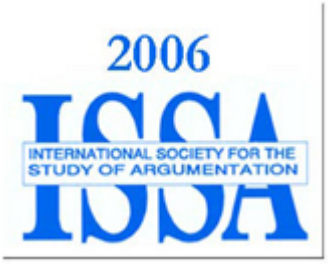
ISSA Proceedings 2006 – Cinematic Arguments: The Efficacy Of The Day After Tomorrow In Public Arguments On Global Warming



1. *Introduction: Science Fictions and Public Understandings of Science*

The proposition that science fiction films play a role in shaping public discussions and understandings of science receives limited academic attention (Frank, 2003; Kirby, 2000, 2003a, 2003b; Vieth, 2001). Although science fiction films do succeed as texts that open intellectual space to consider the philosophical, cultural, and ethical dimensions of scientific and technological advancements (Aldridge, 1983; Kuhn, 1999, 2000; Stork, 1997; Suvin, 1979, 1988), popular science fiction films rarely are embraced by the scientific community for advancing a particular scientific argument. More often, scientists identify fictional films as irresponsible and inaccurate depictions of science that frustrate efforts to educate lay publics on the value of "real" scientific knowledge and, in an effort to stem the risk of public confusion, occupy the role of epistemic gatekeepers who parse out the science fact from the science fiction (Corbett & Durfee, 2004; Lewenstein, 1995; Nelkin, 1987; Silverstone, 1991; Wynne, 1995).

The scientific commentary on the global warming disaster film, *The Day After Tomorrow*, however, marks a departure from the rhetorical practice of just isolating science fact from science fiction as a way to promote proper scientific knowledge. Instead, scientific interlocutors commenting on the film craft a rhetorical space where obscuring the distinctions between "real" global warming science and its fictional representations functions as an argumentative commonplace to endorse a specific scientific argument. Despite substantial evidentiary support, the scientific arguments for combating global warming that circulate in public spheres often lose persuasive force when juxtaposed against skeptical arguments that identify shortcomings in global warming science and the

potential economic risks associated with efforts to address global warming. Consequently, scientists and advocates spreading the word about climate change encounter a number of rhetorical difficulties, including how to communicate the dangers of global warming in ways that are both scientifically valid and effectively dramatic.

I argue that the public scientific discourse surrounding *The Day After Tomorrow* highlights a paradoxical rhetorical practice that mobilizes a patently fictional film as a *topos* for promoting a scientifically grounded argument in an effort to elucidate the dangers of global warming. I argue this rhetorical move functions as a form of oppositional argumentation that challenges the norms of public scientific discourse. In addition to using the blockbuster as an opportunity to focus public attention on global warming, scientific interlocutors employ the film's visual potency and pointed political commentary to buttress scientific arguments that illustrate the dangers of global warming. This paper illustrates how the scientific discourse on *The Day After Tomorrow* blurs the distinctions between fact and fiction to bolster arguments on global warming by first, examining the rhetorical difficulties inherent in public debates on climate change, and second, exploring the potential for oppositional arguments to alter the norms of public discussions of global warming.

2. *The Day After Tomorrow and the Public Debate on Global Warming*

In the weeks prior to its 2004 Memorial Day weekend release, *The Day After Tomorrow* became enveloped in a sustained public scientific discourse on global warming where scientific interlocutors capitalized on the opportunity to educate publics on the "reality" of global warming (Bridges, 2004; Coren, 2004). In addition to numerous newspaper articles and television specials, the National Resource Defense Council, Greenpeace, the Environmental Literacy Council, the Union of Concerned Scientists, National Snow and Ice Data Center, the Energy Future Coalition, and the Woods Hole Oceanographic Institution all created websites to answer questions about the science in the film and the reality of global warming. Each website employed a variety of images and quotes from the film throughout its website, highlighting the various dangers of global warming (Griscom, 2004). On the days leading up to the film's release, many major newspapers featured stories on the global warming debate that used *The Day After Tomorrow* as a qualified attention-getting device designed to spur informed public debate on global warming (Bowles, 2004; Hager, 2004; Munoz, 2004; Sennott, 2004; Vancheri, 2004). Gretchen Cook-Anderson, a National Aeronautics

and Space Administration (NASA) spokeswoman, notes "Whether its premise is valid or not, or possible or not, the very fact it's about climate change could help to spur debate and dialogue" (qtd. in Barollier, 2004). Likewise, Geochemist Michael Molitor suggests that the movie "is going to do more for the issue of climate change than anything I've done in my whole life" (qtd in. Booth, 2004). Wallace Broecker, the earth scientist who first identified the link between ocean currents and abrupt climate shifts, believes the film is "wolf-crying science," but he concedes that no researcher will turn down "an opening to get our message out" (qtd. in Dayton, 2004).

As these quotes illustrate, using the film as a topos for educating and motivating non-scientific publics on global warming efforts invites a serious problematic. While the film is a visually stunning text that focuses public attention on global warming, its depiction of climate change lacks degrees of scientific fidelity. This presents a troubling double bind for scientists using the film as a tool to promote public action against global warming. On one hand, the film boasts dramatic visuals and a clear scientific and political message that presents advocates with an opportunity to bring attention to a significant scientific and political issue. Unlike the exposure available to various scientific institutions and environmental activists groups, the considerable marketing budget and countless news articles examining the scientific fidelity of the film brought heightened public attention to various global warming issues previously unavailable to such advocates.
On the other hand, the film depicts the progression of global warming in a scientifically suspect manner. In a matter of days, the Earth is subject to global super-storms that lead to rapid sea-level rise, ultra-violent weather conditions, and flash-freezing. While the film highlights some credible depictions of the potential, long-term impacts of global warming, its description of such an environmental disaster opens scientists and environmental activists to the well-worn criticisms of alarmism levied by many skeptics. This Faustian bargain presents a rhetorical challenge for many scientists and environmental advocates to simultaneously generate public interest on global warming while maintaining a level of scientific credibility.

The rhetorical difficulties of transmitting technical discourses into non-technical public spheres often complicates public policy deliberations (Farrell & Goodnight, 1981), and this double bind becomes even more challenging when we consider the inherent difficulties in rendering climate science understandable to non-

scientific audiences. The technical sophistication of climate science coupled with the inherent complexity and countless variables of the global atmosphere increases the difficulty to communicate the causes and effects of warming to lay publics. Despite an overwhelming scientific consensus that human-induced global warming is real and presents the possibility of devastating consequences (IPCC, 2001), the multiplicity of stasis points in the global warming debate provides skeptics ample opportunity to undercut the persuasive force of consensual scientific evidence (O'Donnell, 2000).

Even within the scientific consensus, there are methodological, evidentiary, and interpretative disagreements over the rate and effect of global warming. And as scientists guided by the accepted discursive and epistemological scientific community standards, there is recognition that global warming science possesses degrees of uncertainty. Given the preference for scientific "certainty" before the installation of expensive and drastic policy actions, the skeptical argument prospers by rhetorically exploiting evidentiary or methodological discrepancies or shortcomings as illustrative of scientific uncertainty. By casting enough doubt on public descriptions of warming science, skeptics thwart meaningful policy changes designed to curb global warming in favor of maintaining the *status quo* and calling for more conclusive research before dramatic changes in public policy. The rhetorical posture of generating sufficient doubt on the science, regardless of the certainty within the scientific community, carries a persuasive force that discourages action against global warming, especially when such actions are juxtaposed to economic sacrifices for the American consumer. In other words, if the "certain" disadvantages of the policy changes necessary to curb global warming invite greater risk than the advantages of acting on an "uncertain" science, then there exists no pressing need for policy change.

These skeptical arguments are magnified further in non-scientific public spheres by the norms inherent to the journalistic community. The journalistic norms of objectivity and balanced reporting often run counter to accurately representing the near consensus on the dangers of human-induced global warming. Such norms predispose journalists to cover both sides on any global warming story: a scientist and a skeptic. As a result, the credibility of the skeptical arguments becomes amplified within various non-scientific public spheres beyond their credibility within various scientific communities, thus creating a public image of a scientific controversy where one does not truly exist (Boykoff & Boykoff, 2004). All together, these rhetorical challenges create a discursive climate that increases difficulties for scientists and activists to mobilize public support for addressing

global warming.

The wealth of scientific evidence suggests that warming is occurring and it is human-induced, and yet inaction is commonplace. Therefore, mere adjudication of the "facts" yield little results. The rhetorical strategy of "piling up" scientific facts does not guarantee publics understand climate science or that they would be sympathetic to such claims. As Gregory and Miller (1998) argue, such education efforts do little to enhance publics' appreciation, let alone understanding, of scientific issues. Gregory and Miller suggest that:
While facts may be interesting and no bad thing in themselves, knowledge of facts does not imply an understanding of their significance or implications, nor of their place in the wider scheme of science. More important, knowing the facts is often little help to citizens who are trying to come to terms with contemporary issues in science (Gregory & Miller, 1998 p. 90).

Because the contextualization of scientific facts is required for publics to understand the tangible implications of such scientific information, the interlocutors better equipped to rhetorically link scientific arguments with concrete implications often find greater sympathies from non-scientific publics. The rhetorical construction of global warming science by skeptics as insufficient to justify action coupled with claims of alarmism and immediate economic devastation enables a compelling discursive move that is difficult to counter with scientific evidence alone. Given the prospects of the devastating effects of unchecked global warming, scientists push for timely action, even if there is limited scientific uncertainty on the speed and consequences of global warming. This leaves rhetors advocating efforts to combat global warming with rather limited rhetorical options that simultaneously goad publics into action and skirts charges of alarmism. In other words, rhetors are searching for rhetorical devices that illustrate the tangible consequences of global warming that counter the persuasive force of economic sacrifices. I suggest that the use of *The Day After Tomorrow* in the public scientific discourse on global warming as a form of oppositional argumentation that expands the rhetorical landscape by altering the norms of acceptable public scientific argumentation.

3. *Global Warming and the Norms of Public Scientific Discourse*
Argumentative norms serve an important role for rhetors and audiences to produce, understand, and adjudicate competing discourses. However, these norms can militate against the development of inventive discourses that can

impact public controversies (Olson & Goodnight, 1994). These communicative norms function to legitimize hegemonic discourses by rendering arguments that fail to conform to such norms as inefficacious to the public conversation (Goodnight, 1992; Habermas, 1987). Consequently, rhetors must make use of oppositional arguments that utilize alternative persuasive techniques that do not conform to the accepted, and debilitating, norms and, in turn, capitalize on discursive opportunities that exist beyond deliberative spheres.

Kathryn Olson and G. Thomas Goodnight (1994), in their investigation of the rhetoric of the anti-fur controversy, posit that the use of oppositional arguments in social controversies function to alter both the content and norms of a given debate. They describe a social controversy as "an extended rhetorical engagement that critiques, resituates, and develops communication practices bridging the public and personal spheres." Further explaining that "social controversy occupies the pluralistic boundaries of democracy and flourishes at those sites of struggle where arguers criticize and invent alternatives to establish social conventions and sanctioned norms of communication" (249). As a result, a social controversy can center on a number of contestations of power and access to all points of the deliberative process. They note that traditional understandings of public sphere arguments assume a "more or less consensual vocabulary" shared by all interlocutors. Equal access to those discourses is not always available. This rhetorical effort is compounded when we consider how scientific discourses function to exclude non-scientists from the public discussions.

Alternative modes of rhetorical address, such as non-discursive modes of communication emerge to shake up calcified argumentative norms and expand possibilities for persuasion. In their analysis of anti-fur protest rhetoric, Olson and Goodnight argue that protesters employ persuasive tactics that are not illustrative of straightforward deliberative rhetoric. Instead, the protesters utilized dramatic visual and emotive rhetorical techniques that shifted the focus away from 'rational,' discursively based norms of acceptable argumentation. By incorporating arguments not traditionally associated with rational, deliberative rhetorics, the anti-fur protestors introduce arguments that possess a rhetorical force not grounded in the discursive practices established by hegemonic discourses.

Specialized spheres, where scientific argumentation and technological reasoning constitute the norms of acceptable argumentation, often militate against non-traditional, or non-scientific, rhetorics, as evidenced by the rhetoric of

demarcation literature (Gieryn, 1999; Taylor, 1996). However, as scientific discourses migrate into public spheres where deliberation implicates issues that transcend narrow technological considerations, the opportunities for deployment of non-traditional forms of argument become more numerous. As Olson and Goodnight suggest, when rhetors employ non-traditional forms of argument that are particularly appealing to broad audiences, their rhetorical performances rearticulate the landscape of acceptable argument within deliberative spheres, even if they are not, in this case, appropriately scientific.

Olson and Goodnight suggest that social controversy "challenges the parameters of public discussion by extending argumentative engagements to the less-consensually based cultural and social regions of oppositional argument" (250). They contend that oppositional arguments work beyond the traditional norms of persuasive argumentation by challenging the enthymematic qualities of discursive argumentation that establishes reasonability that informs persuasion. In the case of global warming debates, creating enough uncertainty ensures that presumption remains with the *status quo*, especially when we consider the enthymematic force and historical success of economic arguments over abstract environmental concerns. Scientists, both those in the majority as well as the skeptics, champion Mertonian norms that privilege disinterestedness and skepticism, however, when these debates play out in public spheres, the skeptics mobilize these norms to undercut the rhetorical validity of the global warming arguments. Skeptics employ a rhetoric of sobering distance and doubt, arguing that scientists are utilizing fear tactics when describing the dangers of global warming, a rather unscientific discursive practice (McCright & Dunlap, 2000).

4. *The Heated Scientific Reponses to The Day After Tomorrow*

The very basic scientific premise of *The Day After Tomorrow* is based upon accepted science, despite the outlandish display of rapid climate change. In addition to the scientific studies that suggest the existence of human caused global warming, there are numerous theories that predict global warming would disrupt the oceanic cycle resulting in varying levels of climatic disruption (Broecker, 2003; Ton, 2004; Weaver & Hillaire-Marcel, 2004). Furthermore, there exists scientific evidence that suggests the possibility of abrupt (measured in decades as opposed to weeks, as depicted in the film) and destabilizing climate change (Alley *et al*., 2003; Calvin, 1998).

Although these scientific theories advance low-probability, high impact global warming scenarios, they receive serious government attention. An October 2003

Department of Defense report suggests that because of the scientific possibility of rapid climate change and the onset of a new ice age, the United States must take active measures to prepare for any risks associated with such climate shifts (Schwartz & Randall, 2003). The authors, who are actually employees of oil companies, argue that the rapid onset of a new ice age would spark resources wars and massive refugee migrations that the government is ill-equipped to handle. The media and the advertising campaign for the film were quick to recognize the parallels between an official government report and the events depicted in the movie (Whipple, 2004).

Even though these theories posit low-probability, high-impact global warming scenarios, they are important to consider because their effects would be both devastating and irreversible. Although abrupt climate change theories do not fall within the scientific mainstream, these scenarios are more dramatic and compelling. They are also most subject to criticisms of alarmism because of their low probability. The invocation of such dramatic theories might heighten awareness, but they are also criticized as the least scientific.

The Day After Tomorrow demonstrates a scenario where narrative conventions of a big-budget Hollywood disaster film conflict with the scientific message the movie attempts to articulate. That Hollywood takes artistic license with facts to spin a compelling yarn is an obvious and banal observation. However, dramatizing the effects of global warming is an important rhetorical strategy for encouraging publics to act now to curb such a threat (Nisbet, 2004). The extent to which these dramatic liberties indict the more factual elements articulates the central rhetorical dilemma for those invoking the film to increase attention to global warming. The stunning visuals may present an opportunity to depict the dangers of global warming, but the seeds to its rhetorical ineffectiveness are inherent. However, merely correcting "the science" in a film overlooks and even undermines its possible contribution to public discourses on science.

In the case of *The Day After Tomorrow*, scientists are careful not to dismiss the film *carte blanche* as wholly fictitious, placing aspects of the film on a fact versus fiction spectrum that concedes that some aspects of the film reflect scientific fact. Within this fact versus fiction idiom, rhetors are careful to identify how the film reflects some scientific accuracy. For example, climate expert Tom Prugh, in an interview with National Geographic on the scientific fidelity of *The Day After Tomorrow*, answers the question "how realistic is this movie?" by noting, "it has a

kernel of truth, although it has been 'Hollywoodized.' There is evidence that abrupt climate change has happened a couple of times in the last 13,000 years, but it's never happened in a few days, as it does in the movie. That's completely impossible." Prugh's comment begins with a relatively positive appraisal of film before conceding its fictional elements. Prugh completes the interview with an endorsement of the film: "I would urge people to go see the movie. I thought it was a lot of fun. I would also urge them to drive to the movie theater together with a few friends [to conserve gas an put less exhaust into the atmosphere] and turn out all the lights in the house before they leave" (qtd. in Lovgren, 2004a).

Furthermore, science rhetors sympathetic to the film are deliberate in calling attention to the dramatic elements that are requisites in a Hollywood film. Climate expert Heidi Cullen argues "some of the events in the movie we're beginning to see already. But of course everything is condensed and dramatized" (qtd. in Bowles & Vergano, 2004). Geoff Jenkins, a climatologist at the Hadley Centre for Climate Prediction and Research (which is depicted in the film), also provides a guarded account of the film when he states, "it's a movie and we shouldn't get too po-faced about it. Hollywood's not going to make money out of a bunch of scientists discussing uncertainties" (qtd. in Dayton, 2004).

This rhetorical strategy evident in most appraisals of the film attempts to render transparent narrative film making conventions (aspects of the film that are "just a movie") while maintaining the scientific credibility and significance of global warming. The science rhetors that use the film to promote public interest in climate change demonstrate a complex relationship with the film's rhetorical potential. In each case, these rhetors resist the straightforward classification of the film as "fact" or "fiction."

In contrast to this modulated perspective, there are a number of scientists sympathetic to global warming concerns who argue that the film has no place in the public discourse on climate change. Their fundamental concern centers on how audiences will accept the film and how that might shape public understandings of climate science. Janet Sawin, a climate and energy program director at the Worldwatch Institute, captures this concern when she argues that "there is some concern that what the movie shows is so extreme that people will say, Oh, that could never happen, so I'm not going to worry about it. That blows a very serious issue out of proportion and could cause people who are skeptical to become even more skeptical" (qtd. in Lovgren, 2004b).

A survey of the public discourse suggests that there are three major issues that

trouble science interlocutors who wish to expunge the film from public discussion. First, they suggest that warming skeptics exploit the scientific infidelities in the film to indict real global warming science. For example, skeptical scientists argue that the film's suggestion that global warming would initiate a massive ice age defies common sense.

While some reputable scientific theories indicate that warming could initiate an ice age, such an idea seems counterintuitive to those not well versed in meteorological sciences. These counter-intuitive depictions of the effects of global warming can prompt some audiences to dismiss global warming as a farce. Furthermore, during the 1970's numerous scientists and climate models predicted the onset of a new ice age. However, more sophisticated climate models and increased physical evidence suggests that steady global warming is the more likely scenario (McGuire, 2003).

Skeptics exploit this climate "flip-flop" as evidence of scientific uncertainty regarding global warming and the political motivations that inform climate science (Michaels, 2004a, 2004b). *The Day After Tomorrow*, some scientists argue, obfuscates the debate and invites rhetorically powerful skeptic indictments of global warming science (Hopey, 2004).

Second, some scientists argue that the cataclysmic events the film depicts, such as the flash-freezing superstorm and the exaggerated tsunami that crashes against the Statue of Liberty, although visually powerful, could confuse audiences as to the effects of global warming. These events are the dramatic devices that are the most obvious departure from scientific fact. Some scientists are concerned that such visual depictions are so ridiculous that audiences would discount global warming itself as a dramatic device and not a serious environmental and political issue.

Bill McKibben, an environmental writer for *Grist Magazine*, clearly identifies this central tension when he suggests that "It's always been hard to get people to take global warming serious because it happens too slowly" (McKibben, 2004). But McKibben argues that while the film may focus attention to global warming and properly illustrate some of the effects of global warming, its depiction of the effects of global warming might set expectations too high. He argues that "if the reason we're supposed to worry about global warming is that it will first send a tidal wave over the Statue of Liberty and then lock it forever in an ice cube, anything less will seem… not so bad" (McKibben, 2004).

Third, and perhaps most rhetorically compelling, some fear that the overt political message of the film taints global warming science as politically motivated and not

adhering to the "objectivity" good science requires (Bowles, 2004). These fears are quite evident in the rhetoric critics use to dismiss the film as liberal propaganda. Paul Dreissen, a senior fellow with the Committee For A Constructive Tomorrow and Center for the Defense of Free Enterprise, argues *The Day After Tomorrow* "breaks new ground in combining horror, propaganda and manipulation of history and science to serve political agendas" (Driessen, 2004). Dreissen recasts global warming scientists as doing everything in their power to promote a "fright night" scenario, instilling irrational and scare tactics that oversell the potential impacts of global warming. This rhetoric of irrationality attempts to recast the boundaries between fact and fiction by suggesting that because the film is fictional, everything depicted in the film is therefore fictional. This metonymic argumentative strategy is reflected in the strongest criticisms of the film.

Although some scientists who support efforts to combat global warming disagree over whether *The Day After Tomorrow* is a useful tool in drawing public attention to warming, most scientists treat *The Day After Tomorrow* like a deductive argument where the conclusion is correct but the premises are at worst false and at best suspect. When scientists are adjudicating the factuality and falsity of the film's depiction of global warming, they are supplying the scientifically valid premises without expunging the rhetorical residue of the film's effect. In other words, this rearticulation of the climate science behind the film maintains the dramatic and visual effect of global warming at the same time substantiates the real scientific argument. This rhetorical fungibility enables these scientific arguments to circulate in public discussions of global warming where the divisions between fact and fiction are more porous without sacrificing scientific credibility. Even though some scientists balk at using the film as a topos for generating public action on global warming, those scientists who do embrace the film do so by adopting a rhetorical posture that distances themselves from the obvious narrative conventions of a fictional film while offering minor correctives to depictions of global warming. In the end, the visual devastation of global warming, even if it does not occur at such a rapid rate or have that extreme of an effect as depicted in the film, remains relatively intact within the public discourse.

5. *Conclusion: The Rhetorical Force of Facts and Fictions*

As often the case with many summer blockbusters, stunning visuals and spectacular special effects often eclipse insightful commentary. Outside of

demonstrating the competing discourses between scientists and skeptical politicians, the film possesses few philosophical moments. *The Day After Tomorrow*, by most accounts, is not a very good *film*: the human drama is trite, the script has numerous plot holes, and the characters are flat. Unlike more contemplative science fiction films that ruminate on our relationship with science and technology (*2001: A Space Odyssey, GATTACA, Blade Runner*), the most notable narrative aspects of *The Day After Tomorrow* are its story of a scientist's attempt to convince reluctant policymakers of future environmental catastrophes and powerful visuals of the effects of global warming.

The rhetoric surrounding *The Day After Tomorrow* and the global warming debate demonstrates that a film's impact on public scientific discourse is determined by a complex negotiation between fact and fiction. As many science rhetors suggest, the film blends some scientific fact with a heavy dose of Hollywood fiction. For environmentally concerned advocates, the rhetorical struggle is to liberate the factual elements of the film, such as illustrating the dangers of global warming, from the unscientific elements while maintaining the dramatic force of the movie. My analysis reveals that advocates negotiate this rhetorical struggle by simultaneously calling attention to the need to address global warming while distancing themselves from the patently Hollywood aspects of the film. In other words, each reference to the film is highly qualified with statements that delineate scientific fact from its fictionalization. I suggest there are oppositional qualities to this argumentative approach in that the fictional text, and not just the rational scientific arguments, functions as the rhetorical force behind the global warming arguments. I argue that the scientific commentary on the "factual" nature of the film leaves a rhetorical residue that helps validate future attempts to promote global warming efforts.

Warming skeptics assume a similar rhetorical stance, focusing on the factual and fictional elements of the film to come to the "truth" about global warming. However, their comments emphasize the fictional elements of the film as reflective of what scientists believe. According to warming skeptics, when science rhetors adopt *The Day After Tomorrow* as evidence of dangerous global warming, these climate advocates are only promoting alarmists fears that are based in scientific fictions. Both rhetorical strategies suggest that the lines between fact and fiction are porous rhetorical constructions. And as rhetorical constructions, they are subject to movement and rearticulation. This idiom of fact versus fiction is particularly salient in public discussions of global warming science. Within specialized scientific circles, warming skeptics remain on the margins. However,

in media coverage of global warming science, skeptics receive equal attention from journalists who seek balanced reporting. Since decisions on if and how we combat global warming are products of public deliberation and are not the sole province of specialized scientific spheres, arguments either for or against action must be put into publicly accessible terms.

Because global warming is likely to unfold gradually, where its impacts are difficult to understand in contrast to the more localized and immediate economic effects, *The Day After Tomorrow* presents an attractive commonplace for science rhetors to promote public discussion. The film's dramatic depictions of the impacts of global warming are visually spectacular, thus giving a visual analog to the impacts of global warming. However, this presents the inherent risk that endorsement of the film as evidence of global warming effects exposes anti-warming arguments to charges of alarmism. Therefore, it is important to understand how scientists rhetorically negotiate this double bind as a way of shaping public discussions on global warming and promoting policy change.

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