and Ravetz (2009), observing (like the Royal Society) that interested and motivated citizens could play an important role in authenticating science through a process of extended peer review—and securing "the gold standard of trust." In this vision, the newly emerging blogosphere represented an infrastructure for such a model of open- ness in science to take root. They go on to argue that before knowledge can be useful for public deliberation it must be "fully exposed to the proliferating new communication media" (Hulme & Ravetz, 2009). This view is supported by work in science and technology studies (STS) showing how epistemic norms shift over time and space to change what is meant by scientific objectivity (Jasanoff, 2011a; Mahony, 2014). The Russell Review also identified that prior to the internet, "scientific debate largely took place in journals and conferences that effectively excluded the public from active engagement" (Russell et al., 2010, p. 41). Climategate underlined reasons why this needed to change.

A third view recognized that while extended peer review might be an ideal, *more truthful public representations of how science works* are key for the many publics who possess a limited ability to participate in validating science. Lahsen (2012, p. 280) argued that this "second wave scientific literacy" would help improve public understanding of science's strengths and limitations, and that scientific knowledge is important *despite* the inevitable human flaws of scientists. This argument echoed a call from then Alan Thorpe, then Chief Executive of the UKs Natural Environment Research Council, that one response to Climategate must be to "communicate the fact that research

is a human activity subject to human emotions and failings" (Thorpe, 2010, p. 1). For the public communication of science, this view implied a need to move away from depicting science as a form of rationality detached from social factors toward a greater openness from scientists regarding the everyday practices of their work (Ramírez-i-Ollé, 2015b; Ryghaug & Skjølsvold, 2010).

In practice, the emails also revealed how scientific culture militated against wider engagement. Some of this resistance is perhaps traceable to the role of the blogosphere, a site that was at the time occupied largely by climate science sceptics. Holliman (2011, p. 840) describes Climategate as "an unofficial and largely unstructured form of public engagement; one where critics of anthropogenic explanations of climate change assembled as socio-technical networks." The climate sceptical blogosphere focused almost explicitly on climate science rather than differences in values or politics, providing sites for both translating and reinterpreting knowledge claims from established climate scientists (Sharman, 2014). Climategate emails revealed that this new mode of knowledge contestation and "extended peer review" (Hulme & Ravetz, 2009) was viewed with dismay by some scientists. For example, in 2009, Phil Jones commented that "[s]cience should be conducted through the peer review literature, as it has been for over 300 years" and that those operating outside of these boundaries, such as bloggers, should not expect equal access to scientific data (F. Pearce, 2010, pp. 224–225). This reflected a wider context where science blogs were perceived as a challenge to public engagement with science due to the absence of evaluation or critique on controversial issues (Trench, 2012, p. 287).

In summary, Climategate revealed openness to be more complex than implied by the call to open up datasets. Important responses sought to re-assert its importance as a norm, while acknowledging new opportunities for improving scientific quality through extended peer review. While many publics remain unable to participate in such endeavours, the public performance of such practices are important in maintaining public trust in science. However, without more truthful public representations of how science works, ironically what Climategate represented one example of, opportunities for reframing climate action will remain unfulfilled. In the next section, we turn fully to the role of publics' engagement with climate change during and after Climategate and how, in turn, scientists and public institutions have engaged with them. It is through these engagements that embedded framings might be renegotiated to consider more productive ways of connecting knowledge, climate change, and public action.

3.3 Engaging publics: From trust to participation?

Climate science cannot tell us how we should re-order societies and economies to address climate change. So, in theory, expanding the types of engagement between climate scientists, policy advocates and publics might redress some of the frailties of scientific consensus-centred forms of imagining and advocating for climate action (Section 3.1). But this relies on first acknowledging a diversity of ways in which publics might constitute themselves and engage with climate matters beyond those ways stipulated by experts (both physical scientists and social scientists) and public institutions.

Publics were notable by their absence in early official and journalist responses to Climategate, revealing a major weakness in public reasoning over climate change. "The public" were implicitly imagined as a shadowy, uninformed mass awaiting climate change information from scientists and the media (W. Pearce, Brown, Nerlich, & Koteyko, 2015). For example, the chapter in *The Climate Files* entitled "A Public Disaster" focuses entirely on public relations and mainstream media (F.

Pearce, 2010, pp. 179–191), indicating the absence of reflection on how different publics actually made sense of Climategate. The post-Climategate reports also paid little attention to publics. The House of Commons Science & Technology Committee identified climate science as "a matter of global importance and public interest" (House of Commons Science and Technology Committee, 2010, p. 19), and argued that "t[here] is no doubt that the e-mail disclosure from CRU… has affected the public view of climate science" (2010, p. 42), but did not provide any evidence to support this view.

Social scientists were, unsurprisingly, quicker to attend to evidence around how publics were engaging with both climate science and Climategate. One such line of analysis centred on the direct impact of Climategate on public trust, where the evidence is mixed. Leiserowitz et al. (2013) argue that Climategate negatively impacted upon American public trust in climate scientists, although this was primarily amongst those culturally predisposed towards climate scepticism (Kahan, Jenkins-Smith, & Braman, 2011).[5] This is disputed by MacInnis and Krosnick (2016) who provide survey evidence to argue that the affair had minimal effect on "belief" in global warming. Indeed, there are signs that climate scepticism in the US was already growing prior to Climategate, suggesting the influence of other social factors such as the economic crisis or the growing partisan politicization of climate science (W. Pearce & Nerlich, 2018; Whitmarsh, O'Neill, & Lorenzoni, 2013) or scientific factors such as the contested "hiatus" in average global temperature increase (Hawkins et al., 2014; MacInnis & Krosnick, 2016). The impacts of Climategate were more discernible within television news, as US meteorologists and news producers became more sceptical of climate science (Maibach et al., 2012), and climate sceptics had, for a time, greater visibility on BBC news programs (F. Pearce, 2010, pp. 188–190).

The trauma of Climategate clearly made it difficult for scientists to distinguish between climate sceptics associated with fossil fuel funding and extraction (Leber & Vicens, 2017; Oreskes, 2010; Richardson, 2010) and others with a broader range of reasons for engaging with the content of climate science (Hulme, 2013). Perhaps unsurprisingly given the pressures for scientific consensus identified above, challenges to prominent scientific claims were associated with ideologically motivated scepticism. However, in recent years, we have seen evidence that Climategate has prompted some changes in public communication around climate science. Increasing numbers of climate scientists have been engaging in public debate through blogs and social media platforms. This willingness to engage in public suggests a new era in which climate science is no longer "a matter only for an elite community of experts" (Pallett & Chilvers, 2013, p. 1178).

For example, climate impacts scientist Richard Betts (2012) has established a reputation for public discussion of cli- mate change, including sceptics, having identified a relative absence of public discussion regarding scientific uncertainties. Similarly, climate scientist Tamsin Edwards started a blog called *All Models Are Wrong*, seeking to engage climate sceptics and focus on the uncertainties in scientific modelling. This attracted strong criticism from some climate scientists and communication professionals who felt that drawing attention to uncertainties was unnecessary and risked being "misunderstood and misused" (Edwards, 2012). This reaction suggests that some influential climate scientists see scepticism as a product of scientific misunderstanding or irrationality (Sharman & Howarth, 2016). However, excluding "unruly publics" (de Saille, 2015) from engagement based on crude labelling does no justice to the complexity of the politics of climate knowledge (Howarth & Sharman, 2015; Nisbet, 2019).

Meritxell Ramírez-i-Ollé (2015a) demonstrates this point through a detailed ethnographic account of a dendro- climatological controversy. The research shows how Michael Mann, an influential climate scientist at the center of Climategate, became excluded from the dendroclimatological community for "uncivil scepticism", whereas the sceptical blogger, Andrew Montford, became regarded by one respected scientist as a "civil skeptic" (Ramírez-i-Ollé, 2015a, pp. 213–231). So, in at least one case, the contribution of climate bloggers has been not to divert scientific research agendas, as some have claimed (Lewandowsky, Oreskes, Risbey, Newell, & Smithson, 2015), but actually to help improve scientific quality (Ramírez-i-Ollé, 2015a, p. 254).[6] Of course, communication practices and underlying values can provide significant, sometimes insurmountable, hurdles to overcome in climate change engagement (Porter, Kuhn, & Nerlich, 2018). However, post-Climategate efforts by some climate scientists suggest a new willingness to attempt engagement despite these obvious barriers, increasing understanding even where persuasion is not possible, or even attempted (Edwards, 2019).

We now outline the promise of cosmopolitan knowledge: a conceptual orientation to public knowledge that offers a productive way of amplifying these new forms of engagement in support of more diverse approaches to discussing climate action.

4. THE PROMISE OF COSMOPOLITAN KNOWLEDGE

The notion of cosmopolitan knowledge arises from the recognition that global challenges can only be addressed by giving the epistemic demands of scientific and cultural diversity their due. It reflects a wider shift in social and political theory from universalised, privileged views of the cosmopolitan to a post-imperial, pluralized mode of thinking (Robbins & Horta, 2017) capable of recognizing "cosmopolitanism from below" (Kurasawa, 2004).

Cosmopolitanism in this tradition, reflects an ethical sensibility of conversing with difference (Appiah, 2007).[7] Some polemicists have sought to downplay the importance of extending diversity to epistemic matters, describing it as part of the "postmodern assault on science" (Kuntz, 2012), a train of thought echoed in recent concerns over "alternative facts" and a so-called "post-truth" society. In response, STS scholars have underlined why the facts that matter for public action must be crafted out of engagements with the disparate social contexts within which people find knowledge to be meaningful (Jasanoff & Simmet, 2017; Marres, 2018). Simply appealing to self-evident truths or to expert authority does not suffice. In this section, we explore why this recognition of diversity is a strength rather than a weakness for engaging with climate change.

Scholars of cosmopolitan knowledge call upon scientists and policy advocates to acknowledge the limits of broad appeals to scientific authority and develop new ways of engaging in the global public sphere that respect this reasonable diversity. The notion of a cosmopolitan moment helps us discern how such a fundamental shift in the terms of engagement between science and public policy matters might be brought about. Theorists of cosmopolitan knowledge are acutely attentive to the need to develop more culturally robust ways of connecting knowledge and action in the public or collective good. Their point about diversity is not simply to acknowledge that it exists or to tailor pre-given messages to different audiences, but to find ways of reasoning together through these differences, rather than attempting to "change enough brains" through messaging strategies (Lakoff, 2010, p. 79). Cosmopolitan knowledge, they argue, is capable of traveling across the world and absorbing

new meanings precisely because of its rejection of the clarity of a single way of knowing how the world is and how humans should act (S. Beck, 2012; Hulme, 2010a). As Sheila Jasanoff has suggested elsewhere, there is a need to "restore communication between the domains of emotion and intellect, affect and reason, imagination and argument" (Jasanoff, 2011c, pp. 636–637) in bringing science to bear on public matters. Rethinking the epistemic foundations of public discourse along cosmopolitan lines is part of this challenge.

Translated to climate change, a cosmopolitan orientation is better equipped than a narrowly science-centred one to grapple with the challenge of climate action. Importantly, this means not just paying attention to attitudes, opinions, or even values, but to how different cultures, professions, movements, and faiths "know" the world. In this picture, knowledge, meaning, and value are inextricably linked. As Candis Callison (2014) shows, the norms and values of particular cultural formations are central to understanding how facts about climate change are made meaningful. Callison documents these vernacular epistemologies in relation to diverse groups: First Nations representatives, science journalists, evangelical Christians, corporate responsibility campaigners, and science policy experts. So rather than redoubling efforts to enforce the primacy of scientific knowledge across all discussions of climate change, the turn to cosmopolitan knowledge is oriented towards "embracing plurality in the making, accrediting and mobilizing of knowledge" (Hulme, 2010b, p. 563).

A cosmopolitan turn could also bring to life the diverse ways in which scientific and technical knowledge about climate is generated. In reflecting on the apparently intractable polarization of current climate change debates, Jane Goodall (2020) reflects where we might be if a diverse range of experts with detailed knowledge of the changing nature and impacts of climate, such as land rangers, farmers, and wildlife experts had taken the public "on a journey on which doubts, and uncertainties were part of the process of coming to an understanding?" Instead, Goodall highlights how in the late 2000s former US Vice President Al Gore became the world's most prominent climate change communicator, using a lens of unassailable and settled scientific facts which may have exacerbated polarization.

Challenges to mainstream climate science come not only from sceptics. In 2018, high-profile activist groups have asserted that "we only have 12 years to stop catastrophic climate change" (Extinction Rebellion, 2019), a claim first given prominence in a *Guardian* story about an IPCC report (IPCC, 2018; Watts, 2018), While some individual scientists have criticized this interpretation of the report (Freedman, 2018), the IPCC itself has refrained from making public comment, finding itself caught between the demands of both policymakers and activists (Asayama et al., 2019). The speed with which the "12 years" claim spread from a Guardian article shared over 30,000 times on social media into political discourse has echoes of the wildfire spread of the Climategate crisis a decade ago (Bounegru, De Pryck, Venturini, & Mauri, 2020). While different in content and political character, the IPCC's communication vacuum suggests that the organization has yet to come to terms with the political character of its scientific assessments, and how digital technology has altered the temporal dimensions of politicization. However, there have been developments outside of the IPCC, with scientists contributing to the *Climate Feedback* (https://climatefeedback.org) initiative which provides rapid "scientific credibility" ratings for media articles about climate change (Box 1).

5. DISCUSSION AND CONCLUSION

We began this article asking how Climategate came to be seen as a scandal and what lessons may be drawn from this significant moment in the history of climate science. We have shown that the CRU emails became scandalous because of established norms that shape interactions between climate science and publics in three areas: how climate policy is justified through climate science; how climate science is validated; and how publics engage with climate science. Conventionally, policy is meant to follow from science that has been validated within the scientific community alone and authorized by a passive and trusting public. Climategate, and the responses to it, comprehensively demonstrated the limitations of these science-first terms of engagement.

Our review suggests, first, that scientific consensus continues to strongly shape public accounting for climate policy, with some environmental communication agencies using it as a central message. Second, while the scientific norm of openness has been re-established, and extended peer review become more accepted, there could be greater openness about the inevitable flaws and limitations of scientific knowledge about climate change. Third, Climategate did prompt some scientists to open up their engagement practices, rejecting the idea that conflicting values or political stances should exclude individuals from public discussions about climate change. The legacy of Climategate may be mixed, but there is a major opportunity today to build on these positive changes to address the hard work of reconciling desires for low-carbon futures with lived local experiences (Krzywoszynska et al., 2018). Where scholars in the social sciences and humanities have advocated a cosmopolitan perspective toward knowledge required for such climate action, we argue that we are now seeing promising examples of such perspectives in practice. In Table 1, we summarise what a move from science-first to cosmopolitan knowledge means for the scientific norms that underpinned Climategate.

TABLE 1 Comparison of norms arising from science-first and cosmopolitan knowledge of climate change

	Knowledge of climate change	
Practices in the public life of science	Science-first	Cosmopolitan
Justifying policy	Scientific consensus	Epistemic diversity
Validating science	Open data	Openness to uncertainty
Engaging publics	Trust in science	Public reasoning

If Climategate has accidentally led us towards a cosmopolitan moment, what else might this moment signify? Seizing a cosmopolitan moment might mean scientists having the freedom to bridge the is/ought stricture (Walsh, 2010) both in their capacity as citizens and as experts reasoning across this boundary to articulate other grounds for action. It might allow some to go where the data takes them and explore the ambiguous and complex nature of climate phenomena without being constrained by fear of damaging a consensus that is expected for climate action (Edwards, 2019). Others may also bridge the relationship between fact and emotion (Readfearn, 2020; Wang, Leviston, Hurlstone, Lawrence, & Walker, 2018) or indeed, reconstruct scientific norms altogether by “thinking like a

climate" (Knox, 2015). Likewise, publics may act as "experts" engaging with scientists on scientific matters where appropriate and also carve out forms of public reasoning on climate action that do not only start from scientific consensus.

Following such a cosmopolitan transformation, science-advisory modes of representation of climate change would not be dispensed with. Indeed, the IPCC and others may be needed more than ever to engage with these different voices. However, they would take their place alongside a more diverse spectrum of modes of representation which is characteristic of how democracy works. Science advisory institutions such as the IPCC would also devote more attention to constructing arguments bridging facts around vulnerability or inequality as well as, or indeed more than, a restatement of facts centred on temperature records. As Kenny Walker (2013) has argued, uncertainties around science do not need to curtail action; they may equally well be used as a site for mobilizing public participation and policy action.

Participation by publics through such mechanisms as citizen panels or citizen assemblies would constitute another mode of representing the issues and perspectives at stake (Devaney, Torney, Brereton, & Coleman, 2020). Their value lies in expanding the range of types of arguments and forms of public reasoning—including conceptions of the public good—available in engagements with climate change (Brown, 2006). Such engagement is unlikely to happen at the same global scale of climate science, focusing instead on more mundane objects such as eco-kettles or house lighting (Marres, 2012). Yet, some social movements remain committed to a "science-first" approach to holding policymakers to account (Evensen, 2019). For example, Extinction Rebellion have successfully re-introduced emotion into public debates about climate change, yet their exhortations to "tell *the* truth" (Extinction Rebellion, 2019b, emphasis added) and set a new policy target prior to citizens' assemblies revisit familiar tensions regarding who gets to define the scope of public participation in climate politics, and how (Mohr, Raman, & Gibbs, 2013).
These are not abstract concerns. A cosmopolitan perspective is essential for recognizing that these debates and resolutions will play out differently in different national and local settings. In Australia, for example, the bushfires of 2019–2020 have brought about an extraordinary outpouring of collective sense-making from tragedy, bridging the gap between climate change as universal phenomenon brought to us by science and the world of everyday perception (Jasanoff, 2010; O'Connell, 2020). While commentators in this national conversation refer to the scientific consensus, many also call upon a wider range of epistemic and normative resources including the observations of knowledgeable locals (Armstrong & Logue, 2020) and the need to learn from knowledge forged over millennia by Indigenous Australians (Keneally, 2020). At the same time, some also reconnect Australian experiences with those of asylum-seekers from Pacific countries where climate change was already experienced as happening in the present (O'Connell, 2020). These examples perhaps show a willingness to begin to grapple with the politics of climate change in new ways.

Climate science has produced extensive volumes of knowledge, but it is not self-evident which sources should be selected to frame participation events or how knowledge should be connected to climate futures. Such decisions are fraught and value-laden and increasingly made in a decentralized information environment whose patterns and structures are still opaque. The lessons of Climategate identified in this review can help pave the way for a more nuanced and effective engagement with climate science, publics, and policies. A cosmopolitan approach to climate knowledge starts from a discussion of the public values that are both shared and contested within societies, what these mean

for imagining future possibilities for living with climate change, and how we might have better conversations about them. With crucial, difficult, and potentially traumatic discussions ahead, such an approach would be a fitting legacy of Climategate.

ENDNOTES

[1] In this review, we do not wish to go over the familiar aspects of Climategate in detail. These are amply covered elsewhere in the literature. For an overview of key individuals and a readable, even-handed journalistic account of the content and context of Climategate, see *The Climate Files* (F. Pearce, 2010). The most robust defence of the climate scientists caught up in Climategate comes from Michael Mann (2012), while the most detailed skeptic account comes from Andrew Montford (2010b). Scholars of science and society have provided a range of analyses including sceptics' use of metaphors to justify policy inaction (Nerlich, 2010), the disjoint between the contents of the e-mails and Mertonian norms of science (Grundmann, 2013), the e-mails as a window on consensus formation (Ryghaug & Skjølsvold, 2010), a "brand analysis" of climate science (Blowfield, 2010), a critique of the social sciences' role in accentuating the fallout from Climategate (Lahsen, 2013) and a reflection on the generative potential of Climategate in reframing climate change—a topic which we focus on in this review (Hulme, 2013). In the UK, three key reports were written about the episode (House of Commons Science and Technology Committee, 2010; Oxburgh, 2010; Rus- sell et al., 2010), along with a subsequent report into the conduct of these reports (House of Commons Science and Technology Committee, 2011). *Climategate*: *Science of a Scandal* (O'Hagan, 2019) was released to coincide with the 10-year anniversary, included interviews with many of the key scientists involved and won a Royal Television Society Scotland Award (RTS Scotland Awards, 2020).

[2] While often extremely polarized, climate sceptics and policy advocates often focus on science as the arbiter for knowledge claims (W. Pearce, 2013).

[3] For an exception, see Singh (2010).

[4] This view was most succinctly expressed in the UK science community by Sir Mark Walport, then Government Chief Scientific Adviser, saying that "scientific research is [not] complete until the results are communicated" (House of Commons Science and Technology Committee, 2014, p. 30).

[5] Survey evidence from 2009 to 2010 suggested modest drops in public acceptance that climate change is man-made in both UK and Norway (Ward, 2011).

[6] For example, a *Nature* article on ocean heat uptake was retracted in 2019 following criticisms by Nicholas Lewis first published on Curry's blog (Lewis, 2018; Resplandy et al., 2019). Curry's blog is one of the most prominent in the cli- mate sceptical blogosphere (Sharman, 2014).

[7] It is beyond the scope of this piece to review the extensive debate on cosmopolitanism. Gurminder Bhambra (2017) provides an incisive critique of those, such as Bruno Latour, who have stated that climate change should be Europe's main priority. Bhambra argues that such claims reflect a systematic blindness to the colonial dimensions of Europe's political crises.

[8] Indeed, other potentially controversial areas of science advice have become interested in establishing frameworks for consensus science assessments (W. Pearce et al., 2018).

REFERENCES

Appiah, K. A. (2007). *Cosmopolitanism: Ethics in a world of strangers*. London: Penguin.

Armstrong, Z., & Logue, P. (2020, January 2). Don't dismiss our anger in Cobargo Scott Morrison, we are the ones living through a crisis. *The Guardian*. Retrieved from https://www.theguardian.com/commentisfree/2020/jan/03/dont-dismiss-our-anger-in-cobargo-scott- morrison-we-are-the-ones-living-through-a-crisis.

Asayama, S., Bellamy, R., Geden, O., Pearce, W., & Hulme, M. (2019). Why setting a climate deadline is dangerous. *Nature Climate Change*, 9(8), 570–572. https://doi.org/10.1038/s41558-019-0543-4

Beck, S. (2012). The challenges of building cosmopolitan climate expertise: The case of Germany. *Wiley Interdisciplinary Reviews: Climate Change*, *3*(1), 1–17. https://doi.org/10.1002/wcc.151

Beck, S., Borie, M., Chilvers, J., Esguerra, A., Heubach, K., Hulme, M., … Görg, C. (2014). Towards a reflexive turn in the governance of global environmental expertise. The cases of the IPCC and the IPBES. *GAIA - Ecological Perspectives for Science and Society*, *23*(2), 80–87. https://doi.org/10.14512/gaia.23.2.4

Beck, S., & Mahony, M. (2017). The IPCC and the politics of anticipation. *Nature Climate Change*, *7*(5), 311–313.

Beck, U. (2010). Remapping social inequalities in an age of climate change: For a cosmopolitan renewal of sociology. *Global Networks*, *10*(2), 165–181.

Betts, R. (2012, January 18). Widening the climate conversation. *Soapbox Science*. Retrieved from http://blogs.nature.com/soapboxscience/ 2012/01/18/climate-science-%E2%80%93-moving-beyond-a-single-issue.

Bhambra, G. K. (2017). The current crisis of Europe: Refugees, colonialism, and the limits of cosmopolitanism. *European Law Journal*, *23*(5), 395–405. https://doi.org/10.1111/eulj.12234

Blowfield, M. (2010). Voices: Climategate leads nowhere. *Business Strategy Review*, *21*(2), 76–78. https://doi.org/10.1111/j.1467-8616.2010.00667.x

Bounegru, L., De Pryck, K., Venturini, T., & Mauri, M. (2020). “We only have 12 years”: YouTube and the IPCC report on global warming of 1.5ºC. *First Monday*. https://doi.org/10.5210/fm.v25i2.10112

Brahic, C. (2010). Climategate scientist breaks his silence. *New Scientist*, *207*(2771), 10–11. https://doi.org/10.1016/S0262-4079(10)61828-3 Broder, J. M. (2010, March 3). The credibility of climate science, Cont. *The New York Times*: *Green Blog*. Retrieved from https://green.blogs. nytimes.com/2010/03/03/the-credibility-of-climate-science-cont/.

Brown, M. B. (2006). Survey article: Citizen panels and the concept of representation*. *Journal of Political Philosophy*, *14*(2), 203–225. https:// doi.org/10.1111/j.1467-9760.2006.00245.x

Callison, C. (2014). *How climate change comes to matter: The communal life of facts*. Durham, NC: Duke University Press.

Cameron, F., Hodge, B., & Salazar, J. F. (2013). Representing climate change in museum space and places. *Wiley Interdisciplinary Reviews: Climate Change*, *4*(1), 9–21. https://doi.org/10.1002/wcc.200

Caney, S. (2005). Cosmopolitan justice, responsibility, and global climate change. *Leiden Journal of International Law*, *18*(4), 747–776.

Climate Change Impacts. (2019). National Oceanic and Atmospheric Administration. Retrieved from https://www.noaa.gov/education/ resource-collections/climate-education-resources/climate-change-impacts.

Climategate Revisited. (2012, October 31). BBC Radio 4. Retrieved from https://www.bbc.co.uk/programmes/b01nl8gm. Closing the Climategate. (2010). Closing the Climategate. *Nature*, *468*(7322), 345. https://doi.org/10.1038/468345a

Cook, J., & Pearce, W. (2019). Is emphasising consensus in climate science helpful for policymaking? In M. Hulme (Ed.), *Contemporary Climate Change Debates: A Student Primer* (pp. 127–145). London: Routledge.

Delingpole, J. (2009, November 20). Climategate: The final nail in the coffin of ‘anthropogenic global warming’? *Telegraph Blogs*. Retrieved from

https://web.archive.org/web/20160129202347/http://blogs.telegraph.co.uk/news/jamesdelingpole/100017393/climategate-the-final- nail-in-the-coffin-of-anthropogenic-global-warming/.
de Saille, S. (2015). Dis-inviting the Unruly Public. Science as Culture. *24*(1), 99–107. https://doi.org/10.1080/09505431.2014.986323.

Devaney, L., Torney, D., Brereton, P., & Coleman, M. (2020). Ireland's citizens' assembly on climate change: Lessons for deliberative public engagement and communication. *Environmental Communication*, *14*(2), 141–146. https://doi.org/10.1080/17524032.2019.1708429

Doherty, B., De Moor, J., & Hayes, G. (2018, November 27). The 'new' climate politics of Extinction Rebellion? *OpenDemocracy*. Retrieved from https://www.opendemocracy.net/en/new-climate-politics-of-extinction-rebellion/.

Douglas, H. (2009). *Science, policy, and the value-free ideal*. Pittsburgh, PA: University of Pittsburgh Press.

Edwards, T. (2012, May 10). All blog names are wrong. *All Models Are Wrong*. Retrieved from https://web.archive.org/web/20120510053144/ http://allmodelsarewrong.com/all-blog-names-are-wrong/

Edwards, T. (2019, February 6). Polar thinking. *All Models Are Wrong*. Retrieved from https://blogs.plos.org/models/polar-thinking/ Evensen, D. (2019). The rhetorical limitations of the #FridaysForFuture movement. *Nature Climate Change*, *9*(6), 428–433. https://doi.org/10.1038/s41558-019-0481-1

Extinction Rebellion. (2019a) FAQs. *Extinction Rebellion*. Retrieved from https://rebellion.earth/the-truth/faqs/.

Extinction Rebellion. (2019b). Our demands. *Extinction Rebellion*. Retrieved from https://rebellion.earth/the-truth/demands/.

Ford, J. D., Cameron, L., Rubis, J., Maillet, M., Nakashima, D., Willox, A. C., & Pearce, T. (2016). Including indigenous knowledge and experience in IPCC assessment reports. *Nature Climate Change*, *6*(4), 349–353. https://doi.org/10.1038/nclimate2954

Freedman, A. (2018, January 22). Climate scientists refute 12-year deadline to curb global warming. *Axios*. Retrieved from https://www. axios.com/climate-change-scientists-comment-ocasio-cortez-12-year-deadline-c4ba1f99-bc76-42ac-8b93-e4eaa926938d.html.

Goodall, J. (2020, January 7). Inflammatory exchanges. *Inside Story*. Retrieved from https://insidestory.org.au/inflammatory-exchanges/. Grundmann, R. (2013). "Climategate" and the scientific ethos. *Science, Technology & Human Values*, *38*(1), 67–93. https://doi.org/10.1177/0162243911432318

Guteri, F. (2010). It's Gettin' hot in here: The big Battle over climate science. *Discover Magazine*. Retrieved from http://discovermagazine. com/2010/apr/10-its-gettin-hot-in-here-big-battle-over-climate-science.

Hawkins, E., Edwards, T., & McNeall, D. (2014). Pause for thought. *Nature Climate Change*, *4*(3), 154–156. https://doi.org/10.1038/ nclimate2150

Hilgartner, S. (2000). *Science on Stage: Expert Advice as Public Drama*, Writing Science, Stanford: Stanford University Press.

Hoggan, J. (2010, April 5). The Smoking Guns and Blue Dress Moments of Climategate. *DeSmogBlog*. Retrieved from https://www. desmogblog.com/smoking-guns-and-blue-dress-moments-Climategate.

Holliman, R. (2011). Advocacy in the tail: Exploring the implications of 'Climategate' for science journalism and public debate in the digital age. *Journalism*, *12*(7), 832–846. https://doi.org/10.1177/1464884911412707

Horton, R. (2010, July 7). Climate email inquiry: Bringing democracy to science. *The Guardian*. Retrieved from http://www.theguardian. com/commentisfree/cif-green/2010/jul/07/climate-email-inquiry-revolution.

House of Commons Science and Technology Committee. (2010). The disclosure of climate data from the Climatic Research Unit at the University of East Anglia (HC 387-I). Retrieved from https://publications.parliament.uk/pa/cm200910/cmselect/cmsctech/387/387i.pdf.

House of Commons Science and Technology Committee. (2011). *The reviews into the University of East Anglia's climatic research Unit's E- mails*. London, UK: The Stationery Office.

House of Commons Science and Technology Committee. (2014). *Communicating Climate Science (HC 254)*. London, UK: The Stationery Office.

Howarth, C. C., & Sharman, A. G. (2015). Labeling opinions in the climate debate: A critical review: Labeling opinions in the climate debate. *WIREs Climate Change*, *6*(2), 239–254. https://doi.org/10.1002/wcc.332

Hughes, H. R., & Paterson, M. (2017). Narrowing the climate field: The symbolic power of authors in the IPCC's assessment of mitigation. *Review of Policy Research*, *34*(6), 744–766. https://doi.org/10.1111/ropr.12255

Hulme, M. (2010a). Cosmopolitan Climates. *Theory, Culture and Society*, *27*(2–3), 267–276. https://doi.org/10.1177/0263276409358730 Hulme, M. (2010b). Problems with making and governing global kinds of knowledge?. *Global Environmental Change*, *20*(4), 558–564. https://doi.org/10.1016/j.gloenvcha.2010.07.005

Hulme, M. (2013). After Climategate… never the same. In *Exploring Climate Change Through Science and in Society: An Anthology of Mike Hulme's Essays, Interviews and Speeches* (pp. 252–264). London: Routledge.

Hulme, M. (2018). WIREs climate change 2018: An editorial essay. *Wiley Interdisciplinary Reviews: Climate Change*, *9*, e503. https://doi.org/ 10.1002/wcc.503

Hulme, M., & Ravetz, J. (2009, December 1). 'Show your working': What 'ClimateGate' means. *BBC*. Retrieved from http://news.bbc.co.uk/ 1/hi/8388485.stm.

Hulme, M., Zorita, E., Stocker, T. F., Price, J., & Christy, J. R. (2010). IPCC: Cherish it, tweak it or scrap it? *Nature*, *463*(7282), 730–732. https://doi.org/10.1038/463730a

IPCC. (2018). *Global warming of 1.5ºC. an IPCC special report on the impacts of global warming of 1.5ºC above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. Geneva, Switzerland: World Meteorological Organization.

Jasanoff, S. (2010). A new climate for society. *Theory, Culture and Society*, *27*(2–3), 233–253. https://doi.org/10.1177/0263276409361497 Jasanoff, S. (2011a). The practices of objectivity in regulatory science. In *Social knowledge in the making* (pp. 307–338). Chicago, IL: University of Chicago Press.

Jasanoff, S. (2011b). Cosmopolitan knowledge: Climate science and global civic epistemology. In *The Oxford Handbook of Climate Change and Society*. Oxford: Oxford University Press. https://doi.org/10.1093/oxfordhb/9780199566600.003.0009

Jasanoff, S. (2011c). Constitutional moments in governing science and technology. *Science and Engineering Ethics*, *17*(4), 621–638. https:// doi.org/10.1007/s11948-011-9302-2

Jasanoff, S., & Simmet, H. R. (2017). No funeral bells: Public reason in a 'post-truth' age. *Social Studies of Science*, *47*(5), 751–770. https://doi. org/10.1177/0306312717731936

Jaspal, R., & Nerlich, B. (2012). When climate science became climate politics: British media representations of climate change in 1988. *Public Understanding of Science*, *23*, 122–141. https://doi.org/10.1177/0963662512440219

Jha, A., & Pearce, F. (2010, February 3). Climate change researchers must be more open, says chief scientist. *The Guardian*. Retrieved from https://www.theguardian.com/environment/2010/feb/03/climate-change-chief-scientist-beddington.

Kahan, D. M., Jenkins-Smith, H., & Braman, D. (2011). Cultural cognition of scientific consensus. *Journal of Risk Research*, *14*(2), 147–174. https://doi.org/10.1080/13669877.2010.511246

Keneally, T. (2020, February 1). Thomas Keneally: 'These fires have changed us'. *The Guardian*. Retrieved from https://www.theguardian. com/australia-news/2020/feb/01/thomas-keneally-these-fires-have-changed-us.

Knox, H. (2015). Thinking like a climate. *Distinktion: Journal of Social Theory*, *16*(1), 91–109. https://doi.org/10.1080/1600910X.2015.1022565 Krzywoszynska, A., Watson, M., Buckley, A., Chiles, P., Gregson, N., Holmes, H., & Mawyin, J. (2018). Opening up the participation labora- tory: The cocreation of publics and futures in upstream participation. *Science, Technology & Human Values*, *43*(5), 785–809. https://doi. org/10.1177/0162243917752865

Kuntz, M. (2012). The postmodern assault on science. *EMBO Reports*, *13*(10), 885–889.

Kurasawa, F. (2004). A cosmopolitanism from below: Alternative globalization and the creation of a solidarity without bounds. *European Journal of Sociology/Archives Européennes de Sociologie*, *45*(2), 233–255.

Lahsen, M. (2012). Climategate and the virtue of the scientific community: An editorial commentary on the Maibach et al. and Grundmann opinion articles. *WIREs Climate Change*, *3*(3), 279–280. https://doi.org/10.1002/wcc.170

Lahsen, M. (2013). Climategate: The role of the social sciences. *Climatic Change*, *119*, 547–558. https://doi.org/10.1007/s10584-013-0711-x Lakoff, G. (2010). Why it matters how we frame the environment. *Environmental Communication: A Journal of Nature and Culture*, *4*(1), 70–81. https://doi.org/10.1080/17524030903529749

Leber, R., & Vicens, A. J. (2017). 7 years before Russia hacked the election, someone did the same thing to these scientists. *Mother Jones*. http://www.motherjones.com/politics/2017/12/climategate-wikileaks-russia-trump-hacking/.

Leiserowitz, A. A., Maibach, E. W., Roser-Renouf, C., Smith, N., & Dawson, E. (2013). Climategate, public opinion, and the loss of trust.

American Behavioral Scientist, *57*(6), 818–837. https://doi.org/10.1177/0002764212458272

Lewandowsky, S., Oreskes, N., Risbey, J. S., Newell, B. R., & Smithson, M. (2015). Seepage: Climate change denial and its effect on the scien- tific community. *Global Environmental Change*, *33*, 1–13. https://doi.org/10.1016/j.gloenvcha.2015.02.013

Lewis, N. (2018, November 6). A major problem with the Resplandy et al. Ocean heat uptake paper. *Climate Etc*. Retrieved from https:// judithcurry.com/2018/11/06/a-major-problem-with-the-resplandy-et-al-ocean-heat-uptake-paper/.

MacInnis, B., & Krosnick, J. A. (2016). Trust in scientists' statements about the environment and american public opinion on global warming.

In J. A. Krosnick, I.-C. A. Chiang, & T. H. Stark (Eds.), *Political psychology: New explorations* (pp. 487–526). London: Routledge.

Mahony, M. (2014). The predictive state: Science, territory and the future of the Indian climate. *Social Studies of Science*, *44*(1), 109–133. https://doi.org/10.1177/0306312713501407

Maibach, E., Leiserowitz, A., Cobb, S., Shank, M., Cobb, K. M., & Gulledge, J. (2012). The legacy of Climategate: Undermining or revitalizing climate science and policy? *WIREs Climate Change*, *3*(3), 289–295. https://doi.org/10.1002/wcc.168

Mann, M. (2012). *The hockey stick and the climate wars: Dispatches from the front lines*. New York, NY: Columbia University Press.

Mann, M. E. (2009, December 18). E-mail furor doesn't alter evidence for climate change. *Washington Post*. Retrieved from http://www. washingtonpost.com/wp-dyn/content/article/2009/12/17/AR2009121703682.html.

Marres, N. (2012). *Material participation: Technology, the environment and everyday publics*. London: Palgrave MacMillan.

Marres, N. (2018). Why we can't have our facts back. *Engaging Science, Technology, and Society*, *4*, 423–443. https://doi.org/10.17351/ ests2018.188

Matthews, P. (2013, March 26). Making science public. *Bishop Hill*. Retrieved from http://www.bishop-hill.net/blog/2013/3/26/making- science-public.html.

McKitrick, R. (2010). Understanding the Climategate inquiries.

Mohr, A., Raman, S., & Gibbs, B. (2013). Which Publics? When? *Sciencewise*. Retrieved from http://www.sciencewise-erc.org.uk/cms/assets/ Uploads/Which-publics-FINAL-VERSION.pdf.

Monbiot, G. (2009, November 25). Pretending the climate email leak isn't a crisis won't make it go away. *The Guardian*. Retrieved from http://www.theguardian.com/environment/georgemonbiot/2009/nov/25/monbiot-climate-leak-crisis-response.

Monbiot, G., Pope, V., Hulme, M., Lynas, M., Pielke Jr, R., Highfield, R., …Garvey, J. (2010, February 4). Climate consensus under strain.

The Guardian. Retrieved from http://www.theguardian.com/commentisfree/cif-green/2010/feb/04/climate-consensus-under-strain.

Montford, A. W. (2010a). *The Climategate Inquiries*. London: Global Warming Policy Foundation.

Montford, A. W. (2010b). *The hockey stick illusion: Climategate and the corruption of science*. London: Stacey International.

Nerlich, B. (2010). 'Climategate': Paradoxical metaphors and political paralysis. *Environmental Values*, *19*(4), 419–442. https://doi.org/10.
3197/096327110X531543

Nerlich, B., Hartley, S., Raman, S., & Smith, A. (Eds.). (2018). *Science and the politics of openness: Here be monsters*. Manchester, UK: Manchester University Press Retrieved from http://oapen.org/search?identifier=643155

Nisbet, M. C. (2019). The trouble with climate emergency journalism. *Issues in Science and Technology*, *XXXV*(4), 23–26.

O'Connell, M. (2020, January 13). Pictures of the world on fire won't shock us for much longer. *The Guardian*. Retrieved from https://www. theguardian.com/commentisfree/2020/jan/13/pictures-world-fire-australia-bushfire-climate-emergency.

O'Hagan, S. (2019). Climategate: Science of a scandal. *BBC Four*. Retrieved from https://www.bbc.co.uk/iplayer/episode/m000b8p2/ Climategate-science-of-a-scandal.

O'Neill, S., Williams, H. T. P., Kurz, T., Wiersma, B., & Boykoff, M. (2015). Dominant frames in legacy and social media coverage of the IPCC fifth assessment report. *Nature Climate Change*, *5*(4), 380–385. https://doi.org/10.1038/nclimate2535

Oreskes, N. (2010). My facts are better than your facts: Spreading good news about global warming. In M. S. Morgan & P. Howlett (Eds.), *How well do facts travel?* (pp. 135–166). Cambridge: Cambridge University Press Retrieved from ftp://ftp.borg.moe/yarr/Gentoomen%20Library/Misc/Cambridge.University.Press-How.Well.Do.Facts.Travel.2010.RETAiL.EBook.pdf#page=158

Oxburgh, R. (2010). Report of the international panel set up by the University of East Anglia to examine the research of the climatic research unit. Retrieved from https://www.uea.ac.uk/documents/3154295/7847337/SAP.pdf/a6f591fc-fc6e-4a70-9648-8b943d84782b.

Pallett, H., & Chilvers, J. (2013). A decade of learning about publics, participation, and climate change: Institutionalising reflexivity? *Environment and Planning A*, *45*(5), 1162–1183. https://doi.org/10.1068/a45252

Pearce, F. (2010). *The climate files: The battle for the truth about global warming*. London: Guardian Books.

Pearce, W. (2013, July 30). Are climate sceptics the real champions of the scientific method? *The Guardian*. Retrieved from https://www. theguardian.com/science/political-science/2013/jul/30/climate-sceptics-scientific-method.

Pearce, W., Brown, B., Nerlich, B., & Koteyko, N. (2015). Communicating climate change: Conduits, content, and consensus. *Wiley Interdisciplinary Reviews: Climate Change*, *6*(6), 613–626. https://doi.org/10.1002/wcc.366

Pearce, W., Grundmann, R., Hulme, M., Raman, S., Hadley Kershaw, E., & Tsouvalis, J. (2017a). A reply to Cook and Oreskes on climate science consensus messaging. *Environmental Communication*, *11*(6), 736–739. https://doi.org/10.1080/17524032.2017.1392109

Pearce, W., Grundmann, R., Hulme, M., Raman, S., Hadley Kershaw, E., & Tsouvalis, J. (2017b). Beyond counting climate consensus. *Environmental Communication*, *11*(6), 723–730. https://doi.org/10.1080/17524032.2017.1333965

Pearce, W., Mahony, M., & Raman, S. (2018). Science advice for global challenges: Learning from trade-offs in the IPCC. *Environmental Science & Policy*, *80*, 125–131. https://doi.org/10.1016/j.envsci.2017.11.017

Pearce, W., & Nerlich, B. (2018). 'An inconvenient truth': A social representation of scientific expertise. In B. Nerlich, S. Hartley, S. Raman, &

A. Smith (Eds.), *Science and the politics of openness: Here be monsters* (pp. 212–229). Manchester, UK: Manchester University Press Retrieved from http://oapen.org/search?identifier=643155

Pearce, W., Niederer, S., Özkula, S. M., & Sánchez Querubín, N. (2019). The social media life of climate change: Platforms, publics and future imaginaries. *WIREs Climate Change*, *10*(2), e569. https://doi.org/10.1002/wcc.569

Porter, A. J., Kuhn, T. R., & Nerlich, B. (2018). Organizing authority in the climate change debate: IPCC controversies and the management of dialectical tensions. *Organization Studies*, *39*(7), 873–898. https://doi.org/10.1177/0170840617707999

Ramírez-i-Ollé, M. (2015a). *The Making of Dendroclimatological Knowledge: A Symmetrical Account of Trust and Scepticism in Science [doctoral]*. Edinburgh, UK: University of Edinburgh.
Ramírez-i-Ollé, M. (2015b). Rhetorical strategies for scientific authority: A boundary-work analysis of 'Climategate'. *Science as Culture*, *24*(4), 384–411. https://doi.org/10.1080/09505431.2015.1041902
Ravetz, J. R. (2011). 'Climategate' and the maturing of post-normal science. *Futures*, *43*(2), 149–157. https://doi.org/10.1016/j.futures.2010.
10.003
Readfearn, G. (2020, March 7). 'I'm profoundly sad, I feel guilty': Scientists reveal their personal fears about the climate crisis. *The Guardian*. Retrieved from https://www.theguardian.com/environment/2020/mar/08/im-profoundly-sad-i-feel-guilty-scientists-reveal-personal- fears-about-the-climate-crisis.
Resplandy, L., Keeling, R. F., Eddebbar, Y., Brooks, M. K., Wang, R., Bopp, L., … Oschlies, A. (2019). Retraction note: Quantification of ocean heat uptake from changes in atmospheric O_2 and CO_2 composition. *Nature*, *573*(7775), 614–614. https://doi.org/10.1038/s41586-019- 1585-5
Richardson, J. H. (2010, March 30). This Man Wants to Convince You Global Warming Is a Hoax. *Esquire*. Retrieved from https://www. esquire.com/features/marc-morano-0410.
Robbins, B., & Horta, P. (2017). *Cosmopolitanisms*. New York, NY: NYU Press.
Rogers, A. (2018, November 28). The climate apocalypse is now, and It's happening to you. *Wired*. Retrieved from https://www.wired.com/ story/the-climate-apocalypse-is-now-and-its-happening-to-you/.
Royal Society. (2012). Science as an open Enterprise. Retrieved from https://royalsociety.org/~/media/Royal_Society_Content/policy/ projects/sape/2012-06-20-SAOE.pdf
RTS Scotland Awards 2020. (2020, April 27). Royal Television Society. Retrieved from https://rts.org.uk/award/rts-scotland-awards-2020. Rudiak-Gould, P. (2013). "We have seen it with our own eyes": Why we disagree about climate change visibility. *Weather, Climate, and Society*, *5*(2), 120–132. https://doi.org/10.1175/WCAS-D-12-00034.1
Russell, M., Boulton, G., Clarke, P., Eyton, D., & Norton, J. (2010). The independent climate change E-mails review. Retrieved from http://
citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.179.2074&rep=rep1&type=pdf.
Russill, C. (2018). The "danger" of consensus messaging: Or, why to shift from skeptic-first to migration-first approaches. *Frontiers in Communication*, *3*, 37. https://doi.org/10.3389/fcomm.2018.00037
Ryghaug, M., & Skjølsvold, T. M. (2010). The global warming of climate science: Climategate and the construction of scientific facts. *International Studies in the Philosophy of Science*, *24*(3), 287–307. https://doi.org/10.1080/02698595.2010.522411
Sarewitz, D. (2000). Science and environmental policy: An excess of objectivity. In R. Frodeman (Ed.), *Earth matters: The earth sciences, philosophy, and the claims of community* (pp. 79–98). Upper Saddle River, NJ: Prentice Hall Retrieved from http://www.pdcnet.org/oom/ service?url_ver=Z39.88-2004&rft_val_fmt=&rft.imuse_id=enviroethics_2001_0023_0002_0215_0218&svc_id=info:www.pdcnet.org/collection
Shapin, S. (1988). The house of experiment in seventeenth-century England. *Isis*, *79*(3), 373–404. https://doi.org/10.1086/354773
Sharman, A. (2014). Mapping the climate sceptical blogosphere. *Global Environmental Change*, *26*, 159–170. https://doi.org/10.1016/j. gloenvcha.2014.03.003
Sharman, A., & Howarth, C. (2016). Climate stories: Why do climate scientists and sceptical voices participate in the climate debate? *Public Understanding of Science*, *22*, 826–842. https://doi.org/10.1177/0963662516632453
Sheppard, K. (2011, April 21). Climategate: What Really Happened? *Mother Jones*. Retrieved from https://www.motherjones.com/ environment/2011/04/history-of-Climategate/.
Singh, A. (2010, January 10). Pachauri in a spot as Climategate hits TERI : Latest headlines, news—India today. *India Today*. Retrieved from http://indiatoday.intoday.in/story/Pachauri+in+a+spot+as+climategate+hits+TERI/1/78466.html.
Thorpe, A. (2010). The consequences of Climategate. *Planet Earth, Autumn*, 1. https://nerc.ukri.org/latest/publications/planetearth/archive/ planet-earth-aut10/.

Trenberth, K., Somerville, R., Hayhoe, K., Benestad, R., Meehl, G., Oppenheimer, M., …, Running, S. (2012, February 1). Check with climate scientists for views on climate. *Wall Street Journal*. Retrieved from https://www.wsj.com/articles/ SB10001424052970204740904577193270727472662.

Trench, B. (2012). Scientists' blogs: Glimpses behind the scenes. In S. Rödder, M. Franzen, & P. Weingart (Eds.), *The sciences' media connection–public communication and its repercussions* (pp. 273–289). Dordrecht, The Netherlands: Springer. https://doi.org/10.1007/ 978-94-007-2085-5_14

Trexler, A., & Johns-Putra, A. (2011). Climate change in literature and literary criticism. *Wiley Interdisciplinary Reviews: Climate Change*, *2*

(2), 185–200. https://doi.org/10.1002/wcc.105

van der Sluijs, J. P., van Est, R., & Riphagen, M. (2010). Beyond consensus: Reflections from a democratic perspective on the interaction between climate politics and science. *Current Opinion in Environmental Sustainability*, *2*(5–6), 409–415. https://doi.org/10.1016/j.cosust. 2010.10.003

von Storch, H., & Allen, M. (2009). Reaffirming climate science. *Nature, News.*, *2009*, 1155. https://doi.org/10.1038/news.2009.1155

Walker, K. (2013). "Without evidence, there is no answer": Uncertainty and scientific ethos in the silent spring[s] of Rachel Carson. *Environ- mental Humanities*, *2*(1), 101–116. https://doi.org/10.1215/22011919-3610369

Walsh, L. (2010). Before Climategate: Visual strategies to integrate ethos across the "is/ought" divide in the IPCC's climate change 2007: Summary for policy makers. *Poroi*, *6*(2), 33–61.

Wang, S., Leviston, Z., Hurlstone, M., Lawrence, C., & Walker, I. (2018). Emotions predict policy support: Why it matters how people feel about climate change. *Global Environmental Change*, *50*, 25–40. https://doi.org/10.1016/j.gloenvcha.2018.03.002

Ward, B. (2011, February 14). The S word: Has the impact of 'Climategate' worn off. *New Scientist*. Retrieved from https://web.archive.org/ web/20160304032313/; https://www.newscientist.com/blogs/thesword/2011/02/has-the-impact-of-climategate.html.

Watts, J. (2018, October 8). We have 12 years to limit climate change catastrophe, warns UN. *The Guardian*. Retrieved from https://www. theguardian.com/environment/2018/oct/08/global-warming-must-not-exceed-15c-warns-landmark-un-report.

Whitmarsh, L., O'Neill, S., & Lorenzoni, I. (2013). Public engagement with climate change: What do we know and where do we go from here? *International Journal of Media & Cultural Politics*, *9*(1), 7–25.

Wynne, B. (2010). When doubt becomes a weapon. *Nature*, *466*(7305), 441–442. https://doi.org/10.1038/466441a

Citation: Raman S & Pearce W. Learning the lessons of Climategate: A cosmopolitan moment in the public life of climate science. *WIREs Climate Change*. 2020;e672. https://doi.org/10.1002/wcc.672

Funding information: Economic and Social Research Council, Grant/Award Number: ES/N002016/1