

“We Have Seen It with Our Own Eyes”: Why We Disagree about Climate Change Visibility

PETER RUDIAK-GOULD

Mellon Postdoctoral Fellow, Department of Anthropology, McGill University, Montreal, Quebec, Canada

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ABSTRACT

Can the phenomenon called “global climate change” be witnessed firsthand with the naked senses? The question provokes sharply divergent answers from different individuals and ideational communities. Physical scientists and experimental psychologists tend to regard climate change as inherently undetectable to the lay observer, while others, such as anthropologists, indigenous advocates, and environmentally inclined Western citizens, often claim that the phenomenon is not only visible in principle but is indeed already being seen. A third understanding of the visibility of climate change is held by some scholars who portray climate change as invisible at the outset but capable of being made visible via communication tactics such as the miner’s canary. This paper queries the motivations for and consequences of these divergent answers to a deceptively simple question, ultimately suggesting that the dispute between climate change “visibilism” and “invisibilism” is not scientific so much as political, being a proxy war for a larger debate on scientific versus lay knowledge and the role of expertise in democratic society.

1. Introduction

Is climate change visible? The question is far from straightforward, animating citizens and scholars alike and provoking sharply divergent answers from different individuals and communities:

“[N]o-one can see climate changing or feel it happening.”
—Mike Hulme, geographer (Hulme 2009, p. 196)

“Native nations of the Arctic and Subarctic are already feeling catastrophic effects of warmer temperatures, in the melting of sea ice, permafrost, and glaciers, and increases in fires, insects, flooding and drought patterns.”
—Alan Parker et al., indigenous advocates (Parker et al. 2006, p. 1)

“[P]eople do not directly experience climate change.”
—Janet Swim et al., psychologists (Swim et al. 2009, p. 17)

“The past four years of heavy rains and flash flooding here in southern Minnesota have left me worried about the future of agriculture in America’s grain belt. For some time computer models of climate change have been

predicting just these kinds of weather patterns, but seeing them unfold on our farm has been harrowing nonetheless.” —Jack Hedin, farmer (Hedin 2010)

“[Y]ou can’t actually see global warming.” —Anonymous BBC environment correspondent (quoted in Anderson 1997, p. 122)

“Islands that used to be our playgrounds have disappeared . . . Some scientists say there is no rise in sea-level but the tide is rising. We have seen it with our own eyes.”
—Koloa Talake, former Prime Minister of Tuvalu (quoted in Connell 2003, p. 98)

Not only do the answers diverge, they are stated as self-evident truths. This combination of sureness and disagreement, the existence of these “contradictory certainties” (Schwarz and Thompson 1990), hints that the question ventures beyond the empirical and touches key commitments and loyalties (see Hulme 2009). Is the question not simply one of definitions? Perhaps it all depends on what is meant by “visible” and by “climate change”: people can see *manifestations* of global warming, but not global warming itself; people can see the *impacts* of global warming, but not its causation. Or perhaps the question hinges on the spatial or temporal referent: climate change is invisible to sheltered, ecologically naïve urban Westerners but visible to ecologically savvy indigenous people, nature workers, and frontline

Corresponding author address: Dr. Peter Rudiak-Gould, Department of Anthropology, McGill University, Rm. 718, Leacock Bldg., 855 Sherbrooke St. W., Montreal, QC H3A 2T7, Canada.
E-mail: peterrg@gmail.com

communities. Climate change is invisible now, visible in the future. But these are unsatisfying answers to the question, because they do nothing to clarify why visibility or invisibility might be asserted or emphasized, by whom, based on what “prior commitments” (Jasanoff 2010, p. 240), and with what consequences. Rather than deflating the question “Is climate change visible?” or attempting to definitively answer it, I hope to explore the stakes of the question itself, a microcosm of our larger disagreement over the meaning of climate change (Hulme 2009).

No small amount of ink has been spilled over the role of visualization and sight in climate change communication and perception (see Akerlof et al. 2013; Anderson 1997, 121–123; Beck 1992; Dobrin and Morey 2009; Doyle 2007, 2009, 2011; Egan and Mullin 2012; Farbotko 2010a,b; Hamblyn 2009; Li et al. 2011; Marx et al. 2007; Orlove et al. 2008; Rudiak-Gould 2012; Sunstein 2006; Swim et al. 2009; Weber 2006), and, more generally, in environmentalism (see, in particular, Dobrin and Morey 2009). Yet, as I will explore in this article, most of these authors take either the visibility or the invisibility of climate change for granted and content themselves with exploring the consequences of this assumption. With a “visibilist” or “invisibilist” stance assumed from the beginning, there is no room to query why visibilism or invisibilism might appeal to different thinkers or communities or what worldviews and agendas they serve. In this article I advocate neither visibilism nor invisibilism but explore the ideological depths of both.

First, a few words about terminology are necessary. Although the word “visible” carries multiple meanings in the realm of climate change—and that polysemy is one of the themes of this article—generally I use the word to mean “detectible with the senses, unaided by scientific instruments or training.” It follows that visible, in my use, is quite a different thing from “visualizable,” the former referring to things *born* seeable, the latter to things *made* seeable. The distinction becomes crucial because some actors feel that climate change is visualizable but not visible; indeed, there would be no need to visualize it if it could already be seen. It should also be acknowledged that by using words like “see” and “vision” as stand-ins, or metonyms, for a whole bundle of sensory modalities, I risk committing the well-known ethnocentric error of ocularcentrism (see, e.g., Gell 1995). But given the current intellectual climate, no other word will do. Visibility and invisibility, seeing or not seeing climate change, are the terms in which the debate is manifesting, both in and out of the academy. A philosophical analysis might find proclamations on both sides to be intellectually wanting, but that is hardly the point: what concerns me here are the *motivations* and the *stakes* of these impassioned speech acts.

2. The invisibility of climate change

Although there is no predicting the opinion of an individual on the question of climate change visibility, particular stances are popular in certain ideational communities. Physical scientists tend toward staunch invisibilism (Farbotko 2010b, 225–226). It is insisted that climate change is inherently *global* (Hulme 2010, p. 272; Miller 2004) and fundamentally a phenomenon of *climate*: a statistical aggregation of long-term, precise measurements (see Ingold and Kurtila 2000, p. 187; Miller 2004; Strauss and Orlove 2003). Anthropogenic tampering with the atmosphere does not result in specific weather events but merely “loads the dice” in a stochastic system; no individual (visible) event can be attributed with certainty to climate change (Allen 2011; Doyle 2011, p. 39). Even while upbraiding scientists for their poor communication of climate change to the public—unnecessarily “speaking in code” (Hassol 2008, p. 106), overusing “weasel words” and “caveats” (Hassol 2008, p. 106), and failing to capitalize on useful metaphors—Susan Joy Hassol cannot bring herself to advise scientists to respond “yes” when a layperson asks if a particular hurricane is attributable to climate change; instead, she recommends answering that “global warming is increasing the *chances* of such events occurring” (Hassol 2008, p. 107, emphasis added). There is little room for visibilism in this conception of climate change: the gulf between brute, visible reality and climate change is crowded with arcane mathematics, high-tech measuring devices, and inhumanly large temporal and spatial scales.

Recently, there have been hints that climatologists’ invisibilism is softening. In October 2011, Oxford University climatologist Myles Allen took Al Gore to task for his sloppy attributions of visible weather events to global warming, but just nine months later, a series of hot-off-the-presses attribution studies (see Peterson et al. 2012 for a summary) inspired a volte-face: that same professor of geosystem science heartily declared that linking specific events to manmade climate change was now, in some cases, empirically justified, changing the very “climate of the climate change debate” (Allen 2012). James Hansen’s spin on these new studies was far gloomier but no less paradigm breaking in its tone: global warming is no longer prediction but reality, and its “signal is now louder than the noise of random weather” (Hansen 2012). While the writings of these opinion leaders herald a shift in the physical scientific community, the new view hardly qualifies as populist visibilism. Even Allen in his enthusiasm warns his readers that “chance remains the single dominant factor. . . For the vast majority of events, we simply don’t yet know”

whether climate change is the culprit (Allen 2012). Attribution still requires advanced statistics, regional and global weather data, and the technical mediation of climatologists; this is not yet a *carte blanche* for lay perception of climate change.

While physical scientists may no longer be able to claim a monopoly on defining and elucidating the issue of climate change, their earlier hegemony in that area has left a legacy in the popular terms used to describe the phenomenon, and those terms everywhere enforce invisibilism. “Climate change” presumes that the change is in the climate, a mathematical abstraction that is not only invisible but, in a sense, unreal. “Global warming” and “global climate change” emphasize the wide spatial reach of the phenomenon and the inadequacy of any local sighting to constitute an “observation of climate change.” The “greenhouse effect” attempts a relatable metaphor, but it does so by making the least visible link in the chain of causation a stand-in for the entire phenomenon: the heat-trapping action of greenhouse gases is a process both global and microscopic, simultaneously too small and too large to be directly seen. It is precisely the part of the phenomenon that is most unambiguously invisible, the most airy and ungrounded, as opposed to the more down-to-earth and arguably visible workings of car exhaust and coastal erosion.

Experimental psychologists have evidently cast their lot with the physical scientists. Unlike most physical scientists, experimental psychologists do show interest in lay perceptions of climate and of the issue of global climate change (Feinberg and Willer 2011; Feygina et al. 2010; Spence et al. 2011; Swim et al. 2009). Yet, rarely do experimental psychologists portray those lay perceptions as reliable or legitimate or as being anything other than the *imagined* visibility of climate change. The authors of a report by the American Psychological Association’s Task Force on the Interface Between Psychology and Global Climate Change (Swim et al. 2009) echo physical scientists when they write that “[c]limate is a statistical and thus technical concept and is described by the distributions of such variables as temperature and precipitation in a region, collected over time. The average person is rarely concerned about the climate in her region, but thinks a lot about the weather” (Swim et al. 2009, p. 22). Climate becomes abstract and therefore invisible, at least to “the average person.” The authors write (Swim et al. 2009, p. 21):

While a region’s climate and changes in its climate obviously determine its weather patterns, weather events—even extreme ones—are not necessarily diagnostic of changes in the climate. Climate change is a trend in averages and extremes of temperature, precipitation,

and other parameters that are embedded in a lot of variability, making it very difficult to identify from personal experience. People often falsely attribute unique events to climate change and also fail to detect changes in climate.

While the authors allow that “some, such as those living in Alaska, Northern Canada, and Northern Europe... are currently responding to their *direct* contact with current physical environmental impacts of climate change” (Swim et al. 2009, p. 55, emphasis added), this point is not emphasized in most of the report, which elsewhere states baldly, “people do not directly experience climate change” (Swim et al. 2009, p. 17). In an article on the influence of flood experience on attitudes toward global climate change (Spence et al. 2011), a team of three psychologists and one sociologist write that although it is “understandable” (Spence et al. 2011, p. 46) and potentially of educational value (Spence et al. 2011, p. 48) that laypeople evaluate global climate change in terms of visible weather events, it is technically inaccurate: “[c]limate change itself is not directly observable by individuals, it being a reference to average climate conditions over a long period of time rather than that observed on a daily or seasonal basis” (Spence et al. 2011, p. 46). Other researchers—not psychologists but with similar methodologies, geographical foci, and interest in cognitive biases—have made similar claims. Li et al. (2011) and Egan and Mullin (2012) emphasize that daily temperatures, though demonstrably having an influence on Americans’ and Australians’ belief in climate change, are in actuality irrelevant to its truth or falsity. The existence of more humanistic and phenomenological traditions in psychology (see, e.g., Kahn and Hasbach 2012) proves that invisibilism need not be *intrinsic* to the discipline, but for now it remains dominant. [For other examples of invisibilist statements, see, for instance, Doyle (2007, 2009, 2011), Marshall (2006), Mormont and Dasnoy (1995), and Sunstein (2006)].

Why this invisibilist stance? Standard scientific arguments for invisibilism—namely, that climate change is too big, too slow, and too uneven to be seen—are reasonable, but this by itself does not explain why physical scientists and experimental psychologists find invisibilism so plausible while certain other individuals and communities do not. In the case of physical scientists, the prior (probably unconscious) commitments that predispose the community to invisibilism are obvious. Science is founded on an Enlightenment epistemology and philosophy of mind in which human thinking is akin, I think, to Christian notions of human nature: both tremendously fallible (it falls prey to self-serving bias,

sensory illusion, habit, prejudice, authority, and tradition) and wonderfully improvable (it can transcend its fallibility given the proper effort, training, and social apparatus). In the classic formulation, Descartes finds himself deceived by his senses and prone to unjustified certitude, but ultimately achieves truth via God's goodness and his own rational cogitation. This framework, accounting for both the lure of tradition/falsehood and the achievability of modernity/truth, can easily be applied to climate change: human fallibility is the temptation to regard the weather (read: local, subjective experience), while human redemption is the effort to measure the climate (read: global, objective fact). Visibilism is the habitual illusion, invisibilism its rational replacement. Both the popularity and the falsity of visibilism are neatly accounted for.

Reinforcing this view, scientists can point to all sorts of wild misconceptions among the public regarding climate change. As a "promiscuously corroborable" (Rudiak-Gould 2012) phenomenon, climate change can become an explanation for all sorts of things (Connell 2003; Nuttall 2009; Rudiak-Gould 2012), and many of these attributions seem to the science educator to be embarrassingly misinformed. How, the argument might go, can one legitimize laypeople's "sightings" of climate change when they include such things as solar eclipses (Rudiak-Gould 2012)? How can one trust lay perceptions of climate change when the scientifically untrained conflate the ozone hole with global warming (BBC World Service Trust 2010), or think that they themselves have locally caused climate change (BBC World Service Trust 2010), or give statements such as the following (Inupiat woman quoted by Marino and Schweitzer 2009, p. 213), when asked what global warming is?

[I]t was our satellite field that has made a hole in our ozone layer and I'm pretty sure that it might be the government. As far as I understood that we have a satellite field that has a hole through the ozone layer and they turn on full satellite strength every thirteen or fourteen years to drain out some of the air pollution. . . . Or maybe if everyone could cut down on carbon monoxide.

The deficit model of science communication has come under heavy fire from anthropologists and science and technology scholars (see, e.g., Wynne 1992), but it remains little weakened in its native land of science education and is a natural ally of climate change invisibilism.

The scientific claim to authority hinges on its ability to perceive what cannot be seen: that which is too large, too small, too fast, too slow, too far in the past, too far in the future, or too contrary to everyday intuitions (see McCauley 2011). For sociologist Ulrich Beck, the modern

proliferation of invisible threats both entrenches *and undermines* the scientific monopoly on truth (Beck 1992, p. 27, 29), while media scholar Julie Doyle implies that the emergence of bottom-up, placed-based climate change knowledge is inherently at odds with the visualist epistemology of science (Doyle 2011, p. 27). But most scientists, it seems, disagree. For them, invisibilism does nothing but *flatter* their expertise: they thrive on their ability to use "the 'sensory organs' of science" (Beck 1992, p. 27; also see Wolf 1999, 275–276) to see, or perceive, what the public cannot. Given that scientists are typically socialized to regard science without politics as both desirable and achievable (see Latour 2004), they are ill-equipped to realize that invisibilism is not brute truth but a particular understanding of a complex phenomenon. For most physical scientists, it is not their framing of the phenomenon but *the phenomenon itself* that makes it outside of the layman's ken.

Visibilism is not only implausible to the physical scientist, it may also feel vaguely insulting. The idea that the phenomenon can be observed by the man on the street demeans scientists' arduous training and painstaking work and implicitly questions the financial and social capital that society grants them. Climatologists could have christened the phenomenon with the more citizen-accessible phrase "long-term weather change," and (despite protests about the crucial difference between weather and climate) this would not be an inaccurate title: "long-term" and "change" spread the word "weather" out over a period of time, rendering the climate/weather distinction moot. The phenomenon might also have been characterized as "pervasive" or "multisited" rather than "global," and again the concept would have been made more welcoming to laypeople and lay knowledge without any great sacrifice of empirical accuracy. Arguably, then, scientists' insistence on describing the phenomenon with the terms "global" and "climate" does not stem merely from a desire for terminological exactitude but from a particular political outlook in which scientific authority is central (see Miller 2004; H. A. Smith 2007).

For experimental psychologists, visibilism does not constitute such a direct challenge to prestige and authority, but many of the same prior commitments as in physical science are on the line. Having abandoned its roots in the subjective methods of introspectionism and the interpretive bent of psychoanalysis, and having shrugged or laughed off the more recent postmodern turn, mainstream experimental psychology remains strongly attached to the standard scientific epistemology. Experimental psychologists thus choose the view of climate change visibility that flatters the methodology they favor. And while physical scientists may have a

vague, general sense that the layperson is prone to cognitive frailties and mistakes, psychologists have built an entire subdiscipline around that idea. Many psychological experiments are, at base, an investigation of the difference between the stimulus as it actually is (known perfectly to the experimenter) and the stimulus as it appears (perceived imperfectly by the subject): a classic expression of the Enlightenment theory of reason competing with illusion. Such experiments give experimental psychologists many reasons to doubt the ability of informal observers to reliably perceive a phenomenon like climate change. People are insensitive to evidence that contradicts previously held beliefs (Nickerson 1998), a process that seems to be at work in the area of climate change (Borick and Rabe 2010; Kupperman 1982; Weber 1997). They overweight the importance of one-off vivid events (Tversky and Kahneman 1982) and thus underinvest in climate change (Sunstein 2006). Their attention is remarkably tunnel visioned and distractible (Simons and Chabris 1999). Their memory is biased and incomplete. Why trust the quick-and-dirty cognition of the human animal to a task as grand and subtle as tracking changes in the earth's atmospheric system? Visibilism becomes yet another cognitive bias on an already long list.

This preoccupation with bias is evident in the experimental psychology literature on climate change, much of which investigates nonrational, non-evidence-based influences on climate change attitudes. Trust in the scientific consensus on climate change is powerfully swayed by prior conviction in the justness of the world or of the dominant social system (Feinberg and Willer 2011; Feygina et al. 2010). In a series of studies particularly damning to the notion of reliable lay observations of climate change, even sitting in a heated room makes subjects more likely to think that global warming is afoot (Risen and Critcher 2011). Many studies in experimental psychology and allied fields emphasize how difficult it is for the scientifically untrained to understand the causative mechanism of climate change (Sterman 2011). In the report by the American Psychological Association's Task Force on the Interface between Psychology and Global Climate Change, a chapter on lay understandings of climate change risks focuses heavily on biases: the nonrational influence of prior expectations, finite pool of worry, future discounting, and visibilism itself. Another chapter—entitled “Which Psychological Barriers Limit Climate Change Action?”—implies throughout that climate change is self-evidently an issue on which people should act, yet various cognitive biases conspire against such action. In a psychologically oriented article arguing that public inaction on climate change stems more from a “tragedy of cognition” than

a “tragedy of the commons,” Johnson and Levin (2009) write bluntly, “In an ideal world, people would tackle major crises such as global climate change as rational actors, weighing the costs, benefits and probabilities of success of alternative policies accurately and impartially. Unfortunately, human brains are far from accurate and impartial” (see also Akerlof et al. 2013, 82–83).

Invisibilism carries significant implications. One which may be welcomed by climate educators and capacity builders is that the belief in manmade climate change does not depend on the shifting sands of local observation (an unusually hot summer one year, an unusually mild one the next year), but on the terra firma of global averages and scientific consensus. Agreement in the scientific community that human industry is heating the planet has, like global temperature itself, steadily risen, in stark contrast to the wishy-washy, weather-like vicissitudes of public opinion on the issue (Brulle et al. 2012). If climate change is invisible and if the public can be convinced of such, no longer will lay opinion follow the ups and downs of local weather (Egan and Mullin 2012; Li et al. 2011); if climate change is “only accessible... via an immense scientific, technical and institutional network” (Mormont and Dasnoy 1995, p. 49), and if the public can be convinced of such, no longer will lay opinion be at the mercy of journalistic and political whims (Brulle et al. 2012).

Less promising for climate activists (but flattering to the scientific profession), invisibilism shackles public acceptance of climate change to public trust of climatologists. In an age of “reflexive modernity” (Beck 1992) where science becomes the “unwilling target of its own methodological skepticism” (Jasanoff 2010, p. 244), such trust is not always easy to come by. Even if this obstacle can be overcome, invisibilism may doom the issue to abstraction and unrelatability. How can people find personal meaning in something they do not see, something they *cannot* see? Both reflection (Jasanoff 2010) and empirical evidence (Marx et al. 2007) indicate that statistical abstraction does little by itself to foster public concern; far less than relatable (which is often to say *local, visible*) stories (Akerlof et al. 2013). Although this human “bias” toward narrative is exactly the sort of mental habit that invisibilists would point to as proof of the inadequacy of lay thinking, even they must admit that it presents some formidable challenges to concern entrepreneurs.

Perhaps most fundamentally, invisibilism can be taken to mean that publics have little right to speak about climate change. You do not need a weatherman to know which way the wind blows, but you do need a weatherman to detect long-term changes in global wind

patterns. For Johnson and Levin (2009), science tells us to act: publics and politics just get in the way. The American Psychological Association's Task Force on the Interface between Psychology and Global Climate Change is quite explicit about this connection between invisibility and scientific authority (Swim et al. 2009, p. 22, emphasis added):

Because climate change is so hard to detect from personal experience, *it makes sense to leave this task to climate scientists*. This makes climate change a phenomenon where *people have to rely on scientific models and expert judgment*, and/or on reports in the mass media, and where their own personal experience does not provide a trustworthy way to confirm the reports.

Similarly, in an article on the (misguided) public habit of assessing the truth of climate change based on recent local weather, the authors seem dubious that laypeople can rise to the challenge of intelligently addressing such a complex issue: "This myopic focus on their immediate experience suggests that people's beliefs can be as mercurial as the weather and raises important questions about the role of labile public opinion in the formulation of policy in complex areas" (Li et al. 2011, p. 5). Climate change becomes the province of specialists, and the role of the public is limited to lending those experts the support and trust they deserve.

3. The visibility of climate change

Well-educated members of frontline indigenous communities are often outspoken visibilists. Not only is global warming visible in principle, it is currently being seen—plainly, brightly, pervasively. "Climate change" is becoming a catchall explanation for visible local changes in the low-lying island nation of Tuvalu (Connell 2003). In 2002, then Prime Minister Koloa Talake stated, "Flooding is already coming right into the middle of the islands, destroying food crops and trees, which were there when I was born sixty years ago. These things are gone. Someone has taken them and global warming is the culprit. . . . We have seen it with our own eyes." (quoted in Connell 2003, 97–98). In the Marshall Islands, all sorts of perceived changes—erosion, accelerating time, a solar eclipse—are spoken of as observable impacts of *oktak in mejatoto* (climate change), a scientific discourse of which locals have heard (Rudiak-Gould 2012; see also Marshall Islands Journal 2010); climate change becomes not just visible but *hypervisible*. The same is occurring in the Arctic, where it is becoming increasingly common for local elites to interpret and portray ecological perturbations as visible local manifestations of climate change

(Huntington et al. 2005, p. 63; Nuttall 2009; Shearer 2011).

Environmentally concerned Westerners are now joining the game. In Rudiak-Gould (2012, p. 52) I note that the terms English speakers use to designate the issue of climate change have evolved since the 1980s to allow an ever-broader spectrum of weather events to count informally as evidence: the "greenhouse effect" does not clearly refer to any meteorological event, while "global warming" allows unusual warmth to count as a visible impact, and "climate change" allows almost any sort of unusual weather, even cold, to count as a visible impact. The result of this expansion of "corroborative potential" (Rudiak-Gould 2012, p. 52) is that now even urbanites and office workers report seeing climate change. Norwegians attribute strange weather to *klimaendring* (climate change) (Norgaard 2006). Urban Canadians were quick to interpret the unseasonably mild winter of 2011/12 as a local manifestation of global warming (J. Gobby and N. Giroux 2012, personal communication). The year 2012 was a watershed for lay observation of climate change. As scientists gaped their jaws over record arctic melting and the Secretary-General of the World Meteorological Organization declared that "[c]limate change is taking place before our eyes" (Vidal 2012), the United States was hit by widespread droughts and heat waves; Americans became convinced in increasing numbers that they had been personally touched, indeed harmed, by a changing climate (Yale Project on Climate Change Communication 2012). Hurricane Sandy rounded out "the year abnormal weather became normal" (Vidal 2012). I quote an anonymous American man, when asked why he believes global warming is real: "I 'believe' what my eyes see. . . . the glaciers are melting. Entire ecosystems are disappearing. Nothing scientific about it." Numerous studies show that Western citizens are now interpreting local weather observations as visible signs of global climate change (Akerlof et al. 2013; Egan and Mullin 2012; Hamblyn 2009, p. 231; Li et al. 2011; Risen and Critcher 2011; Spence et al. 2011), a nexus of lay and scientific knowledge so tight that the line between citizens and scientists becomes blurred.

Many scholars, activists, and journalists who transmit local voices to a wider audience have few qualms in casting their lot with the visibilists. Indigenous advocate Minnie Degawan writes, "For indigenous peoples, climate change is a reality. . . . They experience the drying up of once fertile farmlands, the torrential floodwaters that inundate their soon-to-be harvested gardens, the dwindling water supply during summer and the diminishing of the fruits of the land in general" (Degawan 2008, p. 53; see also Lynas 2004; Parker et al. 2006). Sociologist and journalist Christine Shearer,

in a muckraking account of climate injustice in an Alaskan indigenous community, does not hesitate in depicting local damages as direct impacts of climate change (Shearer 2011), nor do the various scholars contributing to the edited volume *The Earth Is Faster Now: Indigenous Observations of Arctic Environmental Change* (Krupnik and Jolly 2002). The same tendency is evident in my own discipline, anthropology. With their holistic approach, anthropologists are keenly aware that climate change is just one driver out of many (Hassan 2009, p. 62), yet, in general, they have been comfortable with interpreting local reports of change straightforwardly as eyewitness accounts of climate change (but see Nuttall 2009 for a notable exception). In the seminal volume *Anthropology and Climate Change: From Encounters to Actions* (Crate and Nuttall 2009), Susan Crate and Mark Nuttall place numerous chapter studies of local observations of environmental change under the heading of climate change, thus implying visibilism. More generally, the discipline's tendency to emphasize studies of climate impact *observation* over studies of climate science reception, education, and communication (Rudiak-Gould 2011) betrays the same conviction that climate change must be perceptible without scientific savvy. [For other examples see Byg and Salick (2009), Petheram et al. (2010), and W. D. Smith (2007).]

Why might these particular communities favor visibilism? The indigenous movement grew up in large part as an opposition to the hegemonic, assimilative reach of the state (Niezen 2003), and part of the perceived apparatus of centralized control is the universalizing agenda of science. Scientists of various stripes are accused of a long history of colonial collaboration and insensitive intervention in local affairs. If indigenous advocates care about climate change (and they often do, given its disproportionate impact on indigenous communities) *and* are chary of science, then they have little choice but to portray climate change as detectible to the untrained eye. The idea that laypeople could possess such perceptiveness is upheld by another agenda item for indigenous leaders and advocates, the vindication and defense of local knowledge (Simpson 2004). Ecological hyperperceptiveness is now prominent on the list of celebrated indigenous traits. The indigenous person is "still hearing and obeying the heartbeats of the Earth itself," writes a Sami scholar (Gaski 1997, p. 24). For indigenous people, "even tiny changes in water cycles, wildlife, soil, and weather are readily apparent," writes an indigenous advocate (Cherrington 2008). "The slightest changes in the environment tell them when something goes wrong," reports an anthropologist of the Quechua people (Bolin 2009, p. 232).

Crate (2008, p. 582) says of the native Siberian people she studies: "Viliui Sakha elders' testimonies of the local effects of global climate change reveal no debate about whether climate change is occurring. Like most indigenous peoples they are, by default, ethnoclimatologists." For these thinkers, while the "global" in global climate change may not be visible, the "climate" certainly is. For scientists, the place attachment of indigenous communities is among the factors making it impossible to detect the broad-based abstraction that is climate. For indigenous advocates, precisely the opposite is true. A lifetime of experience in one place [and many lifetimes' worth of oral history (Bolin 2009, p. 232)] makes climate, and climatic change, readily apparent; this is the "generational" level of climate observation described by Strauss and Orlove (2003). Lay expertise and climate change visibilism become as conceptually plausible and ideologically imperative to indigenous advocates as their opposites become to most physical scientists.

Anthropology is at times perceived (even by its own practitioners) to be a contemporary or historical arm of the colonial project, but much of the discipline is now passionately postcolonial and many of its members are close allies of the indigenous movement. In recent decades anthropologists have developed a set of ethical, epistemological, and ontological preferences that suit this political outlook: bottom-up over top-down solutions, diversity over uniformity, detailed concreteness over generalized abstractness, and local intimacy over global detachment (Ingold 2008). Anthropology has also developed a cautiousness toward science as both an oppressive practice and a problematic methodology inimical to its own. Many anthropologists therefore tend to downplay the necessity of science for tackling the climate crisis. If even the scientifically untrained realize that the impacts stem from people's dysfunctional relationship with the earth (see, e.g., Crate 2008; W. D. Smith 2007), then the scientific discovery of the greenhouse effect is simply redundant. If "global climate change—its causes, effects, and amelioration—is intimately and ultimately about culture" (Crate 2008, p. 570), then the scientific search for a technological solution is unnecessary and fatally distracting. [Science, after all, bears part of the blame for creating the climate crisis in the first place (Doyle 2011, 19–20).] If adaptation is best served by the revitalization and deployment of local ecological knowledge (Bolin 2009), then science will only get in the way. And if climate change is *visible* to the untrained eye (or the locally trained eye), then scientific detection merely serves to render the threat abstract and unrelatable (Marx et al. 2007). In this line of reasoning, visibilism becomes part of the decentering

agenda of postmodern, postcolonial anthropology (Geertz 1984).¹

Visibilism has some obvious practical benefits for raising awareness. If climate change is plainly evident without need for expert interpretation, then it is definitely occurring: “if it can be seen then it must be real” (see Doyle 2011, p. 4, 22; Doyle 2007, 130–131). The thorny issue of public distrust of scientists is rendered moot. The threat, touching us here and now, is lent visceral urgency (Doyle 2007). The fatal obstacle that is future discounting becomes irrelevant. But climate change communicators may be less sanguine about other consequences of *visibilism*. Encouraging overattribution (Connell 2003; Nuttall 2009; Rudiak-Gould 2012), *visibilism* may stoke buck passing and conveniently ignore history and power: it was climate change that caused this erosion, not the colonial legacies that left the shoreline treeless. *Visibilism* also plays into the hands of ideological climate contrarians in a number of ways. First, by implying that scientific consensus is not enough to establish that the planet is in a climate crisis, it can only help the “merchants of doubt” (Oreskes and Conway 2010) who prey on public distrust of experts. Second, *visibilism* creates a problematic new zeitgeist in which global warming can be both confirmed *and refuted* in one’s backyard. Britain’s 2009/10 winter, its coldest in 31 years, seems to have done more to damage the U.K. public’s acceptance of climate change than the Climategate scandal that preceded it (see Barasi 2010). In the United States, four out of five climate change disbelievers cite their own weather observations as the reason for their skepticism (Borick and Rabe 2010). Some publics have thus twisted *visibilism* into a rhetorical weapon *against* the reality of climate change; *visibilism* straddles the divide between climate change believers and skeptics, who find themselves at odds over evidence but not over

epistemology. Thirdly, *visibilism* encourages empirically dubious links between local weather and global climate, thus delivering ready examples of sloppy attributions into the eager hands of climate contrarians. Examples are rife in the blogosphere, such as the blogger Porter Good, who attacks an alleged causal link between global warming and coastal erosion in the Marshall Islands on the grounds that erosion would naturally have occurred in any case. His use of *visibilism*, too, is conspicuous: “Meanwhile, South Florida is bracing for record low temperatures, Ft. Lauderdale broke theirs, and cold weather homeless shelters opened early” (Good 2010). *Visibilism* gives climate change skeptics a virtually unlimited body of expert witnesses to testify against climate change; as the ranks of scientifically credentialed climate change skeptics dwindle, publics can be called to testify in their stead.

Whether *visibilism* is ultimately a positive or negative prospect for awareness raising, its most fundamental and consequential effect is to give nonscientists the right to speak about climate change. One might say that to be heard, you must be able to see. *Visibilism* precipitates “a momentous demonopolization of scientific knowledge claims” (Beck 1992, p. 156) about the climate crisis. The sensory modality of sight is often associated in the critical literature with quite the opposite of this demonopolization (for a summary, see Escobar 1999, p. 6). The gaze objectifies and dehumanizes, the privileging of vision marginalizes non-Western sensory regimes (Gell 1995), panopticism enforces compliance, “seeing like a state” erases local distinctiveness and autonomy (Scott 1998), and visualism and visual mapping are keystones of scientific domination of nature and erasure of place (Doyle 2011). What is rarely mentioned, and what a consideration of climate change *visibilism* reveals, is that there is also something profoundly democratic and egalitarian about sight. Few people possess scientific credentials, but nearly everyone has a working pair of eyes. Especially if one understands the word “see” as shorthand for sensation in general, for perception unaided by scientific instruments (see Wolf 1999, 275–276), then every human being, even the blind, can see. Expertise is decentered: either that, or center and periphery switch places, and now it is the place-based citizens, with their finely honed senses, who are trustworthy and the place-eradicating scientists who are suspect. The idea that climate change visibility puts ordinary people in the same league as, or a higher league than, scientists is explicitly invoked by indigenist activists, who sometimes claim that indigenous people are *better* at detecting climate change than climatologists themselves. “Using traditional ecological knowledge, [indigenous people] are describing today the same drastic shifts in

¹ The work of media studies scholar Julie Doyle provides an interesting counterpoint. Doyle shares with critical anthropologists a post-Enlightenment outlook and theoretical toolkit, yet departs from most anthropologists by arguing for a kind of climate change *invisibilism* and against the *visibilism* of climate change communicators such as Greenpeace (Doyle 2007, 2009, 2011). Inspired by a critical visual studies literature that repudiates Western and scientific visualism (see Escobar 1999, p. 6), Doyle overlooks the liberation and decentering that may also result from visuality. Drawing on the same literature, geographer Carol Farbotko characterizes the Tuvaluan case as an unalloyed example of visualism as hegemonic oppression, the “ecocolonial gaze” (Farbotko 2010a, p. 58) turned onto a “sinking island nation.” Neglected in this assessment is the way in which this “mythology of visual graspability” (Farbotko 2010a, p. 55) is invoked by Tuvaluans themselves to assert their right to speak about climate change and to resist the scientific skepticism that challenges their claim to vulnerability (see Connell 2003).

the environment that Western scientists had predicted would occur in the future” (Parker et al. 2006, p. 1). “While the scientific consensus on the impacts of climate change on vulnerable regions like the Arctic and SIDS [Small Island Developing States] has been building over the last few years, people who live there have long observed environmental changes” (Crump 2008, p. 26). “Because of our [Sami] traditional knowledge, we knew about climate change before the scientists got involved... They would not listen to us because they said our conclusions were only based on traditional knowledge; it was not science. Now they listen. . .” (quoted in Ahren 2008, p. 19). Reflecting on the Tuvaluan use of firsthand observation to contest scientific claims of a lack of local sea level rise (an unusual case in which scientists were perceived to be the climate change *skeptics*), John Connell writes: “The messenger was to be firmly put in place. Distant science was no match for local knowledge and visual evidence” (Connell 2003, p. 98). Climate change visibilism turns sight, long considered a cudgel of the powerful, into a “weapon of the weak” (Scott 1987).

4. Invisible climate change made visible

There is an alternative to the climate change visibilism/invisibilism dichotomy, a position that could be called “constructive visibilism.” Climate change is neither inherently invisible nor inherently visible; it is, like all other objects (Goodwin 1994), *made* visible. Climate change, after all, is a slippery concept, encompassing origins, causation, present impacts, possible effects, and a host of related issues (Rudiak-Gould 2012, p. 52); by declaring certain events to be “part of climate change,” we are changing the term’s definition and thus (tautologically) proving our statement. In the introduction to an edited volume on glacial retreat, Ben Orlove, Ellen Wiegandt, and Brian Luckman make much of the fact that glaciers are visible (Orlove et al. 2008, p. 5):

As large, slow-moving objects, glaciers can be directly seen. Though this point may seem so obvious that it does not merit being mentioned, it is quite significant. There are many other environmental concerns that involve entities that cannot be seen by the naked human eye. One cannot gaze up into the sky and tell whether ozone thinning has taken place, nor can one feel whether one is exposed to harmful levels of radioactivity. Genetically modified crops cannot be distinguished from other crops simply by looking at them. However, a person who returns to a glacier after an absence of several decades or who compares photographs of it taken at different times can easily note glacier retreat.

They continue: “If the world does address the great challenge of global warming, it will be in part because of

the way that glaciers serve as icons to *make this challenge visible*” (Orlove et al. 2008, p. 17, emphasis added). Richard Hamblyn writes more generally of climate change “canaries”: “individualized instances of warning signs or wake-up calls, that alert us to the presence of wider perils,” (Hamblyn 2009, p. 230) whose role is “to *render global warming visible*” (Hamblyn 2009, p. 231, emphasis added). Similarly, Marx et al. (2007) call for the translation of the (unseeable) realm of climatological abstraction into the (seeable) realm of local narratives. Such an approach to climate change visibility is implicit in many awareness-raising campaigns, such as Greenpeace’s use of imagery (Doyle 2007), the World Wide Fund for Nature’s Climate Witness program, and 350.org’s recent Climate Impacts Day, which sought to “‘connect the dots’ between [visible] extreme weather and [invisible] climate change” (Henn 2012).

A popular variety of constructive visibilism hinges on the understanding that climate change is visible to frontline communities but invisible to sheltered urbanites and Westerners; so climate change can be made visible to the ecologically oblivious through the teleportation of frontline images and testimonials. If Londoners do not care about climate change, bring them photographs of a melting Arctic (Borick and Rabe 2010), show them documentaries of a sinking Tuvalu (Farbotko 2010a,b), or broadcast to them local voices from an eroding Alaskan island (Shearer 2011). Whether this constitutes the “seeing” of climate change or some sort of vicarious, mediated process (Doyle 2007) is unclear, but in either case, a particular, and crucial, middleman has been eliminated: the scientist. In another brand of constructive visibilism, experts regain their privileged role as mediators: climate change must be rendered seeable by packaging mathematical simulations of future climate impacts into computerized imagery for public consumption—the “subjunctive documentary” (Wolf 1999).

For all its popularity, constructive visibilism can end up as the worst of both worlds. Frontline visibilists will not be pleased to hear that they experience climate change only because they (or we) think they do. Nor will constructive visibilism appeal to those who feel that social consensus, far from allowing climate change to be seen, has in fact made us blind to it (Norgaard 2006). Invisibilists, meanwhile, will balk at the suggestion that, in principle, *anything* can be counted as “an impact of climate change.” Critical scholars have also pointed out that pressganging foreign communities into the role of visible “climate change canaries” has a host of troubling consequences. It “burden[s] these sites with providing proof” (Farbotko 2010a, p. 47) of climate change, making them expendable (Farbotko 2010a, p. 54) and precipitating

a perverse impatience for them to finally sink or otherwise be destroyed (Farbotko 2010a,b). It encourages in frontline communities a disempowering self-perception of hopeless, inherent vulnerability (Barnett and Campbell 2010). It feeds Western audiences the comforting fantasy that climate change, and climatic vulnerability, are safely distant from their own communities (Farbotko 2005).

These liabilities notwithstanding, constructive visibilism is attractive at least on the surface for its compromise between an anti-intellectual visibilism and an elitist, undemocratic invisibilism. Both scientists and citizens are needed; both can help the other see climate change, and the trick is to translate between the two (Jasanoff 2010; Marx et al. 2007). One might foresee the emergence of a citizen science of climate change that muddies the line between lay and expert, TEK² and high-tech, visibilism and invisibilism; already, frontline communities are drawing creatively from both local observation and scientific education to interpret and respond to climatic perturbation (Rudiak-Gould 2011). Sensory experience on the ground breathes life and urgency into desiccated expert assessments, while scientific generality serves to unite disparate communities around the travelable concept of climate change and methodological skepticism provides a cautionary counterpoint to overexuberant local attribution. If recent scientific advances in climate change attribution are able to convince hard-nosed empiricists like Myles Allen to verge on a kind of cautious, incipient visibilism, then the time may be at hand when invisibilist experts and visibilist publics can join hands. That will be a consummation devoutly to be wished for, but it is still a tentative development in an intellectual landscape dominated by difference.

5. Conclusions

As I have shown, the visibility of climate change is partly an empirical question of just how dramatically humans have tampered with the atmosphere; partly an instrumental question of how best to communicate anthropogenic global warming to the public; and partly a moral, political, and epistemological interrogation of the value and role of scientific expertise in democratic society. The resulting debate distills many of the tensions in climate change discourse and, more generally, environmentalism: Should science be seen as the perpetrator, or as the savior? Is large government the problem, or the solution? To ask if climate change is visible is implicitly to ask who we ought to trust and what

sort of “civic epistemology” (Jasanoff 2005) is needed to guide us through an era of “global, elusive hazards” (Kasperson and Kasperson 2005). The same commitments are on the line when one asks about the visibility of other complex, wide-ranging threats. Can an individual’s “weather-like” experience of losing a job or a house count as “an impact of the Global Financial Crisis”? Or is a recession an abstract mathematical construct, economic climate change, about which only economists can authoritatively speak? Can radioactive fallout be plainly seen in birth defects and cancer, no matter what the experts may say (Barker 2004)? Or is it inherently invisible, necessitating the scientist’s Geiger counter, merely loading the dice in the sweepstakes of health, requiring a presumption of nonexistence until proven otherwise (Beck 1992)? The question is far from academic (see Monbiot 2011).

Ultimately, I think, the visibilism/invisibilism debate boils down to an old tension in democratic theory and practice, the dilemma between two seemingly unacceptable positions: that scientists ought to have authority to speak over citizens, and that citizens can be trusted to make informed decisions about complex technical issues of which they have little understanding. This article does not claim to have any novel suggestion for resolving this dilemma. Even the “centrist” view that climate change can be *made* visible may be, as I have argued, problematic. But I do hope to have shown that the seemingly simple question is an ideological bombshell in disguise. It is a small skirmish in a larger battle, old wine in a new bottle. Some might still insist that the question is only a word game. Even if so, it is a word game we are now playing in earnest, and who wins that game, when, where, and how, will have far-reaching consequences. Scholars of many disciplines would do well to document, and at times to intervene in, this ongoing ideological proxy war.

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² Traditional ecological knowledge.

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