

# Disciplines, Geography, and Gender in the Framing of Climate Change

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## THE FRAMING OF CLIMATE CHANGE.

Climate change is discussed and represented—or “framed”—in many different ways, which influences both how the issue is perceived and what solutions may be proposed. In a 2007 *Science* paper, Nisbet and Mooney discuss the framing of controversies such as stem cell research, evolution of species, and global climate change. They summarize the literature to define framing as a way of organizing ideas and defining a phenomenon in order to resonate with people’s core values and assumptions. Importantly, they note that framing allows people to identify quickly what matters, who might be responsible, and what should be done.

Among the many framings of climate change (see Moser and Dilling 2007), one rather common framing is as prospective environmental catastrophe, which lately includes terms such as “tipping points” or “tipping elements.” Russill, in a 2008 *Environmental Communication* paper, found that this framing arises from (and, we would argue, is given power and legitimacy from its association with) the geosciences, but that such messages of catastrophe

are propagated and amplified by political, media, and societal circuits. Yet catastrophic framings of climate change largely ignore contributions from other types of knowledge to understanding climate change and its significance. For example, framing climate change as a result of market failure (as economists such as the United Kingdom’s Sir Nicholas Stern have done) leads to a narrative of managerial correction by “releasing the power” of the carbon markets. A very different framing of climate change might come from an ethics perspective, in which a narrative of responsibility for historical emissions demands reparations for damage caused, now and in the future. Environmental historians might frame climate change in terms of past civilizations experiencing environmental change, suggesting a narrative of longer-term continuity and social capacity to adapt to change. Hulme provides a deeper analysis of these frames, and others, in his 2009 book.

Psychologists, sociologists, and political scientists are arguing that catastrophic framings of climate change may be blocking more sustainable political pathways, more publicly motivating media reportage, and a deeper societal engagement with climate change. A 2009 study by O’Neill and Nicholson-Cole examined the effect of fear-inducing imagery and icons on climate change engagement. They demonstrate how these sorts of catastrophic framings are likely to disempower individuals, distancing them from the issue and leading to feelings of fatalism, denial, or apathy.

Turnpenny and colleagues elucidate in their 2009 paper how climate change is a “wicked” phenomenon: there are complex interdependencies, difficulties in defining the problems themselves, and difficulty in identifying and reaching consensus on solutions. These characteristics pose severe challenges for effective policy and individual action. Seemingly elegant single solutions offered through a catastrophic frame (such as calls for a globally binding mitigation agreement

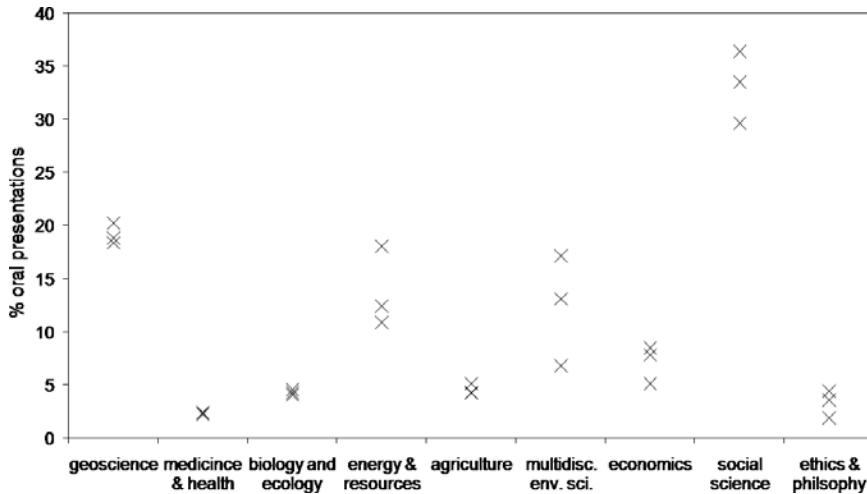
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DOI:10.1175/2010BAMS2973.1

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**FIG. 1. Percentage of oral presentations given in each of the nine domains. Crosses indicate the number of presentations coded by each analyst for each domain. This figure demonstrates substantial intercoder agreement. Some disagreement is noted in classifying oral presentations into the multidisciplinary environmental science, energy and resources, and social science domains. However, rather than detracting from the results, such disagreement strengthens our conclusions that much current climate change research is being carried out in interdisciplinary (hence difficult to classify) fields, rather than in the geosciences or in economics alone—disciplines which are most typically used to frame climate change.**

to prevent imminent environmental catastrophe) are proving elusive. Rather than advocating the selection of a particular frame, we instead suggest that multiple frames should be allowed to gain legitimacy, opening the way to multiple solutions even though with their inherent complexity they may initially be unappealing.

**AN EPISTEMOLOGICAL HIERARCHY.** There is emerging recognition that different institutions promote certain types of climate change knowledge production, while other types are marginalized—a situation we term an “epistemological hierarchy.” In a forthcoming article in *Climatic Change*, Bjurström and Polk have found evidence in the IPCC Third Assessment Report of disciplinary climate change knowledge biases toward the physical and economic sciences; and a 2007 *Environmental Science & Policy* paper by Karlson and colleagues documents a geographical North/South knowledge divide. As these authors note, promoting certain types of climate change knowledge over others has important consequences. By marginalizing certain framings of climate change—framings which may help to address the “wickedness” of climate change—fruitful political and social responses may be excluded.

To seek evidence of such an epistemological hi-

erarchy, we examined the proceedings from the Copenhagen Climate Change Congress, held in March 2009. The Congress Web site (<http://climatecongress.ku.dk>) states that the event was attended by more than 2,500 delegates from nearly 80 countries. The Congress produced six key messages (see sidebar) and claimed it was updating the findings of the IPCC Fourth Assessment Report in the lead-up to the international climate negotiations at the United Nations Climate Change Conference (COP15) in December. Here we present four key findings that emerge from analysis of the 590 abstracts detailing the oral presentations given at the Congress.

**DISCIPLINARY REPRESENTATION.** Three of the authors of this paper, all interdisciplinary climate researchers, independently classified each Congress oral presentation into a knowledge domain derived from the Journal Citation Reports (JCR) of ISI’s Web of Knowledge subject categorization, following Bjurström and Polk’s methodology. A “knowledge domain” refers to a body of knowledge that is used in one or more related scientific disciplines. For example, in the JCR, “geochemistry and geophysics,” “physical geography,” and “geology” are three of the eight subjects grouped into the “geoscience” knowledge domain. Because economics typically dominates the climate-related social sciences, we differentiated economics from other social sciences. Note that we used the *abstracts* to classify each oral presentation into a domain, *not* the presumed background of each presenter.

The Copenhagen Congress was exceptional in its disciplinary spread of papers (compared, for example, to the knowledge domains represented in the IPCC). We found contributions from diverse knowledge domains—from ethics and philosophy to the geosciences (Fig. 1). Indeed, the majority of papers were not from the geosciences. Yet the Congress secretariat chose to emphasize geosciences in

## KEY MESSAGES ARISING FROM THE CONFERENCE

### Key Message 1: Climatic Trends

Recent observations show that greenhouse gas emissions and many aspects of the climate are changing near the upper boundary of the IPCC range of projections. Many key climate indicators are already moving beyond the patterns of natural variability within which contemporary society and economy have developed and thrived. These indicators include global mean surface temperature, sea level rise, global ocean temperature, Arctic sea ice extent, ocean acidification, and extreme climatic events. With unabated emissions, many trends in climate will likely accelerate, leading to an increasing risk of abrupt or irreversible climatic shifts.

### Key Message 2: Social and Environmental Disruption

The research community provides much information to support discussions on “dangerous climate change.” Recent observations show that societies and ecosystems are highly vulnerable to even modest levels of climate change, with poor nations and communities, ecosystem services, and biodiversity particularly at risk. Temperature increases above 2°C will be difficult for contemporary societies to cope with and are likely to cause major societal and environmental disruptions through the rest of the century and beyond.

### Key Message 3: Long-Term Strategy : Global Targets and Timetables

Rapid, sustained, and effective mitigation based on coordinated global and regional action is required to avoid “dangerous climate change” regardless of how it is defined. Weaker targets for 2020 increase the risk of serious impacts, including the crossing of tipping points, and make the task of meeting 2050 targets more difficult and costly. Setting a credible long-term price for carbon and the adoption of policies that promote energy efficiency and low-carbon technologies are central to effective mitigation.

### Key Message 4: Equity Dimensions

Climate change is having, and will have, strongly differential effects on people within and between countries and regions, on this generation and future generations, and on human societies and the natural world. An effective, well-funded adaptation safety net is required for those people least capable of coping with climate change impacts, and equitable mitigation strategies are needed to protect the poor and most vulnerable. Tackling climate change should be seen as integral to the broader goals of enhancing socioeconomic development and equity throughout the world.

### Key Message 5: Inaction Is Inexcusable

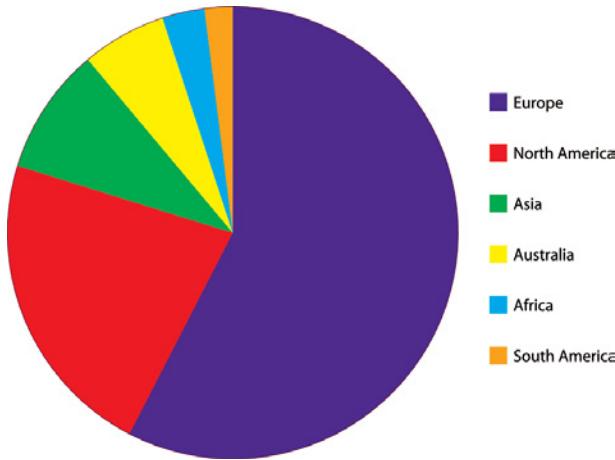
Society already has many tools and approaches—economic, technological, behavioral, and managerial—to deal effectively with the climate change challenge. If these tools are not vigorously and widely implemented, adaptation to unavoidable climate change and the societal transformation required to decarbonize economies will not be achieved. A wide range of benefits will flow from a concerted effort to achieve effective and rapid adaptation and mitigation. These include job growth in the sustainable energy sector; reductions in the health, social, economic, and environmental costs of climate change; and the repair of ecosystems and revitalization of ecosystem services.

### Key Message 6: Meeting the Challenge

If the societal transformation required to meet the climate change challenge is to be achieved, then a number of significant constraints must be overcome and critical opportunities seized. These include reducing inertia in social and economic systems; building on a growing public desire for governments to act on climate change; reducing activities that increase greenhouse gas emissions and reduce resilience (e.g., subsidies); and enabling the shifts from ineffective governance and weak institutions to innovative leadership in government, the private sector, and civil society. Linking climate change with broader sustainable consumption and production concerns, human rights issues, and democratic values is crucial for shifting societies toward more sustainable development pathways.

their media strategy and conference management, with key pre-Congress media interviews presenting geoscience research through a catastrophic framing. Much of the subsequent media reportage focused on potential future catastrophic environmental breakdown. The journal *Science* headlined their coverage

with “Projections of Climate Change Go from Bad to Worse,” while the BBC reported “‘More Bad News’ on Climate Change.” Catastrophic reporting reinforces the hierarchical preeminence of the geosciences and, conversely, the knowledge claims of the geosciences provide legitimacy and credibility to catastrophic



**Fig. 2. Geographical distribution of participants as a percentage of total oral presentations.**

framing. This serves to reinforce the message of climate change as an unfolding, almost predetermined, disaster. Hulme's 2009 book contends that one of the reasons there is inaction and disagreement on climate change is because science is not doing the job we want or expect it to do. For example, the geosciences can help narrow down the range of the climate sensitivity, but they can only partly address the social, cultural, and political questions of what constitutes dangerous climate change. On the other hand, other knowledge domains well-represented in the Congress presentations (but less so in the media reporting and key messages), such as the social sciences or ethics and philosophy, are well-equipped for this sort of enquiry.

**GEOGRAPHICAL REPRESENTATION.** Our second finding concerns the geography of knowledge. The conference proceedings listed each participant's institutional affiliation and geographical location. We used this as a first approximation for participants' nationality. While it is clear this will not represent the participant's nationality in all cases, we hypothesized that researchers who move are likely to be significantly influenced in their intellectual work by the cultural context of their employment.

While participants from 56 countries gave presentations, the geographical distribution of these contributions was very uneven, with most of the papers originating from very few countries (Fig. 2). The imposition of the English language on the Congress presentations and reporting introduces further

constraints on the geography, and representation, of knowledge.

Annex 1 countries (those that have responsibilities under the Kyoto Protocol for mitigating their greenhouse gas emissions) are considerably overrepresented, while non-Annex 1 representatives presented just 12% of all contributions. The dominant geographical origins of presented knowledge are the United States and the United Kingdom, with over half of all contributions from U.S., U.K., Dutch, or German participants. Participants from the Middle East, Africa, and South America together presented a little more than 5% of all papers. Meaningful dialogue with countries such as China and India is critically important in the debate around emissions reductions, international development, and social justice, yet participation from each of these countries was just 2%.

It is clear that the majority of climate knowledge presented at this international research conference is produced in just a few regions of the world. Yet the impacts of climate change reach worldwide, and effective climate mitigation requires collective emissions reductions. Authors such as Karlson et al. (2007) and Kadlikar and Sagar (1999) warn that scientific knowledge divisions across geographical boundaries place limits both on effective policymaking and on equitable negotiation of international agreements. Contributions from Ford, and Dugmore and colleagues in the 2009 edited collection, *Adapting to Climate Change: Thresholds, Values, Governance*, examine Inuit response to sea ice change and limits to Norse Greenland settlements, respectively. Both demonstrate the need to bring geographically and culturally nuanced knowledge about climate change into national and international discourse: if the majority of knowledge claims originate from a small proportion of nations, then that knowledge will be necessarily limited in its geographical scope and political legitimacy.

**GENDER REPRESENTATION.** Our third finding concerns the gender of the presenters. The gender of the first author from each oral presentation was recorded. In cases where we did not know the participant, the author was located online. Less than a third of oral presentations were from women. This was especially pronounced in the geosciences, where less than 20% of presentations were from women, contrasting with more than 40% within the social sciences. Sources such as Gender Climate Change ([www.genderrcc.net](http://www.genderrcc.net)) and Terry's (2009) edited collec-

tion on gender and climate emphasize the importance of gender equality in working toward more effective adaptation and mitigation strategies.

Terry (2009a) contends that to some extent, the lack of attention to gender issues in climate change reflects a more general misunderstanding of the social sciences within mainstream climate framing. She describes the mainstream framing as stereotypically “masculine” in its discourse of technological innovation, large-scale economic instruments, and climate modeling. She finds such discourses inherently gender-inequitable: for example, womens’ restricted access to resources such as land, credit, and information hinders them from playing an equitable role in climate-mitigation market instruments.

**KNOWLEDGE HIERARCHY.** Finally, the dominance of geoscience presentations on the first day of the Congress may provide further evidence of an implicit hierarchy in the knowledge domains contributing to the framing of climate change. This hierarchy is similar to that reflected in the three working groups (WG) contributing to the IPCC Assessment Reports: WG I focuses on physical science, WG II on the vulnerability of socioeconomic and natural systems, and WG III on mitigation options. This structural linearity of knowledge implies that better climate change science leads to better knowledge of potential impacts, which are prerequisites for, and will necessarily lead to, actions to reduce greenhouse gas emissions and to adapt political, social, and economic systems. Yet, as risk researchers such as Gregory and colleagues note, such linearity in moving from intellectual understanding to social change is not necessarily reflected in real-world practice. A good example of this nonlinearity between knowledge and behavior is the large carbon footprint of most climate scientists, despite their knowledge of climate change causes and effects! A myriad of psychological, social, and infrastructural barriers remain impediments to more sustainable practices in the conduct of research—even climate change research.

**CONCLUSION.** This article offers evidence that an epistemological hierarchy exists in the framing of climate change whereby the geosciences disproportionately influence the representation of climate change as primarily an environmental issue. Developed country, and male, contributions also disproportionately influence this framing. We argue that simply carrying out more physical science—

and framing climate change as an awaited future catastrophe—will not enable political leaders to win the case for large-scale, transformative social change. Climate change is a deeply contextualized and culturally situated phenomenon. Efforts to address gender and geographical equality, as well as forging closer links between the geosciences, the social sciences, and the humanities will greatly enhance links between knowledge and action and further help to address climate change.

While the IPCC Third Assessment Report attempted to include more social science research, Bjurström and Polk’s analysis found that such representation remained minimal. Erlich and Kennedy raised the idea of a “Millennium Assessment of Human Behaviour” in 2005. Their vision was for an ongoing series of transparent and open forums, modeled on the IPCC but mainly focused on the social sciences—for a “deeper consideration of the ethical dimensions of how we treat each other and our life-support systems.” The need for such an institution was reflected in several of the Copenhagen social science sessions, and is supported by us here, in a call to the IPCC Fifth Assessment Report to explicitly recognize the contribution that social science and humanities can make. Perhaps this could take form through the establishment of a fourth IPCC Working Group, “Historical, Cultural, and Social Contexts,” taking its place as the new WG I in order to provide legitimacy to a plurality of different framings of the issue *before* the physical science of climate change is assessed. Until we recognize that climate change must be understood as an ethical, cultural, and political phenomenon—even more than it is an environmental one—the chances for meaningfully addressing climate change remain low.

**ACKNOWLEDGMENTS.** The Tyndall Centre for Climate Change Research provided funding support for the lead author to attend the Copenhagen Congress. Thanks to Karen O’Brien, Jill Jäger, and Jon Barnett for useful comments on an earlier draft of the paper, and to the three anonymous reviewers and *BAMS* editors for suggestions. This version remains the responsibility of the authors.

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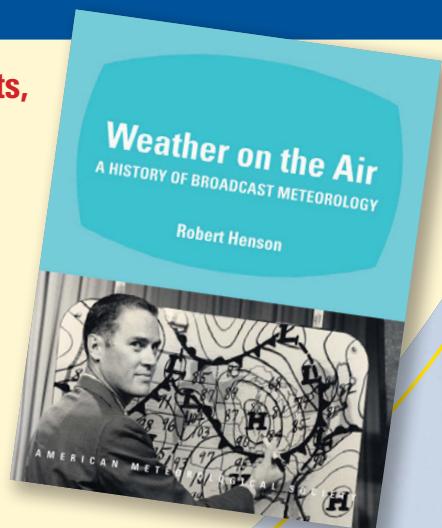
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