Entertaining Facts: what the news media do with expert information about environmental risks

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ABSTRACT

This research aims to clarify why there is such a difference between expert understandings of the environmental risk of global warming and climate change, and social world understandings. The news media are the primary source of information about science for the non-expert social world. Therefore this analysis compared expert priorities and preferences with news media selections from the Intergovernmental Panel on Climate Change reports. Experts are focused on the physical world; the news media are focused on their audiences. News texts are crafted to appeal to assumed contemporary audience discourses. The comparison of expert and news media reports of an environmental risk aimed to discern in news media texts underlying assumptions about discourses circulating in the social world. The analysis focuses on two 'best possible case' information sources: the IPCC reports and the 'prestige press' U.S. newspaper *The New York Times*. Qualitative comparison of IPCC reports and news mediations of those reports is accompanied by quantitative analysis of news information selection frequencies and section placements. Readers of different sections received quite different information about the risks. *New York Times* journalists preferred political definitions of global warming and climate change over the definitions of scientific experts. The politically-motivated 'sceptical' lobby exploited the news ethic of balance and the value assigned to conflict to gain equal or greater news media attention, compared with that accorded to the vast majority of climate scientists. Experts ignored the news media, preferring to advise policy makers. Policy makers obtained most of their information about global warming and climate change from the news or directly from politically well-connected 'sceptical' lobbyists. As a result, *New York Times* audiences received a very partial representation of a risk which was framed as 'political but not physical' and 'global but not local'. Throughout the 17-year analytical period, news selectors virtually ignored expert advice about likely risks to U.S. populations, environments, infrastructures and economies, and expert warnings of the urgent need for adaptation and emergency planning. The research argues, then, that a journalistic focus on political discourses resulted in an overall neglect of information detailing the reasons why experts were certain that global warming would happen and would change climate and sea level , or about physical risks directly threatening *New York Times* audiences. Audiences consequently did not receive available information about ways of protecting their health, safety and economic security.

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CHAPTER 1 Introduction

Climate scientists have long been clearly aware of the processes of the greenhouse effect, which keeps the planet warm enough to sustain life. They have also long been aware that putting more warming gases into the atmosphere would warm the atmosphere and change climate and sea levels.[1] These expert certainties about the causes and potential risks of global warming and climate change were initially accepted by the non-expert social world.[2,3] Then however, throughout the 1990s and well into the 2000s, social world acceptance of the reality of the risks blurred into a cacophony of conflicting opinions. The assertion that there was no substance to expert warnings about global warming or climate change became widely accepted. Only when physical changes began to directly affect the social world did social world opinions begin to shift more towards acceptance of the existence of the risk and the need for action to avert future risks.

The question driving design of the research was why there were such differences between expert understandings of the risks of global warming and climate change, and social world understandings. I decided that one way to answer this question would be to examine the changes in information as it moved from scientific experts to the news media and thence to the non-expert social world.

As I researched more, I realised that two further questions needed to be asked: what information about the risks of global warming and climate change was available to the social world; and, who were the primary sources of this information? Expert climate science information was available from 1990 in the assessments of the Intergovernmental Panel on Climate Change. These assessment reports were extensive, bulky and technical. While they were the first source of information for non-experts about a physical risk, they were not the first source for most of the non-expert social world. People get most of their information about physical science from the media,[4] and the news media are the first source of this

[1] (Weart 2011)
[2] In this thesis, the social world is understood in its broadest sense to comprise all humans, their social relationships and their cultural groupings. See Section 1.3.1 later in this chapter.
[3] (Trumbo 1996; Wilson 2000; Boykoff and Boykoff 2004; Antilla 2005; Carvalho 2005; Boykoff and Roberts 2007; Carvalho 2007; Anderson 2009)
[4] (Gerbner, Gross, and Signorielli 1981; Fahnestock 1986; Friedman, Dunwoody, and Rogers 1986; Nelkin 1987; LaFollette 1990; Nelkin 1995; Bucchi 1996; Beck 1999; Wilson 2000; Allan 2002; Bucchi and Mazzolini 2003; Boykoff and Boykoff 2004, Cook, Pieri et al. 2004, Mythen 2004; Brossard and Shanahan 2006)

information for other popular media and thus for the wider social world.[5] Therefore news media reports of expert information about global warming and climate change must have contributed to what seemed to scientific experts to be a puzzling knowledge deficit in social world discourses about this environmental risk. The thesis question then became refined: what do the news media do with expert information about the environmental risk of global warming and climate change; and why?

1.1 Analytical approach

This analysis begins, not with discourses circulating in the social world, but with expert advice about the physical world. It qualitatively examines expert advice and news media re-presentations of that advice, and then quantifies news media selection, salience and placement decisions. The analysis is filtered through the dual lenses of academia and journalism. Before returning to the academic world, I had worked as a journalist for some 20 years. This work included general journalism, science and business journalism and specialised writing on global warming and climate change. It included news management roles such as chief reporter and news editor. In assessing scholarly contributions to the fields of science communications and media studies, and journalistic representations of expert advice, my perspectives unavoidably are those of both outsider and insider: as an academic analyst with journalistic experience, and as a journalist with academic experience.

There is by now a substantial body of scholarly work examining news media treatments of information about global warming and climate change.[6] Boykoff and Boykoff (2004) established that the journalistic ethic of 'balance' and the news value of 'conflict' caused an informational bias in the United States 'prestige press', with the demurring views of mostly non-specialist 'sceptical' scientists given equal weight with the overwhelming consensus of internationally respected climate scientists. Antilla (2005) found not only many examples of

[5] (Wilson 2000a; Suleski and Ibaraki 2009; Pew Research Center's Project for Excellence in Journalism 2010)
[6] (McComas and Shanahan 1999; Nissani 1999; Demeritt 2001; McCright and Dunlap 2000, 2003; McManus 2000; Weingart, Engels, and Pansegrau 2000; Zehr 2000; Dispensa and Brulle 2003; Boykoff and Boykoff 2004; Brossard, Shanahan, and McComas 2004; Antilla 2005; Boykoff 2007; Boykoff and Rajan 2007; Boykoff and Boykoff 2007; Boykoff 2008; Boykoff and Mansfield 2008; Carvalho 2005, 2007, 2008; Liu, Vedlitz, and Alston 2008; Olausson 2009; Sampei and Aoyagi-Usui 2009)

this informational bias, but also a tendency for U.S. news outlets to use politically aligned 'sceptical' scientists as their primary information source. Carvalho's (2005) analysis of United Kingdom 'quality' newspapers found a similar ideological bias in *The Times* newspaper (owned by Rupert Murdoch's News International empire). These findings clearly identify patent flaws in news mediation and organisational processes. However, my own experience as a journalist specialising in this issue convinced me that journalistic misunderstandings of the nuances of balance, and news management attempts to exert ideological influence, were not the only reasons for social world and news media confusion about the reality of the risks.

The journalistic ethic of acting as a guardian of the public interest should have encouraged clear communication of expert concerns about the risk. Yet, news treatments of expert advice from the Intergovernmental Panel on Climate Change seemed overall to inadequately represent these expert explanations of processes going on in the physical world. It seemed to me that there were other latent factors operating in news mediations of expert advice: some form of inherent differences between the cultures of experts and news media which were obscuring news mediations of expert concerns.

I decided that what had not yet been attempted was a detailed close analysis of news mediations of the IPCC reports. I wanted to take an open approach to the research, not restricting my analytical focus to a handful of themes, but rather, comparing all of the information contained in the IPCC reports with all of the information selected for news mediations of those reports. Close analysis is hugely time-consuming, particularly since I wanted to examine news mediations of the official release of all IPCC reports from 1990 to 2007, to see if there were changes in news representations of the issue over time. It would be impossible for a single researcher to carry out this level of analysis with more than one expert report, or more than one news medium.

I decided that this analysis could best be achieved by making a comprehensive analysis of one news medium's treatments of the reports of one expert organisation, rather than a summary analysis of many treatments of many reports. I already had selected the IPCC reports for comparison with their news mediations. I decided that the news medium to be analysed should be a 'best possible case' exemplar. The rationale was that if the 'best possible case' news medium still showed substantial differences from expert preferences, these differences could clarify previously undetected underlying news mediation processes

For reasons, then, of time but also of methodological approach, I selected one expert source—the assessments of the Intergovernmental Panel on Climate Change (IPCC), and one news medium—*The New York Times*.

To establish more clearly what the news media did with available expert information, I devised an analytical approach which was both qualitative and quantitative. Making the assumption that news media coverage of expert advice rises shortly before and after release of official expert reports, I set six-week analytical windows around the official release dates of the 1990, 1995 and 2001 IPCC reports, and one-week windows around release of the 2007 reports because of an exponential rise in *New York Times* stories on the issue in 2007. I closely examined all IPCC reports and all *New York Times* coverage within the analytical windows. I then coded all news texts to identify every piece of information selected from the IPCC reports. This permitted statistical analysis of information selection frequencies, and qualitative comparison of these frequencies with expert priorities. I examined the literature in a range of scholarly fields, but primarily in the field of media studies, to discover reasons for differences between news media and expert preferences and priorities. Preliminary conclusions arising from the quantitative analysis and the literature review were then tested by a closer qualitative analysis of relevant news media texts which were readily identifiable through the quantitative coding system.

1.2 Contribution to scholarly research

This thesis contributes to scholarly research in four different ways. First, it focuses on expert advice rather than social world discourses about expert advice. The environmental risk of global warming and climate change is caused by human activity, but it develops in the physical world. Scientific experts advise the non-expert social world of the physical processes involved and the likely risks to human health and safety and to the natural environment which sustains all life on Earth. Actions taken (or not taken) by the social world reduce or exacerbate the physical risks as they evolve. Almost all content analyses of news treatments of expert advice on global warming and climate change begin by theorising discourses about the risk circulating in the social world. They then examine news media texts

to substantiate these hypotheses. This thesis examination of the flow of information about environmental risks starts, instead, with the original source material of expert advice about the physical world which then is transformed by news mediation. It does not focus primarily on what the news media do to the social world or what the social world does to the news media. Rather, it examines what the news media do with expert information.

This analytical approach does not ignore discourses circulating in the wider social world. Indeed, it would be impossible to do so. The relationship between the news media and their audiences is symbiotic and reflexive: if the media do not attract the audience's interest, the audience will ignore the media products regardless of how important they might appear to a scientific expert. This means that any expert information is shaped to fit the assumed preferences of the media audiences. Audiences actively engage with media texts, but only if their attention is engaged in the first place. Familiarity and relevance attract: audiences, as Elizabeth Bird has explained, ". . . say, 'why do I need to know this; what difference does it make to *my* life?' " (Bird 2003, 72). To engage the attention of their audiences the news media insert appeals to what they assume may be the lived experiences and discourses of their imagined audiences.[7,8]

One hypothesis behind the decision to compare expert and news media explanations of an environmental risk was that news media assumptions about discourses circulating in the social world would be revealed through establishment of concrete and verifiable differences between expert and news media preferences. While a specialised speaker addressing a similarly specialised audience may have a reasonable degree of certainty that her/his audience will understand the material being presented in scientific language using scientific concepts, the news media do not enjoy such certainties. Their audiences have varied interests, live in differing social contexts, and identify with and share a variety of social world discourses. For this analysis, it was hypothesised that because the news media are necessarily attentive to the interests of their audiences, differences between expert and news media information preferences would reveal news media assumptions about the discourses which circulated contemporaneously among their audiences and which shaped particular ideas of the 'reality' of that risk.

[7] (Ien Ang articulated the idea that audience research imagines particular audiences, rather than describing actual audiences. Ang 1991)

[8] (Fiske and Hartley 1978; Hall et al. 1978; Hall 1981; Fahnestock 1986; Williams 1990; Beck 1992; Wynne 1992; Fairclough 1995; Allan, Adam, and Carter 2000; Fiske 2001; Väliverronen 2001; Dimopoulos and Koulaidis 2002; Myers 2003; Zinken 2003)

Both discourse analysis and audience research are notoriously difficult to achieve in a form which is meaningful and rigorously established, and which can be applied to the multiplicity of discourses which circulate continuously in the social world.[9] Social world understandings of the 'realities' of the physical world are shaped by a wide range of discourses which interact dynamically and continuously within any social grouping, and between many such groupings. While the motivation for this thesis involved clarification of social world understandings about a physical risk, its refinement into a question of differences between expert and news mediated information permitted a foundation of verifiable research materials. The methodological assumption was that establishing concrete differences between expert and news media information preferences and priorities would permit extrapolation of news media assumptions about audiences, and the discourses which circulated there.

A second contribution to scholarly research is the inclusion of brief mentions of the issue in otherwise unrelated texts. All other content analyses of news media treatments of global warming and climate change exclude these. However, brief mentions of an issue permit identification of news media assumptions about other discourses circulating contemporaneously in the worlds of their imagined audiences. Substantive treatments of information about global warming and climate change, and their section placements, tend to follow a news media discursive framing of the issue. Brief mentions in otherwise unrelated stories indicate a news writer assumption that that particular issue or idea is another part of audience discourses. This content analysis reveals significant differences in section placements between substantive treatments and brief mentions of global warming and climate change,[10] suggesting that news media ideas of the environmental risk, and the social world's ideas, were not identical. The methodological approach is to infer audiences' discursive understandings of an environmental risk from assumptions about contemporary discourses evident in news media texts. It thus contributes to the scholarly literature by offering an additional way of understanding discourses and audiences.

Third is a contribution to the field of science communication. Analysis of the flow of information between experts and non-experts is in part an analysis of science communication. Over the past several decades, much scholarship has been devoted to the fields of public understanding of science, science communication, science popularization and scientific literacy. "Public understanding of science" is the term used mostly by British scholars when

[9] (Ang 1991, 1995; van Dijk 1993, 2004)
[10] See Chapter 3, Section 3.11.

they discuss improving the non-scientific public's understanding of scientists and scientific knowledge claims. American scholars tend to use "science communication" relatively synonymously. Both terms are the titles of two academic journals. "Scientific literacy" is used mainly by the scientific community, in a pedagogic sense of a unidirectional flow of information from expert to non-expert.[11] "Science popularization" tends to imply a positive representation of science and its potential social benefits.[12]

Until quite recently, most of this scholarship has been science-centred, privileging the scientific worldview and treating the popular media and the public as passive and ignorant. As Bernadette Bensaude-Vincent (2001) has argued:

> . . . [public communication of science] is conceived as a one-way flux of information, stemming from scientists and flowing down to a receptive public through the various channels of modern media.
>
> (Bensaude-Vincent 2001, 99)

Massimiano Bucchi's (1996) review of the literature on science communication has criticised the ". . . idealized and largely unproblematic vision of the public communication of science" which imagines the journalist as translator/mediator whose task is simply one of ". . . reformulating scientific discourse in more simple words" (Bucchi 1996, 376). My analysis shows that the news media actively re-shape expert information to attract the attention of their audiences. This supports other scholarly research showing that the news media privilege social world discourses over those of experts.

A survey of science writers and scientists by science communications researcher Hans-Peter Peters (1995) has identified significant cultural differences between journalists and scientists, with scientific experts expecting journalists to passively repeat their carefully-phrased advice, and journalists expecting a far more active role in the information flow. He found that journalists were much more likely to agree with the statement that "It is the journalist's task to translate expert statements from scientific jargon into everyday language" (Peters 1995, 42, Table 3). Scientists were much more likely to agree that "Journalists should accept expert statements rather than question them" (Peters 1995, 42, Table 3). While scientists expected to be accorded some form of elite status by journalists, Peters' survey revealed instead that "Journalists consider experts to be passive sources who are used by them to perform the

[11] (Logan 2001)
[12] (Bucchi and Mazzolini 2003)

media functions of, for example, informing and entertaining the public and criticising elites" (Peters 1995, 45). A review of science communication literature conducted for this thesis revealed that until very recently, communication of science was imagined mostly to involve scientists talking directly to policy makers or the public. While many scholars acknowledged that "people" or "the public" got most of their information about science from "the media", analyses of news media practices and rationales were almost entirely absent from science communication literature. Also virtually absent was recognition of the inevitability of change as information moves from experts to non-experts.

Mediation is a crucial element in the flow of information from experts to non-experts, yet to date the science communication literature includes little reference to the scholarly field which focuses on mediation processes: that of media studies. In their critical review of 25 years of science communication research, Martin Bauer, Nick Allum et al. listed the scholarly fields underpinning this research:

> . . . sociology, psychology, history, political science, communication studies, and science policy analysis . . . Research is carried out by psychologists, sociologists, political scientists, cultural theorists; even philosophers are increasingly getting in on the act.
>
> (Bauer, Allum, and Miller 2007, 79, 87)

In these lists of scholarly fields, the specialist field of media studies is conspicuous only by its absence. It is hoped that this thesis, which applies media studies theory to an analysis of communication of scientific information, may encourage greater collaboration between the scholarly fields of science communication and media studies.

A fourth contribution to scholarly research is to the specialist field of content analyses of news media treatments of the environmental risk of global warming and climate change. Its intended contribution is clarification of changes in the information flow between experts and news media, and of possible reasons for these changes. Virtually all content analyses of news mediations of the risks of global warming and climate change[13] take news media stories as their information source.[14] Most begin with a summary statement of expert understandings.

[13] (McComas and Shanahan 1999; Nissani 1999; Demeritt 2001; McCright and Dunlap 2000, 2003; McManus 2000; Weingart, Engels, and Pansegrau 2000; Zehr 2000; Dispensa and Brulle 2003; Boykoff and Boykoff 2004; Brossard, Shanahan, and McComas 2004; Antilla 2005; Carvalho 2005, 2007, 2008; Liu, Vedlitz, and Alston 2008; Olausson 2009; Sampei and Aoyagi-Usui 2009)

[14] See Chapter 2, Section 2.2.4 for discussion of the partial exceptions of Weingart, Engels, and Pansegrau (2000), and Dispensa and Brulle (2003).

They then discuss differences in social world understandings of the risks, hypothesise social world discourses on the risk, and examine news media texts to establish details of those discourses. These analyses have established a range of connections between news representations of the risk and power structures and ideologies operating in the social world. They have also clarified the impact of political discourses on news media representations. However, because they are focused on the connections between the news media and the non-expert social world, they have not closely examined the earlier stages of the information flow: the source expert information and its mediation in news texts. The difference with my research is that I closely compare expert advice and news mediations of that advice.

Almost all other content analyses of news mediations of information about global warming and climate change compare several or many news outlets, restricting their objects of analysis to overall theme, page placement, headline, preferred speaker and/or, sometimes, a handful of topics contained in the body of the text. Most content analyses focus on aspects of news mediation decided primarily by news management. Page placement, headline and, often, overall theme are determined by news management. These aspects clarify official news media preferred positions on any issue, and these details were included in the quantitative analysis. However, news management preferences are not the only mediators of scientific information.

News writers themselves add layers of complexity to any piece of information once it has been selected and framed in conscious or unconscious consultation with the news organisation's corporate policy preferences. These layers are audience-centred. They invoke, refer or allude to beliefs, discourses and ideas which circulate in the social world of the media audiences. Consequently, this thesis also closely examines textual details. Information selection is determined mostly by the journalist writing the text of any news story, as are textual appeals to discourses assumed to be circulating in the worlds of that writer's imagined audiences. Section placement—a management decision—provides an indication of the more particularised audiences to which the writer then appeals.

1.3 Key concepts

This research starts with expert reports on physical world processes, comparing these with news media treatments of expert advice. I then apply concepts familiar to media studies, discourse analysis, audience research, cultural studies and science communication scholars, to gain a better understanding of why news mediations of expert advice differed so significantly from the source expert reports.

1.3.1 Physical and social worlds

In this thesis, the physical world is understood to be the physical planet and its interacting atmospheric, biospheric, hydrological, cryospheric, terrestrial and oceanic systems which provide the air, water and food necessary for life on Earth. The social world is understood in its broadest sense to comprise all humans, their social relationships and their cultural groupings. Within the broad umbrella of 'the social world', many different cultural groupings co-exist (or not), defining themselves and their view of 'the world' by discourses which articulate shared behaviours, ideas, values, beliefs and knowledges. Cultural groupings can be defined broadly, as in 'Westerners', or more specifically, such as 'people who believe that global warming is causing changes in climate'. Any cultural grouping can also be described as a discursive community: a community of 'like minds' who share discourses articulating particular ideas of 'reality'.

1.3.2 Discourse

The social world constructs ideas of the physical world, social relationships and cultural groupings through the processes of discourse: the articulation or assumptions of ideas about the way 'the world' is. Teun van Dijk has elaborated on the connections between individuals

and the discourses which shape the social worlds which individuals inhabit, saying that "Social actors involved in discourse do not only use their individual experiences and strategies, they rely upon collective frames of perceptions, i.e. *social representations*" (Italics in original) (van Dijk 2009). All individuals and all cultural and social groupings are immersed in the discourses which construct their particular ideas, values, worldviews and knowledges. Siegfried Jäger and Florentine Maier have explained that:

> 'Knowledge' refers to all kinds of contents that make up a human consciousness, or in other words, all kinds of meanings that people use to interpret and shape their environment. People derive this knowledge from the discursive surroundings into which they are born and in which they are enmeshed throughout their lives.
>
> (Jäger and Maier 2009, 34)

Discourses which circulate within any cultural grouping are not static, and not exclusive. No culture is an island; all cultures are influenced by discourses circulating in other cultural groupings. Media theorist John Fiske has likened 'culture' to a "river of discourses" (Fiske 1996, 7). The connotations of ongoing movement and mixing suggested by Fiske's analogy are fundamental to ideas of culture and discourse, as cultural, media and discourse theorists have long understood. Raymond Williams observed that culture should be viewed as ". . . a 'constitutive social process' rather than a conclusion" (Williams 1977, 19). More recently, Ien Ang has argued that in any culture, meanings and values are continually produced and re-negotiated in ". . . an ongoing, plural, often conflictive process taking place in all dimensions of social activity" (Ang 2005, 477). There is agreement among theorists that both cultures and discourses are dynamic. In anthropologist James Clifford's memorable phrase, cultures do not hold still for their portraits (Clifford 1986, 10). Neither do discourses. They change continuously as new ideas and information arrive and are assimilated into the discursive flows.

1.3.3 Framing

Framing involves decisions about the overall structure of a news media text, about what information to select and what salience to assign to selected information. The very general

definition of a frame is a skeleton which supports other details. In any news story, selected informational details are hung around a narrative frame. This frame presents the story as a particular type of narrative. In news media jargon, any story has an 'angle'. In academic language, this 'angle' is a frame. News texts tend to be brief: usually substantially fewer than 800 words unless they are written as a feature article, in which case they can run to around 1500 words. Given the inherent need to attract audience attention, and the restrictions of a very limited word count, any news story is "framed" to provide a basic narrative structure which will be familiar to audiences. Information is then selected to fit that frame. William Gamson and Andre Modigliani (1989) have described framing as an interpretive package which has ". . . at its core . . . a central organizing idea, or *frame*, for making sense of relevant events" (Italics in original) (Gamson and Modigliani 1989, 3). Sharon Dunwoody and Robert Griffin have described frames as "mental maps" (Dunwoody and Griffin 1993, 24). Esa Väliverronen has argued that framing ". . . sets the boundaries within which the event or phenomenon can be discussed at each moment in time" (Väliverronen 2001, 41). In a news text, framing powerfully affects the tone and type of expert information being offered to that text's imagined audiences.

Once a journalist has decided on the 'angle' of a story—is it a story about global disasters, for example, or about potential benefits of global warming, or about the unacceptable costs of taking any preventive action?—information is then selected and given more or less emphasis to fit that particular framing. Robert Entman has argued that:

> To frame is to select some aspects of a perceived reality and make them more salient in a communicating text, in such a way as to promote a particular problem definition, causal interpretation, moral evaluation and/or treatment recommendation for the item described.
>
> (Entman 1993, 52)

Samantha Lay has described news selection processes as ". . . active construction . . . a form of guided interpretation" (Lay 2008, 298). Framing actively guides audiences to think about a topic in a particular way: to fit it into an existing discourse in a form which has been quite tightly restricted by the news writer.

The entire topic of global warming and climate change is broad, complex and composed of a multiplicity of different sub-topics. This is seen even in the organisation of the IPCC reports, which are split into three broad categories: the science and impacts of climate change, and

possible strategies for responding to the risk. Within these categories there are multiple sub-topics, as seen in the IPCC chapter headings and their many sub-sections. To report on this issue, particularly given the space restrictions of news stories, journalists are forced to severely limit the spread of topics from which they select information, and then to also severely limit the information which they select to include in their preferred narrative frame. In limiting topics and information, journalists are guided by assumptions of the audiences for whom they are writing. Mark Miller and Bonnie Reichert have argued that in any contentious policy issue, different segments of different populations will have specific and competing concerns:

> The selective nature of framing suggests that in their discussion of the complex issues these stakeholders will discuss those policy implications more salient to them, while ignoring other implications.
>
> (Miller and Reichert 2000, 46)

Miller and Reichert's observation concerns the ways that audiences deal with information about a complex issue. It applies as well to the ways that journalists shape available information to appeal to the assumed interests and discourses of their imagined audiences. As Chapter 7 shows, the audiences of different sections of *The New York Times* received quite different framings and quite different information about the environmental risk of global warming and climate change.

1.3.4 Mediation

Mediation is intrinsic in any exchange of information or ideas. Expert information is not adequately disseminated to non-experts until it has been both received and retained. For this to occur, any new information inevitably is mediated. In the scholarly fields of media and communication studies, 'mediation' is commonly understood to mean the various ways that the popular media re-shape ideas and information: ". . . the processes involved in the channelling of social knowledge and cultural values through an institutional agency to an audience" (Casey et al. 2002). This thesis focuses on the ways that the news media re-shape expert information to make it palatable for their imagined audiences. However, it is important

to recognise that in any exchange between a sender and a receiver, whether or not there is intervention by the popular media, ideas, information and knowledge change. In a person-to-person interchange, mediation occurs as the sender tries to tailor information for the receiver's assumed existing understandings and as the receiver further re-shapes that information to fit it into their own knowledges, ideas and worldviews.

In an exchange which involves the intervention of the popular media, media workers add another layer to the information flow, themselves transforming original expert information to align it with their assumptions of the prior knowledge and interests of their audiences. Audiences then further transform the mediated expert information, making different senses of it depending on which discourses shape their own particular construction of 'reality'.[15]

The scholarly field of science communication tends to imagine the news media as passive and frequently delinquent transmitters of the words of science. Massimiano Bucchi and Renato Massolini have observed that science communication literature generally conceptualises the news media as ". . . a 'dirty mirror' of science, as an opaque lens unable to present and filter scientific content properly" (Bucchi and Mazzolini 2003, 7). Implicit here is the expectation that the news media should repeat expert information as phrased by scientists. However, communication is never entirely one-way. If a clearly phrased expert idea or concept does not resonate with the interests, concerns and contexts of non-expert audiences, the information is unlikely to be received let alone retained. News mediations of expert information are intended to inform non-expert audiences, not to replicate scientific language in a form which would be acceptable to scientists but incomprehensible to most of the non-scientists who constitute media audiences. Journalists mediate expert advice in an attempt to offer audiences information in a form which attracts attention and may be retained.

1.3.5 The media or the news media?

Much of the scholarly literature on media treatments of expert scientific information discusses "the media" and then focuses entirely on the news media alone. Many scholars

[15] Closer analysis of the social constructions of 'reality' is outside the scope of this thesis, which examines news media assumptions about audiences rather than audience assumptions about 'the world'.

have asserted that most people (i.e. non-experts) get most of their information about science from the media.[16] A closer reading reveals that by "the media" they mean "the news media", rather than the full range of popular media. For example, in their insightful discussion of the media practice of adding "cultural resonance" to texts to increase their appeal, making them seem more "natural and familiar", Gamson and Modigliani (1989) observed that promotional materials often used such techniques, ". . . [facilitating] the work of sponsors by tuning the ears of *journalists* to its symbolism" (Italics added) (Gamson and Modigliani 1989, 6). The choice of the specific occupation of "journalists" strongly suggests a more singular focus on the news media, rather than the entire spectrum of popular media. Similarly, discourse analyst Norman Fairclough's discussion of "media discourse" uses only examples from the news media (Fairclough 1995). At times the assumption that the "news media" are the only "media" which circulate discourse becomes explicit: "Analysis of 'framing' draws attention to how surrounding features of the *reporting* discourse can influence the way in which represented discourse is interpreted" (Italics added) (Fairclough 1995, 82). "Reporting discourse" seems clearly to refer to the news media. News media "report": other media perform other activities.

In the more specific scholarly field of science communication, "the news media" similarly tend to be subsumed into "the media". In his perceptive review of literature on "public communication of science", Massimiano Bucchi analysed scholarly critiques of "media" representations of science. He noted that:

> Until the 1970s, contributions were almost exclusively of a prescriptive tenor: books were written by scientists and major scientific writers which documented the inaccurate coverage of science by the media and offered advice to *journalists* to help them improve their writing and understanding.[17] (Italics added)
>
> (Bucchi 1996, 376)

If advice to the media means advice to "journalists", then it would appear that "the media" are understood to include only the news media.

While this scholarly conflation of "the media" and "the news media" ignores the many diverse forms of popular media which circulate information to non-experts, the news media

[16] (Gerbner et al. 1981; Fahnestock 1986; Friedman, Dunwoody, and Rogers 1986; Nelkin 1987; LaFollette 1990; Nelkin 1994; Bucchi 1996; Beck 1999; Wilson 2000; Allan 2002; Bucchi and Mazzolini 2003; Boykoff and Boykoff 2004; Cook, Pieri, and Robbins 2004; Mythen 2004; Brossard and Shanahan 2006)
[17] (Bucchi cites Burkett 1965; Kreighbaum 1967; Crowther 1970; Farrands 1993)

role of acting as the first source of expert information for non-experts—other journalists, other media and their audiences[18]—justifies close scholarly attention being paid to news media treatments of scientific information.

1.4 Chapter summaries

Chapter 2 describes the methodology of this thesis. The research approach was inductive, based on the hypothesis that immersion in the data would reveal previously undetected trends and patterns. It was also cumulative, beginning with qualitative analysis of expert reports and *New York Times* stories about those reports, to discern expert priorities and apparent differences in *New York Times* priority framings and selections. Then, a statistical analysis identified every *New York Times* selection from the IPCC reports and compared these with IPCC priorities. This produced much finer detail of *New York Times* selection preferences. These statistically derived results were then examined more closely by returning to the original news stories, to confirm or expand understanding of the quantitatively established trends in *New York Times* framings and selection preferences. For the statistical analysis, analytical windows of six weeks around the official release of the IPCC reports of 1990, 1995 and 2001, and one week around the release of the 2007 IPCC reports, were set. All *New York Times* news stories mentioning global warming and climate change which were published within these analytical windows were included in the analysis. The statistical analysis quantified information preferences, selection frequencies, and section placement and salience decisions.

Chapter 3 applies media studies theory to qualitative analyses of *New York Times* treatments of expert advice on the environmental risk of global warming and climate change. The aim was to use scholarly theory to demonstrate reasons why *New York Times* mediations of expert advice differed from expert information preferences and priorities. As in the later discussion of the statistical analytical results, qualitative analysis of *New York Times* treatments of IPCC advice establishes that the *New York Times* preferred political framings of the risk over expert advice on its physical processes. Chapter 3 discusses scholarly theory which argues that all

[18] (Wilson 2000a; Suleski and Ibaraki 2009; Pew Research Center's Project for Excellence in Journalism 2010)

popular media are focused on their audiences rather than scientific experts. It discusses journalistic ethics and news values, noting the difficulties which these can pose for adequate communication of the social implications of a long-term physical environmental risk. Chapter 3 also discusses differences between substantive treatments and brief mentions of the risk, theorising that the greater proportion of brief mentions of the risk in 'lifestyle' and 'local sections, compared with the more politically-oriented sections, may indicate that popular awareness of the risks outstripped the awareness of news writers who were focused on political discourses to the near-exclusion of interest in developments happening in the physical world. This chapter also discusses the importance of direct experience in social world uptake of expert information about a physical risk.

Chapter 4 uses literature from climate science, risk theory, geography and humanities disciplines to trace evolution of social world discursive constructions of the environmental risk of global warming and climate change. It reviews scholarly research on the ways that the journalistic ethic of balance and the news value of conflict permitted the ideological and industrial 'sceptical' lobbies to achieve an overall informational bias in news reports of the risk. This chapter discusses differences in scientific and news media cultures which impaired social world understandings of the risk. It also discusses psychological research suggesting broader reasons why the social world might have been reluctant to accept the realities of the risk. It then presents and discusses the results from the statistical analysis which show differing proportions of section placements of IPCC information over time to theorise changes in news media assumptions about audience understandings of the risk.

Chapters 5, 6 and 7 discuss the content analysis in greater detail. Chapter 5 qualitatively compares IPCC information priorities with selection and salience decisions evident in *New York Times* 'coverage of record'[19] of these reports. The analysis shows that the risk of global warming was framed as 'global therefore not local' and 'political not physical'. Information about physical risks to U.S. populations, available in all IPCC reports from 1990, was minimised or ignored throughout the 17-year analytical period. Expert explanations of the physical processes which rendered the risk certain, and the need for action urgent, were rarely selected or given salience. *New York Times* journalists preferred political framings of the issue over the framings of scientific experts.

[19] (See Chapter 2, Section 2.2.5.)

Chapter 6 quantitatively analyses overall information selection frequencies. The analysis shows that information related to political discourses and to a framing of the issue as a problem for 'others' but not 'us' was greatly preferred. Scientific explanations of the reasons for expert concern, and for expert warnings of an urgent need for adaptation and emergency planning, were selected far less frequently than information related to political conflicts over whether and how much greenhouse gas emissions should be reduced. Information about large-scale global risks was selected relatively frequently, but information about direct risks to U.S. populations, environments and infrastructures was virtually ignored, as was information about available or potential new technologies.

The quantitative analysis of 'specialist' and 'local' section placements of discrete information categories from IPCC reports shows, in Chapter 7, that readers of different sections were given quite different information about the risks of global warming and climate change. Apart from the geographically placed 'NY-Region' section, all news mediations of the risk treated it as abstract rather than concrete. Direct risks to human and economic welfare were ignored. For 'Business' section readers, the risk was framed as a matter of undesirable new taxes or inconvenient changes to industrial and transportation processes. 'Health' section readers received no information about direct risks to the health and safety of U.S. populations. For 'Science' section readers, the issue was framed as a massive global risk which would have negligible national or local implications. 'Technology' section information selections all but ignored a wealth of expert advice about promising and commercially viable new technologies. Assumptions about different imagined audiences created a cacophony of greatly varying information, depending on section.

1.5 Conclusion

This analysis concludes that *New York Times* journalists preferred political definitions of global warming and climate change over the definitions of scientific experts. These resulted in an unnecessarily restrictive framing of the issue, with a focus primarily on political disputes over whether humans were causing the risk, or whether there was a need to reduce carbon dioxide emissions. Expert warnings about the urgent need for adaptation and

emergency planning to reduce or avoid the expected impacts were virtually ignored. Throughout the 17-year analytical period, news selectors ignored expert advice about likely risks to U.S. populations, environments, infrastructures and economies. At the same time, experts ignored the news media—the primary definers of scientific information for non-experts, preferring to advise policy makers. The 'sceptical' lobby exploited the journalistic ethic of balance and the news value of conflict to gain equal or greater credibility with the vast majority of climate scientists in news texts. Policy makers obtained most of their information about global warming and climate change from the news media whose ethic of balance had been turned into bias by 'sceptical' lobbying, or directly from these lobbyists who were politically well-connected. As a result, *New York Times* audiences received a very partial representation of a risk which was framed as 'political but not physical'. They were not given available information about direct physical risks to the health, safety and economic welfare of U.S. populations.

CHAPTER 2 Methodology

2.1 Introduction

This methodology was designed to clarify what the news media do with expert information about environmental risks, and why they do it. Its aims are to provide a better understanding of the information flow from experts to non-experts; to discover inherent differences between expert and news media approaches to environmental risks; to clarify news media assumptions about social world discourses and, ultimately, to improve social world understandings of physical environmental risks.

I wanted a methodology which would examine all stages of the information flow: physical processes, expert advice about those processes, news mediations of that expert advice, and audience uptake of expert advice. Observations and explanations of physical processes come from two scientific sources: the Intergovernmental Panel on Climate Change reports on the impacts of climate change; and the annual statements on global climate issued by the World Meteorological Organization. At the core of this methodology is an analytical focus on expert reports and their mediations in news texts. Assessment of audience understandings of expert advice is derived from textual evidence of news writer assumptions about the discourses which circulate in the worlds of their audiences.

The methodology was designed to explore the connections (and disconnections) between experts and the news media; the news media and the non-expert social world; and the physical and social worlds. I decided that to achieve this, I would need to select one environmental risk and then compare expert information priorities with news media information selection preferences. Since the news media are focused on their audiences rather than on the requirements and preferences of experts, such a comparison would enable me to deduce news media assumptions about their audiences and, in particular, about the various discourses circulating in the worlds of those audiences. I decided that I would need to make a detailed content analysis of both expert and news media texts, and that this should be spread over a long period to provide the opportunity to identify whether and/or how social world

discourses about a physical environmental risk changed as physical planetary processes begin to impact on the social world.

Unlike most content analyses of news mediations of the issue of global warming and climate change, the object of this analysis is not an assessment of the relative balance of one news media outlet's version of expert information compared with another news medium; the relative influence of various news outlets' management ideological preferences on political and policy making discourses; or identification of cultural differences between different countries' media representations of the issue.[20,21] Rather, the objects of the analysis are to identify apparently inherent differences between expert priorities and those of the news media; to identify social world constructions of a physical 'reality'; and to discern also what happens when physical planetary processes begin to impact on the discourses of the social world.

To identify apparently inherent differences between the distinctive cultural groupings of experts and news media, I decided that what was required was intensive qualitative and quantitative analysis. This would not be possible for a single researcher examining a multiplicity of news media. Nor would it be necessary, since the object of the exercise is to compare two discrete cultural groupings, rather than a number of subsets within the grouping of the news media. I decided that I should try to compare two 'best possible' cases', since if even the best showed differences, there was a good chance that this might indicate underlying fundamental differences between experts and news media. Thus, I chose one expert source—the reports of the Intergovernmental Panel on Climate Change, issued over a 17-year period between 1990 and 2007; and one news medium—*The New York Times*. This permitted close comparison of reports from the internationally recognised expert body mandated to advise on

[20] (McComas and Shanahan 1999; Nissani 1999; Carvalho 2000, 2005, 2007; McCright and Dunlap 2000, 2003; McManus 2000; Zehr 2000; Väliverronen 2001; Dimopoulos and Koulaidis 2002; Bucchi and Mazzolini 2003; Dispensa and Brulle 2003; Weingart, Engels, and Pansegrqu 2000; Boykoff and Boykoff 2004; Brossard, Shanahan, and McComas 2004; Brossard and Shanahan 2006; Antilla 2005; Schuck and De Vreese 2006; Boykoff and Boykoff 2007; Boykoff and Rajan 2007; Boykoff and Roberts 2007; Boykoff and Mansfield 2008; Boykoff 2008; Liu, Vedlitz, and Alston 2008; Olausson 2009; Sampei and Aoyagi-Usui 2009)

[21] Two content analyses compare global warming and climate change news coverage in two or more countries. Brossard, Shanahan and McComas examined cultural differences in journalists' fact selection processes, comparing French and U.S. newspapers (Brossard, Shanahan, and McComas 2004), finding that French coverage was more event-based with a greater focus on international relations, while U.S. coverage tended to emphasise conflicts between scientists and politicians. Dispensa and Brulle investigated differing coverage given the issue in Finland, New Zealand and the United States (Dispensa and Brulle 2003). They examined the political allegiances of the various news media corporate owners and identified biased, relatively anti-science coverage of U.S. newspapers which they linked to the dominance of the fossil fuel industries in that country. Again, these cultural comparisons are ideological, and take news media representations of the issue as their starting point, rather than beginning with the source expert advice.

the environmental risk of global warming and climate change; and the newspaper which, in the U.S., had the reputation among scientists and environmentalists as providing some of the more balanced information about this environmental risk.

2.2 Analytical approach

This methodology follows the assertion of critical discourse analytical theory, that text and discourse are separate analytical concepts, even though they are inextricably linked. Wodak and Meyer explain that 'discourse' is viewed as ". . . a form of knowledge and memory of social practices, whereas 'text' illustrates concrete oral utterances or written documents" (Wodak and Meyer 2009). At the same time, this theoretical approach acknowledges that textual meaning cannot be separated from the context of discursively constructed social understandings.[22] Any text only makes sense in the context of existing social and discursive understandings. Any text will have identifiable and verifiable utterances, but these will only have been selected for their potential connections with the social and discursive understandings of that text's imagined audiences.

Where this methodology differs from the critical discourse approach is that its primary focus is on comparing texts to identify different expert and news media contexts, rather than on establishing or clarifying social world discursive contexts. The "concrete" documentation in expert reports and print news media texts permits comparison of expert understandings about a physical risk, and news media assumptions about social practices, social structures and their underlying discourses. My hypothesis was that if I first separated the various elements involved in the flow of information about environmental risks from experts to non-experts—physical processes; expert advice about those processes; news mediations of expert advice; and social world discourses about a physical risk—and then examined differences between these, I could clarify what was working and, more importantly, what was not working, as information flowed from experts to non-experts.

[22] (Cottle 2000, 12)

2.2.1 Analytical method: an inductive approach

This methodology also differs from other content analyses of news mediations of climate change information by taking an inductive approach, not forming initial hypotheses about the differences between expert and news media ideas of the issue but rather, allowing hypotheses to emerge from the data. Teun van Dijk's (2004) prescription for critical discourse analysis focuses on context rather than text.[23] The critical discourse analytical focus is on discourses which circulate in the social world: on the end rather than the beginning of the flow of information about evolving physical environmental risks. Texts are analysed for their "thematic skeleton" (Carvalho 2000, 6): their overall theme and topic or a limited number of themes and topics. The methodology of this thesis follows van Dijk's argument that because discourses are dynamic and continually interact with each other, the objects of analysis need to be carefully limited.[24] It differs in focusing on texts to establish social world contexts.

Critical discourse analysis tends to begin with a hypothesis of a social world context, seeking then to establish evidence of this context in textual elements. This thesis does not begin with a preconceived hypothesis about social world contexts. Instead, it examines the written record manifest in official expert reports and news media texts, seeking to discover from this comparison evidence of discourses which circulate in the social world. Rather than defining a thematic skeleton by hypothesising social world contexts, this analytical approach attempts to discern a discursive skeleton by comparing expert and news media texts: an inductive analytical approach.[25]

Instead of searching the data for confirmation of a specific hypothesis about social world discursive contexts, this analysis starts with the broader hypothesis that immersion in the statistical data will reveal previously obscured patterns and trends. Patton (1999) describes the statistical approach as following "formulas and rules", while qualitative analysis ". . . is a creative process, depending on the insights and conceptual capabilities of the analyst" (Patton 1999, 1190). He goes on argue that good social science research combines the two, using both ". . . the analyst's preparation and creative insight" and ". . . a technical side to analysis that is analytically rigorous, mentally replicable, and explicitly systematic" (Patton 1999,

[23] (van Dijk 2004)
[24] (van Dijk 2004: 163)
[25] "Inductive analysis means that the patterns, themes, and categories of analysis come from the data; they emerge out of the data rather than being imposed on them prior to data collection and analysis" (Patton 1980, 306).

1191). Accordingly, this methodology combines both qualitative and quantitative analysis. It is an intensive form of analysis which was possible only with selection of a single expert source and a single news medium for analysis.

Fürsich (2009) has argued that most existing textual analysis is qualitative, going beyond the manifest content to focus on the text's underlying ideological and cultural assumptions. "This approach typically results in a strategic selection and presentation of analyzed text as evidence for the overall argument" (Fürsich 2009, 240). She observes that:

> Researchers who follow a line of argumentation that primarily searches for evidence of pre-established ideas, may overlook important new empowering or hegemonic textual structures.
>
> (Fürsich 2009, 244)

Carvalho (2008) has argued, similarly, that discourse analysis

> . . . must take account of the historical conditions and the context of production of media(ted) texts. To do this, the research must be 'rather open' in theoretical and methodological terms.
>
> (Carvalho 2008, 172).

The methodology for this thesis follows the recommendations of Carvalho and Fürsich. It begins with "open" textual research, rejecting the articulation of pre-established hypotheses in favour of an inductive approach which closely analyses and quantitatively records manifest news mediations of manifest expert advice. This permits something of a middle path between an entirely statistical quantitative analysis, and an entirely qualitative analysis. It allowed me to remain open to other unsuspected factors which might be impeding or assisting the flow of information about an environmental risk.

2.2.2 Other content analyses of news mediations of global warming and climate change

There is by now a substantial body of scholarly research into what the news media do with expert information about global warming and climate change. All of this research begins with

a hypothesis of what is going on in the social world, then uses content analysis to support or otherwise illuminate that hypothesis. Almost all of the content analyses of news media representations of the environmental risk of global warming and climate change reviewed for this thesis[26] are policy focused. They examine news media influence on political discourses and/or political influence on media framings. Their methodology involves analysing selected elements of news texts such as headline, overall theme or framing and, sometimes, a summary of the main topic and/or salience preferences of the first one or two paragraphs. All begin by stating the dangers which this environmental risk poses to the social world, and the consensus among climate science experts that the risk is real and based on well understood physical processes and systems.[27] They then theorise why the social world seemed to have difficulty understanding expert advice and undertake content analyses to support these theories. My thesis, on the other hand, begins with the extensive detail of the officially produced expert reports. It then examines all aspects of *New York Times* stories which used these expert reports as a source. It does not restrict the elements of these news texts: instead, the inductive approach matches all available expert information with all available news mediations of this information. Rather than establishing a handful of themes at the start of the analysis, my methodological approach allows key themes to emerge from the analysis itself. The analysis considers in detail both the expert advice and news mediations of that advice. This approach involves matching exponentially more information details than would be required for analysis of selected elements of news texts which demonstrate evidence of a handful of pre-established themes. Thus, it was necessary to limit analysis of news mediations of IPCC reports to a single news medium. To make this analysis more broadly useful, I chose a news medium whose mediations of scientific information are widely used by other news media—and other popular media— as a primary information source. Additionally, *The New York Times* is included in most other content analyses of how the news media frame the issue of climate change. This thesis analysis therefore also adds to an existing body of scholarly literature.

[26] (McComas and Shanahan 1999; Nissani 1999; Carvalho 2000, 2005, 2007; McCright and Dunlap 2000, 2003; McManus 2000; Zehr 2000; Väliverronen 2001; Dimopoulos and Koulaidis 2002; Bucchi and Mazzolini 2003; Dispensa and Brulle 2003; Weingart, Engels, and Pansegrau 2000; Boykoff and Boykoff 2004; Brossard, Shanahan, and McComas 2004; Brossard and Shanahan 2006; Antilla 2005; Schuck and De Vreese 2006; Boykoff and Boykoff 2007; Boykoff and Rajan 2007; Boykoff and Roberts 2007; Boykoff and Mansfield 2008; Boykoff 2008; Liu, Vedlitz, and Alston 2008; Olausson 2009; Sampei and Aoyagi-Usui 2009)

[27] See for example Weingart, Engels et al. (2000, 261); Dispensa and Brulle (2003, 75); Antilla (2005, 338); Carvalho (2005, 1).

Several content analyses considered journalistic values,[28] examining connections between corporate or ideological lobbying materials and their news media re-presentations. In particular, Boykoff and Boykoff (2004) have shown convincingly that the journalistic ethic of balance created a form of informational bias, encouraging news media to give equal salience to the opinions of the vast majority of climate scientists and a handful of outlier 'sceptics'.[29] Other analyses identified deliberate editorial bias. Carvalho (2005, 2007) showed that in the U.K., ideologically-driven 'quality press' such as *The Times* preferred the views of politically-supported 'sceptical' scientists; Antilla (2005) has shown the same in the U.S. with her analysis of the way that a wire service, Associated Press, treated the issue.

In related investigations, researchers have examined the degree of salience given to statements of scientific uncertainty over the issue of global warming and climate change: a 'sceptical' lobbying argument for ignoring expert advice about the risk.[30] Zehr (2000) argued that the quite different understandings of 'certainty' and 'uncertainty' held by experts and non-experts blocked non-expert understanding of what scientists were sure of, and what uncertainties still remained. Demeritt (2001) linked expert advice on climate change with emerging social world mistrust of scientists,[31] recommending for development of more active mutual trust between experts and non-experts.

Thus, existing content analyses of news treatments of the risks of global warming and climate change have critiqued application of the journalistic ethic of balance and the value assigned to conflict which encouraged equal salience to be given to political and scientific opinions. Their evidence of substantial 'sceptical' lobbying influence on news media and of deliberately political framings of this environmental risk justifies scholarly concerns about news media misinformation and perhaps explains why the focus of most such investigations has been on political discourses about the risk rather than on news mediation of original expert advice.

All of this research is useful to this thesis investigation of what the news media do with expert information because it clarifies the end stages of the information flow. In many cases it

[28] Stuart Hall described news values as a set of assumptions based upon knowledge about the audience, dominant assumptions about society and a professional code or ideology (Hall 1973). Gaye Tuchman has identified temporal aspects of news values, describing these as involving "novelty, timeliness, recency, immediacy and urgency" (Tuchman 1978); Anabela Carvalho identifies news values of "novelty, controversy, geographic proximity and relevance" (Carvalho 2007, 224) as being particularly relevant to science news.
[29] See also Nissani 1999; McCright and Dunlap 2000; Demeritt 2001; Antilla 2005.
[30] (Zehr 2000; Antilla 2005; Boykoff and Roberts 2007; Carvalho 2007; Olausson 2009)
[31] (Beck 1999; Giddens 1991)

reveals flaws in news processes and values which misrepresented expert advice, encouraging social world discourses to construct distorted or incorrect ideas of the 'realities' of the physical world and its processes.[32] My research aims to add to the existing body of scholarly research into social world constructions of the environmental risks of global warming and climate change by shedding more light on all stages of the flow of information about these risks.

All other scholarly research into news mediations of climate change begins at the point where information has already been re-shaped. These scholars use news media texts as the primary information source and examine these to support or reject a previously formed hypothesis about social discourses on a selected topic. They then seek to substantiate their hypotheses through a content analysis of news texts. Having briefly summarised the science, they then identify a handful of thematic treatments, usually numbering fewer than half a dozen discrete descriptive items, which they wish to examine. Limiting analysis of news texts to a handful of thematic treatments and including only very abbreviated summaries of scientific advice excludes the extensive and very relevant explanations of physical processes and warnings of physical risks to specific populations, environments and economies which are contained in the full documents of the IPCC reports.

My thesis compares two information source types: scientific advice and news media coverage of that advice. It seeks to discover apparently inherent differences between scientific and news media preferences and priorities. Unlike other content analyses, this research begins with a far more comprehensive base of analytical information: the full reports of the IPCC from 1990 to 2007. This approach required a detailed understanding of the full substance of the IPCC reports, to be able to match that advice with news media selections. My understanding of the information contained in the IPCC reports was tested in the intercoder reliability check. As the reliability coding report shows, identification of IPCC information in *New York Times* stories was well above the 'acceptable' range of a coefficient of .90 or greater.[33] My coding was deemed to be 98.6 per cent accurate. This suggests strongly that this analysis of *New York Times* texts caught virtually all references to information contained in all the IPCC reports. These research findings therefore are empirically verified and verifiable.

[32] See Chapter 4 for expanded discussion of these research findings.
[33] Neuendorf 2002

Also unlike all other scholarly analysis of news mediations of the issue of global warming and climate change, this analysis includes all information in all IPCC reports. Comprehensive inclusion of all scientific advice about the risk and all news media references to expert advice made it possible to identify a range of expert warnings about physical risks to specific U.S. populations, regions and economies which were ignored by *New York Times* selectors. In research, what is not present can be as or more important than what is evident. Very brief summaries of available scientific advice do not permit identification of absences of information. Another difficulty with brief summaries is that in summarising, the original information is extensively mediated. Summarisation dismisses the wealth of detail about the physical world contained in the full scientific reports. Moreover, ignoring the details of scientific advice privileges social world constructions of reality. It ignores actual processes going on in the physical world, which continue regardless of social world ideas of the risk.

To date, the scholarly focus in analyses of news mediations of the issue of climate change has been primarily on the social world rather than on expert advice. Much less scholarly attention has been paid to the details of expert information and the diverse ways that this has been treated in news media texts. My methodological approach therefore aimed to closely compare expert information priorities with news media selection, salience, framing and placement, using a combination of qualitative and quantitative analysis.

2.2.3 Quantitative and qualitative analysis

In comparing the multiplicity of details made available to the news media in expert reports with the (much smaller) multiplicity of details selected by journalists from these reports, a qualitative approach was needed first, followed then by quantification of elements which had been qualitatively identified. First, I qualitatively analysed all IPCC assessments and their coverage in news media texts to identify all occurrences of IPCC information in news coverage of those expert assessments. I coded each individual information item selected in news texts. These information codes were then entered into a statistical analysis programme: Statistical Package for Social Scientists (SPSS). This programme permits cross-comparisons of many variables. It can correlate information items with their section placements and track

changes in those information and section placements over time. I used a combination of SPSS and the Excel programme to identify the most frequently and least frequently selected information items: overall; in each section; and across time. This provided useful insights into underlying trends and patterns of news selection and salience decisions which I then checked by further qualitative analysis of relevant news texts. SPSS permitted ready identification of individual texts containing specific information items. These could then be retrieved and examined more closely to confirm or expand the details of apparent emerging trends which have been quantitatively identified.

2.2.4 Comparing expert and news media texts

One gap in existing scholarly research into news mediations of expert advice about global warming and climate change is that there has not been detailed comparison of expert and news media priorities. Nor has there been quantitative comparison of the multiplicity of expert informational details with news selection and placement preferences. No analysis has been made of mentions of the risk in otherwise unrelated stories.

Weingart, Engels, and Pansegrau (2000) examined German scientific, political and news media publications. Their intention was to establish the systemically different understandings of the issue within scientific, political and media communities.[34] Their primary focus was on how climate change discourses evolved in each of these separate communities,[35] rather than on the transformations which occur as expert advice moves through news mediation to social world discourses. Dispensa and Brulle (2003) included two scientific journals—*Science* and *Nature*—in their analysis, but only for a simple comparison with mainstream news media of their support for, opposition to or neutrality on the contention that global warming is caused

[34] Weingart, Engels, and Pansegrau's (2000) analysis of 23 scientific publications categorises these first by broadly coding the amount of "attention" which they pay to global warming (pp 264–265). They go on to cite statements of concern in the scientific literature about potentially dangerous climate change (pp 266–267) and discussion of the extent to which human activities could be blamed for this, linking these scientific statements with political discourses such as the controversy between developed and developing countries over who might be to blame for human-caused climate change, and also over how much responsibility each country should bear for emitting greenhouse gases. They then discuss attempts in the German scientific literature to link scientific understandings with contemporary political discourses on the issue (Weingart, Engels, and Pansegrau 2000, 268–270).

[35] (Weingart, Engels, and Pansegrau 2000,264)

by human activities. They did not compare the details of expert reports with news selections and mediations of those reports. Antilla (2005) examined 32 scientific studies which had been reported in U.S. news texts in 2003–2004, but her analysis did not compare informational details: rather, it summarised the findings of these studies into six broad categories: predicted or observed impacts; human causes or non-causes of the risk; emission reduction and adaptation planning.

Most content analyses of news treatments of global warming and climate change compare summarised thematic preferences and/or framing strategies of several or many news media outlets.[36] They do not closely analyse all texts in their analytical sample, nor do they directly compare information selected for news texts and information contained in the source scientific documents. Most make quantitative statements of the overall numbers of stories identified for analysis.[37] They then reduce their sample size to manageable proportions by

[36] McComas and Shanahan's analysis (1999) spanned 1980–1995 and considered global warming and climate change stories published in *The New York Times* and *The Washington Post.* Nissani's (1999) analysis of five months' coverage of global warming and climate change in 1997 focused on *The Christian Science Monitor*, *The New York Times*, *The San Francisco Monitor* and *The Washington Post.* McManus (2000) took a very short time-frame—the duration of the international conference of the Kyoto Protocol negotiations (22–17 November 1998) —and analysed 30 stories related to these negotiations published in five mainstream daily Australian newspapers (*The Sydney Morning Herald*, *The Age*, *The Courier-Mail*, *The Australian*, *The Daily Telegraph*), one alternative weekly newspaper (*The Green Left Weekly*), and one international weekly newspaper (*The Guardian Weekly/The Washington Post/Le Monde*). Weingart, Engels, and Pansegrau (2000) examined 23 scientific publications from 1975–1995; the minutes of the German Parliamentary Commission on "Environment, Nature Conservation and Nuclear Safety" from 1987–1994; mainstream news stories published between 1975–1995 in the German weekly newspaper *Der Spiegel*; six years of stories in the national daily newspaper *Die Frankfurter Allgemeine Zeitung* and a special series of 17 articles on climate change published in the national daily newspaper *Süddeutsche Zeitung*. Zehr (2000) focused on climate change and global warming stories published from 1986–1995 in *The New York Times*, *The Wall Street Journal*, *The Chicago Tribune* and *The Los Angeles Times*. Dispensa and Brulle (2003) analysed stories on global warming published in 2000 in newspapers from three countries (*The New York Times*, *The Washington Post*, *The Helsingin Sanomat* and *The New Zealand Herald*), and two international scientific journals (*Science* and *Nature*). Boykoff and Boykoff's (2004) analysis considered global warming stories published from 1988–2002 in *The New York Times*, *The Washington Post*, *The Los Angeles Times* and *The Wall Street Journal*. Brossard anf Shanahan (2004) compared articles on global warming and climate change published in *The New York Times* and *Le Monde* from 1987–1997. Antilla (2005) searched a database of 255 U.S. newspapers for stories on global warming and climate change published over one year (1 March 2003–29 February 2004). Carvalho (2005, 2007, 2008) examined articles on the same topics published between 1985 and 2000 in the U.K. newspapers *The Guardian*, *The Times* and *The Independent*. Boykoff and Mansfield (2008) examined four U.K. tabloids: *The Sun* (and *News of the World*), *The Daily Mail* (and *Mail on Sunday*), the *Daily Express* (and *Sunday Express*), and *The Mirror* (and *Sunday Mirror*) for their coverage of climate change over a seven-year period (2000–2006). Liu, Vedlitz, and Alston (2008) examined stories on climate change published in one single newspaper, *The Houston Chronicle*, from 1992–2005. Olausson (2009) examined stories on climate change, global warming and the greenhouse effect published between 12 September 2004–5 September 2005 in three different Swedish newspapers: a national broadsheet (*Dagens Nyheter*), a national tabloid (*Aftonbladet*) and a local newspaper (*Nerikes Allehanda*). Sampei and Aoyagi-Usui (2009) analysed daily Japanese national newspaper stories on global warming and climate change from January 1998–July 2007 published in *Yomiuri Shimbun, Asahi Shimbun* and *Mainichi Shimbun*.

[37] McComas and Shanahan's (1999) analysis of articles published between 1980–1995 in two U.S. newspapers was, like Brossard and Shanahans's (2004), restricted to articles where "global warming", "climate change" or "greenhouse" appeared in the headline and were a primary theme of the article text. They identified 376 such

excluding texts where "global warming" or "climate change" are only mentioned;[38] excluding texts appearing in specific sections—for example editorials, letters, op-eds, lifestyle sections;[39] and, sometimes, any text not appearing on the front page or not mentioning global warming or climate change in the headline. Having thus limited the size of the sample, the methodology has been to identify a small suite of topics or framings, and/or select individual articles for closer analysis to illustrate arguments supporting the researcher's original hypotheses.[40]

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articles. Boykoff and Boykoff's (2004) analysis began with 3543 articles on global warming published between 1988–2002 in four U.S. newspapers. Random sampling reduced this number to 636 articles selected for closer analysis. Brossard and Shanahan's (2004) sample was limited to stories with "global warming", "climate change" or "greenhouse" in both the headline and the article text, giving them 530 articles from *Le Monde* and the *New York Times* over a decade (1987–1997). Antilla (2005) searched 255 U.S. newspapers for mentions of "climate change" or "global warming" published between 1 March 2003–29 February 2004. After eliminating duplicates, she was left with 544 articles. She eliminated unique accounts published by only one newspaper, leaving 298 articles which discussed 32 scientific studies. She gathered wire and syndicated news service articles about these studies, allocating four different framing categorisations to them: valid science, ambiguous cause or effects, uncertain science and controversial science. She located the studies and related press releases and categorised this source information into six broad categories covering predicted or observed impacts, human causes or non-causes of the risk, emission reduction and adaptation. She then focused her analysis on the wire and syndicated news service articles. Carvalho's (2005) search for articles in three British newspapers published from 1985–2000 where "climate change" was a major theme produced 4487 articles, with a total of more than 9000 articles containing the keywords "climate change", "global warming" or "greenhouse effect". She then severely limited the articles for analysis by focusing on selected critical discourse moments over the time period analysed. The Liu, Vedlitz, and Alston (2008) analysis of one regional U.S. newspaper's coverage of "climate change", "global warming" and "greenhouse gas" began with 1197 articles published between 1992–2005, of which 402 were excluded because their topics were "irrelevant to climate change". Sampei and Aoyagi-Usui's (2009) search of three Japanese newspapers for articles containing "global warming" or "climate change" from January 1998–September 2007 began with 25,532 articles. Their analysis examined the overall numbers of articles, with sub-sections analysing article numbers around defined events such as the launch of a Japanese emission reduction campaign. They compared some sub-section numbers with a contemporaneous public opinion survey. They did not analyse textual details.

[38] All content analyses of news mediations of global warming and climate change reviewed for this thesis excluded stories where the risk was only briefly mentioned.

[39] Boykoff and Boykoff (2004) excluded all 'Opinion' section texts, and all 'lifestyle' section texts. Antilla (2005) excluded all 'Opinion' section texts, and also interviews and book reviews. Carvalho (2005) excluded letters to the editor but included editorials. Olausson (2009) excluded all 'Opinion' section texts.

[40] Brossard and Shanahan (2004) followed the classification pattern established by McComas and Shanahan (1999), identifying seven themes: new evidence or research, scientific background, consequences, economics, domestic politics, international relations and current weather. (McComas and Shanahan (1999) added two further classifications, of consequences, identifying mentions of changes in temperatures, and time range for temperature change.) Carvalho (2005, 2007, 2008) analysed layout choices—page number, size, headline; *objects* (themes) of discourse; actors, language and rhetoric; discursive strategies; and ideological standpoints. Dispensa and Brulle (2003) coded all articles analysed into three categories: 'support' (supporting the assertion that global warming is caused by human activity and is happening); 'against' (opposing the assertion that humans cause global warming and that it is happening), and 'both' (containing both supportive and unsupportive statements). McCright and Dunlap (2000) coded statements in corporate lobbying materials for three broad claims: that the evidentiary basis of global warming is weak and even wrong; that global warming would be beneficial if it were to occur; and that global warming policies would do more harm than good. Each of these categories was then broken into 3–5 sub-sections. McManus (2000) coded for prominence of placement, and for "tone", classifying headlines and sub-headings according to whether they took a positive, neutral or negative tone towards the Kyoto Protocol conference of 1998 (COP4). Olausson's (2009) study of Swedish media representations of global warming and climate change coded for themes of collective action against global warming, focusing on the two particular demands of mitigation action (reducing emissions) and

My analytical aim was to examine what a selected news medium did with expert information around the time of the release of the authoritative reports on the issue, and therefore all references to the issue were deemed relevant. All section placements and all brief mentions were included. My intention was to establish a full picture of a news medium's treatment of the issue of global warming and climate change. The analysis needed therefore to be inclusive, since news editors pay attention to all occurrences of a particular topic, to make sure it does not become 'overworked', or 'tired'. Their attention falls on all stories, whether they be 'hard' news stories, 'opinion' pieces, magazine or lifestyle section articles or brief mentions of an issue in an otherwise unrelated story.

All other content analyses of news media treatment of expert advice on global warming and climate change exclude news texts which only mention global warming and climate change in stories about entirely unrelated topics. I was interested in exploring the extent to which ideas of global warming and climate change were entering popular discourses. I hypothesised that apparently irrelevant mentions of the issue could provide rich indications of news media assumptions about popular discursive uptake of a particular issue or idea. All popular media insert appeals or references to other discourses assumed to be contemporaneously relevant for their audiences, in an attempt to attract audience attention to a particular text.[41] I hypothesised that changes in the frequency and section placements of mentions of global warming and climate change in otherwise unrelated stories, tracked over time, could indicate journalistic assumptions that the issue was becoming a part of the discourses of a particular target audience.

Comparison of expert advice with its representations in news media texts establishes differences between expert and news media priorities and preferences. Section placement of particular information items clarifies news media assumptions about the discourses of the various section audiences. Mention of the environmental risk in otherwise unrelated stories shows a news media assumption that the issue is a part of contemporary popular discourses. Analysis of changing news selection preferences in various newspaper sections over time can

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adaptation action (reducing or preventing climate change risks). Sampei and Aoyagi-Usui's (2009) analysis of 25,532 articles published in three prominent Japanese newspapers detailed date, page number, article size and headline, using quantitatively derived graphs to show changes over time. Weingart, Engels, and Pansegrau (2000) made an initial coding for "attention to global climate change" in German scientific, political and media discourses. They then classified the thematic contexts and the ways that the credibility of statements was established. Zehr (2000) investigated two themes: representations and salience of scientific uncertainty, and uses of scientific uncertainty to ". . . construct boundaries in the popular press between scientists' knowledge claims about climate change and public reconstructions of this knowledge".

[41] See Chapter 3 for more detailed discussion of news media attempts to attract audience attention.

reveal assumptions of changes in the discourses of identifiable discursive communities. Analysis of news mediations of expert advice over time, allied with expert documentation of observed climatic and temperature aberrations, can track the influence of physical planetary changes on social world discourses.

2.2.5 'Coverage of record'

'Coverage of record' is one further analytical tool which can illuminate fundamental differences between news media and expert understandings of an environmental risk. When an official report is issued, most news media pay greater attention to their responsibilities of providing an 'objective' summary of that report, in keeping with their perceived archival role of acting as 'newspapers of record'[42] and fulfilling their role as 'the fourth estate': that is, as the guardians of the public interest.[43] Stories about a particular topic published some time before or after the release of an official report may give greater salience to other non-official opinions. However, news ethics and professional practice dictate that on the day of official release of a report, the news media will make a greater effort to provide a relatively unbiased and comprehensive record of that report's findings and to contextualise information contained in those reports to explain, again in a relatively unbiased way, how that information might be relevant to their audiences. This methodology makes the assumption that news 'coverage of record' reveals news media understandings of a physical risk with a significantly lower chance of contamination by the influence of political or other controversies circulating in the social world. It offers the best chance of discerning fundamental differences between news media perceptions of risk, and those of expert scientists. News texts published on the day of release are more likely to give priority to expert advice rather than to ways that expert advice might affect contemporary political discourses. Chapter 5 compares IPCC information priorities with selections made for *The New York*

[42] (Martin and Hansen 1996)

[43] The phrase "the fourth estate" has been taken historically to imply a watchdog role for the news media: one which carries the responsibility of acting as a guardian of the public interest. The 19th century poet, historian and politician Lord Thomas Macaulay observed that Parliamentary reporters had become "a fourth estate of the realm. The publication of the debates, a practice which seemed full of danger to the great safeguards of public liberty, is now regarded by many persons as a safeguard tantamount, and more than tantamount, to all the rest together" (Macaulay 1907, 71; cited in Sparks 1988).

Times ‘coverage of record’ of all IPCC reports, qualitatively assessing the IPCC priorities and *The New York Times* selections.

2.3 Analytical questions

2.3.1 Quantitative questions:

1. Which IPCC information was selected?
2. Which were the most frequently and least frequently selected information items?
3. In which sections were information items placed?
4. Did news selector preferences for different information categories differ depending on section placement?
5. Were there differences of frequency or proportionality between section placements of substantive information selections, and brief mentions of the overall issue?

2.3.2 Qualitative questions arising from quantitative analysis:

2.3.2.1 Expert-news media interface

1. Does examination of expert source material and news media selections from this information show differences in expert and news media priorities?
2. Does comparison of expert advice and news selections from this advice show different expert/news media preferences for particular items of information, and/or particular information categories?
3. In news selections from expert advice, which expert priorities were given salience and which were minimised or omitted?

2.3.2.2 News media-social world interface

1. In news framings of expert advice, who were the primary definers: scientific experts or political institutions?
2. Is there evidence of a news media preference for framing an environmental risk as political rather than physical?

2.3.2.3 Expert-social world interface

1. Is there evidence of Ulrich Beck's description of emerging social world mistrust in scientists and scientific information?

2.3.2.4 Physical-social world interface

1. Were there connections between manifestations of physical impacts of global warming and climate change and changes in news media assumptions about social world discursive constructions of this environmental risk?
2. Was there evidence of a social world reluctance to accept that that human activity could damage physical systems?
3. Was there evidence of a U.S. framing of global warming and climate change as globally dangerous but locally irrelevant?
4. Do increases in, and section placements, of mentions of global warming in otherwise unrelated stories correlate with expert documentation of aberrant temperature and climate?

2.3.2.5 News values and concepts of time

1. Are there differences between expert priorities for explaining long-ago physical contexts or long-term future risks and news selector preferences for this expert information?
2. Does the news value of 'immediacy' affect news media information selection frequencies when expert information relates to a long-term environmental risk?
3. Does analysis of news media information selection frequencies suggest difficulties which news values of 'novelty' and 'sensational' information may pose to clear communication of a long-term environmental risk?

2.4 Analytical method

This methodology aimed to closely examine expert advice and news mediations of that advice. I therefore selected one source of expert advice—the assessments of the IPCC, one country—the U.S., and one newspaper from that country—*The New York Times*. This limited the analysis to proportions manageable for a single researcher. This analysis compares the official records of scientific advice and news mediations of that advice: the published reports of the IPCC and news stories about those reports published in *The New York Times*. In any publication exercise, there are always production contexts which affect the final product. In the case of the IPCC, the systems for appointing IPCC experts and, particularly, the lead

writers for each IPCC section, would affect salience decisions and focus. In the case of *The New York Times*, the political preferences of the publication's owners and editors, the day-to-day decisions about which section any news story should be placed in; and the particular interests and preferred sources of the journalist concerned, similarly would affect information selection preferences, salience and framing choices, and the impact which these might have on *New York Times* audiences. Further research might wish to more closely investigate the production contexts of these two publishing organisations. The purpose of this analysis, however, was to examine what information was made available to the non-expert social world. It required documentary evidence to permit research which was verifiable and replicable. This analysis therefore examines the end products of production: the published versions of IPCC reports and *New York Times* stories, in an attempt to discern from these news media assumptions about social world discourses concerning global warming and climate change.

The discursive processes which shape social constructions of 'reality' at any particular moment in time are multiple, complex and infinitely interactive. As van Dijk has pointed out, the fundamental problem for any discourse analyst is how to refine the analytical focus to a point where the contexts and situations influencing a discourse become clear enough to make analysis possible:

> Indeed, how do we know or decide where to begin and where to stop such an analysis, since obviously it may begin with details of the interaction, the properties of speakers or of settings, but may stretch to such vast societal "contexts" as contemporary capitalism, neoliberalism, globalization, patriarchy, postmodernism, and so on.
>
> (van Dijk 2004, 163)

Van Dijk suggested that it would only be possible to make a relevant analysis of the contexts affecting any discourse if those contexts were both defined, and limited. Critical discourse analysis reduces the complexities by choosing a single issue and examining its mediation at one critical discourse moment, and longitudinally over time.

Even in the restricted field of analysis of media representations of the issue of global warming and climate change, Anabela Carvalho (2008) has noted the "vast" volume of materials which may need to be analysed, describing it as "unmanageable" for a sole researcher:

> The suggested solution is to analyse some periods exhaustively and then focus on "critical discourse moments", which seems a more adequate option than random sampling or an arbitrary form of choice of texts.
>
> (Carvalho 2008, 173)

The analysis methodology used in this thesis was guided by Carvalho's suggested solution to the problem of reducing the object of analysis to manageable proportions. One single issue was selected—the environmental risk of global warming and climate change. One critical discourse moment and one expert source were selected: the official release dates of the Intergovernmental Panel on Climate Change (IPCC) assessments in 1990, 1995, 2001 and 2007. Because the IPCC reports are issued only once every four or five years, I also included a supplementary source of expert information about observed physical impacts, to more carefully scrutinise news media selections and omissions of information about contemporary climatic and temperature extremes: the annual statements on global climate issued by the World Meteorological Organization.[44] My approach has been to exhaustively analyse selected expert and news media texts within small analytical windows set around the critical discourse moments of the official release of each IPCC report.

Any news media text reporting on expert advice will contain at least several and usually more than a dozen selections of individual pieces of information from that advice. Even with the limitation of a single expert source, and a news medium from just one country, analysis of all *New York Times* selections from the IPCC reports, spanning a 17-year time period, would have yielded too many texts for careful close analysis of information selection, salience and placement choices.[45] I therefore devised a sampling strategy which set shorter-term analytical windows around the release of every IPCC report (see sampling section later in this chapter).

These limitations yielded an analytical sample of 474 stories: comparable to the sample sizes of other content analyses of news mediations of global warming and climate change.[46] Unlike other content analyses, I did not limit the analysis to summary descriptions of themes and

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[44] http://www.wmo.int/pages/prog/wcp/wcdmp/statement/wmostatement_en.html

[45] Between January 1990 and December 2007 *The New York Times* published 6440 articles mentioning "global warming" and 6542 mentioning "climate change".

[46] McComas and Shanahan (1999) worked from a core sample of 376 articles. Nissani (1999) analysed 100 articles. Weingart, Engels, and Pansegrau (2000) based the media section of their analysis on 478 media articles. Dispensa and Brulle (2003) analysed 164 articles. Boykoff and Boykoff (2004) used a randomly selected sample of 636 articles. Brossard and Shanahan (2004) used a core sample of 530 articles. Antilla's (2005) core sample totalled 544 articles. Liu, Vedlitz, and Alston (2008) began with 795 articles which they reduced by focusing only on those texts linking climate change to specific issues (e.g. agriculture, international cooperation, energy, science research and development). Olausson (2009) analysed 141 news items.

framings. Rather, I closely analysed each text to identify every selection of IPCC information. This permitted a comprehensive comparison of news media and expert information preferences. Identification of summary themes and framings facilitates comparison with social world discourses but does not identify what expert information was preferred, what was minimised, or how expert priorities differed from those of the news media. My analysis, while its sample size is comparable to other content analyses, involves analysis of many more variables. It also involves close textual analysis rather than summary descriptions of headline, overall theme and/or the first several sentences.

2.4.1 Selecting objects of analysis

Analysis of what the news media do with expert information on the environmental risk of global warming and climate change could select any country and any news medium, since expert information on this risk is globally available and since news processes and philosophies are broadly similar regardless of the outlet.[47] For several reasons, I selected the United States and *The New York Times*. Of all countries, the U.S. has shown the greatest confusion and controversy over the existence and extent of the risks of global warming and climate change. This possibly is the reason that the majority of scholarly attention to news mediation of this issue has focused on U.S. news media.[48]

European news media and policy makers fairly rapidly accepted the existence of the risk of global warming and climate change and turned their attention to international attempts to reduce or prevent the risk, and to proposed adaptation and mitigation strategies.[49] In the U.K., Carvalho (2005, 2007, 2008) has shown the biased ideological stance of *The Times* newspaper. However, unlike the situation in the U.S., in the U.K. the need to take action to prevent dangerous climate change was recognised early on at the highest political levels. In the late 1980s the Conservative Prime Minister Margaret Thatcher recognised the threat of climate change and led moves to establish a climatic research centre, which began work in

[47] As an example, the 'what, where, when, who, why, how' rule of news writing applies whatever the news outlet, as do the news values of balance, immediacy, novelty, and relevance to audience contexts.
[48] (McComas and Shanahan 1999; Nissani 1999; Zehr 2000; Dispensa and Brulle 2003; Boykoff and Boykoff 2004; Brossard and Shanahan 2004; Antilla 2005; Liu, Vedlitz, and Alston 2008)
[49] (Weingart, Engels, and Pansegrau 2000; Dispensa and Brulle 2003; Olausson 2009)

1990. The UK Meteorological Office's Hadley Centre is now an acknowledged world leader in climate research. Successive British Governments have firmly stated the urgency of the risks in international Climate Convention and Kyoto Protocol negotiations. Despite the significant influence of U.K. news media owned by Rupert Murdoch, who until 2006 expected his news media empire (including *The Times*) to take a 'sceptical' line on global warming and climate change, controversy and confusion over the issue among both media and publics in the United Kingdom was not as pronounced as in the U.S.

In the U.S., sceptical lobbies gained dominance even during the Democratic administration of Bill Clinton (1993–2001)[50] and this dominance was enhanced during the subsequent Republican George W. Bush administration (2001–2009).[51] In the U.S., political discourses and news mediations focused almost exclusively on emission reduction (mitigation), virtually ignoring expert warnings about the urgent need for strategic adaptation and emergency planning. This endangered the health and safety, and the economic welfare, of U.S. populations. Thus, it seemed appropriate to select the U.S., in the hope that analysis of U.S. news mediations of expert advice about this environmental risk might contribute to improved understanding of why a particular nation became a 'problem' for the global community, and for its own citizens.

Having selected a 'problem' country for analysis, I then selected a 'best possible case' news medium from that country, based on the hypothesis that if the news media outlet most likely to accurately represent expert advice still showed significant differences from expert preferences in selection and emphasis of expert information, it was likely that other underlying processes were going on, both in media practices and in the interlinked social discourses; and that these would be revealed in a close comparison between the original expert reports and the mediated texts from the exemplar medium.

People get most of their information about science from the media,[52] and most journalists and most other media get their information about science primarily from the 'prestige' or 'quality' press.[53,54] I therefore wanted my content analysis to be of one of the 'prestige press'

[50] See Chapter 4, Section 4.2.11 discussion of the tendency in the U.S. for opinions on global warming to vary according to political affiliation.
[51] (Gelbspan 1997, 2004; Nissani 1999; McCright and Dunlap 2000; Dispensa and Brulle 2003; Boykoff and Boykoff 2004; Antilla 2005; Anderson 2009)
[52] (Gerbner et al. 1981; Fahnestock 1986; Friedman, Dunwoody, and Rogers 1986; Nelkin 1987; LaFollette 1990; Nelkin 1994; Bucchi 1996; Beck 1999; Wilson 2000; Allan 2002; Bucchi and Mazzolini 2003; Boykoff and Boykoff 2004; Cook, Pieri, and Robbins 2004; Mythen 2004; Brossard and Shanahan 2006)
[53] (Wilson 2004; Suleski and Ibaraki 2009; Pew Research Centre's Project for Excellence in Journalism 2010)

U.S. newspapers. I chose *The New York Times* for analysis because my own observation as a specialist writer on global warming and climate change, and the observations of climate scientists and environmentalists expressed to me in private conversations, were that *The New York Times* was more likely than most U.S. newspapers to present relatively unbiased and accurate information about the issue. This newspaper is widely recognised as a "newspaper of record"[55] by audiences and other media workers. It is an opinion-leader, not only among policy makers but also for other journalists who use its reports as the source of most of their own information about global warming and climate change.[56] Closely analysing one news medium places some limitations on the extent to which research findings can be generalised as applying also to other news media. However, for an analysis of news mediations of scientific information, *The New York Times* is particularly suitable for attempts at broadening the analysis, since it is widely used by other journalists as the primary source of scientific information.[57] It therefore wields disproportionate influence in framing broader news mediations of scientific issues. Almost all scholarly analyses of U.S. news mediation of the environmental risk of climate change include this publication in their analysis. Further and different analysis of *New York Times* coverage of the environmental risk of climate change thus contributes to an existing substantial body of scholarly research.

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[54] Kris Wilson surveyed news media environmental reporters to discover their primary sources for information on global warming and climate change. He found that newspapers were clearly the dominant source: "Interviews with scientists and use of science journals placed a distant second and third, respectively. All other sources, including television news, previous schooling, government officials, and politicians were used very infrequently. All three television sources—public television specials, national television news, and local television news—accounted for a total of only 3 percent of reporters' primary sources" (Wilson 2000: 4). See also Bennett 2012.

[55] Martin and Hansen note that specific references to "newspaper of record" in archival, historical and legal texts suggest an expectation that such a newspaper will: "1) provide relatively comprehensive news reports of the day, 2) publish authoritative records or official notices and 3) perform as an archival, organized chronicle of events" (Martin and Hansen 1996, 582). *New York Times* archivist Lora Korbut notes that the phrase "newspaper of record" was first published in that newspaper in 1927, when the newspaper sponsored an essay contest to promote its annual index. Entrants were asked to elaborate on the contest's title, "The Value of *The New York Times* Index and Files as a Newspaper of Record" (Okrent 26 April 2004). In 2004 the newspaper acknowledged that in five months it had received 589 messages describing *The New York Times* as a "paper of record". Okrent (2004) quoted a deputy editor, Katherine Bouton, who attempted to distance the publication from the idea: "We understand now that all reporting is selective. With the exception of raw original source material, there really isn't anything 'of record', is there?" Even so, there appears to be a widespread expectation that the publication will and does act as a "newspaper of record". An April 2010 Google search for "*The New York Times*" and "newspaper of record" produced 229,000 results. The publication was named the "newspaper of record" for the corporate organisation Fortune 500. A search of one month's *New York Times* issues (April 2010) for the phrase yielded 10,000 results. In Amazon's Alexa Internet listing of top newspaper sites, *The New York Times* topped the list (Alexa, 2010).

[56] Bennett (2012: 215) writes that ". . . most editors take their leads from the wire services and from the prestige papers, such as the *New York Times*, the *Washington Post*, and, increasingly, *The Wall Street Journal*. He describes *The New York Times* as one of the U.S. news organizations ". . . still striving to remain . . . high-quality" (Bennett 2012, 226).

[57] Wilson 1996, Suleski and Ibaraki 2009; Pew Research Center's Project for Excellence in Journalism 2010

2.5 Sampling methodology

Analysing news media coverage of an issue over a long time period demands somehow reducing what can be many thousands of news articles to a manageable number. Accordingly, I followed Carvalho's (2008) recommendation to select particular "critical discourse moments" for analysis. The IPCC issued three assessment reports in 1990 and 1995, and four in 2001 and 2007. The official release dates of all of these assessment reports are taken as the "critical discourse moments" for analysis. I used qualitative analysis to compare IPCC priorities with information selections made in *New York Times* 'coverage of record' published immediately following the reports' official release (see Chapter 5). I set six-week analytical windows around each report release date and collated every *New York Times* story within those windows which mentioned "global warming" or "climate change". I closely analysed each text to identify every selection of IPCC information. Some other content analyses also searched for "greenhouse" or "greenhouse effect":[58] this analysis did not, making the assumption that global warming and/or climate change would of necessity be mentioned in any discussion of the processes of the greenhouse effect and the environmental risk of accelerated warming of the global greenhouse. All of these information selections were coded and entered into the SPSS programme for quantitative analysis.

The value which the news media place on novelty and immediacy means that a short-term analytical window around a significant event will capture the bulk of related news mediation. Regardless of the significance of any official report (or any event), news media attention is short-lived, displaying a pattern of increasing and then diminishing attention around a relatively narrow time frame. When an official report is deemed to be significant, the news media will publish 'coverage of record' on or immediately after that report's official release date. If the report is deemed to be particularly significant, its findings may be previewed in stories published from a day to a couple of weeks before the official release date. Similarly, findings from a particularly significant report may be further detailed or developed in follow-up stories which usually appear within days or up to several weeks after the official release of

[58] (McComas and Shanahan 1999; Nissani 1999; Brossard and Shanahan 2004; Carvalho 2005; Liu, Vedlitz, and Alston 2008; Olausson 2009)

the report. This pattern of coverage reflects the short-term and cyclical nature of news processes.[59] Public attention is assumed to be raised initially by preview stories, highlighted by the 'coverage of record' on the day of the report's official release, and then further informed by follow-up stories. After a relatively short period of time, news editorial decision makers assume that public attention then moves on to other topics and discourses. The more intensive focus on the issues raised by the report in question diminishes or vanishes. In news jargon, after a relatively short period of time, any issue becomes "stale", or "old news" if no "new angle" to the issue is perceived.

This pattern of rising and then diminishing attention has been articulated in broad terms by sociologist and public policy analyst Anthony Downs (1972), who proposed that public attitudes to any domestic issue, even those apparently crucially important to society, seemed to follow a systematic "issue-attention cycle". Downs traced the ways that any one issue ". . . suddenly leaps into prominence, remains there for a short time, and then—though still largely unresolved—gradually fades from the center of public attention" (Downs 1972, 38). Many scholars studying news mediation of the issue of global warming and climate change have noted short-term occurrences of attention patterns which map onto the Downs cycle,[60] generally noting its shortcomings when a long-term environmental risk is being considered. For the purposes of examining news media treatments of expert information around the "critical discourse moments" of the official release dates of the IPCC reports, news media practices of short-lived attention to any issue and the principles of the Downs cycle can both be used to justify setting a short-term analytical window for selection of relevant news media texts.

2.6 Theory and practice: setting the analytical window time-frames

[59] In their discussion of news selection choices and practices, Allan Adam and Carter identify as one important factor the primary news interest in spectacular and short-term specific events. This difference between "event-centred" and "issue-centred" news coverage, they argue, means that ". . . potential sources capable of placing the event in question into a larger context are regularly ignored, trivialised or marginalised" (Allan, Adam, and Carter 2000, 9).

[60] (Trumbo 1996; McComas and Shanahan 1999; McCright and Dunlap 2000; Newell 2000; Wilson 2000; Brossard, Shanahan, and McComas 2004; Boykoff and Boykoff 2004; Boykoff and Roberts 2007; Anderson 2009)

While in theory the intention of setting a six-week analytical window around the release of each IPCC report seemed straightforward, in practice there were three difficulties. First, in 1990, 1995 and 2001 the six-week windows around each individual report overlapped.[61] Second, in 1995 the IPCC did not officially release its full reports, releasing instead only the Summaries for Policy Makers. Third, the 2007 increase in news media stories about global warming and climate change was so great that to include all texts within six-week windows around the release of the 2007 IPCC assessment reports would have overwhelmed a sole analyst. In 1990 the six-week windows around release of the IPCC reports yielded 68 stories which included reference to "global warming" or "climate change". In 1995 there were just 33 such stories published in the six-week windows around release of the Summaries for Policy Makers. In 2001 this figure rose to 104. In 2007 (the only report year where the analytical windows did not overlap), six-week windows would have yielded 1629 stories which referred to "global warming" or "climate change".

The methodological solution to the difficulties of analytical window overlap and the 1995 release of only the Summaries for Policy Makers was to accept the overlaps and the 1995 lack of full report official releases, and to assume that even with imperfectly aligned windows and different types of reports released in 1995, analysis of information selections still would produce evidence of differences between expert and news media selections, priorities and preferences. The statistical analysis did indeed reveal clear differences between preferred information categories, and clear shifts in news media selection preferences over the 17-year analytical period.

The solution to the overwhelming numbers of texts available for analysis in 2007 was to use a six-week window around the release of the IPCC's Science Working Group report, to permit precise comparison with news media treatment of the previous three Science Working Group reports. Analysis of news media treatments of the remaining three IPCC 2007 reports was then limited to one-week windows: three days before and after the official report release dates. Given the substantially greater news media interest (presumably indicating a

[61] The IPCC's 1990 Working Group One report (Science) was released on 25 May; its Working Group Two (Impacts) report was released on 16 October; its Working Group Three report (Response Strategies) was released on 9 June. In 1995, the WG1 Summary for Policy Makers was released on 30 November; the WG2 Summary was released on 24 October; the WG3 Summary was released on 29 July. In 2001 the full WG1 report was released on 20 January; the WG2 report was released on 16 February; the WG3 report was released on 3 March and the Synthesis Report was released on 29 September. In 2007 the WG1 report was released on 2 February; the WG2 report was released on 6 April; the WG3 report was released on 4 May and the Synthesis Report was released on 17 November.

substantial rise in popular interest) in global warming and climate change in 2007, the methodological assumption was that the week surrounding release of the 2007 reports would capture a relatively accurate balance of news media information selection preferences.

One further practical difficulty was that the *New York Times* archival recording system changed after 2001. While 1990, 1995 and 2001 stories all recorded the page number on which the text was placed, this information was no longer available for the 2007 stories. Nor, in 2007, did the archive register whether a story had been placed on the front page—an important salience marker. I dealt with this difficulty by noting front-page placement when I was discussing textual details of pre-2007 stories, and by otherwise simply being grateful that the archiving system still was consistent in logging any news text's section placement—which was a key part of my analysis.

The quantitative analysis therefore is not absolutely precise, but offers strong indications of news media preferences and their differences with expert priorities.

2.7 Data analysis

The analysis took four parts. First, a qualitative comparison of IPCC reports and *New York Times* 'coverage of record' published immediately after the official release of those reports examined similarities and differences between expert information priorities and *New York Times* information and salience preferences (Chapter 5). Second, *New York Times* information selections over the entire analytical period were quantitatively analysed to establish highest and lowest frequency information preferences (Chapter 6). These were compared with IPCC information priorities. Third, quantitative analysis correlated information categories with their section placements to establish differences in news selector assumptions about the interests and contexts of different target audiences (Chapters 3, 4 and 7). Again, these quantitatively established selections and placements were compared with IPCC information priorities. Fourth, mentions of global warming and/or climate change in otherwise unrelated stories were quantitatively analysed. Numbers of mentions were correlated with their section placements to identify news writer assumptions that the issue of

global warming and climate change would be familiar and therefore appealing to the various target audiences for the different sections of *The New York Times* (Chapter 3, Section 3.10).

The starting point for this analysis was the official assessments of the risk of global warming and climate change, contained in the Intergovernmental Panel on Climate Change Assessment Reports of 1990, 1995, 2001 and 2007. There are many stages of mediation of expert information on any one issue, even before it reaches the stage of being considered ready for broader dissemination to non-experts. In the case of climate change, where the IPCC has been charged[62] with providing an authoritative assessment of all relevant research, there is an extensive process of expert appointment, research scrutiny and review as the full reports are drafted.[63] The three IPCC Working Groups which, broadly, are tasked with assessing the science of climate change, the likely impacts and possible response strategies then prepare summaries for policy makers. These latter documents aim both to summarize the scientific advice, and to place it into a perspective useful for policy makers.[64] They become the *de facto* reference documents for the ensuing policy discourses on the issue. These summaries are only a small part of the overall information made available to the news media and to policy makers when the reports are officially released. In considering what the news media do with available expert advice, this analysis considers information available in the summaries for policy makers and in the full reports.

The 1990 IPCC assessment reports each filled around 500 pages. By 2007 each assessment report stretched to over 1000 pages. Over the entire 17-year analytical period, the IPCC assessments contained well over a hundred thousand individual pieces of information. Over the same period, within the analytical windows, *The New York Times* selected just 519 pieces of information. This difference in quantities of information offers rich grounds for comparison of expert and news media information preferences. As well as identifying *New*

[62] As Agrawala notes, in 1988, shortly before the first plenary of the IPCC, a United Nations General Assembly resolution called on the IPCC to ". . . immediately initiate action leading . . . to a *comprehensive* review and *recommendations* with respect to . . . the science of climate change . . . , social and economic impact(s) . . . , possible policy responses by Governments to delay, limit or mitigate the impact of adverse climate change, relevant treaties and other legal instruments dealing with climate, (and) elements for possible inclusion in a future international convention on climate' (UNGA, 1988)" (Agrawala 1998a, 616).

[63] Agrawala's 1998b account of the IPCC's structure and history details the process of preparing workplans and report outlines, nominating experts from governments, international and non-governmental organisations and finalising writing teams. As he explains, the process of drafting the reports is ". . . iterative and typically takes between one and a half to two years. It includes comprehensive expert and government reviews and several 'lead-author' meetings to review comments and resolve inconsistencies across different sections of the report. The final outputs from each Working Group are then presented for government approval at their respective plenary session. The entire IPCC assessment is then approved at a full IPCC plenary session" (Agrawala 1998b, 623)

[64] (Agrawala 1998b, 633)

York Times information selection preferences and section placements, the analytical methodology for this thesis examined how frequently each information item was selected and compared IPCC priorities with *New York Times* selection and salience preferences.

The quantitative component of this analysis identified all pieces of IPCC information selected for re-presentation in each news text published within the designated analytical windows. During these windows, between 1990 and 2007, *The New York Times* published 474 stories which at least mentioned "global warming" or "climate change". Each story was analysed to identify every selection of IPCC information and its section placement. The 519 selections of IPCC information were repeated in a number of stories, giving a total of 1797 selections of IPCC information over the 17-year analytical period. They were placed in 27 different sections.

The procedure for comparison of expert and news media texts began with careful examination of the IPCC reports. I was fortunate to be already fully familiar with the 1990, 1995 and 2001 reports. As a journalist specialising in climate change I had carefully read the 1990 reports. I drafted the popular versions of the 1995 and 2001 IPCC Impacts reports, for the United Nations Environment Programme (UNEP). This task involved familiarising myself with all three reports issued in 1995 and all four issued in 2001. When the 2007 IPCC reports were issued I again read these carefully. I then closely examined *The New York Times* 'coverage of record' of the official release of each IPCC report, to compare expert and news media information priorities and preferences (Chapter 5). While this analysis examines only the selection patterns of one newspaper, these selections are used, as explained in section 24, by other journalists working for other news media as their primary source of information about global warming and climate change. *The New York Times* version of a scientific issue therefore more broadly influences other news media, and other popular media.

The next step involved a similarly close analysis examination of all 474 *New York Times* stories which contained the phrases "global warming" or "climate change" and which were published within the analytical windows, from 1990–2007. Every piece of IPCC information contained in these news media texts was coded and entered in the SPSS programme. The SPSS coding included the text's publication date, section placement, placement salience, overall thematic summary and headline. The programme's 'Cross-tabs' function was then used to correlate section placements and individual information items. The Excel programme was used to calculate total information selection frequencies, and frequencies of particular

information item selections for each section. The 519 information items were then grouped into 36 broader information categories for the analysis of overall information selection frequencies (Chapter 6).

For the analysis of section placements of IPCC information (Chapters 3, 4 and 7), the 35 broader information categories were further collapsed into seven categories: international ethics, benefits, uncertainties, physical risks, emissions cause problem, solutions and adaptation planning. For this aspect of the analysis, the 27 different sections containing substantive treatment of IPCC information were grouped into five broader categories: 'news' sections,[65] 'political' sections,[66] 'specialist' sections,[67] 'lifestyle' sections[68] and the 'local' section: the 'NY-Region' section. I then used the Excel programme to plot charts comparing information type against section placement. Many of these sections also contained stories which only mentioned global warming and climate change in otherwise unrelated stories. A further two sections[69] included mentions of global warming or climate change but had no texts within the analytical windows where the topic was discussed substantively.

Once the quantitative analysis had established trends in news information selection and section placement patterns, I then used qualitative analysis to confirm these apparent trends. Where the quantitative analysis showed an emphasis on or omission of particular information categories, I examined more closely individual stories placed in particular sections and containing specific information items, to verify and/or further illuminate the trend and to provide textual examples.

2.8 Verification of analysis

The extent to which independent judges make the same coding decisions is at the heart of any credible content analysis. Michael Singletary has argued that ". . . if the coding is not reliable,

[65] 'News' sections comprised the Front Page, News Summary, Table of Contents, US, Week in Review, World and World Briefing sections.
[66] 'Political' sections comprised the Editorial, Letters and Op-Ed sections.
[67] 'Specialist' sections comprised the Business, Health, Science and Technology sections.
[68] 'Lifestyle' sections comprised the Arts, Automobiles, Book Review, Consumers World, Magazine, Obituaries, Real Estate, Sports, Style, Travel and Television Listings sections.
[69] Mentions of global warming or climate change were also found in the Chronicle and Film Review sections.

the analysis cannot be trusted" (Singletary 1993, 294). In their guidelines for establishing intercoder agreement, Lombard, Snyder-Duch and Bracken (2002) recommend that there should be multiple coders for content analyses and that the content analysis design should include assessment and reporting of intercoder reliability. [70] My own research demanded specialised knowledge on the part of both coder and coding reliability judge. It would have been very difficult to find a group of coders who were fully familiar with the reports of the IPCC, and prepared to devote a substantial amount of time to reading and coding *New York Times* stories which selected information from these reports. It remained, however, important to have my own specialised coding checked by an impartial and similarly knowledgeable judge. An eminent climate scientist who had been involved with preparation of IPCC reports since 1990 agreed to act as coding reliability verifier. He reviewed a random sample of 10 per cent of my codings.

The reliability guidelines followed Kimberley Neuendorf's (2002) review of 'rules of thumb' for intercoder reliability tests which concluded that ". . . coefficients of .90 or greater would be acceptable to all, .80 or greater would be acceptable in most situations, and below that, there exists great disagreement" (Neuendorf 2002, 145). The coding reliability verification found that my coding of *New York Times* information selections from IPCC reports was 98.6 per cent accurate. The coding reliability report is attached as Appendix Two.

2.9 Conclusion

Examination of the information flow about the environmental risk of global warming and climate change began with careful qualitative examination of Intergovernmental Panel on Climate Change (IPCC) assessment reports: the official expert advice on the risk. 'Coverage of record' by the *New York Times*—the news medium selected for detailed content analysis—was also qualitatively examined. The dual aim of this stage of the analysis was to reveal differences between expert and news media information priorities and preferences, and to discern news media assumptions about the discourses of their audiences.

[70] (Lombard, Snyder-Duch, and Bracken 2002, 600)

A quantitative analysis was then undertaken, using an open, inductive approach to compare expert and news media priorities and preferences. This stage of the analysis examined *New York Times* information selections from the IPCC reports, selection frequencies and information section placements. Short-term analytical windows around the official release dates of IPCC assessment reports were set. The *New York Times* archive was searched for all texts which referred to "global warming" or "climate change" and which were published within the analytical windows. These texts were closely examined to identify each piece of expert IPCC information selected for re-presentation to *New York Times* audiences. Identified information items, their section placement and their placement salience were coded and entered into the statistical programme SPSS.

Statistical analysis of news media information selections and section placements identified significant differences between expert and news media priorities and preferences, and a number of apparent trends in news media selection and placement preferences. These differences were phrased as qualitative questions. Close analysis of the original news media texts provided greater textual detail of the trends evident in the quantitative analysis. It confirmed and added depth to the trends apparent from the statistical analysis, and clarified news media framing preferences and assumptions about discourses circulating in the worlds of their various imagined audiences.

Comparison of expert information priorities, expert documentation of manifest aberrations in temperature and climate and news media information selection preferences revealed more detail of news media assumptions about audience discourses. It also showed correlations between changes in the physical world and changes in social world understandings about the environmental risk of global warming and climate change.

CHAPTER 3 Mediating expert information about environmental risk

3.1 Introduction

This chapter looks in detail at news media techniques, rationales and practices. It examines scholarly theory on science communication and scholarly analyses of how the news media deal with scientific information, applying this theoretical work to qualitative and quantitative assessment of *New York Times* treatments of expert reports on climate change. This analysis examines only *New York Times* selections from the reports of the Intergovernmental Panel on Climate Change. Each news medium has its own preferred editorial framing of any issue. This analysis therefore cannot be extrapolated to apply directly to any other news medium. However, particularly where mediations of scientific information are concerned, *The New York Times* is influential, being used by journalists from other news media—and other popular media—as a primary information source. This chapter examines what *The New York Times* did and did not do with expert information about environmental risk. It considers the reasons for significant differences between these news media information selection preferences and expert information priorities, arguing that the primary focus for all popular media is their audiences rather than the original suppliers of new information and ideas.

Using qualitative analysis, this chapter examines the textual practices evident in *New York Times* stories about IPCC reports, discerning ways in which the writers attempted to attract the attention of their audiences by inserting appeals to discourses assumed to circulate in the worlds of those audiences. Results from the quantitative analysis of *New York Times* selections of IPCC information about global warming and climate change are used to demonstrate differences between media and popular discourses. The quantitative analysis also reveals that news media values of immediacy, timeliness, recency and novelty can be detrimental to clear communication of expert concerns about a long-term environmental risk.

A combination of quantitative and qualitative analysis shows the importance of direct experience of physical changes in construction of social world certainties about an environmental risk. This analysis also shows that journalists preferred political definitions of the issue over scientific advice. Politicians defined the issue as a matter of debate over

emission reductions. Scientific warnings about the need for adaptation and emergency planning were ignored, distorting the journalistic ethic of providing 'thorough' and 'comprehensive' information to audiences.[71]

3.2 Popular media

The popular media include the mainstream media of the 20th century: print, telephone, radio, television, music and advertising; and, in the 21st century, the multiplying range of more interactive Internet-based "social" media which use variations of these mainstream forms. In the 20th century, most information about science was circulated initially by the news media. Audiences had little choice in what information was made available to them although, as a number of audience theorists have pointed out, audiences actively interpreted available information and ideas according to their own particular worldviews and cultural groupings.[72] Before the Internet, however, minority cultural groupings could make their own alternative sense of dominant messages but these resistant interpretations were not widely available outside particular subcultures.

In the early 21st century, usage of the more interactive media of Internet and mobile phones continues to accelerate, bringing with it greater audience activity in producing, rather than merely receiving and reacting to, media texts.[73] Marshall McLuhan's 20th century aphorism that "the medium is the message" (McLuhan 1967) has changed, in the Internet age, to a situation where the medium is the audience. In Internet applications such as blogs, YouTube, Facebook and Twitter, coupled with mobile phone technology, audiences themselves create and circulate the message.

Even so, print news media remain the primary source of expert information for non-experts, whether accessed online or via the traditional news media forms. Kris Wilson's (2000a)

[71] (Society of Professional Journalists 1996)
[72] (Morley 1988; Liebes and Katz 1990; Ang 1991; Ross and Nightingale 2003; Carr et al. 2009)
[73] By 2008, 60 per cent of the global population were users of mobile phones and 23.8 per cent used the Internet (Debrosse 2009). Between 2000 and 2007 the number of Internet users increased globally by 265.6 per cent; between 2000 and 2008 global usage had increased further, to 342.2 per cent (internetworldstats 2009). There remain significant geographical variations in usage, with only 5.6 per cent of the population of Africa identified as users, compared with 74.4 per cent for North America and 48.9 per cent for Europe (internetworldstats 2009), but the growing penetration of both Internet and mobile phones is providing audiences with a greatly enhanced capacity to actively engage with and use available information.

survey of specialist environmental journalists in the U.S. found that their main source of information about global warming and climate change was other newspapers. Wilson's survey of 249 members of the U.S.-based Society of Environmental Journalists found that newspapers were the dominant source of climate change knowledge for these 'specialist' environmental journalists:

> Interviews with scientists and use of science journals placed a distant second and third, respectively . . . All three television sources—public television specials, national television news, and local television news—accounted for a total of only 3 per cent of reporters' primary sources.
>
> (Wilson 2000a, 4)

Wilson's survey found that most of the environmental reporters surveyed ". . . thought that the topic was still strongly debated among those specialists . . . less than half of all environmental reporters were aware [that the greenhouse effect is a scientific certainty]" (Wilson 2000a, 7). These misconceptions about the environmental risk among reporters expected to have some expertise in environmental topics become more understandable when one considers that, as Wilson has shown, most apparently specialist 'environmental journalists' gained most of their information about the issue from newspaper stories; and that a probable primary source would be the 'prestige press' newspapers in the U.S. which, as Boykoff and Boykoff (2004) have shown, distorted scientific consensus on the issue to give roughly equal weight to the warnings of mainstream climate scientists and to the dissenting views of a small group of 'sceptical' scientists.

Further support for the argument that the news media are the primary definers of most information which then is recirculated in other media comes from Suleski and Ibaraki's (2009) details of a Nielsen survey (2005) which had examined the sources of news on the Internet. The Nielsen survey found that the top-ranking sources were professional news organizations.[74] Making a more detailed examination of information sources, the Pew Research Center's Project for Excellence in Journalism (2010) made an intensive one-week study of the information sources for 53 identifiable local news outlets in one U.S. city, including radio talk shows, blogs, new media sites, television, radio and print news.[75] This research found that 95 per cent of the original information sources were traditional media, mostly newspapers. While the U.S. National Science Foundation's annual surveys show that

[74] (Suleski and Ibaraki 2009)
[75] (Pew Research Center's Project for Excellence in Journalism 2010)

people get most of their information about science from television, firstly, and then from the Internet,[76] most of the original sources of scientific information for other popular media remain the news media and, usually, the print news media.

3.3 Social expectations of news credibility

One reason why the news media generally are the primary definers of scientific information for other media and the wider social world may be the social expectation that information produced by journalists should be more credible than other sources of information. This expectation is based in large part on social (and journalistic) expectations that the news media will act as an unofficial and relatively unbiased source of records of official deliberations,[77] and will fulfil their 'fourth estate' role: that is, that they will act as guardians of the public interest.[78]

Cases where journalists are found to have manufactured evidence tend to be extensively publicised both by the news outlet concerned and by its competitors; and the journalists responsible for such misinformation generally are excoriated by their professional peers. In 2003, for example, *The New York Times* described the "widespread fabrication and plagiarism" of one of its reporters, Jayson Blair, as "a profound betrayal of trust and a low point in the 152-year history of the newspaper" (New York Times 11 May 2003).[79] In 2004, the editor of the United Kingdom's *Daily Mirror*, Piers Morgan, was forced to resign after he published photographs alleged to show British troops abusing Iraqi prisoners .[80] The photographs were later proved to be fakes, and *The Mirror*'s board demanded Morgan's resignation. In 2010, phone hacking and the use of private investigators to obtain often salacious details about the private lives of public figures and celebrities led to the demise of

[76] (National Science Board 2010)
[77] (Martin and Hansen 1996)
[78] The phrase "the fourth estate" has been taken historically to imply a watchdog role for the news media: one which carries the responsibility of acting as a guardian of the public interest. The 19th century poet, historian and politician Lord Thomas Macaulay observed that Parliamentary reporters had become "a fourth estate of the realm. The publication of the debates, a practice which seemed full of danger to the great safeguards of public liberty, is now regarded by many persons as a safeguard tantamount, and more than tantamount, to all the rest together" (Macaulay 1907, 71, cited in Sparks 1988).
[79] The article went on to detail Blair's misconduct: "He fabricated comments. He concocted scenes. He lifted material from other newspapers and wire services. He selected details from photographs to create the impression he had been somewhere or seen someone, when he had not" (New York Times 2003).
[80] (Williams and Kerr May 15 2004)

the Murdoch-owned U.K. tabloid *News of the World*, internal police investigations and a U.K. parliamentary inquiry into "Press" culture, practice and ethics.[81] These examples suggest a strong expectation, on the part of news media owners, journalists, their audiences and political leaders, that news should be more trustworthy than other forms of popular media.

Most scholarly analyses of news media treatments of climate change information have focused on 'quality' 'prestige press' newspapers which, as Boykoff and Mansfield (2008) have explained, have a reputation for higher-quality reporting, are more likely to employ specialist science and environmental journalists, and are ". . . the primary influences on policy discourse and decision-making at national and international levels" (Boykoff and Mansfield 2008, 1). Boykoff and Mansfield go on to argue that this focus on 'quality' newspapers ignores the far higher-circulation 'tabloids'. For analyses of audience understandings of an environmental risk, Boykoff and Mansfield are correct in pointing out that the tabloid press and, I would argue, television programmes and high-traffic Internet sites, should be a significant object of analysis. However, since (as Section 3.2 argues) there is sound research showing that other journalists and other media get most of their information about environmental risks from the 'quality' 'prestige press' who are the first mediators of expert scientific advice, it remains relevant to focus the analysis on this primary information source.

3.4 The distorting potential of journalistic norms and news values

All news stories arise out of a wider social context. A story is not 'newsworthy'—likely to attract audience attention to new information—unless it relates to contemporary issues and discourses considered relevant, familiar and interesting to news media audiences. The news organisational practices which determine what makes any story 'newsworthy' are based on journalistic norms and news values. W. Lance Bennett (1996) has argued that the news media operate according to three distinct norms: political, professional and economic. Political norms originate from the 'fourth estate' ethic of informing ". . . citizens of the actions of their

[81] (Lord Justice Leveson 2011)

government officials" (Bennett 1996, 375). Professional norms arise from journalistic ethics, on which news values are in part based. The U.S. journalistic code of ethics states in its preamble that journalists have a duty to provide a ". . . fair and comprehensive account of events and issues" and to serve the public ". . . with thoroughness and honesty" (Society of Professional Journalists 1996). This preamble describes the journalistic ethics of objectivity and balance. News values such as immediacy, relevance, novelty and conflict relate to economic norms, offering suggestions for selection and framing practices which may increase a news text's popularity (thus ensuring the ongoing profitability of the news media organisation).

When it comes to adequately informing audiences of how a physical environmental risk might endanger their own health and economic security, all three of these norms can interfere with clear communication of the risk. In the case of the political norm, Hall et al. (1978) have argued that while the news media are frequently not the primary definers (for example, in the information flow, scientific experts first define a physical environmental risk), the nature of their relationship to political institutions:

> . . . has the effect of making them play a crucial but secondary role in *reproducing* the definitions of those who have privileged access, as of right, to the media as 'accredited sources' . . .
>
> (Hall et al. 1978, 59)

Bennett (2012) has noted the news media tendency to extend their expectation of scrutinising political decisions into a preference for political sources as their primary "accredited" sources. He explains that the news media:

> . . . index or adjust the range of viewpoints in a story to the dominant viewpoints of those in political institutions who are perceived to have enough power to affect the outcome of the situation.
>
> (Bennett 2012, 15)

This content analysis confirms these scholarly arguments. It shows (Chapters 5, 6, 7) that in reporting the advice contained in the assessments of the IPCC, *New York Times* journalists framed their stories to resonate with the views of the risk held by governmental officials and politicians, rather than the views held by scientific experts. This substantially changed news mediations of the risk. *New York Times* selections of information from IPCC reports rearranged expert priorities about the most important information which should be

communicated to non-experts. Instead of giving high salience to expert priorities, *New York Times* journalists prioritised information which was relevant to political discourses on the issue. *The New York Times* is acknowledged as an opinion-leader in political discourses and could therefore be expected to give greater salience to political issues. However, its journalists' preference for political information over information about physical processes and their implications for populations, environments and economies is supported by other research. Painter (2010) found that in news media coverage of the 2009 Copenhagen Conference on Climate Change, only 9 per cent of news stories devoted more than half their word count to scientific issues. The remaining 88 per cent of news stories filed from this conference focused primarily on political controversies. It would appear therefore that the finding of a predominance of politically relevant information selections in *New York Times* coverage of IPCC reports reflected a broader news media tendency.

Framing of the issue as a matter of political opinion rather than expert advice about physical systems and their likely changes was encouraged by the terms of the IPCC's mandate.[82] This expert advisory body had been instructed by the United Nations General Assembly to provide the best available scientific advice on climate change, with an additional instruction that this advice should assist negotiations towards an international treaty on climate change—which dealt in large part with global agreement on reducing greenhouse gas emissions. Although the full IPCC reports contained specific details of national risks, and specific recommendations for dealing with such risks, addressing these at a national level was not the business of the international treaty negotiations. Emission reductions were a matter of international agreement; adaptation and emergency planning remained a matter of national sovereignty and were not specifically discussed at the international treaty negotiation level, except in terms of wrangling over whether and how much developed countries should help developing countries to plan and adapt to global warming and climate change.

Policymakers from many governments, including the U.S. (and other countries such as Australia and New Zealand), tended to frame the risks of global warming and climate change as a matter of international negotiation over emission reductions, and to ignore IPCC advice about the need for emergency and adaptation planning because this was not on any international agenda, being a matter of national or regional initiatives. Journalists who were focused on political discourses followed a framing of the environmental risk defined by

[82] (Agrawala 1998a, 616)

international political negotiators, rather than giving greater salience to expert advice about an evolving physical reality which threatened citizens of every nation. This tendency to ignore the physical and prefer the political has been noted by several scholars.[83] It shows the extent to which political definitions ruled news mediations of information about global warming and climate change even over, it would seem, the journalistic ethics of thoroughness or of providing a fair and comprehensive account of expert advice.

Esa Väliverronen has discussed the difference between science-centred and audience-centred expectations of news treatments of expert information:

> From a science-centred point of view the task of journalism is to convey to the general public information about research results in as accurate, understandable and interesting way as possible . . . By contrast, other genres of journalism such as news reporting or political reporting often deal with science from a broader social perspective.
>
> (Väliverronen 2001, 41)

However, I would argue that there is a difference between providing information about some esoteric aspect of scientific research, and providing information about research which clearly establishes significant health, safety and economic risks to news media audiences. In this latter case, while one broader social perspective might be the relevance of a physical risk to political discourse, another perspective which touches on journalistic ethics should presumably be to attempt to provide audiences with something approaching a thorough and comprehensive account of expert warnings about risks to human and economic welfare.

In the U.S. (and in countries such as Australia and New Zealand), the news media could have raised the physical and economic risks to their audiences, based on the extensive details in the IPCC reports. However, the content analysis of *The New York Times* coverage of IPCC reports shows that its journalists were accustomed to their 'official' sources being the political institutions which were seen to have, as Bennett has observed, the power to "affect the outcome of the situation" (Bennett 2012, 15). Scientific experts were not accorded nearly as much authority as official governmental sources (See Chapters 5, 6 and 7). The 'political' norm of journalism thus distorted the journalistic ethic of providing news media audiences with information which was relevant to their lives.[84]

[83] (See for example Boykoff and Roberts 2007; Anderson 2009)
[84] The exception was the geographically-based 'NY-Region' section of *The New York Times*.

Professional norms, involving journalistic ethics and news values, also worked against the clear communication of expert advice on an environmental risk. Journalistic ethics demand adherence to ideas of fairness, objectivity and balance. News values define aspects of information which will catch the attention of audiences. Chapter 4 discusses in greater detail the findings of Boykoff and Boykoff (2004) which convincingly demonstrate how the journalistic ethics of fairness and balance caused a form of informational bias in news representations of expert advice on global warming and climate change. In attempting to balance their reports on the environmental risk, journalists overemphasised the views of a small handful of 'sceptical' scientists who mostly were not prominent in the field of climate science, giving them equal space and salience with the views of the vast majority of internationally respected climate scientists.

Jenny Kitzinger's (1999) review of literature dealing with news media treatments of risks identified three distinctive aspects of such treatments: the 'nature' of the risk, news values and the internal dynamics of media organisations.[85] Her review established that the news media would give information about a risk high priority if there was a large immediate risk to audiences; if a well-known identity or location was involved; if the risk could be made relevant to audiences; if it could be turned into a 'human interest' story about an individual; if it involved a short-term event rather than a longer-term issue; and, if it was causing or might cause conflict. The latter requirement of conflict explains in part why, as Boykoff and Boykoff (2004) have shown, news media chose to over-emphasise the views of 'sceptical' scientists. This permitted them to demonstrate apparent conflict among experts.

Kitzinger's identification of the importance of 'human interest' and 'location' in assigning relative value to news stories is shown by the content analysis to be highly relevant to the various ways that expert advice about environmental risk was mediated in news stories. IPCC reports dealt with global processes. While individual IPCC chapters provided information about risks to specific locations, including many within the U.S., this information was not selected by *New York Times* journalists who, as Bennett has theorised (1996, 2012) were focused on political framings of the issue. The geographically-placed 'NY-Region' section was almost alone in (occasionally) running stories about direct local risks. Information about 'human interest' aspects of the risk was left to the 'Lifestyle' sections which, in 2007,

[85] (Kitzinger 1999, See in particular pp 62-63)

covered aspects such as a rise in snowmaking machinery purchases[86] and changes in gardening practices.[87]

Kitzinger's identification of a news selector preference for immediate events provides a further area where news values conflict with accurate communication of expert warnings about risks. Barbara Adam has observed that 'newsworthiness' tends to be associated with temporal values such as novelty, timeliness, recency, immediacy and urgency. [88] When it comes to global and long-term environmental risks, Adam argues that these values rarely apply. The content analysis comparison of expert and news selector preferences and priorities shows that expert priorities for communicating historical evidence demonstrating the unprecedented nature of contemporary atmospheric greenhouse gas concentrations, and for warning of expected long-term changes in temperature, climate and sea level, were given little attention by news selectors.[89] If information did not relate to events happening within the next 24 hours or at least within the next several weeks, news selectors were not interested.

The value given to novelty means a news media reluctance to repeat information. If a news medium has once stated that global warming and climate change were a massive risk, re-stating that or at least using that information as a primary theme would be seen as repetition. The value of novelty seems from this research to work against the clear communication of scientific understandings of risk. Few selection categories reached more than five per cent in terms of how frequently they were published for *New York Times* audiences.[90] Most individual information items were repeated once or twice only over the 17-year analysis period. Expert priority statements and warnings were selected for repetition only rarely. News selectors seem, rather, to have preferred new information regardless of its relative importance or unimportance. For example, in 2001 the expert information that already significant global impacts were being observed; that sea levels were rising; and that seasons were changing was selected just twice during the six-week analysis window. To experts, this information represented strong evidence of planetary changes already under way. To news selectors it seems to have been treated more as a 'one-day wonder'. The high value placed on novelty and immediacy seem to have resulted in an editorial decision that expert scientific information, no matter how important or relevant it might be to human society, should only

[86] (Green 15 February 2007)
[87] (Barrington and Revkin 18 January 2007; Raver 18 January 2007; Friedman 19 January 2007; Dewan 3 May 2007; New York Times 6 May 2007)
[88] (Adam 2000, 121)
[89] (See Section 3.12 later in this chapter, also see Chapter 6)
[90] Chapter 6, **Table 3**.

rarely be repeated because, once published, it would be of no interest to audiences because it was no longer 'new'.[91]

In practice, the value of novelty should not have stopped journalists from providing adequate information about the risk to their audiences. There is a plethora of interesting and very useful informational detail in the IPCC reports. One technique for journalists attempting to report on a complex issue is to take a 'mosaic' approach, writing stories on a variety of aspects of the issue, and publishing them over a period of days, weeks or even years. Re-statement of the risk can be included as a small fragment of the follow-up stories. The content analysis shows, however, that *New York Times* journalists ignored specific information which audiences could consider novel and relevant, contained in the 'North America' chapters of the IPCC's reports on the impacts of climate change; and in the extensive reviews of new, emerging and commercially available technologies contained in the IPCC reports on response strategies.

3.5 Media and audiences are inextricably linked

It is not possible to separate the media from their audiences: the two are inextricably linked. For economic and ethical reasons, the news media are focused on their audiences. Any popular medium must, by definition, remain popular, otherwise it will not retain audience attention and will fail in the marketplace. Unlike other popular media, the news media are guided by journalistic ethics which impose expectations of (relative) objectivity and balance, and of acting as guardians of the public interest. However, they still must remain popular. Therefore their primary focus must be their audiences rather than the experts who supply original information. News media selections and salience choices are based on assumptions of what already interests their audiences. Expert information is selected and mediated according to how comprehensible and relevant it can be made to appear to non-expert audiences, thus attracting their attention.

[91] This supports the observation of Allan, Adam, and Carter (2000) concerning the difficulties which news media have in dealing with longer-term 'issues', rather than short-term 'events'.

Attention comes if new information or ideas are sensational, or if they offer familiar connections with ideas and beliefs circulating in the contemporary social world of particular audiences. As Ien Ang has explained, discussing the medium of television, the ". . . text/viewer encounter" takes place within ". . . a firm socio-cultural context" (Ang 1995, 20). Knowledge and ideas are culturally formed, with audiences fitting new information and ideas into existing social and cultural understandings. To attract audience attention, the popular media insert textual appeals or references to the discourses assumed to be circulating in the worlds of their audiences.

Forming assumptions about the discursive surroundings of audiences to provide texts which appear relevant and interesting is not a matter of applying a simple formula. The processes of attracting the attention of audiences are complex, and this complexity explains why, despite the billion-dollar resources of the media industries, it still remains difficult for those industries to develop media products which prove popular in the marketplace.

John Fiske (1987) discussed these difficulties, observing that:

> . . . roughly 80 per cent of the products of mass culture are rejected by the people: eight out of ten Hollywood films fail to make a profit at the box office . . . four out of five new television shows fail to survive their first season, and the music and print industries show similar patterns of rejection.
>
> (Fiske 1987, 326-327)

Some two decades later, Grossberg et al. (2006) noted the ongoing risks of trying to produce popular media texts:

> Ninety percent of all new TV series are gone after one season, 90% of new magazine titles fail within a year, and 90% of pop CDs do not break even . . . The various forms of market testing that guide consumer products have not proven very helpful to the media industries so far.
>
> (Grossberg et al. 2006, 122)

These scholars show that analysis of the linkages between media and audiences is difficult and complex. Within the much smaller field of the news media, the capacity to guess possible connections with contemporary discourses circulating in the worlds of audiences, and thus to attract audience attention, remains a valued and valuable commodity.

3.6 Conflicts between attracting attention and providing necessary information

The high importance placed on attracting audience attention can result in a contradiction between the journalistic ethic of acting as guardians of the public interest, and the more general news media need to create popular texts. Expert information which may be highly relevant to the physical and economic wellbeing of audiences—and the wellbeing of the environment which sustains them—can often be minimised or ignored in news mediation processes. An example of an excessive journalistic focus on the interests of audiences to the detriment of relevant expert information is seen in one *New York Times* mediation of IPCC advice that agricultural activities produce significant quantities of greenhouse gases.

This story, published on the front and inside pages of the 'Week in Review' section, was headlined "An Icon of the Good Life Ends Up On a Crowded Planet's Hit Lists" (O'Neill 6 May 1990). "Icon" and "good life" appealed to patriotic mythologies about the superiority of the U.S. lifestyle and its farming products. "Crowded planet" referred to contemporary discourses on overpopulation—considered largely a problem of other countries, not the U.S.. A "crowded planet's hit list" suggested that an American icon was being threatened by environmental problems caused by other people.

In the text, the writer attempted to dismiss a variety of environmental concerns about cattle farming, including its contribution to increasing greenhouse gas emissions. The text did not mention IPCC warnings of significant risks to U.S. agriculture from expected increases in droughts in many regions,[92] future water shortages[93] or likely reductions in U.S. crop yields.[94] Nor was there any reference to succinct recommendations for future research and planning to reduce ecological and economic threats to U.S. crop and animal productivity—information presumably useful to the U.S. agricultural industry and the U.S. economy— contained in the Policymakers Summary of the 1990 IPCC report on the impacts of climate change.[95]

The first paragraph highlighted the mythologies of the "frontier culture" of Western ranch expansion and the nutritional benefits of U.S. food products, with an implication that the U.S.

[92] (Intergovernmental Panel on Climate Change 1990b, 2-2, 2-3, 2-8, 2-9, 2-12, 2-14, 2-32, 2-33, 3-13, 4-4, 6-14, 7-16)
[93] (Intergovernmental Panel on Climate Change 1990b, 1-3)
[94] (Intergovernmental Panel on Climate Change 1990b, 2-10, 2-33, 3-13)
[95] (Intergovernmental Panel on Climate Change 1990b, 5)

cattle industry and its historical development ensured the physical and spiritual superiority of the national population:

> For generations, dairy has been synonymous with "pure", beef with "strong". And cattle have ranged over the soul of America, a symbol of wide-open spaces, broncobuster spirit and the bucolic life on the family farm.
>
> (O'Neill 6 May 1990)

"Pure" and "strong" carry very positive connotations. They imply connections with social constructions of U.S. national identity, and this is continued in the references to myths of cowboys and the 'Wild West': "the soul of America"; "wide-open spaces"; "broncobuster spirit" and "family farm".

The second paragraph confused environmental risks, implying that overpopulation in other countries was the primary threat to the continued existence of a cherished symbol of U.S. historical origins: "Environmentalists, politicians and consumers are debating whether the planet can sustain its cattle herd as the human population swells. In America, the cow is on trial" (O'Neill 6 May 1990). Environmental and nutritional advantages and disadvantages of cattle-raising were then summarised, with brief mention of agricultural greenhouse gas emissions, before the U.S. cattle herd was personalised: "Recently, Elsie and Bossy have been called 'public enemy No 1 and 'nature's nuclear reactor'." The earlier references to mythologies of the 'Wild West' and the "family farm" add to the likelihood that this personalisation was intended to evoke sympathy and empathy for U.S. cattle. It invites nostalgic recollections of U.S. mythologies of its early history: of small farms and values of neighbourliness. By 1990, this framing of the U.S. cattle industry was disingenuous: most small family farms were being rapidly aggregated into large corporate holdings. In this 1990 *New York Times* story, however, to juxtapose individually named animals with hyperbolic descriptions ("public enemy No 1" and "nature's nuclear reactor") invited audience rejection of these pejorative descriptions.

The mediation could have appealed to patriotic pride in the U.S. environment and economy. Instead, expert warnings about specific climatic and economic risks to a substantial U.S. industry were ignored in favour of attracting an audience to a sentimental framing which appealed to mythologies of historical national origins and values. At no stage was there any explanation of the physical processes which meant inevitable global warming and changes in both global and regional climates as increasing quantities of greenhouse gases reached the

atmosphere. The only explicit references to the risk were “emissions”, “greenhouse gases” and “methane”.

There was one mention of “global warming”, in a paragraph where the selected quote from an Environment Protection Agency (EPA) scientist implied that any action to prevent this risk would have minimal consequences: “ ‘The point is overall global emissions,’ he said. If they were cut 25 percent by 2050, he said, it could reduce global warming by one-tenth of a degree.” This quote was almost certainly selected out of context. By 1990 the EPA had provided detailed reports about expected and substantial negative impacts of global warming on U.S. agriculture, the agricultural economy, the natural environment and U.S. coastal geographies and communities, and had urged significant U.S. governmental action.[96] The 1990 IPCC report had called for immediate 60–80 per cent reductions in greenhouse gas emissions. It seems very likely that the EPA speaker was in fact explaining that existing emission reduction plans would be woefully inadequate.

Instead of considering the rationale behind expert advice for substantial emission reductions, this journalist preferred to frame environmental concerns as undesirable and deserving of ridicule, as is evident in the following three paragraphs. Each of these included quotes selected to mock the idea that there should be any action to prevent global warming:

> Now, we have not been told exactly how our administrators are expected to collect this gas . . . if cows can have airbags, why not equip them with catalytic converters . . . the solution to ruminant methane production could be corks, but I don’t subscribe to that
>
> (O'Neill 6 May 1990)

In this text, the journalist gave priority to providing pleasure to her audiences by invoking nationalistic pride in a mythological place—‘The West’—and its narratives of inspirational activities and values. Journalistic ethics of providing relevant information were not prioritised. No attention was paid to expert warnings about an already-developing environmental risk which involved physical and economic hazards which would impact globally, and on U.S. populations, industries and economies. Instead, environmental concerns were framed as conflicting with more-important national mythologies and a national industry.

[96] See EPA citations in all 1990 IPCC reports.

3.7 If information does not offer pleasure, audiences will not attend

Creating media texts which are widely consumed is a difficult and risky process, as Fiske, Grossberg and others have noted. Ang has argued that media texts must be pleasurable to attract audience attention, pointing out that audiences tend to derive pleasure from references to their everyday life situations; ". . . a more populist ideology, in which values of communality, emotional involvement and humour predominate" (Ang 1995, 26). She says that popular media texts are linked dynamically with discourses which circulate in the social world, and that their mode of address is constructed around a type of audience involvement which:

> . . . is characterized by *instant pleasure*. It is an address in which pleasure is equated with 'entertainment', in which fun is not only presented as perfectly legitimate but also as being in opposition to 'boring information' or 'education'. (Italics in original)
>
> (Ang 1995, 30-31)

Entertainment, Ang emphasised, includes the pleasure that can be derived from 'information' (Ang 1995, 31). However, if information is constructed as important and therefore 'good for you' rather than as pleasurable and 'relevant to your life', it is likely to be rejected by media audiences. Discussing the reasons why, in the Netherlands, the entirely commercial television channel drew much larger audiences than pedagogically and/or ideologically oriented channels, Ang commented that the success of the commercially-oriented channel:

> . . . lies in the fact that it takes the pleasure of consumption and consumption for pleasure seriously, in the fact that it actively engages in the construction of what is pleasurable, and the fact that it has used the pleasurable as a structuring principle for addressing viewers.
>
> (Ang 1995, 32)

Many scholars have assumed that the popular media share the academic goal of using media communication capacity to 'improve' social conditions and society in general. Richard Butsch has noted that "Discourses on audiences can be understood as judgments of fitness for citizenship" (Butsch 2008, 4). Grossberg et al. cite the hopes of scholars such as John Dewey, the early 20th century philosopher and educational theorist, that ". . . the media help to make

us a community" (Grossberg et al. 2006, 33). They note Dewey's criticism of the mass media of his day for:

> . . . failing to fulfil their essential purpose of creating a common language that would result in a sense of national community with which people could understand each other and which would enable people to act together.
>
> (Grossberg et al. 2006, 30)

Creation of a common language and a sense of national community are worthwhile academic and governmental goals. However, these goals are not necessarily shared by the popular media, whose primary aim is often for large audiences rather than for social responsibility. Even within the specialised media form of news, where news managers and owners frequently aim to affect ideological discourses, the priority for news writers remains, first, to attract an audience. Only after an audience has been attracted can any strategy of ideological influence—or of fulfilling journalistic ethics of adequately informing their publics—be implemented. And as Ang has argued, audiences seek media products for pleasure and entertainment rather than a sense of nationhood or self-improvement.

3.8 Entertainment is not necessarily mindless

In reporting on their knowledge of environmental risks, experts' use of language and choice of phrasing tends to reflect the norms of scholarly publication. These norms, however, as Hans-Peter Peters has observed, ". . . often contradict the journalists' crucial professional duty to attract the attention of the audience" (Peters 1995, 46). The differences between expert expectations of passive news mediation of expert advice to make scientific information understandable and the news media requirement of active engagement with the interests and discourses of audiences create a disconnection between expert and news media assessments of the relevance of the risk and, more broadly, scholarly expectations of news media texts.

Creating media texts which will entertain the interest of audiences does not necessarily mean creating texts devoid of information, although this appears difficult for many scholars to

comprehend. Fairclough has observed that "Tension between the objectives of giving information and entertaining is widespread in the contemporary media" (Fairclough 1995, 5). He reflects the views of many scholars in eschewing an entertainment component in information provision, connecting more "conversational" language with "insincerity" (Fairclough 1995, 14) and identifying:

> . . . [a] tendency for public affairs media to become increasingly conversationalized, and its [*sic*] tendency to move increasingly in the direction of entertainment—to become more 'marketized'.
>
> (Fairclough 1995, 10)

The implication here is that the (news) media focus on attracting popular attention to ensure profitability and that therefore ongoing commercial and popular viability must necessarily mean that information which has been represented as being potentially pleasurable and entertaining for audiences is somehow less valid than information shaped seriously for an intellectual audience. However, information takes different shapes depending on the audience. An expert presentation to a specialist governmental department will probably be quite different from an expert presentation to a group of school children. It will be different again from a presentation to a group of similarly trained experts. News media audiences are not expert. News mediations of expert advice must shape that advice to make it palatable to and therefore potentially digestible by those audiences. This does not necessarily mean that all such reshapings of expert information render the information meaningless.

Any media product must entertain to attract attention, but entertainment and information are not necessarily mutually exclusive. While the earlier example of the 6 May 1990 story about the U.S. cattle herd preferred offering pleasure over information, other examples from the *New York Times* archive manage a more equal balance. Andrew Revkin's 'coverage of record' of the 2001 IPCC Impacts Assessment appealed to pleasure in pristine environments and to U.S. pride in its literary giants to attract audience attention to global changes and human responsibilities for global warming (Revkin 19 February 2001a).[97] The headline: "A Message in Eroding Glacial Ice: Humans Are Turning Up the Heat"; summarised the IPCC conclusions that global warming had started and that human activities were responsible. The first sentence made a lyrical appeal to an assumed audience pleasure in remote and beautiful locations:

[97] (Revkin 19 February 2001a)

> The icecap atop Mount Kilimanjaro, which for thousands of years has floated like a cool beacon over the shimmering plain of Tanzania, is retreating at such a pace that it will disappear in less than 15 years . . .
>
> (Revkin 19 February 2001a)

Unusually, Revkin chose to draw comparisons between a historically stable physical state and contemporary changes, and to select also a relatively long-term (in news terms) expert projection of future change.[98] His choice of language attempted to inspire audiences to wish to preserve such a "cool beacon" floating over Tanzania's "shimmering plain", invoking pleasure at not only the beauty of snow-covered mountains, but also at the sensual contrast between mountainous cool and African heat.

Revkin's selection of Mt Kilimanjaro as an example of a global trend was driven in part by U.S. audiences' familiarity with author Ernest Hemingway's short story *The Snows of Kilimanjaro*.[99] To make sure *New York Times* audiences understood the literary relevance of Mt Kilimanjaro, he incorporated Hemingway's title into his second paragraph. Then, having established this patriotic connection, he moved into providing information, detailing expert evidence of global changes and expert advice on their causes:

> The vanishing of the seemingly perpetual snows of Kilimanjaro that inspired Ernest Hemingway, echoed by similar trends on ice-capped peaks from Peru to Tibet, is one of the clearest signs that a global warming trend in the last 50 years may have exceeded typical climate shifts and is at least partly caused by gases released by human activities . . .
>
> (Revkin 19 February 2001a)

Having offered the pleasures of ideas of a pristine environment and pride in a national literary giant, Revkin turned immediately to communicating the idea of observed global change, and human responsibility for that change. His weaving of invocations of pleasure and details from expert reports supports the argument that "entertainment" does not automatically imply frivolity or superficiality. There is further support in the formal definition of the word. The Oxford English Dictionary's definition of "entertain" offers, first, the meaning of ". . . providing amusement or enjoyment"; second, the socially interactive meaning of ". . . show hospitality to"; and then a third meaning of ". . . give attention or consideration to"

[98] Section 3.12 later in this chapter details a *New York Times* tendency to ignore high-priority expert comparisons of contemporary physical developments with long-ago physical conditions and, similarly, to minimise expert projections of long-term and substantial future changes.
[99] (Hemingway 1938)

(Concise Oxford Dictionary 1999, 475). It could be argued that even the most serious intellectual inquiry is undertaken only because it offers a form of pleasure to the inquirer: the pleasure of curiosity rewarded; the pleasure of working out some new, important or relevant idea; the pleasure of establishing new understandings about the natural and social worlds.

3.9 The importance of familiarity and social contexts

Journalists offer their audiences the pleasure of the familiar—of reading about 'themselves'—by embedding in their texts references to assumed audience interests and discourses. Familiarity attracts: unfamiliarity does not, unless it fits the 'sensational' or 'weird' categories. Cultural theorists Hall et al. were among the first to identify the importance of familiarity for the audience in news media texts:

> If the world is not to be represented as a jumble of random and chaotic events, then they must be identified (i.e. named, defined, related to other events known to the audience), and assigned to a social context (i.e. placed within a frame of meanings familiar to the audience). This process—identification and contextualisation—is one of the most important through which events are 'made to mean' by the media. An event only 'makes sense' if it can be located within a range of known social and cultural identifications.
>
> (Hall et al. 1978, 54)

Gamson and Modigliani have noted the news media practice of adding cultural resonances to a text to make it appear natural and familiar.[100] John Fiske has discussed the commercial imperatives of this approach:

> If the cultural commodities or texts do not contain resources out of which the people can make their own meanings of their social relations and identities, they will be rejected and will fail in the marketplace. They will not be popular.
>
> (Fiske 2001, 2)

As Fiske suggests, the processes of information being embedded in social world discourses involve changes both in the source information, and in existing discursive understandings of audiences. Such mediation is essential if information is to be received and retained.

[100] (Gamson and Modigliani 1989, 5)

Audiences are never passive receivers of messages. Any information is mediated by the social and cultural understandings of the receiver. In any culture or society, making sense of new information or ideas involves making connections with existing shared understandings, beliefs, values and knowledges. Audiences change the meanings of media texts, re-shaping information and ideas to align them with understandings already circulating within and between the various cultural groupings with which they identify. Media workers are acutely aware of this active nature of audiences. If they were not, their products would not be popular, their media organisation would not be profitable and the individual media worker would no longer be valued by their employing organisation.

3.10 Imagining different audiences can distort communication of expert information

Anthony Leiserowitz has described the understanding that audiences are plural as a "truism" of social science and public opinion research:

> . . . the 'U.S. public' is in fact many publics—a plurality of different groups and interpretive communities, each predisposed to attend to certain risks and issues and to discount or ignore others.
>
> (Leiserowitz 2004, 32)

Media workers are well aware that there is no single 'public' and no single 'audience'. In creating media texts, media workers attempt to attract the attention of a multiplicity of cultural groupings by inserting appeals and references to a variety of beliefs, worldviews and knowledges. In the case of a physical environmental risk and its interpretations by the social world, excessive news media reliance on existing social world discourses to explain a complex and inherently uncertain physical phenomenon can impede social world understanding of physical risks. Aspects of the risk considered critical by experts can be ignored or minimised if news mediators do not perceive relevant connections with the discourses of their audiences; conversely, aspects deemed less important by experts can be exaggerated because they appear immediately relevant to assumed audience discourses.

Analysis of what information was selected for the 'specialist' and 'local' sections (Chapter 7) shows that different discursive communities assumed to be readers of the various *New York Times* sections received quite different information about the risk. Readers of the 'Business' section were given information related primarily to the perceived business need for ongoing fossil fuel supplies to power industrial machinery and transportation. 'Science' section readers were offered information about a global physical and political problem which was externalised rather than being represented as directly relevant to *New York Times* readers. A similar externalisation of the environmental risk saw 'Technology' section readers given very little information at all about potential technological remedies: presumably because 'Technology' section news writers assumed that the issue would be problematic for 'others', but not for their readers. Journalistic representations of the social meaning of the risk varied according to their assumptions about other discourses assumed to be important to their various audiences. Actual hazards to actual individuals and communities were minimised, abstract implications for social world discourses were highlighted.

3.11 Media and popular discourses are different

The discourses contained in popular media texts play an important part in shaping social worlds and their cultures. The discourses which circulate in various cultural groupings also play an important part in shaping popular media texts. The popular media create some discourses, but audiences also generate their own discourses and ideas which may or may not be picked up by the popular media. The relationship between media and popular discourses is dynamic: Roger Silverstone has observed that the popular media ". . . are both context and themselves contextualized. They both construct a world, and are constructed within and by the world. And of course the world is plural not singular" (Silverstone 2007, 6). Grossberg et al. have argued, similarly, that the popular media create and re-circulate many discourses which also circulate in the social world, but that they are not the sole source of discourses:

> If we live in a world of media, it is still important to remember that we do not live in a media world. The media bring the world to us and help to shape that world, but there is still a reality outside of the media.
>
> (Grossberg et al. 2006, 4)

Differences between popular and media discourses became apparent in the comparison between substantive treatments of global warming and climate change, and brief mentions of the issue in otherwise unrelated stories (see **Chart 1**, later in this section).

The content analysis examined all texts within the analytical windows where "global warming" or "climate change" were mentioned. In most cases, the environmental risk was discussed substantively, and all substantive discussion of this issue was used for the quantitative analysis of information selections, frequencies and section placements. A separate analysis was made of those articles where the risk was only mentioned in stories on entirely different topics. The analytical assumption was that news writers would only insert apparently irrelevant mentions of an issue if that issue was assumed to be a part of contemporary social world discourses. This analytical assumption was borne out in closer analysis of stories which contained only brief mention of "global warming".

For example, a 1995 'Op-Ed' article bemoaning the results of an education department report which showed widespread ignorance of U.S. history among the nation's schoolchildren made one mention of global warming. "The media promote the impression that the urgent questions of the moment—war and peace in Bosnia, the budget, global warming—arrive uninvited and unannounced" (Lapham 2 December 1995). In a 2001 'NY-Region' story about the results of the 2000 census which were due to be released, the writer made a flippant list of six of the most likely views of 10 guests at a dinner party who were representative of the New Jersey demographic. Third on the list was global warming. "Eight will be 'somewhat concerned' or 'very concerned' about global warming. Nine will think it's been 'too danged cold' this winter" (Genzlinger 7 January 2001). One further example of mention of the risk in an otherwise unrelated article: a 2007 article placed in the 'Travel' section which discussed the sights to see in Moscow. "While the Russian capital, even with global warming, is too cold for women to dance nearly naked through the streets in winter. . ." (Kishkovsky 21 January 2007). In all of these examples it is apparent that the writer assumes that the issue of "global warming" is a part of contemporary discourses. In 1995 and 2001 these examples also reference controversies over the existence of the risk: "urgent questions" and the insertion of a reference to an unusually cold winter indicate some doubts about global warming. By 2007, however, closer analysis of mentions of global warming or climate change shows that doubts largely had vanished, and that the risk was mentioned as something which was broadly accepted in the social world as a part of 'reality'.

News media texts where the environmental risk of global warming and climate change is given substantive treatment give an indication of news selector and writer assumptions about dominant political discourses, and of news management preferences. Texts where the issue is only mentioned are much more indicative of journalistic assumptions of contemporary social world discourses. **Chart 1** shows significant differences in the section placement of substantive treatments of the issue and brief mentions.

Chart 1: Comparison of substantive treatments of global warming and climate change, and brief mentions

Substantive Placements | Brief Mentions

Chart 1 shows that in 1990, substantive treatments were placed mostly in 'news' and 'political' sections, with the remainder of placements a relatively even balance between (in descending order) the 'specialist', 'NY-Region' and 'lifestyle' sections. Placement of brief mentions in 1990 differed. While there was a similar proportion of 'news' and 'NY-Region' section placements, there were fewer 'political' section placements, and more mentions in the 'specialist' and 'lifestyle' sections. The differences in placements of brief mentions of the issue suggest that global warming and climate change were not, in 1990, as important in political discourses as was assumed by placement choices for the substantive treatments of the issue. The greater proportion of mentions found in 'specialist and 'lifestyle' sections in 1990 suggests that this issue was more a part of contemporary discourses than formal news selection processes assumed.

From 1995 onwards, the differences between substantive section placements and placements of brief mentions became more striking. In 1995, substantive placements of information about global warming and climate change were found overwhelmingly in the news sections. In contrast, brief mentions were found overwhelmingly in the 'lifestyle' and 'NY-Region' sections. These sections tend to minimise political discourses, appealing rather to topics relevant to the everyday lives of their imagined audiences. In 1995, the 'sceptical' lobby's arguments were prominent in political discourses (see Chapter 4). Comparison with placements of brief mentions in this year suggests that ideas of global warming and climate change were a significant part of the discourses circulating among the readers of the non-political sections of the *New York Times*. It may be that in 1995, *New York Times* audiences were beginning to be aware of physical changes in their lived environments, even though they also were aware of the political controversy over the issue.

Similarly striking differences between substantive and brief mention placements were seen in 2001. Substantive information about global warming and climate change was placed overwhelmingly in the 'news' and 'political' sections: evidence of the ongoing strength of 'sceptical' arguments (again, see Chapter 4 for more detailed discussion). The issue hardly featured at all in substantive treatments in 'lifestyle' sections: a further indication of the strength of contemporary political controversy over the issue, since 'lifestyle' sections tend to stay away from political controversy. In placements of brief mentions of the issue, the proportions were more even. There were proportionately fewer mentions in the 'political' sections, somewhat more in the 'specialist' sections, and significantly more in the 'lifestyle'

and ‘NY-Region’ sections combined. As in 1995, the greater number of mentions in these latter two sections suggests a news writer assumption that the issue was a part of contemporary popular discourses.

The 2007 comparison provides further detail of the extent to which global warming and climate change were becoming embedded in popular discourses. As discussed in Chapter 4, in 2007 the ‘specialist’ sections gave a great deal more substantive attention to the issue: evidence of news selector assumptions that the risk was becoming directly relevant to their readers, and that audiences wanted greater detail about the risk. For the first time since 1990, the proportions of ‘news’ and ‘political’ section placements of both substantive treatments and brief mentions were similar. In 1990 there was broad social acceptance of expert advice about the existence and the risks of global warming and climate change. From 1990 to the mid-2000s, ‘sceptical’ arguments held greater sway in political discourses. The relatively equal balance of ‘news’ and ‘political’ section placements of substantive treatments and brief mentions in 2007 could be read as a rejection of ‘sceptical’ arguments and a return to the 1990 acceptance of global warming and climate change as an actual physical risk.

What is striking in 2007 is the great increase in decisions by ‘lifestyle’ section writers to include brief mentions of global warming and climate change in stories on otherwise unrelated topics. Closer analysis of these brief mentions shows that, as in the 2007 example cited earlier about the Russian winter, the issue was treated not as controversial, but rather as a given: as an accepted piece of social knowledge. In political discourses and, consequently, in the substantive *New York Times* treatments of global warming and climate change, by 2007 this environmental risk still was being represented as an undecided and controversial topic. [101] Both the substantial increase in ‘lifestyle’ section mentions of the risk and a closer analysis which shows connections being drawn with audience experience of unusual weather and seasonal changes suggest that changes in physical planetary systems were beginning to influence popular discourses, and that popular understanding of the risks was outstripping the more politically-driven media discourses on the issue.

Political discourses pay less attention to the physical world unless it intervenes in the form of natural disasters or is available for exploitation. In the social world there are more frequent

[101] See for example Chapter 5, Sections 5.6 and 5.6.1. *The New York Times* ‘coverage of record’ of the 2007 IPCC Science Working Group assessment focused on the debate over whether or not human activities were causing global warming.

direct interactions with the physical world. Even the largely urbanised *New York Times* readers maintain some connection with the natural world, whether that be experiencing changes in seasons and seasonal temperatures, or identifying changes in plant varieties suitable for gardens. The apparently greater acceptance of the existence of the environmental risk of global warming and climate change in popular discourses in 2007, seen in section placements of brief mentions of the issue compared with media discourses (which tended to be linked more tightly to political discourses), is supported when substantive treatments of the issue are more closely examined.

One editorial was headlined "My Warming Garden" (New York Times 6 May 2007). It discussed an officially-produced map showing recent changes in the climates of different regions, and consequent changes in gardening species likely to flourish in each region. The editorial writer observed that "You do not find many gardeners on the fence about climate change". Another article, a review of a book documenting a road trip following the beginning of the Spring season across the U.S., ended with apparent evidence of seasonal change:

> This book may be a hard sell on the East Coast this winter. When January feels like June, what's the hurry for April? Mr Stutz would not be surprised by the country's recent extreme weather patterns. Everywhere he found troubling, if inconclusive, evidence of global warming.
>
> (Woodward 21 January 2007)

By 2007, it would seem, the physical world was influencing popular discourses. Political discourses and their reflections in media discourses still gave significant emphasis to controversies over whether or not global warming was happening or was being caused by humans. The wider social world was incorporating direct experience of physical changes into discourses of global warming and climate change which increasingly involved acceptance of the inevitability of the risk.

3.12 Temporality

The daily news media are in the business of providing "news": information which is new and, generally, related to events which have happened within a 24-hour window around publication or broadcast: hence the news values of immediacy, recency, timeliness and

urgency. This focus on the very short term, and a preference for one-off events which, ideally, are sensational and therefore attractive to audiences, hampers news media communication of very long-term and slowly developing environmental risks. Allan, Adam et al. have defined this difficulty as a different perspective, with the news media being "event-centred" rather than "issue-sensitive" (Allan, Adam, and Carter 2000a, 9). News organisational processes also play a part in underplaying the importance of the long-term implications of environmental risk. As Wilson (2000) has observed, "The underlying causes and long-term consequences are often overlooked in the day-to-day grind to find a new angle by deadline" (Wilson 2000, 207). The news selector preference for information relating to the very near-term is plainly evident in this research.

Quantitative analysis of information selection frequencies[102] (**Table 3**, Chapter 6) shows that out of 1797 separate selections of information within the 17-year analytical period, 26 related to information about the long-term future risks of global warming and climate change, and just 15 related to the long-term historical context. This minimal attention to comparisons with past conditions and the long-term future differs greatly from expert preferences.

The 1990 IPCC report on the science of climate change gave highest salience to expert certainties that human activity was responsible for increasing amounts of greenhouse gases in the atmosphere[103] and that these increasing emissions would warm the planet. Measurements from Antarctic ice cores showed that for the past 160,000 years, methane and CO_2 had been closely correlated with temperature. Present-day CO_2 and methane atmospheric concentrations were nearing the highest concentration seen over that entire time period.[104] The 1995 IPCC Science Working Group clarified the comparison with pre-industrial times, choosing as its first priority statement the advice that:

> Increases in greenhouse gas concentrations since pre-industrial times (i.e. since about 1750) have led to a positive *radiative forcing* of climate, tending to warm the surface and to produce other changes of climate. (Italics in original)
>
> (Intergovernmental Panel on Climate Change 1995a, 3)

The Technical Summary of the 1995 IPCC Science Working Group showed scientific measurements of a sharp and still increasing spike in CO_2 atmospheric concentrations which

[102] Chapter 6, **Table 3**.
[103] (Intergovernmental Panel on Climate Change 1990a, xi)
[104] (Intergovernmental Panel on Climate Change 1990a, xv)

began in the early 1800s:[105] evidence, as far as scientific experts were concerned, that industrialisation was increasing the amounts of warming gases in the atmosphere. In 2001, IPCC experts produced palaeoclimatic data showing that the expected rate of warming over the coming century was "very likely" to be ". . . without precedent during at least the last 10,000 years" (Intergovernmental Panel on Climate Change 2001d, 8). The 2007 IPCC Science Working Group provided further evidence that contemporary warming was dangerously unusual, advising that:

> The last time the polar regions were significantly warmer than present for an extended period (about 125,000 years ago), reductions in polar ice volume led to 4 to 6 m of sea level rise.
>
> (Intergovernmental Panel on Climate Change 2007a, 9)

New York Times coverage of all of the above reports during the six-week windows of this analysis ignored the historical context.

News selectors showed somewhat more interest in information dealing with the relatively recent past. IPCC experts' high-priority advice that there had been rapid warming since the start of industrialisation was selected by *New York Times* writers once in 1990 and once in 2007. This relatively long-term comparison was far less frequently selected than the (still infrequent) selections of IPCC advice about contemporary conditions. Information that global temperatures were rising was selected four times in 1990 with IPCC attribution, twice in 2001 and three times in 2007. Additionally, it was selected (without IPCC attribution) twice in 1990 and three times in 2007.

This tendency to minimise or ignore high-priority IPCC advice about historical contexts and future risks substantially reduced social understanding of the underlying physical evidence which drove expert warnings that global warming and climate change warranted urgent action to avoid or avert substantial risks. Scientific evidence that quantities of greenhouse gases in the atmosphere were higher than ever before, that the contemporary global temperature was higher than the past 10,000 years, and that the recent rise in global temperature was more rapid than at any time in the past 10,000 years provided what IPCC experts considered to be a convincing basis for urging immediate and substantial action to reduce emissions. Even then, because of the long-term nature of global changes, they expected unprecedented and ongoing warming and climate change for the next few decades

[105] (Intergovernmental Panel on Climate Change 1995a, 16, Figure 1)

or centuries: a further reason for scientific alarm (and for warnings of the need for adaptation and emergency planning). News selections minimised or ignored such historical comparisons. Apparently the past was not deemed 'newsworthy'.

The preference for information relating to the short-term is not restricted to the news media. Susanne Moser and Lisa Dilling have argued that:

> For good evolutionary reason, most humans have a limited attention span to devote to non-immediate problems. . . Classic time management literature also tells us that humans spend most of their time on issues or demands perceived as urgent, such as responding to telephone calls or e-mail, whether they are important or not.
>
> (Moser and Dilling 2004, 36)

Politicians tend to be similarly dismissive towards non-immediate problems, regardless of their importance. Naomi Oreskes and Erik Conway interviewed one eminent U.S. scientific advisor who:

> . . . recalls being asked by colleagues, "When you go to Washington and tell them that the CO_2 will double in 50 years and will have major impacts on the planet, what do they say?" His reply? "They . . . ask me to come back in forty-nine years."
>
> (Oreskes and Conway 2010, 173-174)

An apparently general human preference for information about the "now", shared by political decision makers and news selectors, reduced social world understandings of expert certainties, providing more room for 'sceptical' arguments to impede global, national and local action to reduce or avoid an evolving physical environmental risk.

3.13 Direct experience of non-hazardous changes beats big remote risks every time

The news values of familiarity and relevance mean that global environmental risks are not assigned high salience by the news media until they begin to intersect directly with audiences' lives. **Tables 1** and **2** show a strong news selector preference for familiar information about changes being experienced contemporaneously by *New York Times* audiences. In her review of scholarly studies of communication of climate change, Susanne

Moser noted that one factor in popular uptake of expert information about this environmental risk was ". . . the general insulation of most modern, urbanized individuals from climate and the physical environment" (Moser 2010, 34). Citing Sharon Dunwoody,[106], she noted also that "Psychological research shows that direct experience and immediate demands trump vicarious experiences or abstract data almost every time" (Moser 2010, 34). Analysis of *New York Times* selections of expert observations of warming and climate changes supports these scholarly observations. Non-hazardous changes being directly experienced by *New York Times* audiences at the time of publication (such as unusually warmer winters or changes in suitable garden plant species) were given higher salience than hazardous changes being (or likely to be) experienced by populations living elsewhere, either in other parts of the U.S., or in other parts of the world.

In 1990, global warming or climate change were mentioned in 68 *New York Times* stories published during the six-week analytical window. Just two of these stories[107] (3%) discussed local or national physical risks. In 1995 the *New York Times* published only half as many stories dealing with global warming and climate change (35) during the six-week analytical windows. Three of these 1995 stories[108] (9%) dealt with potential local risks. In 2001, 102 stories about global warming and climate change were published during the six-week analytical window, but only three[109] (4%) dealt with local impacts. By 2007, when the environmental risk's impacts were becoming manifest, significantly more stories about global warming and climate change were published within the analytical window: 268, of which 25 (9%) mentioned possible negative local or national impacts. Almost all of these 2007 references to local or national impacts involved aspects of global warming and climate change which did not directly threaten human health and safety. Rather, they focused on aspects being experienced by the mostly urbanised population of New York City: warmer winters, changes in the start of the different seasons or changes in garden plant species.

From 1990, the IPCC assessment reports gave extensive details of dangerous changes which populations everywhere—including in the U.S. —should plan to avoid or reduce. Rain, when

[106] (Dunwoody 2007)
[107] (Rierden 14 October 1990: "Putting the Heat on Global Warming"; Stevens 30 October 1990: "Northern Hemisphere Snow Cover Found To Be Shrinking")
[108] (Stevens 18 September 1995: "Scientists Say Earth's Warming Could Set Off Wide Disruptions"; 18 September 1995: "Global Warming Heats Up"; 26 September 1995: "In Rain And Temperature Data, New Signs Of Global Warming")
[109] (Revkin 26 January 2001: "Ancient Corals May Hint At Worsening El Niño Cycles"; Rather 4 March 2001: "Global Problem, Local Alarm"; Zaritsky 9 September 2001: "Can't We be More Civil?")

it fell, would be heavier; flooding and storms would become more severe; dwindling glaciers and snow cover would reduce water supplies to North American rivers; the U.S. grain belt would dry out; wildfires and heat waves increasingly would threaten human health and safety in the U.S.; and rising sea levels would threaten U.S. coastal wetlands, communities and properties. **Table 1** shows that these warnings were given minimal attention by *New York Times* selectors until 2007, when the predicted risks were being directly experienced by U.S. populations. Even then, most of these physical impacts were happening elsewhere in the U.S., rather than in New York City and State. The news value of relevance to audiences seems to have resulted in a failure to select information about expected threats to human health and safety until audiences in the New York region were directly experiencing changes in climate and temperature.

Table 1: Expected risks: U.S. – Global comparison

Observed changes	1990 – U.S. Impacts	1995 – U.S. Impacts	2001 – U.S. Impacts	2007 – U.S. Impacts	US total	Global total
Drought risk will intensify	0	1	0	2	3	10
Floods will become more severe	0	1	1	3	5	34
Greater weather extremes expected	0	3	2	1	6	12
Heat waves will intensify	1	1	1	3	6	15
Rainfall will become heavier	0	4	0	3	7	13
Seasons will change	0	0	0	2	2	3
Storm risk will intensify	0	0	1	5	6	26
Wildfire risk will intensify	0	1	0	1	2	5

New York is considered one of the financial capitals of the world. Lower grain production would affect not only importing countries dependent on U.S. grain exports, but also the U.S. crop-growing industry's profitability. Yet, as **Table 1** shows, this economic risk was virtually ignored by *New York Times* news selectors, with only one selection of this expert information in 1995, and two in 2007. Droughts in the U.S. mid-west and south-west are remote from the urban dwellers of New York City and State, and their value to news selectors appears to have been minimal. While famines in other countries, when they occur, attract substantial news media attention (being deemed 'sensational'), the risks of future famines plainly are of less interest to news selectors, even though they might be of considerable interest to commodity futures traders. Overall, a risk deemed high-priority by experts was selected only 10 times from 1990–2007, and only three of these selections mentioned specific risks to the U.S. grain production industry.

Similarly, New York City dwellers rarely contend with floods or wildfires, probably explaining the dearth of selections of these significant risks. By 2007, the IPCC was reporting recent North American impacts of ". . . severe economic damage . . . from . . . hurricanes, other severe storms, floods, droughts, heat waves and wildfires" (Intergovernmental Panel on Climate Change 2007b, 619). Among other disastrous U.S. climatic extremes in 2006, the World Meteorological Organization had reported more than 140 deaths from heat waves in California, severe ongoing drought in the U.S. south-west and southern Plains, and a record wildfire season.[110] Increasing U.S. flooding risks were mentioned once in the *New York Times* during the 1995 and 2001 analysis windows, and three times in 2007. The risks of increasingly severe and frequent wildfires were selected once in 1995 and once in 2007. By 2007, the U.S. had experienced four years of increasingly savage storms (though these did not affect the *New York Times*' geographical readership area).[111] A succession of nationally disastrous and economically costly storms seems finally to have engaged news selector attention to increasing storm risks, with five such selections in 2007.

Heat waves, heavier rainfall and, more generally, greater weather extremes, arguably have a more direct impact on urban dwellers. **Table 1** shows that, along with the risk of increasingly severe or frequent storms, these were the most frequently selected U.S. physical risks. Again, the news value of relevance seems to have influenced these selections. The expectation of changing seasons appears to be non-disastrous, and this expert prediction was virtually ignored until 2007 when audiences were directly experiencing such changes. There were two predictions of future seasonal change in *New York Times* stories during the 2007 analysis window and, as **Table 2** shows (later in this section), a further 11 mentions of direct observations of changes in seasons in 2007.

One rare exception to the *New York Times* tendency to ignore expert warnings of national or local physical risks was the 'coverage of record' of the 1995 IPCC Science Working Group's assessment.[112] In this story, placed on the front and inside pages, the front-page coverage was given to global aspects of the risks of global warming and climate change. On the inside pages, the journalist, William K. Stevens, linked expert warnings about specific U.S. risks to to contemporary unusual extremes being experienced in the U.S. He also noted the likelihood that most east coast beaches would disappear within 25 years. This potentially huge national

[110] (World Meteorological Organization 2007)
[111] (World Meteorological Organization 2003, 7, 10; 2004, 7-8; 2005, 7, 9, 10; 2006, 6, 9)
[112] (Stevens 18 September 1995)

impact was not re-selected or developed further in any of the stories included in the 1995 analysis. The absence of any follow-up stories on the expected loss of beaches and coastlines supports the argument that the environmental risk of global warming and climate change was viewed by news selectors as theoretical only, related to political discourses but not to events developing in the physical world.

In 2001, as in 1995, the analytical window shows only one *New York Times* story (out of 102) which provided details of expected U.S. global warming and climate change impacts (Rather 2001). This story, which was placed in the 'NY-Region' section, provided relatively comprehensive detail of risks to the local environment and population. It warned of the likely disappearance of coastal wetlands, flooding of coastal properties, increasingly severe heat waves, increasingly heavy rainfall, more pollution and more vector-borne diseases,[113] salinisation of drinking water supplies and shorter life-spans for infrastructure such as coastal roads and bridges. As in 1995, this story was not followed up by any further discussion of local risks: further indication of news selector assumptions that the risk was largely not a U.S. concern and that audiences were not enormously interested in the issue. Such assumptions can become self-fulfilling prophecies. If the news media assumption is that audiences are not interested in a particular issue, news writers will seldom select information on that issue for re-presentation to audiences. If audiences are not given information about how an environmental risk might affect their personal health, livelihoods and environment, then they will be less interested in that risk. The news media assumption of relative audience disinterest in the environmental risk then becomes reality.

[113] For example, those carried by mosquitoes and ticks.

Table 2: Observed changes: U.S. – Global comparison

Observed changes	1990 – U.S. Impacts	1995 – U.S. Impacts	2001 – U.S. Impacts	2007 – U.S. Impacts	U.S . total	Global total
Droughts are intensifying	0	2	0	0	2	4
Ecosystems are changing	0	0	0	7	7	9
Global warming and climate change have started	0	4	0	14	18	40
Record warming observed	1	0	0	6	7	9
Sea levels are rising	0	1	1	0	2	2
Seasons are changing	1	0	0	11	12	15
Unusually warmer winter	0	0	0	9	9	13

Table 2 shows that *New York Times* news selectors were less interested in extreme weather events happening in other parts of the U.S. or their relationship with expert predictions of long-term and worsening physical risks. They were far more interested in less hazardous and shorter-term changes in temperature and climate which were being directly experienced by *New York Times* audiences. Even the 2006 record snowfall in New York City[114] was not selected by news writers to provide local relevance for the IPCC's 2007 statement that human influences probably were contributing to the observed increased frequency of "heavy precipitation events" (i.e. rain and snowfall).[115] Climate scientists viewed increasingly heavy rainfall and snowfall events as evidence of climate change; news selectors appear to have viewed the same events as 'one-day wonders', unrelated to an evolving global physical phenomenon.

One category of information details which did receive significant attention from news selectors in 2007 was the IPCC advice that global warming and climate change had started. Out of a total of 40 selections of this information over the entire analysis period, 18 of these related to locally and nationally observed phenomena. Most selections of local or national

[114] (World Meteorological Organization 2007)
[115] (Intergovernmental Panel on Climate Change 2007d, 6)

evidence of warming and climate change came in 2007 news stories (14). IPCC evidence of recent record warming, which had been available in all IPCC reports since 1990, did not attract significant news selector attention until 2007. Dunwoody's (2007) "direct experience" seems to have been a factor here: expert warnings about inevitable warming and changes in climate were not deemed relevant for *New York Times* audiences until the actual impacts were being experienced. The relatively high number of references, in 2007, to expert advice that global warming and climate change had started and that record warming was being observed, suggest a news selector assumption that popular understandings of this environmental risk were being affected by direct experiences of changes to physical systems. Coupled with the findings from **Chart 1**, it would appear that by 2007, popular acceptance of the risks and impacts of global warming and climate change, driven by direct popular experience were pulling ahead of political discourses.

3.14 Conclusion

People get most of their information about environmental risks from the media, and other popular media get most of this information from the news media. All information is mediated as it moves from experts to non-experts. All media transform information and ideas to make them appear relevant and therefore attractive to their audiences.

News media versions of expert information are driven by the needs and interests of their audiences, rather than by expert understandings of the most important aspects of their advice about physical systems. The journalistic ethic of holding decision makers to account on behalf of the wider citizenry encourages journalists to give priority to political discourses about environmental risks, since it is politicians and policy makers who are seen to have the power to initiate actions to avert or avoid environmental risks. Thus, expert advice is given less salience than political interpretations of expert advice.

The journalistic ethic of balance and news values of immediacy, recency, urgency, relevance and conflict work to distort expert information about long-term environmental risks, and expert evidence of significant historical contexts which prove the contemporary dangers of environmental risks. In the case of global warming and climate change, the ethic of providing

balanced stories, allied with the news preference for stories about conflict, encouraged journalists to give excessive weight to the views of a small group of 'sceptical' scientists, thus undervaluing the advice of the vast majority of climate scientists. The short-term nature of news media attention meant that long-term historical contexts and projections of substantial planetary changes in future decades and centuries were given minimal attention, even though such contexts and projections were the primary reason for urgent expert warnings about the extent of the risks and the need for preventive action. The global nature of the risk obscured journalistic attention from other more local or national physical risks.

In the evolution of social world understandings of global warming and climate change, popular discourses moved ahead of political and media discourses on the issue. Direct audience experience of changes in temperature and climate encouraged greater certainty in popular discourses that the risks were real, and happening, compared with politically aligned news media discourses.

CHAPTER 4 Discourse: evolution of social understandings of global warming and climate change

4.1 Introduction:

The physical processes which warm the planetary atmosphere have been well known to scientific experts for more than a hundred years.[116] Expert concerns about the climatic results of enhanced atmospheric warming as increasing greenhouse gases were emitted from energy and industrial production have been voiced—and reported in the news media—for more than 50 years.[117,118] In the mid-1980s, climate scientists attending the Villach conference held to examine the risks of rising quantities of carbon dioxide in the atmosphere warned that temperature rises in the first half of the 21st century would be greater than any in human history.[119] In the late 1980s there was broad acceptance of the expert consensus that global warming and climate change posed significant risks to human health and property, and to natural environments and ecosystems.[120] From the early 1990s, however, non-expert social world understandings of the extent of the risk began to diverge sharply from expert understandings.[121] It was not until the mid-2000s that non-expert acceptance of the risk began once again to align more closely with expert understandings and advice.[122]

This chapter examines the evolution of social understanding of the environmental risk of global warming and climate change. It is based on three sources: expert scientific advice contained in the reports of the Intergovernmental Panel on Climate Change (IPCC); news mediations of that advice, published in *The New York Times*; and scholarly analyses of news

[116] (Houghton 2009)
[117] John Zillman's history of climate change notes that "Already by the 1960s . . . scientific concern was beginning to mount, reinforced by the increasing carbon dioxide concentrations evident from the early observations at Mauna Loa, that human activities could, in fact, already be starting to impact on the Earth's climate" (Zillman 2009, 143).
[118] Boykoff and Roberts (2007) cite Waldemar Kaempffert's 1956 New York Times article noting that human activities were increasing quantities of carbon dioxide in the atmosphere by 30 per cent per century: ". . . that is, at the rate of 1.1°C in a century . . . the possibility that man had a hand in the rise cannot be ignored" (Kaempffert 1956, cited in Boykoff and Roberts 2007, 4).
[119] (World Meteorological Organisation 1986)
[120] (Trumbo 1996; McComas and Shanahan 1999; Boykoff and Boykoff 2004; Carvalho 2005; Boykoff and Roberts 2007; Anderson 2009)
[121] (See for example Trumbo 1996; Wilson 2000; Boykoff and Boykoff 2004; Antilla 2005; Carvalho 2005; Boykoff and Roberts 2007; Carvalho 2007; Anderson 2009)
[122] (Boykoff and Roberts 2007; Anderson 2009)

media, policy and popular understandings of global warming and climate change. In the social world, discourses which circulate within and between various cultural groupings shape social constructions of the 'reality' of a physical phenomenon. These social world discourses can be discerned in news media selections, framings and placement decisions, since these are guided in part by assumptions about the discursive preferences of news media audiences. News media assumptions about contemporary popular discourses, evident in news texts, suggest that social discursive construction of a physical environmental risk changes as that risk's impacts become manifest.

Part One of this chapter reviews the scholarly literature to establish factors which influenced news mediations of information about global warming and climate change. This provides the background against which, in Part Two, I examine the overall frequencies of information placements in the different sections of *The New York Times* and look more closely at categories of information selected for the 'political' and 'news' sections.[123] Part Two establishes evidence of changes in news selector assumptions about how social world discourses constructed this risk over the 17-year analysis period from 1990–2007.

Analysis of the evolution of discourses about global warming and climate change demands consideration of the intersections of physical and social worlds. This environmental risk was created by the actions of the social world. It then proceeded to develop according to inexorable physical laws (for example, that a warmer atmosphere would cause more evaporation and also could hold more water, meaning that in a warmer world, rain and snow, when they fell, would be heavier). Content analysis of *New York Times* treatments of expert IPCC advice supports the observations of other scholars, who have noted that for much of the 1990s and early 2000s, the social world was reluctant to accept expert advice about the workings of the physical world and the imminence of the risks of global warming and climate change.[124] *New York Times* framings of this environmental risk show substantial news writer attempts to define it mostly in terms of its impacts on unrelated social world discourses: for example, international and national political discourses, discourses about economics or discourses about the unreliability of scientific information.

[123] Chapter 7 examines categories of information selected for the 'specialist' and 'local' sections. Chapter 3 discusses 'lifestyle' section selections.
[124] (Trumbo 1996; McCright and Dunlap 2000; Boykoff and Boykoff 2004; Carvalho and Burgess 2005; Boykoff and Roberts 2007; Anderson 2009; Swim et al. 2011)

Re-definition of a physical risk as social and non-physical fits well into risk theorist Ulrich Beck's identification of "organised irresponsibility" (Beck 1995, 69). Beck identified the social world's tendency, in the face of environmental risks, to define these in terms relevant to social world discourses even if these definitions are entirely irrelevant to the physical risk which is looming. The result is that social world discourses and institutions appear to be discussing the environmental threat coherently and competently while in fact they are performing the equivalent of re-arranging the deckchairs on the *Titanic*, ignoring physical implications and concentrating on implications for more abstract social world discourses. News writer assumptions about the differing discourses on global warming and climate change, evident in the wide variations in information categories selected for the different *New York Times* 'news', 'political', 'specialist' and 'local' sections, suggest strongly that the social world's discursive constructions of a physical 'reality' need not be related to the physical processes which construct that 'reality' in the physical world.

4.2 PART ONE: Evolution of discourses on global warming and climate change

Discourses on global warming and climate change spanned expert understandings of physical processes, 'sceptical'[125] lobby attempts to dismiss expert advice, political definitions of the risk as purely a matter of emission reductions, news mediations of expert advice which preferred political definitions, and non-expert social world discourses which included aspects of expert, political and news media representations of the issue depending on which discursive community was involved. Non-expert understandings of the risk initially aligned fairly closely with those of experts. Then, for more than a decade and a half, political contestation of expert advice tended to dominate in social world discourses about the risk. It

[125] Many physical scientists have difficulty in applying the word "sceptic" to naysaying lobbyists who contested mainstream climate science, since scepticism is at the core of the scientific method. Three scholars prominent in the field of analysis of discourses about climate change, David Demeritt (2001), Aaron McCright and Riley E. Dunlap (2003) have pointed out that the term was self-selected. While terms 'contrarians' and 'denialists' also have been applied to the 'sceptical' lobby, this thesis follows the description preferred by Demeritt, McCright and Dunlap, describing such lobbyists as 'sceptical' scientists. The quotation marks indicate that lobbyist 'sceptical' scientists differ from mainstream climate scientists. As McCright and Dunlap have observed, what distinguishes these 'sceptical' scientists from the ". . . vast majority in the scientific community is their strong and vocal dissent from the growing consensus regarding the reality of anthropogenic climate change" (McCright and Dunlap 2003, 354, footnote 8).

was only when changes in temperature, climate and seasons began to be directly experienced by *New York Times* audiences that news mediations of expert advice began to demonstrate assumptions that audiences were beginning to accept that the risk was real, and not merely a matter of political contestation.

4.2.1 The scientific discourse

Scientific understanding of the risks of climate change has always rested on elegantly simple theoretical certainties. The existence of the greenhouse effect which traps enough of the sun's heat to keep the planet at a temperature which permits life to flourish was articulated in 1827 by the eminent mathematician Jean-Baptiste Joseph Fourier.[126] At the end of that century, another eminent scientist, the Swedish chemist Svante Arrhenius—who later won the Nobel Prize for Chemistry—theorised that increasing greenhouse gases from industrialisation would warm the atmosphere.[127] His calculation of a 5° Celsius temperature rise when atmospheric carbon dioxide (CO_2) had doubled still sits comfortably with the state-of-the-art projections of today's best climate science.[128]

By the 1950s, climate scientists were measuring a steady increase in greenhouse gases in the atmosphere.[129] Then, in the mid-1980s, a joint French-Soviet research project examining the paleological temperature record via ice cores drilled in Antarctica found that over a 160,000 year period, carbon dioxide atmospheric concentrations mapped closely onto fluctuations in global temperature.[130] Scientific measurements of quantities of carbon dioxide in the atmosphere throughout the 20th century showed a significant and continuing increase, raising fears among the specialised community of climate scientists that climate change could become a substantial global risk.[131] International agencies[132] responded by arranging a series

[126] (Weart 2007)
[127] (Arrhenius 1896)
[128] The 1990 IPCC Science Working Group advised that a doubling of atmospheric carbon dioxide was likely to raise global temperature by 1.5°C–4.5°C (Intergovernmental Panel on Climate Change 1990a, 53). The 2007 IPCC Science Working Group estimated that a doubling of atmospheric carbon dioxide could lead to a global temperature rise in the range of 2°C–4.5°C (Intergovernmental Panel on Climate Change 2007a, 12).
[129] (Zillman 2009)
[130] (Barnola J.M. et al. 1987; Intergovernmental Panel on Climate Change 1990a, xiv)
[131] (World Meteorological Organization 1986)

of conferences to discuss potential implications of the risk and possible policy initiatives. In 1988 the United Nations General Assembly instructed two international technical advisory agencies, the United Nations Environment Programme and the World Meteorological Organization, to establish the Intergovernmental Panel on Climate Change ". . . as an effort by the United Nations to provide the governments of the world with a clear scientific view of what is happening to the world's climate" (IPCC, undated). The IPCC was mandated to comprehensively assess existing knowledge of the science and likely impacts of global warming and climate change, and to review the literature on possible response strategies. Three separate working groups were established to report on these three aspects of the environmental risk.[133]

In the mid 1980s and early 1990s, climate scientists acknowledged that while there was considerable certainty about the inevitability of global warming and its likely climatic and sea level impacts, these impacts would not become apparent until the late 1990s and early 21st century. By then, climate scientists expected to begin to observe evidence such as large-scale melting of polar ice, more severe and frequent heat-waves, heavier and more destructive rainfall, and increasingly severe droughts in mid-continental mid-latitude regions of the planet.[134] By the early 21st century all of these impacts were becoming manifest, as evidenced both in succeeding IPCC reports on observed impacts of climate change and, in more summary form, in the World Meteorological Organization's (2007) statement documenting aberrant and record climate events from 1998–2007.[135] In the intervening years, however, discursive construction of the 'reality' of the risk moved from general acceptance of expert advice to uncertainties which at times were hotly contested.

[132] These international agencies included the United Nations Environment Programme, the World Meteorological Organization, the World Health Organization, the Food and Agriculture Organization and the United Nations General Assembly.
[133] (Agrawala 1998b, 622)
[134] (See Intergovernmental Panel on Climate Change 1990a and 1990b)
[135] (World Meteorological Organization 2007)

4.2.2 Social discourses

Until the early 1990s, scientific advice about global warming and climate change was generally accepted by news media, politicians and policy makers.[136] The first chair of the IPCC, Bert Bolin, acknowledged a general discursive acceptance that global warming and climate change posed significant global risks in his 1990 address to an IPCC meeting in Washington D.C. "There is now a general awareness among nations about the threat of a likely climate change" (Bolin 2007, 58). However, around the time that Bolin voiced his understanding of broad social world acceptance of the risks, social world understandings were beginning to change to uncertainty and disbelief. Bolin later acknowledged that 1990 was when ". . . groups of anti-climate-change lobbyists appeared in the USA as an organised opposition to the IPCC efforts" (Bolin 2007, 63). In news media representations and political and industrial discourses, framing of the risks of global warming and climate change shifted from ideas of an issue which was supported by scientific expertise, to a social world definition of the issue as deeply controversial and lacking authoritative scientific credibility. Over the ensuing years, IPCC statements of certainty about the physical processes, their likely impacts and their underlying causes grew stronger, while social discourses increasingly constructed the risk as uncertain and controversial.

4.2.3 The 'sceptical' lobby

One important factor which contributed to the divergence of scientific and social understanding of the risks of global warming and climate change was the formation, in the late 1980s and early 1990s, of well-funded 'sceptical' lobbies. These were formed by fossil fuel industry groupings and conservative think-tanks[137] to contest expert scientific advice.[138] The corporate motivation was based on an unwillingness to change production methods and

[136] (Trumbo 1996; Wilson 2000; Boykoff and Boykoff 2004; Antilla 2005; Carvalho 2005; Boykoff and Roberts 2007; Carvalho 2007; Anderson 2009)
[137] McCright and Dunlap (2003) use what they call a "typical" social sciences definition of 'conservatism': ". . . the elite-driven network of private foundations, policy-planning think tanks, and individual intellectuals and activists that directly or indirectly attempt to advance social traditionalism and economic libertarianism on a national level" (McCright and Dunlap 2003, 352).
[138] (Bolin 2007; Anderson 2009)

fuel sources;[139] the conservative motivation was based on libertarian resistance of government regulation and imposition of new taxes,[140] and resistance also to the idea that the natural world could endanger rather than enrich human society.[141] The substantial funding and political connections contributed by corporate and conservative funders of the 'sceptical' lobby permitted a sophisticated public relations strategy to equal or overrule the advice of climate scientists.[142] The success of this public relations strategy was aided by climate scientists' mistrust and dislike of the news media,[143] by journalists' confusion over how to establish the credibility of experts,[144] and journalistic adherence to the ethic of balance[145] and the news value of conflict[146] which sat uncomfortably with accurate renderings of expert advice.

Alison Anderson has noted in her 2009 review of literature on communication of expert information about global warming and climate change that the scholarly literature now shows ". . . how powerful industry groups, special interest lobbies and PR companies in the United States have manipulated scientific claims and exploited the news media" (Anderson 2009, 170-171). McCright and Dunlap's 2000 and 2003 examinations of the framing and claims-making techniques of conservative think tanks revealed these organisations' strategy of aligning themselves with ". . . prominent American climate change skeptics known for their staunch criticism of mainstream climate research and their affiliations with the fossil fuels industry" (McCright and Dunlap 2003, 348). Their research demonstrated the disproportionate influence which a small group of 'sceptics' had on media framings and political opinion-forming. They argued that the 'sceptical' lobby took advantage of the journalistic ethic of balance to achieve:

> . . . approximate parity with some of the most renowned experts in the field . . . There is little doubt that the entrepreneurial leaders of these conservative think tanks were cognizant of the media's balancing norm and aggressively manipulated the media's need to present "both sides of the story".
>
> (McCright and Dunlap 2003, 366)

[139] (Demeritt 2001, van den Hove, Le Menestral and de Bettignies 2002; McCright and Dunlap 2000, 2003)
[140] (McCright and Dunlap 2000, 2003; Oreskes 2007; Oreskes and Conway 2010)
[141] (McCright and Dunlap 2000; Milton 2002; Moser 2010; Swim et al. 2011)
[142] (Demeritt 2001; van den Hove, Le Menestrel, and de Bettignies 2002; McCright and Dunlap 2003; Antilla 2005; Carvalho 2005, 2007; Anderson 2009)
[143] (Schneider 1997; Henderson-Sellers 1998; Bolin 2007)
[144] (McCright and Dunlap 2003; Antilla 2005; Carvalho 2005, 2007)
[145] See the discussion of balance as informational bias in Boykoff and Boykoff 2004.
[146] (Allan, Adam, and Carter 2000; McCright and Dunlap 2003; Antilla 2005; Carvalho 2005; Tolan and Berzon 2005; Oreskes 2007; Olausson 2009; Rhomberg 2009; Oreskes and Conway 2010; Swim et al. 2011)

Boykoff and Boykoff's (2004) content analysis showed convincingly that 'sceptical' manipulation of the news ethic of balance resulted in news representations of global warming and climate change which were biased rather than balanced. McCright and Dunlap's (2003) analysis of the thematic content of documents on global warming produced and/or circulated by conservative think tanks between 1990 and 1997 provided more detail of the main counter-claims which became prominent in social world and media discourses. These were that IPCC advice was either too uncertain or simply wrong; that even if global warming did happen it would be beneficial; and that any action to reduce global warming would cause more harm than good (i.e. that it would wreck the economy).

The lobbying offensive against expert IPCC warnings about global warming and climate change was well funded. Van den Hove, Le Menestrel and de Bettignies (2002) have reported that from 1990 to 2000, the oil and gas industry contributed more than US$122 million in political donations.[147] Gelbspan has recorded that "By 2001, ExxonMobil was giving more than [US]$1 million a year to an array of ideological right-wing organizations opposing action on climate change" (Gelbspan 2008, 51). Antilla has cited Exxon-Mobil donations to one anti-global warming think-tank, the Competitive Enterprise Institute, of US$405,000 in 2002; US$465,000 in 2003 and US$270,000 in 2004.[148] 'Sceptical' organisations and scientists developed a well-organised lobbying and media strategy, unlike the IPCC which preferred to focus on policy makers[149] and to ignore the news media as much as possible.[150]

The public relations successes of the 'sceptical' lobby were due in part to this more than adequate funding from fossil fuel industries and conservative organisations. As Demeritt (2001) observed:

> . . . thanks to generous funding from the fossil fuel industry (Gelbspan 1997), Singer, Seitz, and a handful of other self-proclaimed climate skeptics have become the darlings of the conservative talk-radio circuit and the Republicans in control of the U.S. Congress (Brown 1996).
>
> (Demeritt 2001, 308)

[147] (van den Hove, Le Menestrel, and de Bettignies 2002)
[148] (Antilla 2005, 347)
[149] (Bolin 1994)
[150] As Bolin rather dismissively commented: "It was obvious that views amongst journalists were often based on a rather superficial acquaintance with the work by the IPCC" (Bolin 1994, 107). Ann Henderson-Sellers, another climate scientist, has referred to ". . . the media, which we all love to blame" (Henderson-Sellers 2009).

Funding permitted industry and conservative organisations to recruit scientists, produce lobbying materials in substantial quantities and publicise these extensively. McCright and Dunlap (2003) reported that:

> . . . the 14 conservative think tanks in this study produced and/or circulated 224 documents on global warming between 1990 and 1997. These documents include policy studies, books, press releases, and opinion-editorial essays . . . Members of conservative think tanks also promoted their global warming counter-claims in 1997 through television programs and radio advertisements . . . Conservative think tanks also sponsored policy forums, public speeches, and press conferences in 1997 to present their counter-claims on global warming to policy-makers and the general public.
>
> (McCright and Dunlap 2003, 356)

This lobbying information offensive was far superior to IPCC communication initiatives which focused almost exclusively on producing the official assessments and briefing policy makers. IPCC scientists possessed sound, rationally-based expert understanding of global warming and climate change. However, they were woefully ill-equipped to deal with the emotionalism and irrationalities of political contestation or with clear communication of scientific understandings to non-expert media and publics.

4.2.4 Scientific responses to 'sceptical' lobbying

The IPCC was clearly aware of the lobbying efforts of fossil fuel and conservative organisations, even if it lacked the skills or inclination to contest these. Bolin later described the aims of the 'sceptical' lobby as a strategy of ". . . systematically countering the assessments by the IPCC" (Bolin 2007, 85). He went on to highlight the fossil fuel industry and political affiliations of Don Pearlman, who had advised the U.S. Department of Energy under the Reagan and (George H.) Bush administrations ". . . and was now employed by the coal industry. The Global Climate Coalition,[151] led by John Schlaes, was another similar industrial group" (Bolin 2007, 85). Van den Hove, Le Menestrel and de Bettignies write, similarly, that the Global Climate Coalition's aims were to ". . . [raise] doubts about the

[151] As Bolin (2007) and Gelbspan (2008) have recorded, the Global Climate Coalition was a lobbying organisation established by fossil fuel industries to resist governmental action to avert global warming.

integrity of the mainstream science of climate change, by pointing to the uncertainties and gaps in scientific knowledge" (van den Hove, Le Menestrel, and de Bettignies 2002, 6).

The fossil fuel industry strategy of contesting the certainty of scientific understandings of the causes and results of global warming and engaging in the "organised irresponsibility" of arguing that the whole risk was deeply uncertain, any action to prevent the risk would be impossibly costly and that in any case it was other countries' problem is seen explicitly in the explanation of Exxon Mobil chief executive officer and chairman Lee Raymond:

> Although the science of climate change is uncertain, there's no doubt about the considerable economic harm to society that would result from reducing fuel availability to consumers by adopting the Kyoto Protocol or other mandatory measures that would significantly increase the cost of energy. Most economists tell us that such a step would damage our economy and almost certainly require large increases in taxes on gas and oil. It could also entail enormous transfers of wealth to other countries.
>
> (Lee Raymond, cited in van den Hove, Le Menestrel, and de Bettignies 2002, 4)

This argument ignores climate scientists' certainties about the physical processes which were causing global warming, highlighting instead IPCC statements about remaining uncertainties. It also ignores the likely physical impacts of rising temperatures, climate change and sea level rise, appealing instead to more abstract social world discourses of economic progress and resistance to increased or new taxation. Considerations of economic risks as global warming and climate change continued to develop were also ignored. Instead, the lobbying organisations and their 'sceptical' scientist spokesmen focused on social world discourses which did not incorporate recognition of the physical phenomenon already under way.

'Sceptical' arguments paid little attention to the methodologies and peer review processes of mainstream climate scientists but received substantial attention from the news media, to the dismay of IPCC climate scientists. Bolin described Fred Singer's critique of the IPCC's 1990 report as "simply wrong", "incorrect" and ". . . intentional misinterpretations of the IPCC report" (Bolin 2007, 73). He observed that Singer's press statement criticising the IPCC's 1995 report:

> . . . was solely aimed at discrediting the second IPCC assessment with arguments that were seldom based on the current literature and most of which had been refuted by the IPCC in its second assessment . . . Singer's tainted arguments . . . were neither significant nor verifiable . . . Singer's press release made headlines particularly in the USA . . . I was amazed that this serious issue was presented with an almost complete lack of credible scientific analysis.

(Bolin 2007, 135)

Similarly, eminent U.S. climate scientist Stephen Schneider (1997) complained about the news media treatment of a lobbying document from the Global Climate Coalition compared with news mediations of the research of Thomas Karl, acknowledged by his peers as one of the world's leading climate modellers:

> A report by Accu-Weather, Inc., prepared for the Global Climate Coalition (GCC), purported to be a comprehensive, global climate analysis, but actually used data from just three cities . . . Tom Karl, on the other hand, used data from several thousand stations in his comprehensive analysis of global climate change. However, the GCC's public relations effort to get their side of the story into the media led to their press conference receiving much more attention than Tom Karl's vastly superior scientific efforts.

(Schneider 1997, 97-98)

Another IPCC scientist, Ann Henderson-Sellers, drew explicit connections between what journalists perceived to be balance, and what mainstream climate scientists perceived as misinformation: ". . . journalists' pursuit of 'balance' when most of us believe that any argument is over can be very frustrating especially when it gives yet more oxygen to those trolls"[152] (Henderson-Sellers 2009, 1). As all of the above criticisms from IPCC scientists suggest, the success of the 'sceptical' lobby derived in considerable part from a deliberate public relations strategy to popularise "tainted arguments" (as Bolin put it) which contested mainstream advice from the world's premier climate scientists. These 'sceptical' arguments gained a great deal more news media and popular attention by exploiting a professional news media ethic: that of providing balance for any story where there are conflicting views.

4.2.5 News values and the distorting potential of 'balance'

Information published in the mainstream news media has greater credibility among audiences than information found in other forms of popular media (for example, films, television programmes, cartoons, Internet-based blogs) because the news media are expected to adhere to journalistic ethical standards of accuracy, objectivity and balance. The difficulty raised by

[152] Henderson-Sellers defined "trolls" as: ". . . in web vernacular, tiresome people who intentionally post false or controversial messages to create conflict, to gain funds, or simply to attract attention" (Henderson-Sellers 2009, 1).

Miller and Reichert (2000), that such ethics do not ensure that the "right facts" are reported, became particularly evident in news coverage of global warming and climate change. In this case, the great majority of climate scientists agreed that there were significant risks, but a small group of 'sceptical' scientists vociferously disagreed. Entman has noted that the journalistic ethic of balance ". . . requires that reporters present the views of legitimate spokespersons of the conflicting sides in any significant dispute, and provide both sides with roughly equal attention" (Entman 1989, 30). One key word in this definition is "legitimate"; another is "significant". In the case of news mediation of expert advice about the risks of global warming and climate change, two questions arise. How well did the news media distinguish between legitimate and illegitimate providers of information about a physical environmental risk; and, how well did they decide whether any putative dispute over risk information was significant?

The answer, according to a number of scholars, is: Not well at all.[153] The news ethics of objectivity and balance and the news value of conflict encouraged the news media to give equal weight to IPCC expertise and to the small group of 'sceptical' lobbyist scientists. The risk was framed in the news media as controversial rather than as widely accepted by the vast majority of climate scientists. Boykoff and Boykoff's (2004) analysis of global warming and climate change coverage by four major U.S. newspapers[154] from 1988–2002 found that the majority of this 'prestige press' coverage (52.65%) gave roughly equal attention to IPCC warnings that human activities were warming the atmosphere and changing climate, and to the insistence by the small group of 'sceptical' scientists that they were not:[155]

> Despite the highly regarded IPCC's consistent assertions that global warming is a serious problem with a "discernible" human component that must be addressed immediately, balanced reporting has allowed a small group of global warming skeptics to have their views amplified.
>
> (Boykoff and Boykoff 2004, 126-127)

Consonant with the complaints of leading climate scientists Bolin (2007), Henderson-Sellers (2009) and Schneider (1997) mentioned earlier, Boykoff and Boykoff (2004) concluded that:

[153] (Wilson 2000; McCright and Dunlap 2000, 2003; Boykoff and Boykoff 2004; Antilla 2005; Carvalho 2005, 2007; Boykoff M.T. 2008; Anderson 2009)
[154] These newspapers were *The New York Times*, *The Los Angeles Times*, *The Washington Post* and *The Wall Street Journal*.
[155] (Boykoff and Boykoff 2004, 129)

> . . . journalistic balance can often lead to a form of informational bias . . . [bias is] the divergence of prestige-press global warming coverage from the general consensus of the scientific community.
>
> (Boykoff and Boykoff 2004, 127).

The general news media failure to understand the extent of scientific consensus on the reality and the scope of the risk can be blamed in part on a general lack of scientific understanding among journalists, most of whom come from arts rather than science educational backgrounds. Another factor is the sheer pressure of time and deadlines which most journalists have to deal with every day. Ross Gelbspan, a Pulitzer prize-winning journalist who has written several books on ". . . the campaign of disinformation perpetrated by big coal and big oil" (Gelbspan 2008, 72) has noted that:

> . . . few journalists are comfortable with complex scientific information . . . [and this is] compounded by the daily deadlines that frequently deprive reporters of the time to fully digest complex scientific papers.
>
> (Gelbspan 2008, 74)

A further factor in the news media tendency to give undue weight to 'sceptical' dissension was the journalistic preference for using other news media stories as primary sources rather than scientists. If the source news media information was unbalanced, so too would be the ensuing articles written by other journalists.

Wilson (2000a) has shown that most specialist environmental journalists got their background information on global warming from the print news media, rather than from scientific reports, interviews with scientists or television or radio news. Boykoff and Boykoff (2004) have shown how the 'prestige press' distorted the news ethic of balance to give equal or greater coverage to 'sceptical' lobbyists. However, U.S. newspaper coverage of global warming and climate change went further than a simple journalistic confusion over how to balance mainstream climate science advice with vehement criticisms of that science. At times, the bias appeared deliberate. Liisa Antilla analysed 544 stories about the issue which were published in 255 U.S. newspapers in a single year (1 March 2003–29 February 2004). She examined how the issue was framed[156] and who were cited as the primary sources, focusing on wire and syndicated news service articles which contained information about 32 scientific studies released during the analysis period. She found that:

[156] Antilla (2005) categorised each news version's framing of reported science as 'valid science', 'ambiguous cause or effects; 'uncertain science' and 'controversial science'.

> Not only were there many examples of journalistic balance that led to bias, but some of the news outlets repeatedly used climate sceptics—with known fossil fuel ties—as primary definers. Worse yet, in some instances, such articles originated from wire or news service providers . . . which caused the exponential spread of misinformation.
>
> (Antilla 2005, 350)

Antilla's research found that of the 32 scientific studies covered by news organisations during her analysis period, only 20 came from peer-reviewed scientific journals. In her conclusion, she raised a concern which merits consideration by news media professionals: that if an expert report has not been peer-reviewed, it lacks credibility among experts in that field and, by extension, should be accorded less rather than more credibility by the news media.

4.2.6 The credibility of peer review processes

The credibility assigned by scientific experts to peer-reviewed articles was highlighted in 2011 when the editor of one technical journal, *Remote Sensing*, resigned after a flawed article by two 'sceptical' scientists was reviewed by three scientists with 'sceptical' leanings[157] and published. In his editorial explaining why he was resigning, Wolfgang Wagner explained that:

> Peer-reviewed journals are a pillar of modern science. Their aim is to achieve highest scientific standards by carrying out a rigorous peer review that is, as a minimum requirement, supposed to be able to identify fundamental methodological errors or false claims. Unfortunately . . . the paper by Spencer and Braswell that was recently published in *Remote Sensing* is most likely problematic in both aspects
>
> (Wagner 2011, 2002)

Because of the credibility assigned to articles published in the peer-reviewed literature, and because the authors immediately publicised an inflated summary of their findings,[158] the article was widely reported, and widely circulated among 'sceptical' lobbyists.[159]

[157] Wagner said his editorial team had "unintentionally selected three reviewers who probably share some climate sceptic notions of the authors" (Wagner 2011, 2003).
[158] A press statement by the lead author, headlined "New NASA data blow gaping hole in global warming alarmism" was picked up by the conservatively aligned Fox News and given a new headline: "Does NASA data show global warming lost in space?" (Wagner 2011, 2002).

Articles by 'sceptical' scientists are rarely found in mainstream peer-reviewed climate science literature. The disputed Spencer and Braswell article was published in a journal which specialised, not in climate science, but in the study of Earth from space. Anderegg et al. (2010) investigated the relative invisibility of 'sceptical' scientists in specialist climate science literature. They wanted to shed more light on the conundrum that while the scientific literature and surveys of climate scientists showed ". . . striking agreement with the primary conclusions of the IPCC", there remained:

> . . . substantial and growing public doubt . . .about the anthropogenic cause and scientific agreement about the role of anthropogenic greenhouse gases in climate change . . . A vocal minority of researchers and other critics contest the conclusions of the mainstream scientific assessment, frequently citing large numbers of scientists whom they believe support their claims . . . This group, often termed climate change sceptics, contrarians, or deniers, has received large amounts of media attention and wields significant influence in the societal debate about climate change impacts and policy.
>
> (Anderegg et al. 2010, 12107)

Anderegg et al. used Google Scholar to examine the publication and citation data of 1372 climate scientists. They found that 97–98 per cent of climate researchers most actively publishing in peer-reviewed literature fully supported the IPCC's conclusions on the reality and the risks of global warming and climate change. They found also that researchers who doubted the IPCC's conclusions had expertise and scientific prominence ". . . substantially below that of the convinced researchers" (Anderegg et al. 2010, 12107).[160] The greater the expertise, it would appear, the greater the clarity about the processes of global warming and its implications for climate, sea level and human populations.

Gelbspan has criticised the tendency of the news media, in the name of journalistic balance, to give as much weight to the 'sceptics' as they did to mainstream scientists. His view is that this was not balance, but:

> . . . journalistic laziness . . . when it's a question of fact, it's up to a reporter to dig into a story and find out what the facts are. The issue of balance is not relevant when the

[159] Wagner reported more than 56,000 downloads of the Spencer and Braswell paper within a month of publication (Wagner 2011, 2002).

[160] Of those researchers unconvinced by the IPCC findings, 80 per cent had published fewer than 20 articles. Of those researchers who were convinced by the IPCC findings, more than 90 per cent had published more than 20 articles. When the top 50 most-published researchers in both unconvinced and convinced groups were examined, Anderegg et al. found that the convinced researchers had published far more extensively: an average of 408 climate publications compared with only 89 publications for the most-published unconvinced researchers (Anderegg et al. 2010).

> focus of a story is factual. In this case, what is known about the climate comes from the largest and most rigorously peer-reviewed scientific collaboration in history.
>
> (Gelbspan 2008, 72)

Gelbspan expresses surprise that so few journalists go to the primary source of peer-reviewed literature. "Most scientists write very clearly and economically. These papers, while frequently understated, are not beyond the comprehension of journalists" (Gelbspan 2008, 75). He recommends that journalists writing on scientific topics should look at the literature, talk to scientists to learn where the weight of scientific opinion lies and reflect that balance in their writing.[161] One very obvious first step for journalists is Google Scholar, which provides readily available details of the number of articles published and the number of times those articles have been cited by other scholars.

An important rider however, is that when global warming and climate change are framed as a matter of ideology rather than of expert understandings of the physical world, the value of researching peer-reviewed literature to establish expert credibility can be dismissed. McCright and Dunlap note the observation of U.S. Congressman George E. Brown Jr.[162] that at Congressional hearings:

> Witnesses and subcommittee members . . . appeared to give the non-peer reviewed views of individual scientists greater scientific credibility than peer-reviewed scientific assessments.
>
> (McCright and Dunlap 2003, 361)

They give the example of one Republican congressman speaking at a 1995 U.S. House of Representatives hearing into ozone depletion:

> Mr.Doolittle: You know, I'm not going to get involved in a mumbo-jumbo of peer-reviewed documents . . . thankfully, under this Congress, we're going to get to the truth and not just academic politics.
>
> (McCright and Dunlap 2003, 362)

Doolittle was explaining why he preferred the advice of 'sceptical' scientist Fred Singer over that of other more qualified experts. This example of Beck's "organised irresponsibility"; of defining expert advice about a physical risk solely in terms of its relevance to preferred social

[161] (Gelbspan 2008, 74)
[162] (Brown Jr 1997)

world discourses, could be viewed as a cautionary tale for journalists seeking to check 'the facts' and to clarify the authority of sources of information.

4.2.7 The news value of 'conflict' and its use by the 'sceptical' lobby

The news media place high value on stories about conflict. Along with ethic of providing balance in any story, this preference for controversy increased news media attention to the 'sceptical' lobby's strategy of framing the issue as uncertain and controversial. Many scholars have noted the overwhelming expert consensus that human activities were causing global warming and that the social world needed to plan to deal with its climatic impacts.[163] To climate science experts, there was no controversy: as Henderson-Sellers has said, most believed that ". . . any argument is over" (Henderson-Sellers 2009, 1). Consensus is not as attractive to the news media as conflict, even when scientific consensus provides information important to the health and economic wellbeing of news media audiences. Wilson has observed that "Controversy is great for ratings and circulation but obviously constrains effective climate change reporting and public education" (Wilson 2000, 211). Citing a substantial body of scholarly research, Antilla has concluded that:

> It is well-recognised that in order to maintain an illusion of intense controversy, industry lobbies as well as special interest groups and PR firms have manipulated climate science and exploited the US media (e.g. Gelbspan, 1998, 2004, 2005; Beder, 1999; Leggett, 2001; Rampton and Stauber, 2001; Pollack, 2003; Lahsen, 2005; McKibben, 2005; Mooney, 2005a,b; Austin and Phoenix, 2005).
>
> (Antilla 2005, 340)

The inherent news media preference for narratives of conflict encouraged selectors and writers to give high salience to 'sceptical' critiques of mainstream climate science advice, thus unbalancing the relative credibility of expert and 'sceptical' advice and distorting social world understandings of the risk.

The 'sceptical' strategy of encouraging the U.S. news media to frame global warming and climate change as controversial rather than consensual centred on appeals to news values

[163] (See for example Trumbo 1996; McComas and Shanahan 1999; McCright and Dunlap 2000, 2003; Wilson 2000, 2000a; Boykoff and Boykoff 2004, Antilla 2005; Carvalho 2005, 2007; Boykoff and Roberts 2007; Oreskes 2007; Anderson 2009; Oreskes and Conway 2010. See also all IPCC assessments from 1990.)

categorised by Bennett (1996) as political, economic and journalistic. 'Sceptical' manipulation of journalistic norms of objectivity and balance has been discussed in the preceding section. Boykoff and Boykoff (2004) define the political value as the idea that providing news media audiences with political information will improve the accountability of officials.[164] The detailed content analysis shows clearly that *New York Times* mediations of the official releases of IPCC reports emphasised the political implications of IPCC advice, minimising or ignoring information about physical risks to *New York Times* audiences.[165] Catering to an assumed audience interest in the political ramifications of expert information while ignoring the accumulating evidence of physical risks fits Beck's definition of "organised irresponsibility". It is explained partly by Bennett's (1996) economic norms: the news media organisational expectation that journalists should provide stories which are popular, thus ensuring the news medium's ongoing profitability. The news value of conflict is assumed to draw audiences, thus contributing to the news medium's overall popularity. 'Sceptical' framings of the environmental risk of global warming and climate change as political rather than physical resonated with inherent *New York Times* framing preferences and assumptions about audiences, and the value ascribed to conflict: a professional norm. All of these news media preferences improved the chances that journalists would select and give salience to the political framing of controversial and unnecessary policy proffered by the 'sceptical' lobby.

4.2.8 Certainties and uncertainties: expert, 'sceptical' and social perspectives

Non-experts expect certainty from scientists.[166] Scientists value careful discussion of remaining uncertainties. As Schneider (1993) has said:

> Most members of the general public, as well as many officials in government, do not recognize that most scientists spend the bulk of their time arguing about what they do not know . . . the scientific method operates on the basis of constant questioning
>
> (Schneider 1993, 173)

[164] (Boykoff and Boykoff 2004, 126)
[165] See Chapters 5, 6 and 7.
[166] Zehr has observed that: ". . . science is generally perceived as an authoritative, truth-producing profession" (Zehr 2000, 88). Dimopoulos and Koulaidis' (2002) analysis of science stories in Greek newspapers found that people expect certainty from science and want mainly to know how scientific research might affect social life.

Evolution of social world understandings about global warming and climate change was marked by non-expert confusion over what climate scientists were certain about, and what uncertainties remained. Eminent U.S. climate scientist James E. Hansen (2002) has observed that a basic problem which enhanced this confusion was that:

> . . . we scientists have not informed the public well enough about the nature of research. There is no fixed "truth" delivered by some body of "experts". Doubt and uncertainty are the essential ingredient in science. They drive investigation and hypotheses, leading to predictions. Observations are the judge.
>
> (Hansen 2002, 438)

Climate is a long-term phenomenon. Climate scientists needed a consistent pattern of observations over at least two decades before they could say with certainty that a long-term change in global climate change was happening. In the early 2000s, weather extremes such as increasingly heavy rain, snowfall and flooding, and increasingly severe storms, were consistent with climate science expectations as global warming began changing climate. However, climate scientists needed a twenty to thirty year record of intensifying extremes such as these before they could definitively make statements of certainty that climate change had started. As Hansen has said, news media and the non-expert public were not well enough informed about this disciplinary definition of "certainty".

Climate scientists were certain about the processes of the greenhouse effect, and about the inevitable increase in atmospheric warming as more greenhouses gases were emitted. As the administrator of the U.S. National Oceanic and Administration, D. James Baker, told the *Washington Post* in 1997, there was ". . . a better scientific consensus on [global warming] than on any issue I know—except maybe Newton's second law of dynamics" (Warrick 11 November 1997). However, as each IPCC assessment made clear, there were large remaining uncertainties about what exactly would happen, particularly at regional scales and within biological systems as a warming atmosphere began to impact on physical planetary systems. Many of the uncertainties detailed in the IPCC assessments involved expert concerns that the risks and impacts of climate change could be worse than contemporary scientific methodologies suggested. 'Sceptical' lobbyists distorted the expert statements of uncertainty, claiming they provided clear evidence of overall expert uncertainty about all aspects of the risk.

Van den Hove, Le Menestrel and de Bettignies (2002) have said that in 1997 as negotiations over the Kyoto Protocol intensified, the Global Climate Coalition ". . . pursued its efforts aimed at raising doubts about the integrity of the mainstream science of climate change, by pointing to the uncertainties and gaps in scientific knowledge" (van den Hove, Le Menestrel, and de Bettignies 2002, 6). Bolin has criticised an ExxonMobil executive's 1997 categorisation of climate change as deeply uncertain. "This conclusion was, however, his subjective judgement and not based on a more penetrating analysis" (Bolin 2007, 144). Gelbspan has documented the advice given in 2002 to the Republican Party by Frank Luntz, a political consultant:

> "Should the public come to believe that the scientific issues are settled, their views about global warming will change accordingly," he wrote. "*Therefore you need to continue to make the lack of scientific certainty a primary issue."* (Italics added by Gelbspan)
>
> (Gelbspan 2008, 41)

This deliberate 'sceptical' re-framing of global warming and climate change as lacking any certainty fitted comfortably into emerging social world discourses of mistrust in the pronouncements and assurances of scientific experts.

Risk theorist Ulrich Beck has written extensively of the diminution of public confidence in the scientific-industrial alliance which produced the many benefits of industrialised society, as unforeseen negative results of this alliance's many inventions arose. He and other scholars[167] have argued that failure to consider broader implications of scientific developments led directly to environmental disasters such as acid rain, toxic pollution, ozone depletion and global warming. The consequence was development of a late 20th century popular scepticism about the overall trustworthiness of the scientific enterprise.[168] Swim et al. have argued that climate change ". . . elicits some of the same responses found in the case of technological disasters, including distrust of government, corporations, regulatory authorities, and science itself" (Swim et al. 2011, 56). When there is a general societal mistrust of scientific expertise, the social world is more ready to listen to 'sceptical' scientists contesting the advice of mainstream science. As Gabe Mythen has observed, "In the risk society, counter-experts, political dissenters and protesters are embraced by the public as the keepers

[167] (Giddens 1991; Beck 1992, 1995, 1995a, 1998; Cottle 1998; Beck 1999; Adam, Beck, and Van Loon 2000; Beck 2000)

[168] The uncertain and risky results of scientific discovery have been described as 'manufactured uncertainty' (Giddens 1991, 1995; Beck 1992).

of risk truths" (Mythen 2004, 92). In the case of expert advice about climate change, 'sceptical' scientists were welcomed by many cultural and political groupings in the U.S. as offering more credible voices than the expert climate scientists producing the official IPCC reports.

4.2.9 Different target audiences

IPCC climate scientists did not perceive their role as being to communicate with the public or the news media. Rather, they saw their role as being to advise policy makers and politicians, leaving it up to politicians to mediate their expert advice. As Bolin explained, communication responsibilities for climate scientists involved ". . . a process of collaboration between scientists and politicians, in a mutual learning process" (Bolin 1994, 27). Scientists, Bolin said, needed to inform politicians simply,

> . . . but the message must always be scientifically exact. In reality, little of what we know is politically interesting or even understandable. Politicians are seldom scientists.
>
> (Bolin 1994, 27)

Given that politicians are seldom scientists, they could find it difficult to negotiate towards clarity of understanding through a maze of scientific qualifications seeking to present "scientifically exact" information. Bolin acknowledged that politicians were unlikely to understand this "exact" information. He later acknowledged implicitly the substantial role played by the news media in mediating expert information to make it comprehensible to non-experts. "Interpretation must not be left, exclusively, to journalists because matters tend to become exaggerated and, if repeated frequently, may mislead the public" (Bolin 1994: 28). However, he did not recommend closer collaboration with these communication professionals.

IPCC scientists did not draw up any 'public relations' strategy to communicate their consensus on the risks of global warming and climate change to the news media, or to the public—apart from holding a media conference when each report was officially released. They published their assessments and discussed these with policy makers and politicians. In

contrast, the 'sceptical' lobbies used their well-funded supporting organisations to take full advantage of news media values, enhancing news media coverage of their dissenting arguments.

There are several difficulties with the IPCC focus on providing exact scientific advice to politicians and policy makers. First, as Bolin has acknowledged, few politicians have a scientific background; second, like most non-experts, politicians get most of their information about science from the news media.[169] Thus, expert scientists' communication attempts were focused on politicians whose information came primarily from the news media who had been manipulated by the 'sceptical' lobbies to give excessive salience to 'sceptical' arguments.

A third difficulty in imagining that science communication means providing "scientifically exact" information is that such information inevitably is mediated and transformed as it is communicated to non-experts. A further related difficulty is an apparent insistence by climate scientists that theirs should be the primary voices explaining the physical risk to the social world. Decision makers at the higher levels of government do not read every report entirely, relying instead on a brief summary from their policy advisers. Therefore, expert scientific reports to decision makers tend to be substantially mediated and extensively summarised by policy advisors who may or may not have some understanding of the scientific discipline/s in question. If scientists only talk to politicians and policy advisors, then it is politicians and their advisors who mediate the original scientific advice as they rephrase it for their non-expert constituents. The lack of collaboration with the primary providers of mediated expert information—the news media—inhibits and restricts both political and popular capacities to make informed decisions about risks which may directly affect individuals and communities.

4.2.10 Different expertises: who speaks for the social world?

On the surface, the expectation that scientists should speak about the science seems reasonable. But scientific knowledge about physical phenomena is valuable to the social

[169] (Gerbner, Gross, and Signorielli 1981; Fahnestock 1986; Friedman, Dunwoody, and Rogers 1986; Nelkin 1987; LaFollette 1990; Nelkin 1994; Bucchi 1996; Beck 1999; Wilson 2000; Allan 2002; Bucchi and Mazzolini 2003; Boykoff and Boykoff 2004, Cook, Pieri et al. 2004, Mythen 2004; Brossard and Shanahan 2006)

world only when it is explained in terms of its socio-economic relevance: and, physical scientists are not expert in socio-economic matters. Just as politicians are seldom scientists,[170] so too, scientists are seldom politicians (or expert media communicators). Bolin's call for ". . . a continued dialogue between politicians and scientists" (Bolin 1994, 29) is followed almost immediately by the statement that ". . . only scientists can grasp the intricate interactions that take place in the complex system of the global environment" (Bolin 1994, 29). While this latter statement may be indisputable, it does not include any explicit recognition that policy makers (and media) are much better at grasping the intricate interactions that take place in the social world. "Dialogue" appears to involve a communication model more closely approaching that of transmission from expert to non-expert, rather than that of a mutual exchange of understandings.

The expectation that physical scientists should speak both to and for the social world is seen even in the organisation of climate science research. In 1994, Bolin advised climate scientists that "As scientists we must first of all ask ourselves: What is important to people and to politicians?" (Bolin 1994, 28). The question which immediately arises for this analyst is: How can physical scientists, who by definition are focused on the physical world, specify the needs of the social world without active discussions with social world representatives? By 2007, Bolin had acknowledged that ". . . making implicit societal assumptions [was] not the role of a scientific assessment body" (Bolin 2007, 157). Here, there is explicit recognition that climate scientists are not expert in socio-economic matters. Along with scientists such as Schneider,[171] Bolin has recognised the need for dialogue and collaboration between experts and non-experts. Acknowledgement that social world understandings differ from scientific understandings of the physical world is an important first step in any communication process. A second step could be to actively involve the communication expertise of the news media and the understandings of the social world developed by the non-scientific academic world.

In the academic world, the social sciences and humanities focus particularly on the social world. Yet, as the American Psychological Association has observed, climate policy decision makers have rarely consulted social world experts, even though:

> . . . understanding human drivers of climate change, the impact of climate change on humans, and the effectiveness of instruments that are central to other disciplines

[170] (Bolin 1994, 27)
[171] (Schneider 1997)

> cannot be fully understood without an appreciation of psychological and social processes.
>
> (Swim et al. 2011, 83)

Thus, one potentially useful action for climate scientists to take, which might greatly improve non-expert understandings of environmental risks, could be to engage in a more mutual and reflexive dialogue with the non-scientific scholarly world and the news media as well as with politicians.

One of my most vividly recalled observations from the early scientific discussions of global warming and climate change involved an IPCC conference held in Geneva in 1990 or 1991. Physicists and chemists had been collaborating for more than a year to clarify the physical atmospheric processes of the risk. They had recently included biologists in their research assessments, since it had become apparent that improved understanding of the workings of the carbon cycle would be crucial to estimates of how much carbon dioxide might be absorbed by plants, or emitted to the atmosphere. In conversations with physicists and chemists attending this conference, I gained the impression that they were still uncomfortable with each other's different knowledges, but remained resignedly optimistic that their collaborations would yield better understandings of planetary processes. The biologists tended to remain in physically separate groups, and appeared at times almost defiant about the importance of their knowledge contributions to overall scientific understanding of the risks. I happened, fortuitously, to be at the front of the conference room looking at the participants when one speaker told the conference that because global warming and climate change were caused by human activities, research into what to do about it would have to include "sociologists". I saw a collective jaw-drop from some 200 or more scientific participants. Clearly the idea of involving non-scientists caused substantial discomfort. Additionally, the scientific definition of which scholarly fields to approach for advice about the social world was severely restricted. Many other scholarly fields also have insights to offer which could advance interdisciplinary understandings of this environmental risk, its social implications, and ways of encouraging social world actions to avert or reduce the risks.

4.2.11 Social world discursive conflicts with expert advice

The American Psychological Association has observed that although climate change is a physical process, ". . . it is driven by and understood through social processes, including interpretations of events presented in the mass media" (Swim et al. 2011, 18). In the U.S., several dominant discourses militated against broad discursive acceptance of expert advice about the inevitability, imminence and risks of global warming and climate change. Emerging social world mistrust of scientists combined with mythologies of 'nature' and political ideologies to privilege the views of the 'sceptical' lobby. Emerging and quantifiable changes in the physical world became re-framed in social world discourses as matters of dogma rather than fact. The issue became ideological rather than scientific, with expert warnings about the scale and extent of the risks cast instead as attacks on the value systems which were discursively constructed as the foundations of 'Western civilisation'.

News media framings of the issue as primarily political rather than physical, seen in the detailed content analysis of *New York Times* selections from IPCC reports,[172] played into or at least supported an increasing tendency in the U.S. for global warming and climate change to be cast as a matter of politics rather than the physical world. Gelbspan has noted that "Top editors tend to see all issues through a political lens" (Gelbspan 2008, 68). This largely political framing in the primary information source for non-experts likely encouraged a similar pattern in the discourses circulating among the two U.S. political parties where, as Dunlap and McCright (2008) have shown, "belief" in global warming differs according to political affiliations. Citing a 2008 Gallup Poll, they report that:

> . . . while more than three-fourths of Democrats (76 percent) believe global warming is already happening, only 42 percent of Republicans share that view in 2008 . . . Republicans have become somewhat less likely over the past decade to believe that global warming is already occurring (from 48 to 42 percent), while Democrats have become much more likely to hold this belief (from 52 to 76 percent)
>
> (Dunlap and McCright 2008, 29)

Other research has found that if Republicans were asked whether they would be willing to pay a "carbon offset" on purchases such as airline tickets, 65 per cent said they would. However, when this same mechanism for charging fees for carbon dioxide emissions was

[172] See Chapters 5, 6 and 7.

described as a "carbon tax", this percentage dropped to 27 per cent.[173] Ideological Republican resistance to additional taxation is seen in this difference. Framing a physical risk as a matter of ideology rather than of processes going on in the physical world permits an irrational ideological reasoning that if "belief" in a physical risk does not fit political affiliations; and if those affiliations were held to be paramount; then expert information can be dismissed.

While social and political discourses have no inherent requirements to display logic or rationality, or to incorporate concern for vulnerable populations and industries, there are more stringent requirements for journalists. The *New York Times* preference for political interpretations of a physical risk demonstrates a breach of journalistic ethics, in news selectors' neglect of important and relevant expert information about physical processes and scientific certainties about those processes. This neglect of relevant expert information, however, could be categorised more as inadvertent omission rather than deliberate misdirection. The journalistic perception of the importance placed by the *New York Times* on providing credible commentaries on political matters appears to have encouraged news selectors to frame any issue, whether political or physical, primarily in terms of its political relevance.

A more egregious breach of journalistic ethics is seen in the deliberate misrepresentations of global warming and climate change propagated by the conservatively partisan Fox News. This news organisation actively advocated the dissenting views of the climate change sceptics and denigrated scientific advice. Jon A. Krosnick and Bo MacInnis (2010) have cited a 2009 Fox News editorial directive to reporters, ordering them to qualify any report of scientific measurements of rising global temperatures by noting that global warming theories were "based upon data that critics have called into question" (Krosnick and MacInnes 2010). By 2009, sceptical demurrals about the validity of IPCC science had long been disproved by climate science. Fox News, however, continued to ignore any journalistic ethic of providing accurate and balanced information relevant to audiences.

This research by Krosnick and MacInnis shows that the Fox News framing of global warming and climate change as uncertain and based on unreliable science appears to have affected its audiences' perceptions of the issue. These two scholars surveyed 1001 American adults, including frequent Fox news viewers and viewers who rarely or never watched Fox news, to establish whether frequent exposure to the sceptical views propagated by Fox news would

[173] (Hardisty, Johnson, and Weber 2010, cited in Swim et al. 2010)

affect individuals' understanding of the risks of global warming and climate change. They found that among Americans who watched no Fox News, 82 per cent believed that planetary temperatures were rising, and 85 per cent of these believed that these temperature rises were connected to human activities. Significantly fewer individuals who most frequently watched Fox News (63 per cent) believed that planetary temperatures were rising, and of these, 60 per cent believed that there was a connection with human activities. Krosnick and MacInnis quality their findings by noting that it is impossible to establish causal factors behind the tendency for frequent Fox News viewers to be less convinced than non-Fox News viewers that global warming had started and had been caused by human activities. They point out that while frequent exposure to sceptical views may have influenced the opinions of Fox News viewers, it would also be possible that people who were more disposed to prefer sceptical views in any case might also prefer the Fox News version, since it was more consonant with their own preconceptions.

Regardless of audiences' political preferences, it remains incumbent on news organisations to provide information which is not only accurate and balanced, but which also provides audiences with information important for their health, safety and economic security. By deliberately treating global warming as uncertain and unreliable, Fox News endangered its audiences and their hopes of improving their economic security. Its insistence that the views of a small handful of under-qualified and often entirely unqualified 'sceptical' critics should be preferred over those of the world's leading climate scientists shows the triumph of ideology over rationality.

Ideologically-based irrational reasoning occurs when social world constructions of the 'reality' of the physical world conflict with expert advice about the workings of physical planetary systems. The development of global warming and climate change demonstrate that human activities can disrupt the physical systems which supply the natural resources on which all human life relies. This evolving physical risk increasingly challenges the ideology that the natural world is both controllable and available for human exploitation. Such an ideology is political. It is not based on any scientific understanding of physical processes, relying rather on a human preference to place human life and enterprise at the top of any planetary hierarchy. The idea of human superiority over any other physical system or life form has been described variously as a "triumphalist" view of nature;[174] the "Dominant

[174] (Williams 1978)

Social Paradigm";[175] a "Promethean perspective";[176] and "Manifest Destiny".[177] It is exemplified in President (George W.) Bush's words of encouragement following the devastation of New Orleans by Hurricane Katrina. Citing past natural disasters such as the early severe winters of pioneering white Americans, the Chicago fire (1871), the San Francisco earthquake (1906) and the 1930s Dust Bowl, he proclaimed:

> Every time, the people of this land have come back from fire, flood and storm to build anew—and to build better than what we had before. Americans have never left our destiny to the whims of nature—and we will not start now.
>
> (President George W. Bush, cited in von Storch and Krauss 2005)

Bush's appeal to patriotism ignored the fact that his historic analogies did not include any previous examples of "flood and storm" (which had just destroyed much of New Orleans). His reference to the Dust Bowl failed to recognise that human land mismanagement was substantially to blame for this 1930s disaster (which was caused by a combination of poor soil conservation practices and an unusually long drought). Bush also failed to acknowledge any human culpability for the increasing vulnerability of New Orleans to storms.

Less than a year before Hurricane Katrina hit, *National Geographic* magazine had warned that the Federal Emergency Management Agency considered a hurricane strike on New Orleans as one of the most dire threats to the nation.[178] Louisiana's protective barrier islands and coastal wetlands were disappearing faster than anywhere else in the U.S. because of the human activities of levee and canal building. Extensive levee building protected built-up areas from flooding but stopped deltaic lands from being replenished with sediment each year by springtime flooding. Additionally, extensive building of canals allowing oil drilling access for the petrochemical industries increased erosion.[179]

In the triumphalist version of the human-natural world relationship, inconvenient physical results of human activities were ignored. As cultural theorist Raymond Williams has argued, triumphalist versions of 'man's conquest over nature' do not include the recognition that there are:

[175] (Dunlap and Van Liere 1984)
[176] (Dryzek 1997)
[177] (Brulle 2000)
[178] (Bourne Jr. October 2004)
[179] (Bourne Jr. October 2004)

> . . . major natural forces, and these not only at the level of the physical universe and the solar system, which are still and in any reasonable projection beyond our control . . . The triumphalist version overrides all this real knowledge.
>
> (Williams 1978)

Developing manifestations of global warming and climate change offered disturbing evidence to a triumphalist that humanity might not always be able to control the natural world. The triumphalist solution was to ignore the accumulating physical evidence and focus on social constructions of a 'reality' which ignored any contradictions being observed in the physical world. Beck's "organised irresponsibility" comfortably fits this unrealistic discursive behaviour.

4.2.12 Psychological responses to climate change

Individual and community responses to information about global warming and climate change further contributed to the shape and direction of social world discourses about these risks. A 2011 report from the American Psychological Association on psychological aspects of climate change[180] provides insights into reasons why it took the social world so long to recognise that there was, indeed, a physical risk which required urgent action. Swim et al. (2011) observe that personal responses to a risk can both inhibit and encourage actions to avoid or reduce any perceived danger. They note that individual responses to information about global warming and climate change include uncertainty, mistrust and a sense of helplessness which can:

> . . . easily slide into active denial . . . this could be denial of the existence of climate change and human contribution to climate change, and could include more specific denial of the role that one's behaviour or one's group's behaviours has in harming others.
>
> (Swim et al. 2011, 126)

A readiness to deny that the problem exists, or that humans cause it, would have provided further fertile ground for the 'sceptical' lobby's arguments which had received wide news media coverage throughout the 1990s and into the 2000s.

[180] (Swim et al. 2011)

The long-term nature of climate change may have exacerbated the social propensity for denying the existence of the problem. Swim et al. note that following disasters in general there is a common pattern of ". . . disbelief, shock, denial, or outrage immediately following the event, as well as altruistic feelings associated with saving lives and property" (Swim et al. 2011, 43). They go on to observe that while short-term events can bring emotional satisfaction as individuals perform altruistic actions, when a risk is more long-term:

> Emotional support and optimism for the future have the potential to give way to disillusionment, intrusive thoughts and images, anger, and disappointment as long-term implications and emotional impacts of the event become apparent.
>
> (Swim et al. 2011, 43)

These psychological reactions to information about the scale and significance of global warming and climate change may in part explain why the social world in the U.S. took more than a decade and a half to accept that the risks were real and that the physical phenomenon already was becoming manifest.

However, regardless of the strength of the 'sceptical' lobby or the inhibiting nature of psychological reactions to information about global warming and climate change, from around 2000 popular concern about the risks seems to have outstripped national political concern. The overall analysis of section placements of IPCC information (**Chart 2**) shows an exponential rise in information selections about global warming and climate change in 2007. It shows also a substantial rise in the proportion of such information appearing in the 'specialist' sections in 2007: evidence of a news selector assumption that *New York Times* audiences wanted more detailed information about the risk.

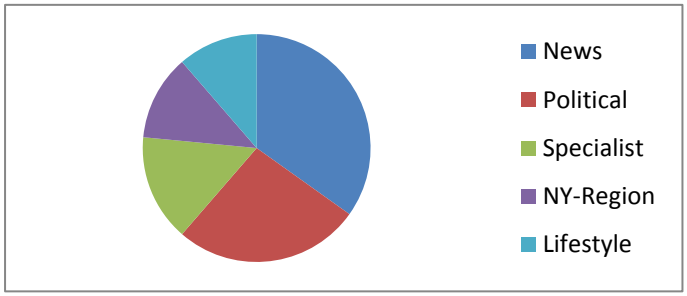
4.3 Part Two: Section placements: 1990–2007

Changes in *New York Times* news writer selections and framings over time show that as a physical risk began to affect *New York Times* audiences directly, that newspaper's journalists appear to have assumed that social world discourses about that risk were beginning to change. Until the mid-2000s, depending on the section, *New York Times* journalists appear to have assumed that social world discourses constructed global warming and climate change variously as an imminent global catastrophe, a possible problem in the future, a highly unlikely fixation of pejoratively framed 'environmentalists', a chimera invented by scientists desperate for research funding, an unacceptable threat to Western capitalism and ongoing

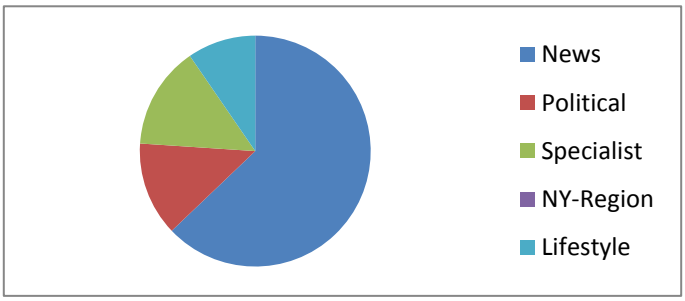
economic development, an opportunity for new technological developments—and a variety of other discursive constructions of 'realities'. The 'realities' which operated in the physical world were not affected by these various socially constructed 'realities'. Increasing quantities of greenhouse gases emitted by human activities continued to warm the atmosphere with resulting (and ongoing) rises in temperature and sea level, and changes in climate. But it was only in 2007 that the content analysis of *New York Times* information selections and section placements showed an assumption that *New York Times* audiences were becoming aware that global warming and climate change posed real risks.

Chart 2: Section placements of IPCC information

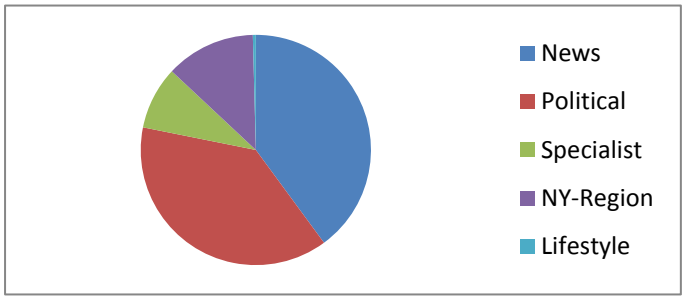
1990 **n=132**



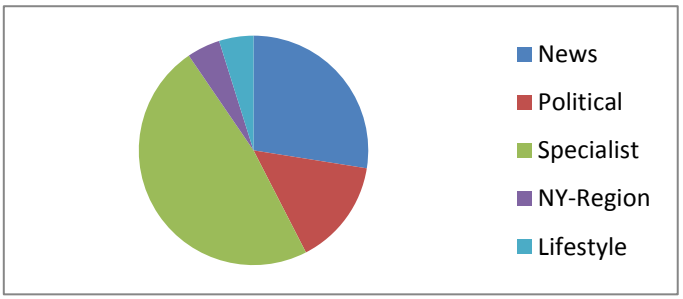
1995 **n=167**



2001 **n=238**



2007 **n=1258**



4.3.1 Changing placement preferences and information selections over time

News selector decisions about the sections relevant for placement of IPCC information show changes in assumptions about audience interests and preferences over time. **Chart 2** shows that this issue was framed from the start as political, with almost as many 1990 placements in 'political' sections as the 'news' sections. In 1990 there was a relatively even balance of information selections for 'specialist', 'lifestyle' and 'NY-Region' sections. This suggests that news selectors for all of these sections assumed that their audiences were interested in the issue. This analytical evidence of relatively balanced information placements among the various sections supports the analysis of other scholars who have observed that during the late 1980s and up to around 1990, human responsibility for creating the risk of global warming was broadly accepted.[181]

Sectional allocation of IPCC information changed substantially by 1995. By this stage 'sceptical' arguments were in the ascendency in the U.S.[182] **Chart 2** shows that in 1995 information about the issue was placed mostly in the 'news' pages. These 1995 placement decisions may indicate a *New York Times* editorial decision to deal with the intensifying controversy about the risks of global warming and climate change, emphasising their 'factuality' by selecting information about the sound expert evidence of these risks. Supporting this argument is the **Chart 2** finding that in the 1995 'specialist' section placements, information about global warming and climate change was placed only in the 'Science' section:[183] a supposedly more 'factual' section compared with the more politically focused 'Business' pages, or the more ethically focused 'Health' pages.

In 2001, **Chart 2** shows that the great majority of selections of IPCC information were spread evenly between the 'news' and 'political' sections. This switch from the 1995 preponderance of 'news' section placements may indicate a change in editorial advocacy strategy.[184] In 2001 the 'sceptical' lobby's arguments still held sway in U.S. political discourses. Boykoff and Boykoff (2004) found that from 1990 through 2002, there was a statistically significant

[181] (See for example Trumbo 1996; Mazur 1998; McCright and Dunlap 2000, 2003; Carvalho 2007, Anderson 2009)
[182] (See Trumbo 1996; McCright and Dunlap 2000, 2003; Boykoff and Boykoff 2004; Antilla 2005; Boykoff and Roberts 2007; Carvalho 2007; Anderson 2009)
[183] See Chapter 7 for further discussion.
[184] While advocacy is explicit in Editorials, Op-Eds and Letters, it can also often be discerned in news texts written by journalists. Advocacy can be identified by its very selective framings, its salience preferences, and, often, by the explicit insertion of journalistic opinion into an otherwise apparently 'straight' reporting text.

divergence between news media coverage which over-emphasised doubts that human activity could be causing global warming, and minimised the scientific consensus that the risk did indeed exist and that humans were responsible.[185] In the pages of *The New York Times* in 2001, global warming and climate change still was framed as a global risk which was political rather than physical, and of little direct concern to U.S. individuals, communities and industries. The only exception evident in the *New York Times* in 2001 was its 'NY-Region' section which, as Chapter 3 has shown, investigated specific risks to locally placed audiences.

Until 2007, information about global warming and climate change was placed primarily in 'news' or 'political' sections. The 2007 pattern of selection numbers and placements was very different. **Chart 2** shows that in 2007, overall information selections increased exponentially (1258) compared with selections during the analytical windows of 1990 (132), 1995 (167) and 2001 (238). This finding supports other scholarly analyses which identify a significant increase in news media coverage of climate change after about 2002.[186] The striking increase in overall numbers of information items selected in 2007 suggests a news selector assumption of a surge in audience interest in global warming and climate change.

Chart 2 shows that in 2007, for the first time, the majority of information selections were found in the 'specialist' sections. 'Specialist' sections identify topics deemed important to audiences and provide more detailed treatment of the topic. The change to majority placements in 'specialist' sections suggests an assumption that the issue was becoming normalised in discourses circulating within and between various discursive communities, and that there was consequently an audience demand for more detailed information.

4.3.2 Other discursive influences

There are several likely reasons for the 2007 leap in information frequencies and the switch to majority placements in 'specialist' sections: the influence of other popular media, other opinion-leaders and direct audience experience of unusual changes in weather and temperature. By 2007, two popular films about climate change had heightened popular

[185] (Boykoff and Boykoff 2007, 4)
[186] (See Boykoff and Boykoff 2004, 2007; Boykoff and Roberts 2007; Maxwell Boykoff 2007; Anderson 2009)

awareness of the issue. The 2004 BAFTA award-winning feature film, *The Day After Tomorrow* (Emmerich 2004) and the 2006 Oscar-winning documentary *An Inconvenient Truth* (Guggenheim 2006) both gained widespread attention. Business leaders also began to support research into new technologies which did not produce greenhouse gases. In September 2006, global business leader Sir Richard Branson announced that all of his profits from his five airlines and his train company, expected to amount to $3 billion over the ensuing 10 years, would be invested in developing energy sources that did not contribute to global warming .[187,188] The same story also reported the intention of another wealthy U.S. industrialist, Steve Bing, to contribute $40 million to push for a California state initiative aimed at reducing the state's dependence on petroleum by 25 per cent over the following 10 years. It is telling that this story was written by a 'Science' section writer and placed in the 'Science' section of the *New York Times*. Advocacy for other business leaders to follow the example of these top business leaders appears to have been deemed inappropriate for 'Business' section readers. It may be that even in 2006, 'Business' news selectors assumed that their audiences remained reluctant to consider emission reductions and new, clean technologies.

Two other significant events of 2006 were the release of an influential report on the economics of climate change, and a policy reversal by influential global media mogul Rupert Murdoch. The Murdoch policy reversal was not accompanied by any fanfare or official announcement, but in September 2006 his high-circulation U.K. tabloid *The Sun* launched a "Go Green with the Sun" campaign. This was interpreted by media observers to be an indication that Murdoch had dropped his earlier opposition to ideas that global warming might indeed pose significant risks.[189] Murdoch's News International media outlets, including the U.K. based *The Times* and *The Sun*, previously had taken a staunchly sceptical approach to the issue.[190] Shortly afterwards, the Stern Review on the economics of climate change, written by Sir Nicholas Stern, a former chief economist of the World Bank and an economic adviser to the U.K. government, was released. This review's advice was widely covered by

[187] (Revkin 21 September 2006)
[188] Branson's planned investment in global warming research was followed in early 2007 by similar announcements from two other global business leaders: Bill Gates and Warren Buffet.
[189] For example, financial correspondent Andrew Geoghegan told Australian Broadcasting Corporation audiences on 27 September 2006 that the "Go Green with the Sun" campaign suggested that Rupert Murdoch had been ". . . convinced that global warming is real and needs his attention"(Geoghegan 27 September 2006).
[190] (See for example Carvalho 2005, 2007; Boykoff and Rajan 2007; Boykoff and Mansfield 2008)

global news media.[191] It described climate change as ". . . the greatest and widest-ranging market failure ever seen" and called for ". . . an urgent global response" (Stern 2006, i).

The greater exposure of the risks of global warming and climate change in film, documentary, economic reviews and the publications of the largest global media conglomerate likely combined with direct *New York Times* audience experience of changes in weather and temperature to heighten discursive interest in the issue. By 2007, as the World Meteorological Organization annual statements on global climate make clear,[192] U.S. populations, including *New York Times* audiences, were beginning to experience aberrant and sometimes disastrous weather and ecological changes.[193] All of these factors are likely to have contributed to the exponential increase in information selections from IPCC reports seen in *New York Times* stories about global warming and climate change within the 2007 analytical windows.

4.3.3 'Political' and 'news' section placements 1990-2007

New York Times 'political' section placements of information about global warming and climate change show varying news editorial assumptions about the issue's relevance to social world discourses over the 17-year analytical period. In 1990 and 1995 the majority of information selections were contained in the 'Letters' section, suggesting that the issue was imagined by section editors to be a matter of popular discourse but not one which warranted more formal editorial intervention. In 1990 the second most frequent 'political' section placement was in 'Op-Eds'; in 1995, 'Editorials were the second most frequent 'political' section for placement of IPCC information selections. 'Op-Eds' offer a less formal forum for influencing public opinion; 'Editorials' indicate that an issue is considered adequately important to warrant formal editorial intervention. In 2001 and 2007, there were significantly fewer information selections in the 'Letters' section, and significantly more in the 'political' sections indicating editorial attempts at influencing audience discourses on an issue. In 2001 the great majority of 'political' section information placements were found in the 'Op-Ed'

[191] See Chapter 7, Section 7.7.2 for discussion of *New York Times* coverage of the debate between Stern and Yale economists.
[192] See Chapter 5, Section 5.6.1.
[193] See Chapter 5, see also Chapter 3 discussion of absence of coverage of local or national risks.

section; in 2007 ‘political’ section placements of IPCC information were found mostly in the ‘Editorial’ section.

Throughout the analytical period, information about physical risks—almost entirely threatening other countries not the U.S. —was the most frequently selected information category placed in the ‘political’ sections. Taken together, information about the emissions which caused the risk, and solutions (relating almost entirely to emission reductions) were the second most frequently selected category of information. Compared with the salience assigned to uncertainties in IPCC reports, *New York Times* selectors selected relatively many items of information relating to scientific uncertainties. In most cases these uncertainties were framed as evidence of overall expert uncertainty about the risk rather than, as stated in IPCC reports, as information about remaining uncertainties which did not detract from fundamental certainties about the processes causing global warming and the inevitability of resulting changes in climate and sea level.[194] Potential benefits of global warming were raised in each year, although in 2007 these reduced as a proportion of overall information selections, perhaps indicating a growing popular awareness that global warming was more a matter of risk than benefit. International ethics, such as intergenerational equity or the responsibilities of developed countries (which caused the problem in the first place) towards developing countries (which would suffer far worse impacts than developed countries), received some attention from ‘political’ section writers in 1990, 2001 and 2007. At no stage did ‘political’ sections mention the need for adaptation and emergency planning in the U.S. to reduce risks to communities, environments, industries and economies.

‘News’ section placements show that throughout the analytical period, the ‘World’ section carried the greatest number of information selections about global warming and climate change. This was particularly the case in 1995, where the ‘Front Page’ and ‘World’ section placements should in fact be considered as an amalgamated unit. These 1995 ‘Front Page’ placements were almost always catalogued by *New York Times* archivists as part of ‘World’ section placements. The preponderance of ‘World’ section placements throughout the analytical period supports the argument that global warming and climate change were imagined by news writers to be a problem for ‘others not us’; a problem which was ‘global but not local’.

[194] See Section 4.2.8 earlier in this chapter for more detailed discussion of scientific certainties and uncertainties.

The balance of information categories selected for 'news' sections varied considerably over the analytical period. In 1990 the emphasis was largely on international political solutions to the problem, and on physical risks to other countries. This changed in 1995, when *The New York Times* appears to have attempted to rebut growing support for 'sceptical' arguments by emphasising expert certainties about the risk.[195] 'News' sections in 1995 emphasised physical risks (almost entirely to other countries), but also made much of the underlying expert certainties about the physical processes causing the problem, and their connections with human emissions of warming gases. This latter selection pattern appears to indicate advocacy on the part of *New York Times* news selectors: an attempt to demonstrate the 'factuality' of the risks.

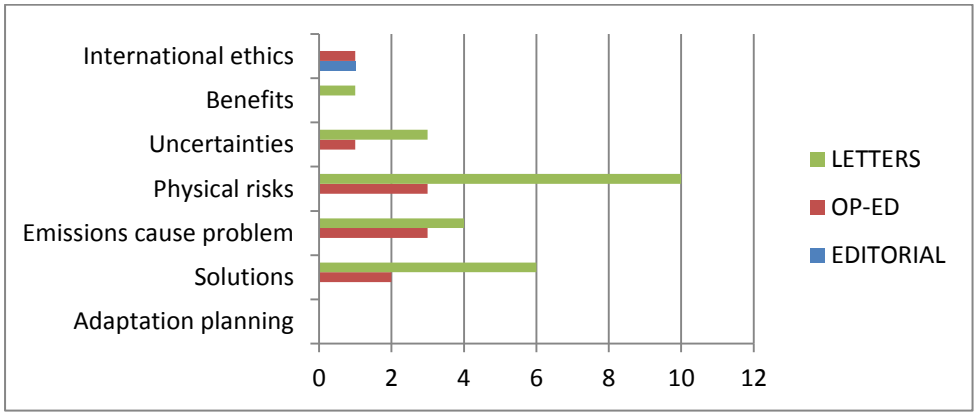
Compared with 1995, 2001 saw fewer items of information about global warming and climate change placed in the 'news' sections (105 in 1995; 95 in 2001). Proportionately, the categories of information selected for 'news' sections in 2001 were similar to those selected in 1995, with physical risks the main selection category and information about the emissions causing the problem coming second. However, in 2001 this information was placed in a wider range of 'news' sections, including the summary sections such as 'World Briefing' and 'news Summary', which select only news stories assumed to be of broad interest to audiences.

In 2007, selections of information about global warming and climate change placed in 'news' sections almost quadrupled, rising from 95 in 2001 to 346 in 2007. The balance of categories of information was similar to previous years, with the exception that adaptation and emergency planning surfaced for the first time. This offers further reinforcement for the argument that until *New York Times* audiences began to directly experience warmer temperatures, changes in seasons and the suitability of particular plant species for their gardens, ideas of global warming and climate change remained remote and theoretical rather than directly relevant to specific audiences.

[195] See Section 4.3.1 earlier in this chapter.

Chart 3: 1990 'political' section information placements

n=35



As **Chart 3** shows, the majority of 'political' section placements appeared in the 'Letters' section, with half as many found in the 'Op-Ed' section. The 1990 'Letters' section writers split their attention between raising concerns about physical risks—all of these involving global rather than local risks—and focusing on both the greenhouse gas emissions which were causing the problem, and ways of reducing these emissions. This pattern of information preferences was continued in 'news' section placements, where again the majority of attention was paid to global risks and emission reduction possibilities. No attention was paid to direct U.S. risks.

Chart 4: 1990 'news' section information placements

n=46

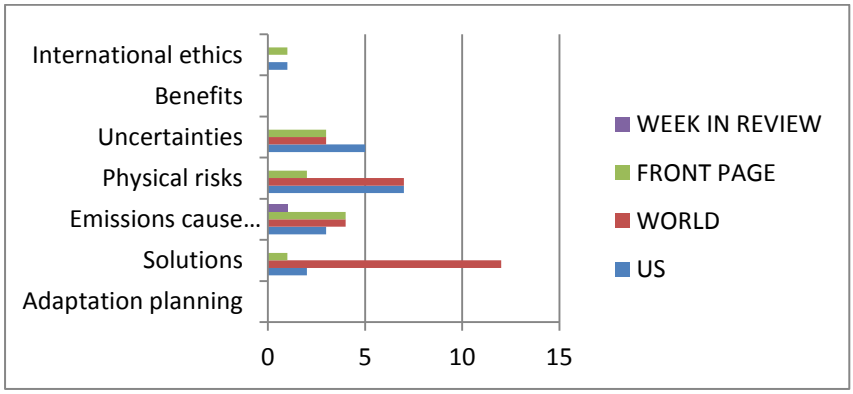
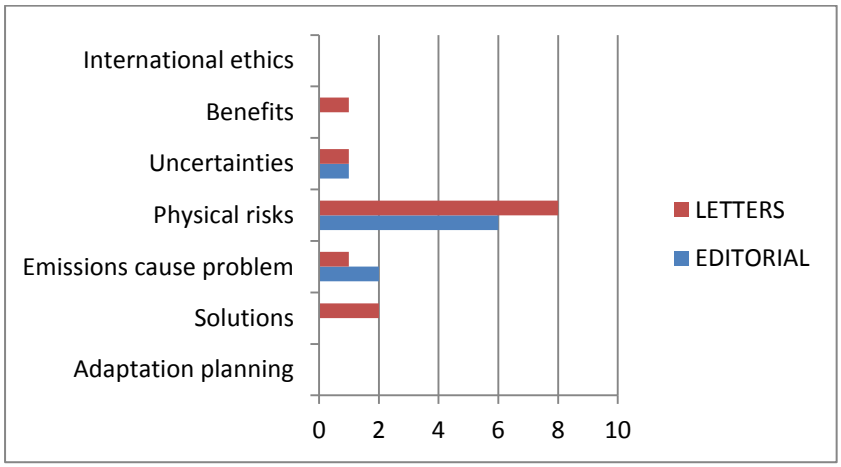


Chart 4 shows that in 'news' sections in 1990, solutions were the most frequently selected, with these mostly placed in the 'World' section, denoting a global problem. The problems caused by greenhouse gas emissions also were selected relatively frequently. Closer analysis shows that these selections related almost entirely to CO_2 emissions, and to international discussions about global reductions rather than explanations of expert rationales for warning of a significant global risk, or information about potential local or national initiatives. Physical risks were the second most frequently selected but qualitative analysis shows that these did not include local or national risks. Uncertainties were selected much more frequently than their appearance in IPCC reports would indicate was appropriate. They were framed, not as outstanding expert uncertainties about a certain risk, but as possible evidence that experts were fundamentally uncertain about whether there was any risk at all. Compared with 1995, where the 'U.S.' section carried virtually no information about global warming and climate change, in 1990 this section contained relatively many items of information: further evidence that in 1990 this risk was perceived as relevant to national audiences, unlike the situation five years later when it appeared to have almost entirely dropped off national radars.

Chart 5: 1995 'political' section information placements

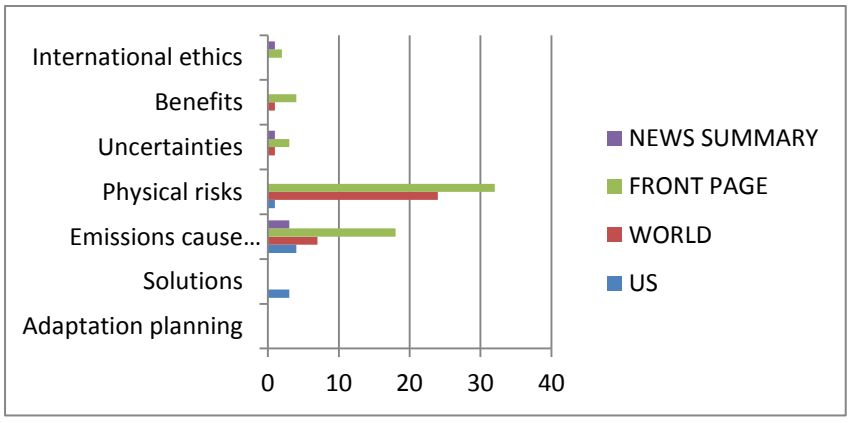
n=22



In 1995, no ‘Op-Eds’ published within the analytical window mentioned global warming or climate change. Instead, ‘political’ section placements were split between ‘Letters’ and ‘Editorials’. An editorial makes a formal statement of a news medium’s preferred policy on an issue: selection of readers’ letters is a less formal process illustrating news medium policy preferences. Opinion-writers are in a more arms-length position from formal editorial policy than full-time employees of a news medium. It may be that in 1995 the *New York Times* preferred to represent the issue as factual rather than a matter of opinion and encouraged its ‘Op-Ed’ writers to stay away from an overly controversial issue. Instead, global warming and climate change were represented as a formal *New York Times* concern which was supported by its readers. ‘Letters’ and ‘Editorials’ made much of likely physical risks, supporting the argument that news editors were attempting to persuade readers that there were real risks involved. However, qualitative analysis reveals that almost all of these selections of information about risks involved risks for ‘others’, not ‘us’. The risk still was framed as ‘global but not local’.

Chart 6: 1995 ‘news’ section information placements

n=105



In 1995, the majority of information selections were placed in the 'news' sections (see **Chart 2**) **Chart 5** shows that of these 'news' placements, the great majority were found in 'Front Page' or 'World' sections. In *The New York Times*, 'Front Page' and 'World' section placements tend to involve internationally important news. The preponderance of such 'news' section placements in 1995, and the very small number of 'U.S.' section placements, shows the ongoing tendency to frame the issue as global but not posing direct physical risks to U.S. audiences.

Chart 7: 2001 'political' section information placements

n=91

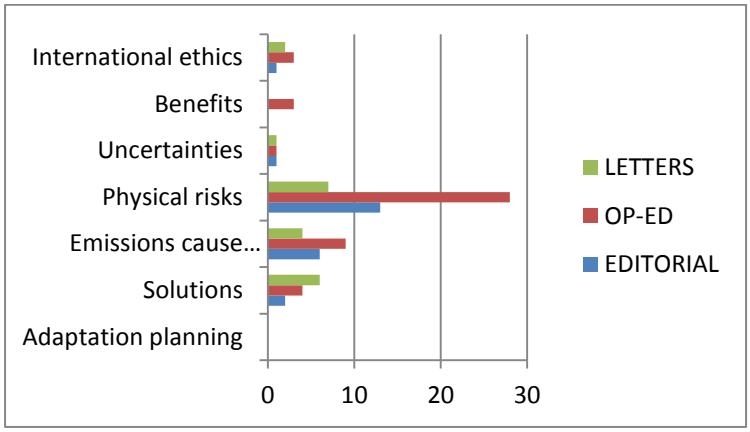


Chart 7 shows that in 2001 the task of contesting the contemporaneously dominant sceptical discourse was given primarily to opinion-writers rather than editorial writers. In a newspaper, direct advocacy and official news medium policy on issues are seen most clearly in 'Op-Eds' and in 'Editorials'. In 2001, there was double the quantity of IPCC information selections in the *New York Times* 'Op-Eds' section (48) compared with 'Editorials' (23) and 'Letters' (20) sections. While in 1995 the editorial strategy seems to have been to present 'the facts' about the risks of global warming and climate change, in 2001 *New York Times* editorial writers may have become weary of pushing an issue which remained highly controversial. Instead, it was left largely to opinion-writers, perhaps to distance *New York Times* editorial policy from an issue which had been painted by the 'sceptical' lobbies as deeply uncertain and primarily political.

Chart 8: 2001 'news' section information placements

n=95

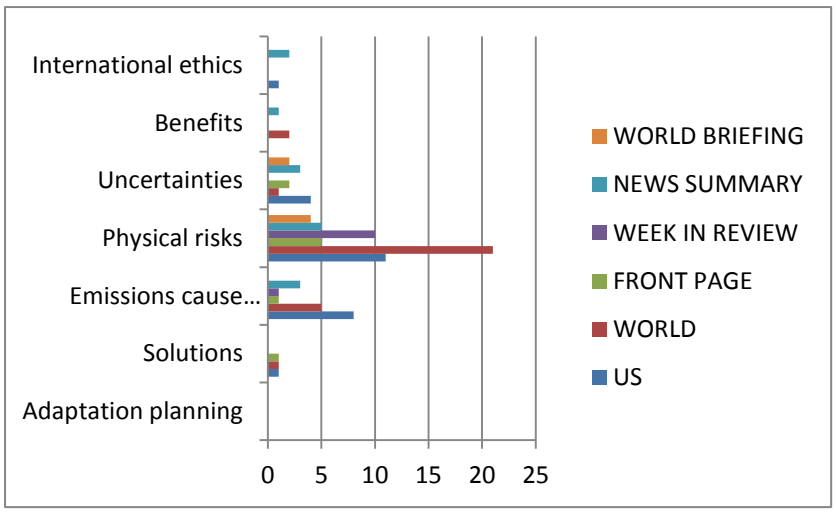


Chart 8 shows that within the 'news' sections in 2001, information about global warming and climate change was placed increasingly frequently in the 'U.S.' section. This suggests an editorial assumption that audience interest in the issue had increased to the extent that it had become a part of national discourses. It is significant that by 2001, global warming and climate change were being selected for inclusion in 'News Summary', 'World Briefing' and 'Week in Review' 'news' sections. Topics are only selected for these summary or review sections if they are considered to be part of dominant audience discourses. Chapter 3, Section 3.11 has detailed *New York Times* assumptions that the issue was entering popular discourses by 2001, as seen in the leap in numbers of mentions of "global warming" or "climate change" in otherwise unrelated articles. Other research also has found a separation, by the early 2000s, between national and international political discourses which framed the issue as controversial and uncertain, and broader popular concern about the risks.

Brewer (2003) documented the wide range of emission reduction initiatives being implemented by the early 2000s at state and community levels. By 2003, five north-eastern states in the U.S. and four Canadian provinces had set a goal of reducing greenhouse gas

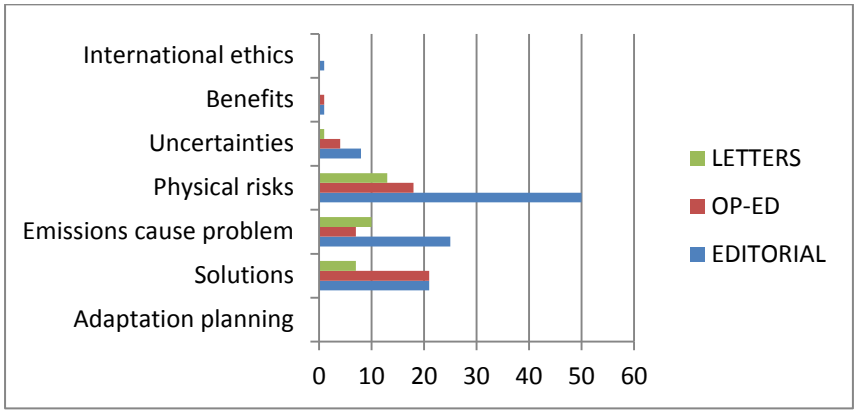
emissions to 1990 levels by 2010.[196] California had legislated state regulation of motor vehicle emissions; and the Governor of New York had made a similar proposal:

> At the local level, 67 cities have joined the Cities for Climate Protection Campaign, and have thus committed to undertake various mitigation efforts such as increasing energy efficiency standards.
>
> (Brewer 2003, 153)[197]

Brewer's research suggests a different understanding of the risks within broader popular discourses, where popular concern appeared to be driving political decisions at sub-national levels. These decisions, however, related entirely to emission reduction initiatives. There were no initiatives to plan for adaptation or disaster preparedness, suggesting little awareness even at local or state levels of potential risks to U.S. populations. This perhaps is not surprising, given the dearth of information about likely local and regional risks or the need for planning in *New York Times* information selections.

Chart 9: 2007 'political' section information placements

n=188



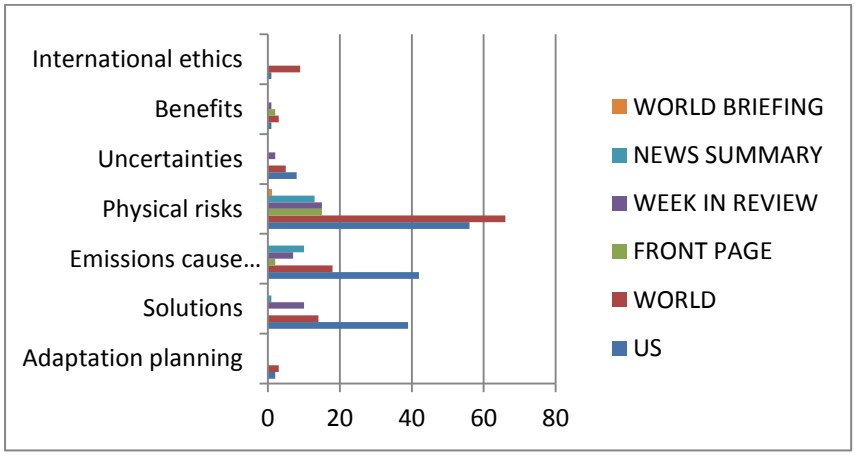
[196] (Brewer 2003)

[197] By 2008 these numbers had increased. Gelbspan has reported that: "Some thirty states—and more than 100 US cities—have initiated plans to reduce their own carbon emissions" (Gelbspan 2008, 12).

In the 2007 'political' sections, 'Editorials' for the first time were the preferred location for selections of information about global warming and climate change, followed by the 'Op-Ed' section. 'Editorials' gave most of their attention to physical risks, almost all of these being physical risks to other countries. The risks still were being framed as 'global not local'. 'Op-Ed' writers preferred to talk about solutions without paying any attention to expert certainties about physical processes which were the reason why solutions were needed.[198] Solutions addressed by 'Op-Ed' and "Editorial' writers related to a narrow suite of options revolving around mechanisms for reducing CO_2 emissions. When opinion writers discussed physical risks, these again related to global rather than local problems. The exception was local non-disastrous changes in temperature and climate.[199]

Chart 10: 2007 'news' section information placements

n=346



As the effects of global warming became increasingly evident, a news selector assumption that social world attention to this risk was strengthening is seen in the increasing frequency of information selections. **Chart 1** (Chapter 3) and **Chart 2** (earlier in this chapter) show the exponential increase in information selections from the 2007 IPCC reports, compared with the previous three IPCC assessments. By 2007 there was an increase in selections of information which explained expert advice about the cause of the environmental risk and its likely physical impacts.

[198] See Chapter 6, Section 6.2.1 for further discussion of an overemphasis on 'solutions' to the detriment of explanations about the 'problem'.
[199] See Chapter 3 Sections 3.11 and 3.13 for discussion of articles about changes in gardening practices.

For the first time, adaptation planning appeared in *The New York* Times 'news' sections. This still related to 'others'. There were no selections of information about adaptation and emergency planning which U.S. populations should consider. Information about global warming and climate change continued to be placed mostly in the 'World' section, with information selections relating to large problems for other parts of the world. Information about emissions (meaning fossil fuel CO_2 emissions) and solutions (meaning emission reductions) also continued to be heavily preferred. Closer analysis of information selections shows that expert certainties about the existence and extent of the risk, and expert explanations of the rationales underlying these certainties, were mostly ignored. However, the 2001 trend of placing more information about the risks in the 'US' section continued in 2007, again suggesting news editorial assumptions of increasing audience interest in the issue.

4.4 Conclusion

Global warming and climate change were well accepted by scientific experts and by the social world in 1990. There are several reasons why this initial acceptance of the risks by the social world changed quickly into disbelief and scepticism. At the individual level, the American Psychological Society has identified a reaction of helplessness as individuals were confronted with a risk which frequently was framed in news media representations as a looming global catastrophe. Fear of uncontrollable disasters can result in denial, paralysis or apathy.[200] There was little information in the U.S. news media to indicate how this global risk could be controlled or managed at the micro levels of individuals, communities or even regions. Compounding social reluctance to accept expert advice about the physical world was, in the U.S. at least, a news media framing of the issue as political rather than physical. This framing supported 'sceptical' lobby framings of global warming and climate change as a political issue which had no basis in physical science.

The cumulative qualitative and quantitative content analyses of Chapters 5, 6 and 7 show that *New York Times* news writers preferred international and national political controversies concerning the expert recommendations of significant emission reductions. Associated expert

[200] (Moser 2010; Swim et al. 2011)

recommendations for urgent strategic adaptation and emergency planning were virtually ignored in the pages of the *New York Times*. Community and regional level research and planning to attempt to avoid or reduce the physical risks predicted by experts could have at least diluted feelings of helplessness. *New York Times* audiences were, however, given very little information about such potential actions. Instead, global warming and climate change were constructed almost entirely as a matter of politics or a possible problem for other countries, but not for the physical environments inhabited by *New York Times* audiences.

A further factor in social world reluctance to accept expert advice that a global physical phenomenon was developing and that this would threaten human health and property was that the idea that humans could change physical planetary systems conflicted with Western constructions of the natural world as subordinate to human enterprise. Western discourses of the relationship between humans and the physical world included assumptions that natural resources were inexhaustible and inalienably available for exploitation; and, a related assumption, that the right to exploit natural resources brought large benefits to Western civilisation and large profits to business. When discourses of human superiority over the natural world encountered expert advice about a looming global physical risk which threatened to cause physical and economic damage to the social world, social world constructions of 'reality' tended to be preferred. Expert advice about physical changes was transformed into a social world construction of a risk which posed unacceptable challenges to Western value systems, mythologies and economic progress.

The emerging 'Risk society' shift in non-expert perceptions of scientists, which had moved from earlier trust to a deepening mistrust, was another factor which made the social world more likely to prefer 'sceptical' lobby arguments over expert reasoning and evidence. The news ethic of balance and the value assigned to conflict enhanced the credibility and the news media profile of a small group of vocal 'sceptical' scientists. Meeting the ethic of balance encouraged news selectors and writers to give equal salience to 'sceptical' and mainstream climate science advice. Framing the issue as conflicted sat more easily with news values than representing the issue as largely agreed by scientific experts.

All of these factors created a fertile ground for the arguments of well-organised, well-funded and politically well-connected 'sceptical' lobbies. These 'sceptical' lobbies were created by fossil fuel industries unwilling to change production practices; and by conservative libertarian think-tanks resistant to governmental intervention, additional taxes or any other form of

regulatory decision which might interfere with individual preferences, industrial practices or ideas of the relative values of environment and economy. Unlike IPCC scientists, the 'sceptical' lobbies were skilled in using public relations to influence the news media. They manipulated news values and news media preferences for political information to distort overall news representations of IPCC advice.

IPCC scientists paid as little attention as possible to the news media and tried to stay away from politics, preferring to advise policy makers. The 'sceptical' lobbies focused not only on the news media, but on other popular and more overtly political media such as radio and television talk shows and advertisements; and on briefing political parties. The result was that policy makers received most of their information about global warming and climate change either directly from the 'sceptical' lobbies; from the news media who already had been biased towards 'sceptical' arguments; or from other overtly political popular media.

Consequently, for a decade and a half the concrete reality of physical processes which were changing physical planetary systems were denied, ignored or minimised by U.S. policy makers, by *New York Times* representations of expert advice, and by social world discursive reconstructions of these representations. In the U.S., global warming and climate change were constructed as unlikely and expert advice as dismissible. Ulrich Beck's articulation of a process of "organised irresponsibility" was manifest. Scientific expert definitions and evidence of physical reality were contested or ignored because they did not fit comfortably into the beliefs, values and discourses of the social world. It was only as physical changes, risks and disasters began to impact directly on U.S. populations that popular discourses and, more belatedly, news media representations, began to give more credence to expert advice that global warming and climate change did pose significant risks and did require both emission reductions, and adaptation and emergency planning.

CHAPTER 5 Comparison of expert and news media priorities and preferences

5.1 Introduction

This is the first of three chapters which examine in detail *New York Times* information selections from the expert reports of the Intergovernmental Panel on Climate Change. It clarifies climate science experts' opinions on priority information which they believed needed to be understood by the non-expert social world. These expert priorities and preferences are then compared with selection and salience choices evident in *New York Times* 'coverage of record' of the official release of the IPCC assessments. Having established a base of understanding about expert priorities, the following two chapters then compare these expert preferences with *New York Times* information selection frequencies (Chapter 6) and section placements (Chapter 7). Chapters 6 and 7 involve analysis which is largely quantitative, with support from qualitative analysis of individual news texts. In this chapter the analytical approach is entirely qualitative. The full information available in the IPCC reports[201] is compared with the full text of *New York Times* 'coverage of record' of these assessments, published on or immediately after the official release of each IPCC report.

'Coverage of record' news texts are chosen because the news media culture demands provision of a relatively comprehensive and objective summary of an expert report when it is officially released. This practice is based on the news media understanding of the archival responsibilities attendant on 'newspapers of record'. News texts which use information from a report but which are not published on or immediately after the official release of a report do not purport to constitute an archival record of that report. They do not have the same obligation to provide an overall summary of the report's findings. They can focus on one small aspect of the report, or can prefer popular or political discourses on the issue over the views of experts. Qualitative analysis of 'coverage of record' provides the opportunity for examination of the news media's best effort at impartially and comprehensively representing expert advice.

[201] Issued in 1990, 1995, 2001 and 2007.

This comparison between IPCC and *New York Times* information priorities and preferences reveals tensions between a 'prestige press' preference for informing political discourses and the journalistic ethic of serving the public good by providing audiences with information relevant to their lives, health and economic security. Information relevant to political debates over whether and how to reduce emissions was substantially preferred over expert statements of certainty about the fundamental physical processes causing the risk; or expert warnings of the need for emergency and adaptation planning to safeguard human health, safety and economic security. Information about physical risks expected to threaten *New York Times* audiences and the wider U.S. population was virtually ignored. A related tension was misunderstanding of the nature of global environmental risk. This comparative analysis reveals a journalistic inability to recognise that a global risk would have local implications. Throughout the analytical period, *New York Times* journalists framed the risk as 'global therefore not local'. The social world only takes action if the reasons for the need for action are clearly understood. This chapter shows that expert reasons for the need for action were minimised while expert recommendations for the politically contentious action of reducing greenhouse gas emissions were substantially preferred. *New York Times* audiences were left ignorant of direct risks to their own health and safety. Thus, they were not given the information necessary to understand the extent of the risks; their potential threats to human life, health, property and profitability; or the reasons why experts believed there was an urgent need for action to reduce the risks.

5.2 Expert priorities and news media selections: overview

From 1990 to 2007, virtually all *New York Times* coverage of IPCC reports was based only on the more political and much briefer Policymakers Summaries. Information in the full reports which was highly relevant to U.S. populations and *New York Times* audiences was ignored. It could be argued that focusing on political definitions of a physical risk is a reasonable approach for 'opinion-leading' 'prestige press' news media. However, whether they specialise in political news or in news about science, technology, health or local issues, journalists are expected to adhere to the ethic of informing the public which, in the case of the U.S. journalistic code of ethics, involves providing a "fair and comprehensive account of

events and issues" (Society of Professional Journalists 1996). If scientific experts place high priority on explaining the rationale for expert concern about a risk and warning of the need for emergency and adaptation planning to reduce the risks, a fair and comprehensive account of expert advice should give weight to such recommendations, particularly in the official 'coverage of record' of the findings of a particular report.

5.3 1990 IPCC Science report and *New York Times* 'coverage of record'

The top priorities of the IPCC's Science Working Group report in 1990 were to state scientific certainties about the physical processes which caused global warming, and to document measurements showing that human emissions of warming gases were increasing "substantially" in the atmosphere (Intergovernmental Panel on Climate Change 1990a, xi) and that the global average temperature had been rising since the start of the 20th century.[202] The overview report, which summarised the findings of all three IPCC working groups, advised that to stop global warming ". . . immediate reductions of over 60%" in human emissions of greenhouse gases would be needed (Intergovernmental Panel on Climate Change 1992, 52). Both overview report and Policymakers Summary from the Science working group warned of specific threats to physical systems which provided food and water to the social world—rainfall patterns, agriculture, horticulture, forestry and fisheries. They also warned of substantial risks to coastal communities and low-lying deltaic regions as sea levels rose.

New York Times 'coverage of record' (Whitney 26 May 1990) focused instead on the environmental risk's potential for effecting political and policy change. The headline ("Scientists Urge Rapid Action on Global Warming") represented the issue as one deemed urgent by experts, but nowhere did the article explain why. Instead, global warming was ". . . made anonymous causally" (Beck 1999, 57). Expert explanations of the processes causing the risk were not selected; expert recommendations with implications for political

[202] (Intergovernmental Panel on Climate Change 1990a, xii)

discourses were preferred. From the first sentence[203] onwards, salience was given to an (unexplained) expert recommendation to reduce greenhouse gas emissions. *New York Times* audiences were not told why experts were certain that there was a problem and why policy action was needed. Nor were they given expert information about how the risk might affect their health, environments or livelihoods. The writer included generalised statements about potential physical consequences (". . . unforeseeable consequences for humanity"), but ignored available details of physical risks to *New York Times* audiences. While the IPCC's warnings of expected rises in sea level were selected, these were contextualised as a risk for other countries, not U.S. populations: "That would be enough to submerge the Maldives and inundate the coastal plains of Bangladesh and the Netherlands". Likely impacts of sea level rise on U.S. coastlines, deltas and wetlands were not selected. The risk was framed as 'global therefore not local'. It was not framed as a problem for U.S. populations.

The IPCC's 1990 report on the science of climate change gave high salience to expert certainties about physical processes. *New York Times* 'coverage of record' of the release of this report gave high salience, instead, to selected aspects of expert advice which were more consistent with contemporary political discourses. Rather than considering the physical risks to the health, safety and economic security of *New York Times* audiences, the 'coverage of record' focused on how the risk might affect political discourses on whether emission reductions were needed or desirable.

5.3.1 1990 IPCC Impacts report and *New York Times* 'coverage of record'

The 1990 IPCC report on the impacts of climate change presented scientifically-based expectations of general planetary responses as temperatures increased. In particular, climate experts expected heavier rain when rain did fall;[204] intensifying drought in some regions, particularly mid-latitude, mid-continental regions (which well describes the U.S. Grain

[203] "A panel of scientists warned today that unless emissions of carbon dioxide and other harmful gases were immediately cut by more than 60 percent, global temperatures would rise sharply over the next century, with unforeseeable consequences for humanity."
[204] (Intergovernmental Panel on Climate Change 1990b, 2-33, 3-15, 4-8, 4-24, 5-7, 5-12)

Belt);[205] and greater temperature extremes, both hot and cold.[206] This report flagged a risk of more flooding in winter in central North America and more droughts in summer in central North America and in the southwestern U.S.[207] It warned that the U.S. could expect an overall reduction in its cereal production in a warmer world.[208] It noted agreement between the various global computer climate models that southern U.S.A. was likely to become drier when CO_2 atmospheric concentrations had doubled,[209] and cited U.S. scientific research suggesting that the U.S. Great Plains—an important crop production region—could experience a reduction in rainfall of up to 40% by the early decades of the next century.[210] The 1990 IPCC Impacts report also offered specific warnings of risks to U.S. populations from sea level rise, and their economic implications: "The United States would lose 20,000 km^2 of land, an area worth about $650 billion (Park et al., 1989; Yohe, 1990)" (Intergovernmental Panel on Climate Change 1990b, 6-2). It singled out the State of Louisiana (which includes the city of New Orleans, later devastated by Hurricane Katrina) as being particularly vulnerable[211] and said sea level rise would cause major losses of wetlands in less than a century.[212]

None of these warnings of specific risks to U.S. environments, populations, industries and infrastructures were selected for re-presentation to *New York Times* audiences, even though it could be argued that potentially catastrophic climatic extremes might fit the category of information which would be of benefit to *New York Times* audiences. Expected global physical impacts which also would affect the U.S. were muted through generalisations. "Serious environmental damage", "serious and ever-increasing risks", "extensive ecosystem damage", and "severe impacts" are far less specific than the floods, droughts, wildfires, storms and crop failures mentioned in the IPCC report. Specific details of likely physical impacts on the U.S. contained in the full report[213] were not selected for *New York Times* audiences. Specific recommendations for strategic planning and research contained in the

[205] (Intergovernmental Panel on Climate Change 1990b, 2-2, 2-3, 2-8, 2-9, 2-12, 2-14, 2-32, 2-33, 3-13, 4-4, 6-14, 7-16)
[206] (Intergovernmental Panel on Climate Change 1990b, 1-2, 2-2, 2-8, 2-28, 5-2)
[207] (Intergovernmental Panel on Climate Change 1990b, 1-3)
[208] (Intergovernmental Panel on Climate Change 1990b, 2-33)
[209] (Intergovernmental Panel on Climate Change 1990b, 2-4)
[210] (Intergovernmental Panel on Climate Change 1990b, 3-13)
[211] (Intergovernmental Panel on Climate Change 1990b, 2-21)
[212] Again citing a U.S. EPA report, the IPCC noted research suggesting that: ". . . 84% of low marsh, 71% of high marsh and 45% of tidal flats would be lost in the Charleston, South Carolina, area without protection (Kana et al., 1986, 1988a)" (Intergovernmental Panel on Climate Change 1990b, 3-22).
[213] (Intergovernmental Panel on Climate Change 1990b, Chapter 1, p 1-3)

Policymakers Summary were also ignored, supporting the argument that the risk was perceived as theoretical but of no direct relevance to U.S. populations.

The Policymakers Summary of the IPCC's 1990 report on the impacts of climate change did not require much journalistic attention, being brief: only five pages. It ended with a list of recommended future research and planning, such as regional research on how crop and animal productivity might be affected by higher temperatures and changing climate, feasible changes in agricultural and land use practices and management, and identification of vulnerable populations, agricultural and industrial production in coastal areas.[214] Many of these recommendations would have been relevant to U.S. populations; none were selected for re-presentation to *New York Times* audiences. Instead, without explaining expert certainties about the underlying physical processes causing the risk, the writer focused on possible international policy initiatives: establishing limits for acceptable temperature rises, reducing emissions and developing an international treaty to "control"[215] global warming. The causes of the risk—human emissions of warming gases—were minimised, as were expert certainties about physical processes. The risk was represented to *New York Times* audiences as global, generalised, of negligible direct concern to U.S. populations, environments and economies, and of future rather than present concern.

5.3.2 1990 IPCC Response Strategies report and *New York Times* (non-) 'coverage of record'

The 1990 IPCC report on ways of responding to the risk of global warming and climate change[216] detailed a broad range of shorter-term measures which it pointed out would also yield other benefits. It began with improvements to energy efficiency and use of cleaner energy sources and technologies, noting that these would also reduce other pollutants in the atmosphere. It recommended improvements to forest management and agricultural practices, and then spelled out short-term adaptation options which aimed to protect vulnerable populations from the risks of climate change. These included developing emergency and

[214] (Intergovernmental Panel on Climate Change 1990b, Policymakers Summary, 5)
[215] The semantic choice of "control" suggests a privileging of the social world's capacity to override physical processes and systems.
[216] (Intergovernmental Panel on Climate Change 1990c)

disaster preparedness policies and programmes, and developing comprehensive management plans to reduce future vulnerability of populations, coastal developments and ecosystems from sea level rise. The report's Policymakers Summary and the full report both contained extensive detail of possible changes to industrial technologies and recommendations for emergency and adaptation planning.[217] This IPCC report also contained extensive detail of possible financial, economic and legal mechanisms.[218]

In hindsight, it seems evident that U.S. industry would have benefited from advance notice of necessary changes to business practices and technologies. Vulnerable U.S. populations, infrastructure and environments later damaged by excessive heat, anomalously severe floods, droughts, wildfires and storms probably would have benefited from earlier emergency and disaster planning. *The New York Times* did not provide its audiences with any information from this report. Because the risk was framed as theoretical rather than physical, practical recommendations for preventive or protective actions appear to have been deemed insufficiently important to be considered relevant to U.S. populations.

5.4 1995 IPCC Science report and *New York Times* 'coverage of record'

Five years later, in an indication of growing expert awareness of the extent to which social world discourses were 'normalising' social understanding of this environmental risk, the IPCC's first priority was to address the social world discourse of whether or not humans were causing global warming. The 1995 report on the science of climate change began by presenting evidence of increasing warming gases in the atmosphere, observed atmospheric warming and observations of resulting climatic impacts and rising sea levels. The report then offered the expert conclusion: "The balance of evidence suggests a discernible human influence on global climate" (Intergovernmental Panel on Climate Change 1995a, 4).

[217] See for example Intergovernmental Panel on Climate Change 1990c, Policymakers Summary: Table 3: Examples of Short-Term Options, p xxxvi; Chapter 3: Energy and Industry, pp 45–72; Chapter 4: Agriculture, Forestry and Other Human Activities, pp 73–128; Chapter 5: Coastal Zone Management, pp 129–158; Chapter 6: Resource Use and Management, pp 161–208; Chapter 7: Public Education and Information, pp 209–218.
[218] See in particular Intergovernmental Panel on Climate Change 1990c, Chapters 9: Economic (Market) Measures; 10: Financial Mechanisms; and 11: Legal and institutional Mechanisms.

The *New York Times* 'coverage of record' ("Talk About Weather: U.N. Says People Do Something About It")[219] engaged with social world discourses about whether or not human activities were causing global warming. The risk was framed as a matter of politics rather than physical changes, focusing on the discursively relevant expert conclusion that humans were changing global climate. Both the headline and the first two sentences gave salience to the IPCC's expert opinion that humans were indeed warming the planet and changing global climate. The third paragraph provided some detail of the physical processes causing global warming: ". . . emissions of heat-trapping greenhouse gases like carbon dioxide released by the burning of coal, oil and wood" but also referred to the contemporary 'sceptical' argument that any warming was natural not human-initiated by incorrectly summarising earlier IPCC findings: "In its first full assessment five years ago, the panel said the warming was as likely to have resulted from natural causes as from emissions ". This follows the 'sceptical' strategy of misrepresenting the 1990 report. Rather than offering a 50–50 chance that any warming was natural, the 1990 IPCC report actually advised that while many other natural factors played a much larger part in regulating global temperatures and climate, the introduction of human-generated emissions was ". . . a significant disturbance of the natural carbon cycle" (Intergovernmental Panel on Climate Change 1992, 52). Most of the rest of this Stevens (1 December 1995) story invoked 'sceptical' arguments, discussing whether or not the scientific methods and conclusions might be credible.

Looming hazards to actual populations and environments—arguably of considerable interest to *New York Times* readers—were tacked on in one final, generalised paragraph which mentioned the likelihood of increases in ". . . heat waves, fires and pest outbreaks in some regions" without noting that all of these likely would affect U.S. populations in the near future; or that experts advised strategic planning to reduce these risks. The risk was understood by experts to be already developing in the physical world, but by *New York Times* writers as theoretical, future and of little relevance to their audiences.

5.4.1 1995 IPCC Impacts report and *New York Times* 'coverage of record'

[219] (Stevens 1 December 1995)

The 1995 IPCC Impacts report placed substantial emphasis on the scientifically certain risks of climatic extremes and the pressing need for strategic adaptation planning. As in the 1990 Impacts report, its Policymakers Summary raised the risk of substantial drops in U.S. crop yields, adding that advance planning and preparation could avoid this risk.[220] To make it easier for non-expert readers, each chapter of the full report began with an Executive Summary. These summaries listed a wide range of risks to land, ocean, ecosystems, human health and human settlements, and made detailed recommendations for preventive and protective planning. The *New York Times* 'coverage of record' paid little attention to this readily accessible expert advice.

The New York Times 'coverage of record' of the IPCC's 1995 report on the impacts of climate change[221] included details from all three IPCC 1995 reports—on the science and impacts of climate change, and on possible response strategies. The issue of global warming and climate change was framed as a matter of economic argument: was it cost-effective to reduce greenhouse gas emissions? These economic arguments privileged the social world's ideas of the issue over the advice of the IPCC. Potential damages from inadequate or non-existent emergency and strategic planning, identified in the full IPCC report, were not selected. The headline ("U.N. Warns Against Delay in Cutting Carbon Dioxide Emissions"), the first sentence and most of the text focused on national and international political debates over whether or not greenhouse gases should be reduced. The first sentence made a strong but generalised statement about the scale of the risks, framing these as economic rather than physically threatening:

> Delaying action to rein in emissions of heat-trapping atmospheric gases like carbon dioxide could increase the rate and magnitude of future climatic changes and make the world more vulnerable to costly and possibly irreversible damages. . .
>
> (Stevens 25 October 1995)

This first sentence was framed more as an actuarial consideration of economic risk, rather than following the IPCC preference for an emphasis on observed and future physical risks to human society. Expert priority recommendations for strategic adaptive and preventive planning were not selected. Rather, the writer then moved immediately to a summary of contemporary social world economic discourses on climate change:

[220] See Intergovernmental Panel on Climate Change 1995b: Policymakers Summary, Table 2 p 10.
[221] (Intergovernmental Panel on Climate Change 1995b)

> Some economists have argued that the only cost-effective way to reduce emissions is to put the reduction off as long as possible, while others insist that doing so would merely push the burden onto future generations.
>
> (Stevens 25 October 1995)

This sentence referred to another theoretical social world discourse: that of inter-generational ethics. Like discourses on the economics of reducing emissions, it discussed the possibility of future actions rather than agreeing that action was needed immediately. The discourse itself did not affect evolving physical processes already taking place in the physical world.

Most of the rest of the article discussed whether emission reductions might reduce standards of living—another contemporary political discourse—and then discussed contemporary international and national political discourses about the desirability or otherwise of reducing greenhouse gas emissions. The writer did list a variety of potential impacts detailed in the 1995 IPCC Impacts report's Policymakers Summary, but these were framed as future rather than present risks, and as problems for 'others', not U.S. populations. "Many low-lying areas around the world could be inundated"; there could be ". . . an increase in heat waves, floods, droughts, fires and pest outbreaks in some regions". Similarly generalised statements were made about the risks of forest types disappearing, desert climates becoming more extreme, a rise in heat-related deaths, and an increase in the range of vector-borne infectious diseases such as malaria. All of these risks pertained to U.S. environments.

By 1995, aberrant changes in climate in the U.S. had been noted by the IPCC reports, and by the WMO's annual statements on global climate. The WMO statement on global climate for 1995 noted contemporaneously unprecedented global warming,[222] and extreme temperatures affecting much of the U.S.[223] It said 1995 had seen the most active hurricane season to affect the southeastern U.S. since 1933.[224] However, *The New York Times*' 'coverage of record' of the IPCC's 1995 report on the impacts of climate change drew no connections between climate extremes recently experienced in the U.S. and the near-identical predictions and observations of climate experts.

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[222] "The 1995 estimated global mean surface temperature over land and marine areas was the warmest since 1861" (World Meteorological Organization 1996, 4).

[223] "Intense heat, along with high humidity, was a feature in July over large areas of the central and eastern United States, and extending into central Canada where it was accompanied by severe forest fires. There were over 1 000 deaths related to the heat" (World Meteorological Organization 1996, 6).

[224] "The most active hurricane season in the Atlantic Ocean since 1933 caused considerable property damage in the Caribbean islands and the south-east coastal areas of the United States" (World Meteorological Organizastion 1996, 4).

5.4.2 1995 IPCC Response Strategies report and *New York Times* 'coverage of record'

In 1995, both experts and news media gave higher salience to contemporary social world discourses on the issue of climate change than they did to scientific explanations of inevitable changes in physical planetary systems. The title of the IPCC's 1995 report on possible response strategies ("Economic and Social Dimensions of Climate Change") engaged explicitly with contemporary social world discourses rather than heralding expert recommendations on technological or policy measures which had been judged potentially useful for reducing the risks. Similarly, the headline of the *New York Times* 'coverage of record' ("Price of Global Warming? Debate Weighs Dollars and Cents") referred to economic discourses on the issue.[225] The full text actively engaged with economic debates, advocating for action. This privileging of social world discourses indicates the extent to which, by 1995, the environmental risk had become 'normalised', defined by both experts and news media as a matter of social discussion rather than of social engagement with evolving physical processes, strategic planning or consideration of technological or policy remedies.

The Policymakers Summary of the 1995 IPCC report on potential response strategies was issued on 29 June 1995, with the full report released on 14 October 1995. The release of the Policymakers Summary was not covered by the *New York Times*. The newspaper's 'coverage of record' involved a preview of the full report four days before its official release on 14 October 1995.[226] It did not mark the actual report release with a 'coverage of record' story. Instead, ten days later, the *New York Times* 'coverage of record' of the IPCC's second working group report on the impacts of climate change, released on 24 October 1995,[227] ended with two summary paragraphs from the third IPCC working group report on potential response strategies. These paragraphs focused on potential energy efficiency technologies: a very narrow selection considering the wealth of technological details contained in the IPCC's 1995 report on possible response strategies. The news decision not to mark the release of this report with archival 'coverage of record' suggests two assumptions by news selectors: one, that there was little audience interest in the issue in 1995 (and this is supported by the drop in

[225] (Stevens 10 October 1995)
[226] (Stevens 10 October 1995)
[227] (Stevens 25 October 1995)

numbers of news texts mentioning this issue in 1995)[228] and, two, that the issue was deemed theoretical but not physical, and therefore there was no need to pay attention to expert suggestions for practical remedial actions or planning.

The full IPCC report on potential responses to climate change covered policy options, equity and social aspects that should be considered, cost-benefit approaches to selecting appropriate actions and policies, emerging technologies, and management and planning tools. *New York Times* selections from this report privileged a narrowly focused suite of economic arguments. It entirely ignored potentially useful expert advice about policy, planning and technological options.

Both the headline and the first paragraph of the *New York Times* preview of this full report framed the issue as one of theoretical economic debate over whether it was worth doing anything about climate change. The first paragraph makes this plain. "If the world's climate is warming because of the burning of fossil fuels, how much will it cost to fix the problem? And is the fix worth the cost?" (Stevens 10 October 1995). "If" reflects a social world discourse, not the advice of experts. The 1990 and 1995 IPCC Science working group reports were categorical that increasing emissions of greenhouse gases would warm (1990) and were warming (1995) the atmosphere and changing climate.

The remainder of the text illustrates that the headline and first paragraph of a news story do not always accurately summarise the full text. Rather than supporting the suggestion of the headline and first paragraph, that any action on global warming depended on a positive cost-benefit analysis, Stevens proceeded to marshal a range of arguments which supported the need for urgent action. He repeated the IPCC conclusion that burning fossil fuels had caused at least part of the warming of the previous century, warned that warming in the next century "will probably cause widespread dislocations in the economies and environments of nations", and then advocated for action. The decision to place "economies" before "environments" indicates an assumption of a social world construction of the risk as a matter primarily of economic discourse rather than of a looming physical risk. Available IPCC evidence of contemporary aberrant changes in the U.S. climate and environment, and expert advice about the urgent need for strategic emergency and adaptation planning, might have acted as a powerful motivator for actual action rather than theoretical discussions about future action or inaction. Such observational evidence and warnings of specific future risks were not selected.

[228] See Chapter 3, **Chart 1**, also see Chapter 4, **Chart 2**.

Stevens' advocacy was restricted to the politically-defined field of economic debate about a narrow range of options, with a few generalised references to sensational global impacts which were not given any local or national relevance.

As with earlier coverage of IPCC reports, this article's salience and selection choices changed expert perceptions of global warming as an existing and evolving physical phenomenon to fit social world discourses which constructed the environmental risk as future, uncertain, a question of economic or political debate, and a risk for 'others' not U.S. populations.

5.5 2001 IPCC Science report and *New York Times* 'coverage of record'

By 2001, climate scientists were measuring near-unprecedented amounts of warming gases in the atmosphere[229] and reporting accumulating instances of near-unprecedented climate extremes.[230] *New York Times* mediations of the 2001 IPCC reports ignored their documentation of physical changes which matched climate science theory on what could be expected as the climate warmed. Instead, journalists continued to emphasise implications for social world discourses, ignoring expert evidence of physical manifestations of a developing environmental risk which increasingly threatened U.S. populations, environments, infrastructure and industry.

The Policymakers Summary for the 2001 IPCC report on the science of climate change gave top priority to addressing uncertainties which circulated in social world discourses by detailing expert observations of aberrances in global physical systems: "An increasing body of observations gives a collective picture of a warming world and other changes in the climate system" (Intergovernmental Panel on Climate Change 2001a, 2). It addressed ongoing discursive uncertainty about whether or not humans were causing this warming and climate change by advising that "There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities" (Intergovernmental Panel on Climate Change 2001a, 10). It detailed scientific evidence of

[229] "The present CO_2 concentration has not been exceeded during the past 420,000 years and likely not during the past 20 million years. The current rate of increase is unprecedented during at least the past 20,000 years" (Intergovernmental Panel on Climate Change 2001a, 7).
[230] (Intergovernmental Panel on Climate Change 2001a, 2-5)

increasing concentrations of atmospheric greenhouse gases, increases in global temperature, a rise in global sea level and decreases in snow and ice cover. None of these statements about scientifically documented physical processes already under way were selected for re-presentation in *New York Times* coverage of the 2001 IPCC reports.[231]

The 2001 IPCC report on the science of climate change was issued on 20 January 2001—the day of President George W. Bush's inauguration. The temporal clash with the presidential inauguration meant that expert advice which strengthened certainties about a global environmental risk was deferred in favour of more short-term and national political discourses. Two days after the official release of the IPCC's 2001 report on the science of climate change, an article written by a wire agency (Associated Press) rather than a *New York Times* staff writer, was published.[232] This article was placed, somewhat oddly, in the 'Health' section even though the text of the article relates only indirectly to health issues, in that it mentions air pollution, drought and the risks of sea level rise for low-lying densely populated areas in countries other than the United States. It could be inferred that the sections theoretically more appropriate for such a story (such as the 'National', 'World', 'Science' or 'Business' sections) were already full of stories relating to the new administration and its policies: and, perhaps, that all *New York Times* staff were fully occupied scrutinising politics and policies of the new national administration and had no time to spare on more global concerns or more physically based phenomena.

Like earlier *New York Times* 'coverage of record' of IPCC reports, the Associated Press story showed a similar tendency to select scientific information for its political relevance. Again, the risk was 'normalised', framed as theoretical rather than actual; and as future rather than present. Scientific certainties about existing and expected physical changes resulting from human-generated greenhouse gas emissions were given far less salience than scientific statements which related to existing social world discourses of uncertainty about human responsibility for the environmental risk.

The headline ("Climate Panel Reaffirms Major Warming Threat") very probably was written by *New York Times* sub-editors rather than by the Associated Press writer,[233] contributing a framing preferred by that news medium's editorial staff rather than the Associated Press

[231] See later in this chapter, Section 5.5.1 which discusses *The New York Times'* failure to select IPCC details of specific North American impacts already being experienced and scientifically observed.
[232] (Associated Press 23 January 2001)
[233] Even when a newspaper uses articles supplied by another news agency, the practice is for the publishing medium's sub-editors to write the headline and, often, further edit the text.

writer. Both headline and opening sentence framed the risk as serious, but potential rather than present. The opening sentence described the report as ". . . the most emphatic warning yet about the danger of global warming". "Threats", "warnings" and "dangers" refer to future events rather than events actually happening in present times. The opening sentence did assign salience to the credibility of expert opinions that global warming was indeed a significant risk (". . . the most emphatic warning yet") rather than to contemporary political discourses of scientific uncertainty on the issue. However, the following paragraph turned immediately to the political rather than the physical, observing that the IPCC report ". . . could spur stalled world negotiations on curbing greenhouse gas emissions". Similarly, a quote from the chairman of the IPCC was selected for its political, rather than scientific relevance: " 'This adds impetus for governments of the world to find ways to live up to their commitments' to reduce emissions of greenhouse gases, said Dr Robert T. Watson." The discursive focus was limited to political definitions of the risk as being a matter of emission reductions. Expert concerns about the dangerous effects of already unprecedented warming, including significant reductions in global food and water supplies, were not selected.

The restricted focus of this 'coverage of record' engaged with political discourses promoted by the 'sceptical' lobby. Information was selected to rebut the argument that any warming came from natural, not human causes:

> . . . most of the observed warming in recent decades has come from gas releases from human activities . . . new evidence shows more clearly than ever that temperature increases are caused mostly by pollution, not by changes in the sun or other natural factors.
>
> (Associated Press 23 January 2001)

Like earlier *New York Times* coverage of other IPCC reports, the Associated Press story did not draw connections between generalised global physical risks and likely risks to U.S. populations: ". . . drought could strike farming areas, while melting glaciers could raise sea levels, flooding densely populated coastal areas of China, Egypt and other countries". The risk was represented as one for 'others', not U.S. audiences.

5.5.1 2001 IPCC Impacts report and New *York Times* 'coverage of record'

By 2001, aberrant climatic events and aberrant warming were being extensively detailed both in the IPCC's report on the impacts of climate change and in World Meteorological Organization annual statements of global climate. In the social world, the environmental risk appeared to be of diminishing interest. *New York Times* 'coverage of record' of this report's official release was delayed, appearing three days later in two parts: one, a front-page story which ignored the IPCC report but highlighted U.S. research findings which had been included in the report (suggesting that national expertise was more credible than international expert advice).[234] This story reported that a global icon of significance to Americans—Mt. Kilimanjaro—was melting:[235] an information selection which further illustrates the tendency for *The New York Times* to frame the issue as a problem for other countries (Mt. Kilimanjaro is in Tanzania, on the African continent). Revkin used the melting of the Kilimanjaro ice cap to support the (unacknowledged) IPCC conclusion that human activity was causing global warming. This story went on to document other U.S. research findings about reductions in sea ice and the retreat of mountain glaciers. Again, all of this research had been contained in the 2001 IPCC assessments but in this story, the IPCC did not receive any credit. It may be that Revkin was attempting to persuade *New York Times* audiences that global warming had started by appealing to a patriotic belief in the superiority of U.S. scientific expertise. In any case, his formal 'coverage of record' of the 2001 report on the impacts of climate change was a relatively small story placed in the 'World' section,[236] signifying 'others' not 'us'.[237] The Downs cycle of inevitably waning public interest in any issue (Downs 1972), regardless of its inherent importance, appeared to be operating, just at the stage where scientific evidence of substantial and worrying global and regional changes was strengthening. These dual placements, with U.S. research given front-page treatment and international scientific advice relegated to a smaller story on the inside pages appear to indicate a news writer assumption

[234] ("A Message in Eroding Glacial Ice: Humans Are Turning Up The Heat": Revkin 19 February 2001a)
[235] In a U.S. publication, mention of this African landmark invite appeals to U.S. pride in a perceived literary giant, referencing U.S. novelist Ernest Hemingway's 1936 novel, *The Snows of Kilimanjaro*, with its invocation of mythologies of the beauties of the natural world and of human decay.
[236] ("Warming's Likely Victims": Revkin 19 February 2001b)
[237] While the inauguration of George W. Bush as President, and the September 11 World Trade Centre bombing, coincided with the release of the 2001 Science Working Group and Synthesis reports respectively, there were no similar reasons for the absence of timely 'coverage of record' about the 2001 IPCC report on the impacts of climate change and potential preventive actions—or for the complete absence of coverage of the 2001 IPCC Working Group report on possible technological and policy responses to the risk of global warming and climate change.

that in 2001, U.S. audiences were more interested in stories of national scientific research insights than in international advice about a global risk.

The 2001 IPCC impacts report detailed scientific observations of a wide range of unusual aberrations in temperature, weather, sea level rise and reductions in snow and ice. Its first priority was to state that "The probability that the observed changes . . . could occur by chance alone is negligible"[238] (Intergovernmental Panel on Climate Change 2001b, 3). The second priority statement was of emerging evidence that some social and economic systems had already been affected by recent increases in floods and droughts.[239] This report assigned "high confidence"[240] to its statement that in North America there had been increases in weather-related insured losses and public sector disaster relief payments, adding that ". . . insurance sector planning has not yet systematically included climate change information, so there is potential for surprise" (Intergovernmental Panel on Climate Change 2001b, 804). Spiralling disaster costs and relief payments have large economic implications. Although the *New York Times* previously had given substantial salience to economic aspects of policies to reduce greenhouse gas emissions, this statement about existing U.S. economic losses caused by climate change was not selected for re-presentation to *New York Times* audiences. This omission appears to constitute further evidence that *New York Times* information selection was guided primarily by political definitions of the risk, rather than by expert advice about developments in the physical world.

The WMO's statement on global climate in 2000 supported the IPCC's evidence of anomalous climate events being experienced in the U.S. It said severe to extreme drought covered 36 per cent of the U.S. by the end of August 2000, and southern and western regions of the U.S. had experienced one of the worst wildfire seasons in the past 50 years. The 1999–2000 winter in the U.S. had been the warmest on record while, in another example of greater extremes, November and December 2000 had been the coldest on record.[241] All of these climatic events had been predicted by earlier IPCC reports.

[238] See Intergovernmental Panel on Climate Change 2001b, 3. This section of the Policymakers Summary gave specific details: "Examples of observed changes include shrinkage of glaciers, thawing of permafrost, later freezing and earlier break-up of ice on rivers and lakes, lengthening of mid to high-latitude growing seasons, poleward and altitudinal shifts of plant and animal ranges, declines of some plant and animal populations, and earlier flowering of trees, emergence of insects, and egg-laying in birds. . ."
[239] (Intergovernmental Panel on Climate Change 2001b, 4)
[240] i.e. at least a 9 in 10 chance of being correct.
[241] (World Meteorological Organization 2001)

The *New York Times* 'coverage of record' of the 2001 IPCC Impacts report did not select evidence of extremes already being experienced in the U.S., or the warnings of future greater damage which were documented in the full IPCC impacts report. Instead, the framing was upbeat, emphasising that the U.S. might benefit from global warming and representing the risk as a problem for 'others' but not for U.S. populations. The headline ("Warming's Likely Victims") referred to other countries, as was made clear in the first, framing sentence:

> Global warming is expected to increase crop yields in temperate northern regions while harming agriculture in the tropics, further widening the gap between rich, industrialized countries and poor developing nations . . .
>
> (Revkin 19 February 2001b)

This framing gave salience to expert advice that agriculture in temperate regions (which include the U.S.) could benefit from warmer temperatures and more CO_2 in the atmosphere. This potential benefit for U.S. agriculture was heavily qualified in the original report[242] but these expert qualifications were not selected. Nor did the 'coverage of record' select IPCC evidence of anomalous temperatures, wildfires, snowmelt, flooding and storms in the U.S. Rather, the risk was framed as political; as something which might happen far out in the future; as a problem for others, not people living in the U.S. There appeared to be an ongoing erroneous assumption by *New York Times* news selectors that if an environmental risk was global, it could not be a local problem.

Revkin noted impacts being observed globally ". . . on wildlife, glaciers, sea ice and other features of the earth", then selected the IPCC's warning that temperature rises over the next century could ". . . disrupt water supplies, flood coasts, destroy coral reefs and push vulnerable species like the Bengal tiger to extinction". These selections again frame the issue as someone else's problem, happening elsewhere. A significant proportion of the text dealt with political processes: with procedures for preparing, discussing and releasing the IPCC reports. The last three paragraphs repeated the possibility that U.S. crop yields might increase with more CO_2 in the atmosphere and noted another "hint of optimism": humans would be able to reduce many of the adverse impacts of climate change and to enhance beneficial impacts. Ecosystems, the article ended, would not be nearly as adaptable. This final sentence

[242] See Intergovernmental Panel on Climate Change 2001b: Technical Summary: ". . . sensitivity to a large number of other parameters has not been reported. Other uncertainties include the magnitude and persistence of effects of rising atmospheric CO_2 on crop yield under realistic farming conditions; potential changes in crop and animal pest losses; spatial variability in crop responses to climate change; and the effects of changes in climate variability and extreme events on crops and livestock" (p 33). Also see Box 5-3, Chapter 5, p 254, which details research suggesting that the nutritional value of cereals would drop under enhanced CO_2 conditions.

suggests a worldview which assumes that social world discourses take precedence over developments in the physical world. There was no consideration of the physical 'reality' that humans rely on natural ecosystems for air, water, food and shelter. Rather, the final two sentences of this story heavily privilege the social world: humans will be fine, and what a shame about natural ecosystems.

5.5.2 2001 IPCC Response Strategies report and *New York Times* (non-) 'coverage of record'

The IPCC's 2001 Third Working Group report (Intergovernmental Panel on Climate Change 2001c) attempted to engage with social world policy discourses on how to deal with climate change. It assessed ". . . the scientific, technical, environmental, economic and social aspects of the mitigation of climate change" (Intergovernmental Panel on Climate Change 2001c, 3). It gave extensive details of technological options for reducing and removing greenhouse gas emissions; potential market, regulatory and policy instruments; and cost-benefit analyses of these options (Intergovernmental Panel on Climate Change 2001c). The *New York Times* did not cover the official release of this report. This omission suggests both a waning of public interest in the issue and an inability on the part of both journalists and their issue-defining political sources to imagine the environmental risk as actual rather than theoretical.

5.6 2007 IPCC Science report and *New York Times* 'coverage of record'

Between 2001, when popular interest in climate change appeared to be declining, and 2007 when the IPCC's fourth series of reports on climate change was officially released, there had been a further cyclical peaking of attention to the issue. This had been driven in part by a feature film on climate change, *The Day After Tomorrow*, released in 2004 (Emmerrich 2004), and a documentary, *An Inconvenient Truth*, presented by Al Gore and released in 2006 (Guggenheim 2006). Accumulating climatic extremes and weather disasters affecting U.S.

populations and regions may also have affected popular awareness of the issue:[243] in any case, the exponential leap in numbers of stories about global warming and climate change published within the 2007 analytical windows[244] suggests a *New York Times* assumption that global warming and climate change were entering audiences' popular discourses. However, the 'coverage of record', published on the day this report was officially released, continued to emphasise the political potential of the risk. Despite accumulating expert evidence of aberrant warming and climatic changes being observed both globally and in the U.S. which had been detailed in all previous IPCC reports, *The New York Times* framings in 2007 continued to refer to social world uncertainties over whether or not the risk was real. While it is important for journalists to correct discursive misperceptions of a risk and to urge action to reduce that risk, continuing privileging of political definitions of the risk without selecting information about hazards actually affecting a news medium's audiences removes much of the social world's motivation for taking action rather than just talking about it.

By 2007, there was compelling scientific evidence of near-unprecedented warming and resulting changes in climate and ecosystems. The 2007 IPCC report on the science of climate change[245] began with evidence of increases in warming gases in the atmosphere since the start of the industrial revolution, contextualising these by noting that atmospheric greenhouse gases now far exceeded those measured in ice cores going back many thousands of years. It clearly assigned responsibility to human activity[246] and said categorically that global warming and climate change had started. "Warming of the climate system is unequivocal" (Intergovernmental Panel on Climate Change 2007a, 5).

The *New York Times* 'coverage-of-record'[247] of the 2007 IPCC report on the science of climate change, however, continued to give highest salience to political discourses about contemporary uncertainties, rather than to emphasise expert concerns about the historically unprecedented nature of the risk. The headline ("Science Panel Calls Global Warming 'Unequivocal'") highlighted the IPCC conclusion that global warming had started. The first sentence repeated this conclusion and gave salience to the expert conclusion that humans were responsible. The second sentence selected the expert advice about the long-term nature of climate change: ". . . the world was in for centuries of climbing temperatures, rising seas

[243] (See World Meteorological Organization 2002, 2003, 2004, 2005, 2006, 2007)
[244] See Chapter 3, **Chart 1** and Chapter 4 **Chart 2.**
[245] (Intergovernmental Panel on Climate Change 2007a)
[246] (Intergovernmental Panel on Climate Change 2007a, 2,3)
[247] (Rosenthal and Revkin 3 February 2007)

and shifting weather patterns". The news writers then immediately added a rider, not mentioned in the original Summary for Policymakers, that prompt action could greatly reduce the warming and harmful consequences. This may indicate a desire to advocate for urgent action. It indicates also the *New York Times* preference for selecting information which fitted into contemporary discourses, rather than information about the physical world considered critical by scientific experts. The original report's statement of unequivocal warming was followed immediately by supporting observations:

> "Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level"
>
> (Intergovernmental Panel on Climate Change 2007e, 5)

The news writers, however, ignored the second part of this sentence with its scientific evidence of existing changes: "While the report provided scant new evidence of a climate apocalypse now . . .". This reference to a climate "apocalypse" may indicate a news writer assumption that the earlier peak in popular interest in global warming and climate change, sparked by Al Gore's documentary and the 2004 film *The Day After Tomorrow*, was again diminishing, and that 'disaster weariness' was setting in. Soothing audience fears of imminent "apocalypse" seems to have been a priority for news writers by the time the 2007 IPCC reports were officially released.

The insistence that apocalypse was not immediately imminent resonates with Allan, Adam and Carter's argument that the short-term nature of news media story selection leads to a shorter-term "event-centred" approach to environmental risks, rather than a longer-term "issue-sensitive" approach (Allan, Adam, and Carter 2000, 9). The "event" of the release of each IPCC report was treated, not as advice on an evolving physical risk, but as a new factor for consideration in contemporary political discourses. This short-term approach shows the disadvantages of the news value of immediacy when dealing with long-term environmental risks. If "apocalypse" was not threatening within the next few days or weeks, expert warnings became far less newsworthy. Similarly, scientific evidence of substantial physical changes was again represented to audiences in a summarised form as a global problem with little relevance to U.S. audiences. While the news writers did select evidence of warming temperatures, melting snow and ice and rising sea levels, they did not mention other changes more resonant with the experiences of U.S. audiences such as heavier rain, intensifying

droughts in some regions, worsening heat waves and more savage storms.[248] Focused on U.S. political discourses which ignored physical risks to U.S. populations, *New York Times* journalists ignored such risks even though manifestations of the hazards of accelerating global warming and climate change were becoming increasingly frequent in the U.S.

5.6.1 2007 IPCC Impacts report and *New York Times* 'coverage of record'

In its 2007 report on the impacts of climate change,[249] the IPCC's first priority statement noted observational evidence from all continents and most oceans of changes in natural systems, particularly temperature increases. Its second priority statement was that human-generated emissions were the likely cause of these changes. Its third priority statement noted emerging changes to human and natural environments, including earlier spring crop planting in higher Northern latitudes, more heat-related deaths in Europe, a reduced crop season in parts of Africa which had become warmer and drier, and increasing coastal flooding.

The main body of this 2007 report detailed anomalous climate impacts already being experienced in the U.S., saying that climate change already was adversely affecting U.S. environments, communities, infrastructures and industry. The first paragraph of Chapter 14, which dealt with North American climate change impacts, was highlighted in bold text:

> North America has experienced locally severe economic damage, plus substantial ecosystem, social and cultural disruption from recent weather-related extremes, including hurricanes, other severe storms, floods, droughts, heatwaves and wildfires (very high confidence)[250].
>
> (Intergovernmental Panel on Climate Change 2007b, 619)

This chapter went on to note with "high confidence"[251] a significant increase in wildfires in the western U.S.,[252] saying wildfires were expected to worsen further in future. It warned of

[248] (Intergovernmental Panel on Climate Change 2007e, 7)
[249] (Intergovernmental Panel on Climate Change 2007b)
[250] i.e. more than a 9 in 10 chance of being correct.
[251] i.e. more than an 8 in 10 chance of being correct.
[252] "The forested area burned in the western U.S. from 1987 to 2003 is 6.7 times the area burned from 1970 to 1986 . . . in the last three decades the wildfire season in the western U.S. has increased by 78 days . . . in response to a spring-summer warning of 0.87°C" (Intergovernmental Panel on Climate Change 2007b, 623).

worsening risks of inundation, storm-surge flooding and shoreline erosion for coastal communities and habitats in the U.S. It warned that in North America, water resources were expected to become scarcer in future, droughts would worsen also, and the risks of climate change to human health and infrastructure would increase.[253] All of these statements were made with "very high confidence"—that is, experts considered that there was at least a 9 in 10 chance that they were correct.[254] None were selected for *New York Times* 'coverage of record' of this report, even though they mirrored actual events which had been experienced recently in the U.S.

Finer details of increasing climatic extremes and disasters in the U.S. were recorded in the World Meteorological Organization's annual reports on global climate published from 2001–2007. These provided evidence of intensifying wildfires in the U.S.,[255] persistent drought in the western U.S.,[256] severe record-breaking heat waves,[257] increasingly intense storms,[258] record-breaking flooding and snowfall.[259] All of these events had been predicted from the first 1990 IPCC report.[260] Yet, the *New York Times* 'coverage of record' of the 2007 IPCC report on the impacts of climate change did not draw any connections between expert understandings of how physical systems would react to global warming, and contemporary climatic extremes, anomalies and disasters being experienced by U.S. populations and environments. News selectors ignored the chapter on North America in the 2007 IPCC Impacts report. Instead, they gave extensive coverage to global implications of global warming and climate change, and to international political debate over what should be included in the brief Summary for Policymakers which begins each full IPCC report.

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[253] (Intergovernmental Panel on Climate Change 2007b, 619)
[254] (Intergovernmental Panel on Climate Change 2007b, 21)
[255] See WMO Statements on the Status of Global Climate: 2002 was the second worst fire season for the western U.S., with more than 7 million acres burned. 2003 was the costliest, with more than 300,000 hectares burned in California in October 2003. In 2004, in Alaska/Yukon, a record area was burned: 2.6 million hectares in Alaska. In 2005 a further wildfire destruction record was set, with about 3.5 million hectares burned, 1.8 million of these in Alaska. 2006 broke the record again, with more than 3.9 million hectares burned.
[256] (World Meteorological Organization 2003, 9; 2004, 7; 2005, 6,7; 2006, 7, 8; 2007, 3, 6, 7)
[257] (World Meteorological Organization 2006, 4, 7; 2007, 3, 6)
[258] (World Meteorological Organization 2004, 7, 10; 2005, 7, 8; 2006, 7, 9, 10; 2007, 6, 9)
[259] In July 2006 in California, more than 140 deaths were blamed on the excessive heat; there was "persistent severe drought" in the U.S. southern Plains and the south-west U.S.; and the combination of drought and "anomalous warmth" had resulted in a record wildfire season in the U.S., with more than 3.9 million hectares burned in 2006. At the same time, the north-east U.S. had been wetter than usual, with record-breaking flooding in New England in May 2006. Further record-breaking flooding in the north-east in June 2006 forced the evacuation of some 200,000 people. Overall, in 2006, north-eastern U.S. experienced its wettest summer on record, and there had been record snowfall in New York City (World Meteorological Organization 2007).
[260] See Intergovernmental Panel on Climate Change 1990b, 2, 2-2, 2-3, 2-9, 2-14, 2-33, 3-13, 4-4, 4-24, 6-14, 7-16.

The ‘coverage of record’ gave dual salience to the IPCC’s confidence that human actions were causing global warming, and to international political wrangling over how firmly this conclusion should be stated. Three slightly modified versions of one single story were published on 6 April 2007 in different editions of the *New York Times*: first on the front page (“Earth is already struggling with impact of global warming, experts say”); then in two longer versions placed in the ‘Health’ section (“International report details impact of global warming”; and “Global politics shift as experts say warming is setting in”). The front page version and one of the ‘Health’ section versions began with a framing first sentence that gave salience to emerging impacts while implying that these were mainly a problem for other countries, not the U.S.:

> Earth’s climate and ecosystems are already being affected by the atmospheric build-up of smokestack and tailpipe gases that trap heat, and while curbs in emissions can limit risks, vulnerable regions must adapt to shifting weather patterns and rising seas.
>
> (Kanter and Revkin 6 April 2007a, 6 April 2007c)

This first sentence contained an impressive number of individual ‘facts’, succinctly described. In non-technical language, it explained where some of the major greenhouse gases came from, what (broadly) resulted from accumulating greenhouse gases in the atmosphere, how global warming could be stopped and what needed to be done to reduce the impacts of global warming. The issue still was represented as global, rather than as a threat to U.S. populations. Impacts detailed in the IPCC report’s Policymakers Summary were de-sensationalised. “Shifting weather patterns” sound far less dangerous to human societies than droughts, wildfires, floods and storms, all of which were specified in the IPCC report. There was an implication that “vulnerable regions” did not include the U.S. and this implication was substantiated later in the story (see below).

The second version published in the Health section re-angled the story, framing it more explicitly as a matter of international politics, with a patriotic U.S. twist:

> In a sign of shifting politics over global warming, leading scientists said Friday that China was among a group of nations that had sought to water down a major report on climate change, while they credited the United States, long a skeptic about climate change, with sometimes playing a helpful role.
>
> (Kanter and Revkin 6 April 2007b)

This re-framed version then detailed observed global impacts: ". . . the areas most affected were likely to be the Arctic, sub-saharan Africa, and small islands, and Asia's sprawling, crowded, flood-prone river deltas." These regions certainly already were suffering substantial impacts of global warming and climate change. However, the IPCC had also documented substantial impacts already being experienced in the U.S. These were not mentioned in any of the versions of *The New York Times*' 'coverage of record'. The issue still was framed as a matter of political interest to U.S. audiences, but not as one which could directly affect human health and safety in that country. Expert urgings for all countries to prepare strategic disaster, prevention and alleviation planning still were not selected for re-presentation to *New York Times* audiences. An existing and evolving physical risk still was 'normalised' to minimise expert advice about physical 'reality', and to emphasise instead its relevance to social world discursive constructions of 'reality'. Audiences continued to be left uninformed about direct threats to their health and safety, and their economic security.

5.6.2 2007 IPCC Response Strategies report and *New York Times* 'coverage of record'

The first priority of the IPCC's 2007 report on mitigation of climate change addressed social, not scientific discourses. It attempted to establish definitively that human emissions of greenhouse gases were causing a global problem: "Global greenhouse gas (GHG) emissions have grown since pre-industrial times, with an increase of 70% between 1970 and 2004 (*high agreement, much evidence*)" (Italics in original) (Intergovernmental Panel on Climate Change 2007c, 3). The second IPCC priority was to warn that current actions were not stemming an ongoing increase in warming gases (which already were substantially changing temperatures and climate);[261] the third priority was to establish the credibility of predictions of future emissions growth.[262] The next several priority statements in the report's Summary for Policymakers tried to encourage the social world to do something more effective. They advised that emissions could be reduced without significant economic damage; that changes to lifestyle and behaviour could reduce emissions; that there would be human health benefits

[261] (Intergovernmental Panel on Climate Change 2007c, 4)
[262] (Intergovernmental Panel on Climate Change 2007c, 6)

from reduced pollution if emissions were reduced; and that there were substantial economic benefits in introducing new energy generation and efficiency technologies.[263]

Although the IPCC report gave some priority to the benefits of action, *The New York Times* 'coverage of record'[264] chose to focus instead on a more restricted framing, discussing the report's relevance to international negotiations on emission reductions. The issue still was represented as a matter for decisions sometime in the future, rather than, as expert advice strongly suggested, a matter needing immediate action on two fronts to avert even worse damages: emission reductions, and emergency and adaptation planning to reduce dangers and damages. *The New York Times* gave high salience to the IPCC's first three priority statements. The headline ("Climate Panel Reaches Consensus on the Need to Reduce Harmful Emissions") focused on emission reductions. The first paragraph referred to the cause of the risk, necessary actions and the long time-scales involved.[265] Action to reduce carbon dioxide emissions was framed positively rather than as a matter of controversy: the second paragraph noted agreement from "economists, scientists and government officials from more than 100 countries" on the report's recommendations for limiting carbon dioxide emissions. Emission reductions were represented as possible and necessary, rather than as impossibly costly. Expert urgings for nations to begin planning for emergencies and adaptation, however, were ignored by U.S. politicians and *New York Times* journalists.

The news writer noted the ongoing discursive conflict over whether or not action to reduce emissions would be prohibitively costly, but made a connection with physical impacts already being experienced and expected to intensify in future. "[A] variety of participants, including some from the United States, said in interviews that it was hard to argue against such an investment, given the potential costs of inaction." The article ended by summarising the priority findings of the 2007 Science and Impacts reports, and previewed upcoming international political discussions on the issue.

By 2007, physical manifestations of the environmental risk of global warming and climate change were forcing news media and social discourses to recognise their existence. *New York Times* coverage of the 2007 IPCC reports placed relatively more salience on expected changes to the physical world, although they continued to underplay existing aberrant

[263] (Intergovernmental Panel on Climate Change 2007c, 11-13)
[264] (Revkin 4 May 2007)
[265] "The world needs to divert substantially from today's main energy sources within a few decades to limit centuries of rising temperatures and seas driven by the build-up of heat-trapping emissions in the air, the top body studying climate change has concluded" (Revkin 2007).

climatic extremes which were consistent with expert statements about the physical processes of global warming and climate change. Journalists continued to ignore expert evidence of physical manifestations of global warming and climate change which already were disrupting and damaging the health, safety and economic security of U.S. populations. Their point of reference continued to be political definitions of the issue, rather than expert explanations about physical processes.

5.7 Conclusion

One core journalistic ethic is to tell audiences what they need to know. In selecting from the expert IPCC reports on the risks of global warming and climate change, *New York Times* journalists appear, from this analysis, to have assumed that information about political discussions outweighed information about risks to the health and safety of their audiences, and of wider U.S. populations, environments and economies. The IPCC reports gave high priority to explaining why more warming gases in the atmosphere would warm the atmosphere and inevitably change climate. They also gave high priority to establishing the historically unprecedented nature of increasing quantities of greenhouse gases in the atmosphere, and to stating scientific certainties about ensuing changes in climate and sea level. All IPCC reports detailed how these changes would negatively affect U.S. environments, populations, industries and economies. From 1990, all IPCC reports warned that physical impacts were inevitable, and that planning was urgently needed to protect populations and vulnerable industries. *New York Times* journalists selected information about potential risks to other countries, but ignored information about similarly inevitable risks facing the U.S. Instead, their contextual explanations of how this global environmental risk might affect the U.S. focused largely on political debates about potential policy changes. In focusing on how a physical risk might affect political and economic discourses, and in minimising or completely ignoring information about direct risks to their audiences and wider U.S. populations, *New York Times* journalists disadvantaged their audiences.

Throughout the analytical period, expert advice about the risks was selectively framed as a theoretical political debate about an issue which might develop in the future and which would be a problem for 'others' but not for U.S. populations. The issue was framed as global, with an incorrect assumption that therefore it could not have local impacts. IPCC information

which potentially could benefit *New York Times* audiences was ignored by news selectors. This information included detailed expert advice about necessary strategic and emergency planning, potential policy options, and technological remedies which could reduce physical risks and improve the economic security of industries as disparate as agriculture, horticulture, electricity generation, new energy technology manufacturers, building and infrastructure construction. *New York Times* audiences were not given information on how a global risk would affect them personally, or their communities, regions and industries. Nor did they receive expert advice on strategic planning and preventive actions which could have reduced physical damage to populations, industries and environments.

These findings relate only to analysis of *New York Times* mediations of IPCC reports. They cannot directly be generalised to demonstrate how all other news media represented the information contained in IPCC reports. However, if a respected media source of scientific information distorts expert understanding of a scientific issue, this distortion tends to become far more widespread. Because the *New York Times* is regarded as an authoritative source of information about science for other journalists researching the issue,[266] the unbalanced framing of the issue as political but not physical would have been magnified substantially.

[266] Wilson 2000a; Suleski and Ibaraki 2009; Pew Research Center for Excellence in Journalism 2010. See also Chapter 3, section 3.2.

CHAPTER 6 Information selection frequencies

6.1 Introduction

The previous chapter established the different information priorities of Intergovernmental Panel on Climate Change assessment reports and *New York Times* news selector preferences in 'coverage of record' of the IPCC reports. This chapter aims to examine more closely differences between expert and news media information preferences by quantitatively analysing frequencies of *New York Times* information selection within the full analytical windows set across a 17-year period from 1990–2007. The analysis falls into two parts. First, overall information selection frequencies are established (**Table 3**). Similarities and/or differences with IPCC preferences are discussed, and also their section placements. Then the analysis considers the 20 most frequent information selections (**Table 4**), to provide a clear indication of the predominant framing of the environmental risks of global warming and climate change.

This quantitative analysis confirms the qualitatively assessed findings of Chapter 5, that *New York Times* news selectors preferred information relating to a narrowly defined suite of solutions involving changes to energy use. Their preferences matched the political definition of the issue. Far less frequently selected were the expert priorities of explaining the physical processes causing the risk, recommending more research into local risks and urging the development of strategic plans to deal with increasing natural disasters and to devise ways of adapting to a changing climate and rising sea levels. Potential benefits of global warming were given far higher salience than they received in the IPCC reports. Experts' substantial and detailed qualifications of potential benefits were ignored. IPCC statements of certainty about the underlying physical planetary processes were minimised. Expert statements of uncertainties about possibly greater risks than could so far be established scientifically; or uncertainties about regional or local details given the complexity of the dynamic interactions of global planetary systems, were misrepresented in news mediations as evidence of overall scientific doubt about the existence of the risk. News selections from these reports did not

provide audiences with the information necessary for an adequate and informed assessment of the extent of the physical risks to U.S. environments, populations and industries.

Table 3: New York Times selections from IPCC reports: 1990–2007

	IPCC information	Selection frequency	Selection frequency - percentage
1	Alternative energy sources	159	8.85%
2	Greater extremes expected	149	8.29%
3	Emission reductions needed	126	7.01%
4	Observed planetary changes	117	6.51%
5	Observed aberrant warming	105	5.84%
6	Sea level rise expected	80	4.45%
7	Greenhouse gases trap heat	76	4.23%
8	Fossil fuels cause global warming	64	3.56%
9	Major climate change risks	64	3.56%
10	Cryosphere is melting	62	3.45%
11	Ecosystem risks	61	3.39%
12	Global warming benefits	58	3.23%
13	Urgent action needed	56	3.12%
14	Uncertainties	54	3.01%
15	Energy efficiency	53	2.95%
16	Economic and fiscal risks	49	2.73%
17	Economic and fiscal policy	45	2.50%
18	Human activity responsible	42	2.34%
19	Food resources will drop	35	1.95%
20	Carbon capture	32	1.78%
21	Poorest suffer most	28	1.58%
22	Emissions are rising	27	1.50%
23	Long-term phenomenon	26	1.45%
24	Adaptation planning needed	25	1.39%
25	Risks may be greater than experts advise	22	1.22%
26	Cryosphere will melt	21	1.17%
27	Developed countries should help developing countries	20	1.11%
28	Research and development needed	19	1.06%
29	U.S. emissions relatively substantial	18	1.00%
30	Alternative energy technology risks	17	0.95%
31	Human health risks	17	0.95%
32	Developed countries should act first	16	0.89%
33	Water supply reductions expected	16	0.89%
34	Global warming will change climate	15	0.83%
35	Past context shows gravity of risk	15	0.83%
36	Carbon capture risks	8	0.45%
	TOTAL	**1797**	**100%**

Colour coding	
	Energy solutions
	Physical risks
	Observed changes
	Causes of risk
	Political discourses
	Emergency & adaptation planning

6.2 Part One: Overall information selection frequencies

Environmental risks are complex, involving multiple, dynamic interactions between global physical systems. Expert advice on environmental risks covers a broad range of topics, from understandings of physical processes and inevitably resulting impacts, to recommendations for action, research and planning which could reduce or prevent risks to the social world. Expert advice aims to provide a comprehensive picture of a complex issue. News selections from expert reports aim to provide information which is relevant to the social worlds of their audiences. Selectors' priorities privilege social world discourses which often are unrelated to events unfolding in the physical world, rather than expert understandings of a physical risk. Analysis of information selection frequencies can clarify the often very different representations of an issue offered by news media as opposed to experts.

Table 3 lists, in order of frequency, *New York Times* selections of information from the IPCC assessment reports issued in 1990, 1995, 2001 and 2007. Within the analytical windows set around the release of these IPCC reports, *New York Times* journalists selected 1797 individual pieces of IPCC advice. Many of these individual pieces of advice were re-selected, providing a database of 519 discrete information items from the IPCC reports published within the analytical windows between 1990–2007. In **Table 3**, these 519 separate information items are grouped into 36 broader categories. The complete list of information items comprising the **Table 3** categories is attached as Appendix One.

The 36 grouped categories listed in **Table 3** are further amalgamated by being colour coded into six even broader categories: energy solutions, expert warnings of physical risks, expert documentation of observed planetary changes, expert advice about the causes of global warming and climate change; political discourses about the risks, and expert warnings of the need for emergency and adaptation planning. These categories were chosen by a process of establishing common factors among individual information items.

Chapter 5 established that IPCC experts' highest-priority warnings, based on explanations of fundamental physical processes, were that increasing quantities of greenhouse gases were warming the atmosphere and changing climate; that human emissions of greenhouse gases continued to rise; that the atmospheric consequences of these rising emissions already posed

serious risks to essential natural resources such as food and water supplies, and to human health and safety; and that there was an urgent need both for emission reductions, and for strategic planning to reduce risks to human populations and natural ecosystems. This **Table 3** analysis of *New York Times* information selection frequencies confirms Chapter 5's qualitatively derived conclusion that there was minimal news selector interest in expert explanations of why the risk had arisen or why the risk was substantial; and that minimal attention also was devoted to expert warnings about specific risks to U.S. populations, industries and infrastructures. News selectors preferred information about solutions rather than expert explanations of the causes of global warming and climate change. The quantitative analysis of information selection frequencies also confirms Chapter 5's argument that news selectors gave high priority to information about sensational global climatic impacts, but that almost all this information related to disasters likely to strike other countries not the U.S. **Table 3** shows a high news selector preference for information about observed planetary changes. However, almost none of this information was selected until 2007 when global and local changes in temperature and climate were becoming apparent even to urbanised *New York Times* audiences.

Overall, top information priorities in IPCC reports were selected far less frequently than information about a narrow range of solutions, revolving almost entirely around reductions in fossil fuel use or emissions. **Table 3** shows, additionally, that news selectors preferred information about future solutions over the IPCC priority of energy efficiency initiatives which could be implemented immediately. Information about one major greenhouse gas—carbon dioxide (CO_2) —which was a substantial focus of national and political discourses about potential actions is placed relatively high in **Table 3**. However, high-priority IPCC information about human responsibility for the risks, an ongoing rise in greenhouse gas emissions, the highly aberrant nature of contemporary greenhouse gas atmospheric concentrations compared with the long-distant past and the long-term nature of the risks once global warming and climate change had started are well down the list of news selector preferences. So too is information deemed critical by IPCC experts about potential risks to food and water supplies and to human health; and expert warnings about the need for emergency and adaptation planning. Closer analysis of relevant news texts shows that almost all selections of these expert warnings related to other countries, not the U.S. Selections related to political discourses about whether and when any action should be initiated were

made much more frequently than selections of information and advice about substantial risks to human populations.

6.2.1 Solutions not problems

This quantitative analysis confirms the qualitative analysis of Chapter 5: that *New York Times* journalists focused on information about solutions to the near-exclusion of information about the problem. **Table 3** shows that in *The New York Times,* the most frequently selected pieces of IPCC information related to alternative energy sources (8.85%): a 'solution' repeated far more frequently than explanations of the physical processes which were creating the need for alternative energy sources. The need for emission reductions—another 'solution'—was, overall, the third most frequently selected (7.01%) by *New York Times* writers. Few *New York Times* stories dealing with the need for alternative energy sources or emission reductions linked this need to the scientific context. This context was relatively simple, but required a four-part explanation: 1) greenhouse gases trap heat; 2) more greenhouse gases means a warmer atmosphere; 3) a warmer atmosphere will change climate; 4) human emissions of greenhouse gases continue to rise. Only very rarely was this entire rationale published in the one story. Instead, most stories on alternative energy sources or emission reductions mentioned global warming, or climate change, or (sometimes) rising emissions. Incomplete references to underlying expert understandings of the physical phenomenon meant audiences were not adequately informed about why climate scientists urged emission reductions and development of alternative sources. An excessive focus on solutions diminished the credibility of the problem.

Within the topic of energy use, IPCC reports prioritised emission reductions which could be achieved by improved energy efficiency and energy conservation ahead of development of alternative energy sources.[267] This **Table 3** analysis shows that the need for improvements in

[267] For example, in the Summary for Policymakers of the IPCC's 2001 Synthesis report, technologies promising "net emission reductions" are listed as: ". . . more efficient conversion in production and use of energy, shift to low- or no-greenhouse gas-emitting technologies, carbon removal and storage, and improved land use, land use change, and forestry practices" (Intergovernmental Panel on Climate Change 2001d, 23). Also see Chapter 5 discussion of the restricted focus of *New York Times* selections from IPCC recommendations for response strategies.

energy efficiency was selected far less frequently (2.95%). This latter selection frequency was still almost double the selection frequency of the IPCC's high-priority statement that emissions continued to rise (1.50%): evidence which climate scientist believed underscored the urgent need for the social world to take urgent action. Other methods of reducing greenhouse gas emissions such as changes in agricultural and land use practices were not selected at all.

Increases in forestry plantings, based on the expert understanding that trees absorb CO_2, formed the bulk of information contained in the "Carbon capture" category (19 out of 32 selections—1.06% of the entire analytical sample). Carbon capture offered another way of reducing quantities of CO_2 in the atmosphere but had been convincingly shown by the IPCC to be far less certain than simply reducing emissions in the first place.[268] In *The New York Times* this 'solution' which offered the highly uncertain chance of continuing to emit greenhouse gases and then absorbing them later received a disproportionate amount of news selection attention (1.78%), compared with IPCC priorities. The IPCC reports hardly mentioned carbon capture methods in their Summaries for Policymakers, and buried brief mentions of the possibility of storing carbon as one- or two-line entries in the full reports. Its relatively greater frequency in *New York Times* selections supports the argument that news writers preferred to select 'solutions' rather than 'problems' from the full IPCC reports.

The 1995, 2001 and 2007 IPCC reports gave highest priority to the advice that greenhouse gas emissions continued to rise, thus exacerbating an existing serious risk.[269] *New York Times* news writers selected this latter piece of advice far less frequently (1.50%). Rising emissions are part of the problem; emission reductions are part of the solution. It seems likely that this reversal of experts' selection preferences—emission reductions rather than rising emissions—is related not only to a preference for solutions not problems; but also to the news media value assigned to information deemed particularly newsworthy. Actions to reduce greenhouse gas emissions would directly affect the mechanical processes of industry and transportation, and the power supplies and appliances which underpin the workings of Western society. The advice that emissions continued to rise was, from the perspective of the social world of *New York Times* audiences, information about the status quo rather than about some new, different situation. It was thus less newsworthy than information about potential changes to the status quo. It was made even less relevant to audience discourses about the

[268] (Intergovernmental Panel on Climate Change 2005)
[269] See Chapter 5.

risks of global warming and climate change because *New York Times* news writers only infrequently explained why global warming was inevitable and how it might directly affect U.S. populations. The risk and its physical implications were not explained; the relevance of rising emissions was not contextualised with explanations of the underlying expert rationale. The significance of rising emissions therefore was unlikely to be adequately understood by *New York Times* audiences.

Table 3 shows that scientific observations of planetary changes and aberrant warming were the fourth and fifth most frequently selected categories of IPCC information: a total of 222 separate selections.[270] Closer analysis of these selections of information about the problem rather than about solutions reveals that almost all appeared in 2007, even though the IPCC had presented compelling evidence of planetary changes and warming since its first 1990 reports. Of 117 selections of IPCC advice that planetary changes were beginning, one[271] was published in 1990; two[272] were published in 1995, and a further 15 references to observed planetary changes were selected by the *New York Times* from the IPCC's 2001 reports. As Chapter 3 discusses in greater detail,[273] there appeared to be an assumption by *New York Times* journalists that until audiences were directly experiencing impacts of global warming and climate change, they would not be interested in information about globally observed changes. Instead, news selectors preferred information related to political discourses and theoretical discussions about potential solutions.

6.2.2 Global not local

At first glance, **Table 3** seems to show that *New York Times* news selectors paid high attention to selecting information about the significant risks posed by global warming and climate change. The second most frequently selected category of expert information was that greater extremes could be expected. However, the greater extremes included in this second-listed category in **Table 3** were framed almost entirely as global not local and as 'someone

[270] See Appendix One for the full list of information items and their categorisation.
[271] An unattributed statement that seasons were changing.
[272] One unattributed statement that climate change had started, and one statement attributed to the IPCC: that climate change probably had started.
[273] See Chapter 3, Section 3.13.

else's problem'. Most *New York Times* stories which selected IPCC warnings of greater extremes generalised the risks[274] and represented this expert advice as being a problem for 'others', not for U.S. populations.[275] Real physical risks to U.S. populations and their attendant economic risks[276] were paid little attention by *New York Times* news selectors. It is likely that expert warnings of greater extremes in future were selected so frequently because increasingly severe natural disasters are 'sensational' and therefore of high news value. Categories of "Major climate change risks" (9th on the **Table 3** list), "Ecosystem risks" (11th) and "Urgent action needed" (13th) also were selected relatively frequently. Again, however, closer analysis of individual stories containing these information items shows that information about climate change, ecosystem risks and the need for urgent action was framed as a matter of global but not local concern. Expert priority warnings of specific risks to U.S. food and water supplies and risks from escalating natural disasters similarly were given scant attention.[277]

IPCC reports gave high priority to the need for strategic emergency and disaster planning, and for developing a broad range of possible adaptations to ongoing global warming and climate change.[278] Such adaptation planning was well down the **Table 3** list of *New York Times* information selection preferences (1.39%: a total of 25 selections over the entire 17-year analysis period). Although the news media are expected to provide their audiences with information relevant or important to their lives, the *New York Times* did not select IPCC information warning U.S. populations of likely risks from natural disasters such as storms, floods, droughts or wildfires. There was therefore no encouragement for vulnerable

[274] For example, "sea level rise" rather than details of specific risks to coastal roads, buildings, industries, power supplies, environments and populations.
[275] Also see Chapter 5 discussion of *New York Times* 'coverage of record'.
[276] Hurricane Katrina, for example, was estimated to have cost about US$81 billion. The human costs were also great. The (U.S.) National Hurricane Centre reported 1833 deaths from Katrina, although "Especially for Louisiana and Mississippi, the number of direct fatalities is highly uncertain and the true number will probably not ever be known." Additionally, more than 1.2 million people were under some type of evacuation order, and many displaced residents moved temporarily or permanently to other parts of the U.S. (Knabb, Rhome, and Brown 2006).
[277] Risks to human health were listed explicitly in the Table of Contents of the IPCC impacts reports in 1990 (p xiii), 1995 (p 2) and 2001 (p v) and formed an entire chapter in the 2007 IPCC impacts report (Chapter 8, pp 391–431).
[278] For example, the 1990 IPCC Impacts report advised policymakers to plan, among other things, for ". . . adaptability of vulnerable human populations to heat stress and vector-borne and viral diseases; . . . identification of populations and agricultural and industrial production at risk in coastal areas and islands" (Intergovernmental Panel on Climate Change 1990b, 5). The 2007 IPCC report on the impacts of climate change told policymakers that "Even the most stringent mitigation [emission reduction] efforts cannot avoid further impacts of climate change in the next few decades, which makes adaptation essential . . . [development planning should include] adaptation measures in land-use planning and infrastructure design . . . [and] measures to reduce vulnerability in existing disaster risk reduction strategies" (Intergovernmental Panel on Climate Change 2007b, 20).

communities and industries to plan for such disasters. Detailed IPCC warnings of likely risks to vulnerable industries such as agriculture, forestry and the ski industry were not selected for *New York Times* audiences; nor was practical advice on preventive planning. This apparent disinterest in physical and economic risks to industries, environments and communities appears to support the argument that the environmental risk of global warming and climate change was imagined by *New York Times* news writers to be a matter of international politics, unrelated to the physical world inhabited by *New York Times* audiences or the broader U.S. population.

Over the 17-year analysis period, just 17 selections (0.96%) dealt with expert advice about potential risks to human health. Only one of the 17 *New York Times* selections of IPCC information on human health warned explicitly of risks to the health of U.S. populations. This was a mention of the risk of vector-borne diseases contained in one story placed in the "New York-Region" section which, unusually, looked in some detail at global warming risks as they might pertain to New York State residents (Rather 4 March 2001).[279] None of these expert warnings about human health risks were placed in the 'Health' section. Instead, selections of information about risks to human health were found mainly in the 'World' (6) and 'U.S.' (3) sections, where they were included in stories which focused primarily on the political and environmental implications of a risk which was framed as global, but not of local concern. The dearth of information about how global warming and climate change might adversely affect the health of humans living in the U.S. (for example, a likely increase in heat-related illnesses and deaths or an increase in infectious diseases) seems further evidence of a tendency for *New York Times* news writers to frame this physical phenomenon as a matter of politics, but not of the physical world; as a global problem with little or no local relevance.

6.2.3 Find a simple villain

Communicating the many complexities of the environmental risk of global warming and climate change is a difficult task for journalists, who are focused on their non-expert

[279] See Chapter 7, Section 7.6.1 for more detailed discussion of this article.

audiences. This environmental risk involves dynamic and multiple interactions between global physical systems. Apart from the journalistic preference for allowing the issue to be defined by policymakers,[280] two journalistic techniques combined to blur news media representations of expert advice, thus offering audiences an unnecessarily confused idea of the issue. The first was the journalistic need to simplify information; the second was the tendency to present an issue as black-and-white, assigning blame to a single element. This led to a news media definition of the problem which over-simplified the nature of the risk and of actions needed to reduce its threats to the social world.

Employing a blame-seeking narrative which was highly relevant to U.S. industrial and transportation processes, news selectors focused on one particular culprit—CO_2 emissions. In the U.S., these are produced largely by coal and gas-fired electricity generation, and by petroleum and diesel-powered motor vehicles. With scant selection of scientific certainties about the climatic impacts of adding increasing amounts of this (and other) greenhouse gases to the atmosphere, the narrative became one of unsubstantiated concern about an apparently necessary side-effect of industrial and transportation processes. Global warming thus became represented in many U.S. political and industrial discourses as an unproven threat to the 'American way of life'.[281] Such unsubstantiated blame encouraged discourses of disbelief in expert pronouncements. It played into existing U.S. discourses of human superiority over the natural world, the human right to use all natural resources without concern for the sustainability of such exploitation, and the undesirability and unaffordability of changing industrial or transportation processes which had produced the superior 'civilised' benefits enjoyed by U.S. society.

Table 3 shows that selections of information related to CO_2 or fossil fuels were high on the list of *New York Times* selection frequencies. Within the **Table 3** category of 'Greenhouse gases trap heat' were 76 discrete items of expert information. A majority of these separate information items (48) involved specific mention of CO_2.[282] The related **Table 3** category of

[280] See Chapter 3, Section 3.4.
[281] See Chapter 3, Section 3.6.
[282] Individual expert statements included in the grouped category of 'Greenhouse gases trap heat', with their total number of selections in brackets, are: Animal methane emissions (IPCC not mentioned – INM) (1); Atmospheric CO_2 traps heat (4); Atmospheric CO_2 traps heat (INM) (20); CFCs are greenhouse gases (1); CO_2 is a major greenhouse gas (3); CO_2 is a major greenhouse gas (INM) (15); Correspondence between computer models and observed temperature (1); Dry cleaning solvents produce greenhouse gas emissions (1); Forest burning increases atmospheric CO_2 concentrations (1); Greenhouse gases cause climate change (2); Greenhouse gases cause climate change (INM) (1); Greenhouse gases cause global warming (INM) (1); Greenhouse gases trap the sun's heat (1); Greenhouse gases trap the sun's heat (INM) (1); Methane is a major greenhouse gas

'Fossil fuels cause global warming', also high on the information selection frequency list, contains a further 50 selections of information which attributed responsibility for global warming to fossil fuels (whose burning creates CO_2). Thus, out of 1797 separate selections of IPCC advice from a total of 519 individual pieces of expert IPCC advice, 98 information items (48 +50: 5.45% of all selections) dealt with CO_2 emissions.

By comparison, expert advice about rising emissions which were exacerbating the risk were selected far less frequently (27: 1.50%), while the need for strategic adaptation and emergency planning, given priority in the IPCC reports received even less news selector attention (25: 1.42%). An over-simplified focus on one element of the risk meant that other equally relevant aspects such as ongoing human contributions to the problem, or direct and increasing risks to human health, safety and economic security, were incorrectly represented as being substantially less important.

6.2.4 Accentuate the positive

Benefits of global warming received little emphasis in IPCC reports. When they were noted, such statements were heavily qualified.[283] In *New York Times* selections from these reports, potential benefits of global warming were selected far more frequently than IPCC priorities—or IPCC qualifications about potential benefits—would indicate was appropriate for

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(INM) (1); Ozone-depleting chemicals also enhance global warming (INM) (1); Peatland draining or burning increases greenhouse gas emissions (INM) (1); Rising atmospheric CO_2 will warm the planet (2); Rising atmospheric CO_2 will warm the planet (INM) (3); Scientific consensus—global warming is inevitable (5); Scientific consensus—global warming is inevitable (INM) (7); Storms damage forests, increase emissions (INM) (1); Warming increases tropospheric ozone pollution (1): Wood burning creates greenhouse gas emissions (INM) (1). Total for 'Greenhouse gases trap heat' category: 76. Total variables explicitly mentioning CO_2: 48.

[283] For example, the 1990 IPCC Overview and Policymakers Summary noted that: "Reductions in sea ice will benefit shipping, but seriously impact on ice-dependent marine mammals and birds" (par 2.5.1, p 56). Addressing the benefit of to agriculture of extra atmospheric CO_2, the 1995 IPCC report on the impacts of climate change adds immediately that this benefit ". . . does not allow for changes in agricultural pests and the possible effects of changing climatic variability" (par 3.3, p 9). In 2001, the IPCC Impacts report's chapter on natural ecosystems noted that high-latitude forests had not shown the extra growth expected as temperatures rose, and suggested that this could be because of ". . . increases in water stress, severity of insect attack, and UV radiations and trends toward earlier snowmelt or to sunlight becoming a limiting growth factor" (par 5.2.2., p 247). Introducing a more positive but still qualified note about the ski industry's prospects, the 2007 IPCC chapter on climate change impacts on North America reported that: ". . . early studies of the impact of climate change on the ski industry did not account for snowmaking, which substantially lowers the vulnerability of ski areas in eastern North America for modest . . . but not severe . . . warming" (par 14.4.7, p 634).

'balanced' coverage of expert advice. One early example was a 1990 'Science' section story describing a theory developed by British researchers who had postulated that more wind over the oceans could whip up more salt, which might refract sunlight, cooling the atmosphere. This theory was based on IPCC advice that storms could become increasingly severe in a warmer world. The news writer mediated the expert advice about an undesirable impact of climate change to suggest instead that the impacts of global warming could be beneficial, as was made clear in the headline: "Waves' Action Could Ease Global Warming" (New York Times 2 October 1990). Even if there was any risk, this headline and the accompanying article implied, it might not be harmful. Storms can be good for you. This perspective was not consistent with scientific experts' concern about the scale of the risk.

Table 3 shows that possible benefits of global warming were well up the list of news selection frequencies (58: 3.23%). Unlike other countries' news coverage of potential benefits in other countries, for example that seen in Germany, IPCC qualifications about offsetting negative impacts which likely would reduce most benefits were not selected.

Weingart, Engels et al. have noted the more nuanced description of potential benefits from the regional daily newspaper, *Die Frankfurter Allgemeine Zeitung*:

> Germany—a future summer dream? This will come true when the world will become the stage for the greatest climate shift in many millennia . . . But . . . whether the weather in Germany will become warmer or colder, a global climate change is very likely to entail catastrophes (*FAZ* 27.3.1995: 15).
>
> (Weingart, Engels, and Pansegrau 2000, 279)

This German news perspective not only qualifies potential benefits of global warming and climate change. Unlike *New York Times* selections, it also provides the context with past temperatures and climates given priority by IPCC experts. In Germany, both scientists and the news media represented the risk as potentially catastrophic to Europe in general (Weingart, Engels, and Pansegrau 2000). While *New York Times* selectors avoided mention of potential threats of diminishing snow cover to the ski industry, preferring to select positive aspects (such as ski resorts becoming havens from summer heat), the national German newspaper *Der Spiegel* took a decidedly more pessimistic approach:

> Melting glaciers, the absence of snow, thawing temperatures on the Grossglockner mountain—climate researchers predict the end of winter sports in the Alps (*Der Spiegel:* 47:1991: 340).

(Weingart, Engels, and Pansegrau 2000, 278)

While most *New York Times* selections of potentially negative impacts of global warming and climate change framed these risks as global but not local, this was reversed in *New York Times* selections of potential benefits. Few news selections from the "Greater extremes expected" category dealt with U.S.-specific risks, but almost three-quarters (72%) of the disaggregated information items included in **Table 3**'s "Global warming benefits" category dealt directly or indirectly with potential benefits to U.S. populations, industries and environments.[284] This proportionately high news selection preference for details of benefits to local and national populations may be related to the *New York Times* tendency to frame the issue as a global risk which was not of local concern. An emphasis on potential benefits to the U.S. would support this framing.

Most *New York Times* selections of global warming benefits came after 2001. This evident preference for 'good news' about global warming and climate change might represent attempts to combat 'disaster-weariness' resulting, for example, from the feature film *The Day After Tomorrow* (Emmerich 2004) and Al Gore's documentary *An Inconvenient Truth* (Guggenheim 2006).[285] As Downs has noted, there are distinct attention cycles for any one issue, regardless of its longer-term importance (Downs 1972). *New York Times* news selectors may have assumed, by 2007, that their audiences were tired of news framings of an ongoing potential catastrophe, and were attempting to offer a more upbeat framing, thus encouraging audiences that the risk was not so bad that they should hide under the bed and try to ignore it.

[284] See Appendix One. Disaggregated direct and indirect U.S. benefits included in Table 3's "Global warming benefits": Agricultural production will increase in temperate regions (5); Developed countries using new technology to adapt to climate change (2); Expected longer growing seasons (1); Expected longer growing seasons – INM (2); Expected reductions in deaths from extreme cold (2); Expected reduction in deaths from extreme cold – INM (1); Extra atmospheric CO_2 enhances plant growth (2); Extra atmospheric CO_2 enhances plant growth – INM)1); Farmers will adapt (2); Farmers will adapt – INM (2); High latitude crop and forest yields will increase (5); Humans will adapt – INM (1); Longer growing seasons expected in high latitudes (2); Longer growing seasons expected in high latitudes – INM (5); Observed reduction in extreme cold deaths (5); Ski industry uses technology to adapt to less snow (1); Ski regions could become havens from summer heat (1); Temperate and high latitude forests absorb sun's heat – INM (1); Warmer temperatures reduce heating power demands (1). Total direct and indirect U.S. benefits selected: 42.

[285] *The Day After Tomorrow* took the (scientifically unlikely) scenario of global cooling (which actually involved only the northern hemisphere), dramatising a mega-ice storm sparked by abrupt climate change. *An Inconvenient Truth*'s focus on global warming included the iconic poster image of a polar bear adrift on a melting ice floe. These filmic texts thus raised public awareness of potentially catastrophic change and suggested a connection between global warming, climate change and changes in ice and snow cover—whether those were increases or decreases.

6.2.5 Frequent selection of uncertainties

In IPCC reports, certainties were stated clearly and given priority (unlike *New York Times* information selections) while uncertainties were framed more as areas of possibly larger concern which were not yet adequately understood by climate scientists.[286] 'Science' section writers tended to emphasise uncertainties rather than certainties. All IPCC reports throughout the analytical period emphasised the need for more research. They spelt out the large remaining scientific uncertainties about the scale of likely atmospheric warming and expected changes in climate and sea level; their impacts on weather systems, ecosystems and human society; and details of likely regional and local impacts. However, their first priorities were to document credible measurements of a substantial rise in atmospheric warming gases since the start of industrialisation; and to explain the inevitable consequences for climate, sea level, environment and human health and safety.

These expert priorities were given low salience by *New York Times* news selectors and writers. **Table 3** shows a relatively high frequency of information selections related to scientific uncertainties (54: 3.01%). This selection pattern supports the argument that *New York Times* journalists privileged political definitions of the risk over the definitions of experts.[287] While it is incumbent on journalists to be aware of contemporary discourses and to some extent to reflect these, when expert information contests or adds contextual depth to the received wisdom[288] of contemporary discourses it would seem ethically important for this information to be communicated to news media audiences. Instead, news writers paid little attention to scientific statements of certainty about the causes and expected physical impacts, and much to information which supported social world discourses about the overall uncertainty of the risk.

Closer analysis of *New York Times* coverage of global warming and climate change shows an unresolved tension between non-expert expectations of certainty from scientists, and the

[286] See for example Intergovernmental Panel on Climate Change 2007a, 14: "Models used to date do not include uncertainties in climate-carbon cycle feedback nor do they include the full effects of changes in ice sheet flow, because a basis in published literature is lacking . . . if this contribution were to grow linearly with global average temperature change, the upper ranges of sea level rise . . .would increase by 0.1 to 0.2 m. Larger values cannot be excluded, but understanding of these effects is too limited to assess their likelihood or provide a best estimate or an upper bound for sea level rise."
[287] See Chapter 3, Section 3.4, also see Chapter 5.
[288] 'Received wisdom' refers to ideas which are generally accepted as being true: i.e. it's true because we believe it's true.

methodology at the core of scientific knowledge formation processes which demands continual questioning of apparent certainties. Few news media workers are scientifically trained. Few scientists are trained in news media processes and practices. Journalists, like their non-expert publics, expect certainty from scientific experts. Scientists expect to be able to state remaining uncertainties and have these reflected in news media texts. Carefully phrased scientific qualifications are not newsworthy; information related to social world controversies is.

Just as it was easier for journalists to focus on a simple villain—CO_2—rather than to discuss the far more complex suite of causes and solutions canvassed in the full IPCC reports, so too it was easier for journalists to misunderstand scientific statements of uncertainties and of relative certainties. Instead, the journalistic tendency was to use careful scientific qualifications as support for the contemporary social world discourse, fostered by the 'sceptical' lobby, that if experts were not certain about the entire problem they could not be certain of anything, and concerns about the risks could be dismissed.

Table 4: Most frequently selected IPCC information

	IPCC information	Selection frequency
1	Alternative energy sources needed (11) + INM[1] (45)	56
2	Long-term sea level rise expected (37) + INM (17)	54
3	Emission reductions needed (10) + INM (41)[2]	51
4	Potentially massive global risks (23) + INM (24)	47
5	Atmospheric CO_2 traps heat (7) + INM (35)	42
6	Fossil fuel burning causes global warming (20) + INM (17)[3]	37
7	Greater energy efficiency (5) + INM (30)[4]	35
8	Urgent action needed (18) + INM (17)	35
9	Motor vehicle efficiency must improve (3) + INM (30)	33
10	Global warming has started (14) + INM (16)	30
11	Biofuels reduce global warming (1) + INM (28)	29
12	Human activities cause global warming (22) + INM (6)	28
13	Seasons are changing (3) + INM (16)	19
14	Trees absorb CO_2 (6) + INM (13)	19
15	Renewable energy – solar (2) + INM (16)	18
16	Wind power reduces greenhouse gas emissions (1) + INM (17)	18
17	Nuclear power would reduce CO_2 emissions (2) + INM (14)	16
18	Observed shrinking glaciers (12) + INM (4)	16
19	More research needed (3) + INM (15)	15
20 =	Expected species extinctions (10) + INM (4)	14
20 =	Heat waves will increase (12) + INM (2)	14

Colour coding
Energy solutions
Non-energy solutions
Sensational global risks
Observed changes
Causes of problem

[1]INM=IPCC not mentioned
[2]**Table 4** considers only the general statement that emission reductions are needed. **Table 3**'s "Emission reductions needed" category includes other more specific IPCC advice related, e.g., to air transport, landfill gas, manure burning emissions.
[3]**Table 4** includes the statements that fossil fuel burning increases atmospheric CO_2 and causes global warming. **Table 3**'s "Fossil fuel burning causes global warming" category includes more general references to industrial processes producing atmospheric pollutants.
[4]**Table 4** considers only the general statement that energy efficiency needs to be improved. **Table 3**'s "Greater energy efficiency" category includes other more specific IPCC advice related, e.g. to improved cost-effectiveness of coal generation and advantages for power bills and GDP.

6.3 Part Two: Top twenty information selections: Overview

The difficulty in analysing a large number of individual items is that the details become overwhelming and patterns are hard to establish clearly. Grouping information items into broad topical categories permits identification of overall, if somewhat generalised, information preferences. Part One of this chapter followed this analytical approach, grouping 519 discrete information items selected from IPCC reports into 36 broader categories to establish overall *New York Times* information selection patterns. As a cross-check, to make sure finer details of information selection were not lost in the information grouping process and as an attempt to add richer detail to the analysis of information frequencies, Part Two of this analysis of information selection frequencies returns to the disaggregated list of 519 information items. From this raw list of ungrouped pieces of information selected from the IPCC reports, it identifies the 20 most frequently selected information items (**Table 4**). This analytical approach both confirms and adds depth to the **Table 3** analysis of overall information selection frequencies.

The **Table 4** analysis shows an even stronger preference for information relating to energy solutions, compared with **Table 3**'s analysis of overall information selection frequencies. It confirms the evidence of **Table 3**: that news selectors were significantly less interested in explaining why experts had concluded that there was a problem or how physical systems and processes interacted to create that problem. **Table 4** confirms that news selectors over-simplified the problem, with a large emphasis on CO_2 emissions and little or no attention paid to other causes of global warming, other solutions, or to urgent expert warnings of the need for all populations to update their disaster planning and begin adaptation planning. **Table 4** adds finer detail to the **Table 3** finding that news selectors preferred expert information about 'sensational' impacts happening elsewhere. The exception was information about contemporary changes to seasons and temperature being experienced directly by *New York Times* audiences. The **Table 4** analysis also shows a strong news writer tendency to omit acknowledgement of the information source—the IPCC—when information related to energy solutions, or to local and regional changes in climate or temperature.

6.3.1 Focus on solutions without explaining the problem

Like both **Table 3** in this chapter, and the qualitative analysis of Chapter 5, identification of the top twenty information selection frequencies shown in **Table 4** demonstrates a significant news selection divergence from IPCC expert priorities. The context of past atmospheric greenhouse gas concentrations which showed dangerously unusual contemporary concentrations, and scientific measurements of a continuing rise in greenhouse gas emissions, do not feature at all. Instead, a strong selection preference for solutions is demonstrated. As in **Table 3**, "Alternative energy sources" tops the list. When all information selections in **Table 4** dealing with types of alternative energy sources—alternative (56), biofuels (29), solar power (18), wind power (18) and nuclear power (16)—are amalgamated, the difference between this information category and all others in the top twenty information selections becomes even more striking: 137 of the 626 most frequently selected information items (21.9%). More than one-third of the **Table 4** information categories relate to energy-based solutions (items 1, 3, 7, 9, 11, 15, 16, 17). As in **Table 3**, the amalgamated solutions of alternative energy sources (137 selections in total) come well ahead of the higher-priority IPCC recommendation for immediate improvements in energy efficiency (35 selections: seventh place in the top 20 frequencies).

Similarly, **Table 4** shows a clear news selector preference for information relating to a simple villain—CO_2, and one of its major sources—fossil fuels. If the two **Table 4** information items of "Atmospheric CO_2 traps heat" and "Fossil fuel burning causes global warming" were amalgamated, this amalgamated category (79) would come second in the selection frequencies list, with the combined references to alternative energy sources still almost twice as popular. Closer analysis of news texts containing references to the heat-trapping potential of atmospheric CO_2 and emissions from burning fossil fuels showed that this information almost always was published without contextual explanations of why or how such emissions were causing a significant environmental risk, or what climatic impacts might result. Other sources of greenhouse gases such as emissions from wastes disposal, agricultural activities or deforestation were only rarely found in *New York Times* information selections. The linkages between global warming and climate change were rarely made, and do not appear anywhere in **Table 4**.

6.3.2 Sensational risks, but global not local

The strength of the news value of sensational information is seen again in **Table 4**, where 'sensational' risks take second place with 54 selections of the risk of long-term sea level rise. In **Table 3**, the more general "Greater extremes expected" category took second place. The difference in these second most frequently selected information items in the two tables illustrates the blurring which can occur when a larger data base is amalgamated into fewer categories. **Table 3**'s "Greater Extremes expected" category contained more than double the number of individual information items (37: relating to a range of extremes including heavier rainfall and more flooding, storms, droughts, wildfires and heat waves), compared with the individual information items (15) included in **Table 3**'s "Sea level rise expected" category.[289] **Table 4** examines the disaggregated list of information selections and here, generalised references to long-term sea level rise were preferred above more immediate risks of other specific extremes likely to directly affect U.S. populations.

In all, five of **Table 4**'s categories deal with 'sensational' risks (items 2, 4, 8, 20=, 20=). In all but one of these selections, news writers provided generalised information about a global problem, framing it as not a matter of concern for U.S. populations. Closer analysis of these selections as they appeared in news texts revealed that only three involved potential local risks. Two related to the risks of sea level rise, discussing the future impacts of sea level rise on U.S. coastlines.[290] One warned of future dangers from intensifying heat waves.[291] In none of these three cases were potentially huge or dangerous changes for local populations or environments followed up with later stories. This lack of additional details about direct local risks supports the argument that to *New York Times* journalists, global warming and climate change were imagined as theoretical but unlikely to impact directly on local or national populations or environments. In none of these cases did the journalist select accompanying expert advice about the urgent need for research into local risks, or for local disaster and adaptation planning. Audiences were not given the information necessary to encourage them to accept that they would be directly affected by this global rise, or to undertake or support the actions strongly recommended by experts.

[289] See Appendix One.
[290] (Stevens, 18 September 1995; Rather, 4 March 2001. See Chapter 3.12.)
[291] (Stevens, 18 September 1995)

6.3.3 Direct experience doesn't need expert evidence

Growing popular awareness of changes in local environments, climates and ecosystems is seen in the appearance in **Table 4** of two pieces of information related to observed planetary changes: "Seasons are changing", and "Observed shrinking glaciers" (items 13, 18). All but three of the 19 "Seasons are changing" selections came in 2007. It is significant that most (16 out of a total of 19) of the *New York Times* references to changing seasons did not attribute IPCC advice, suggesting an assumption that direct audience experience was the only attribution required. Rather than being placed in the 'political' or 'news' sections where discourses of the need (or not) for emissions reductions predominated, these selections appeared in the 'lifestyle' sections: a further indication of journalistic assumptions that popular discourses were incorporating a received wisdom that local temperatures and seasons were indeed changing.[292] In lieu of a body of journalistic explanations about the causes of global warming and climate change, or of the reasons for underlying expert certainties about the risks, direct experience appeared to be the factor needed before the social world accepted that the risk existed.

On the other hand, observations of shrinking glaciers are unlikely to be a matter of direct experience for most *New York Times* audiences, and in this category, observations attributed to IPCC advice are in a majority (12 out of a total of 16). Like changes in the duration or temperature of seasons, melting ice and snow offer relatively straightforward evidence of warming temperatures. From 1990, the IPCC reports had noted that cryospheric changes would be among the first indicators of climate change.[293] This information was not selected until 1995. That year's IPCC report on the impacts of climate change had documented substantial and significant melting of polar and mountain regions.[294] This apparently clear evidence was selected once in 1995 in a story about melting glaciers and ice sheets in other

[292] See Chapter 3 discussion of **Chart 1**. Popular uptake of understandings about the environmental risks of global warming and climate change was linked more closely with personal observations of the physical world and increased more rapidly than news media selection preferences, the latter being focused on assumptions of political discourses which were unrelated to developments in the physical world.

[293] Polar regions were expected to warm much more rapidly than other parts of the planet because of the albedo effect. White ice and snow reflect most of the sun's radiation back to space. When ice and snow melt, they expose the darker soil, forest and ocean surfaces, which then absorb substantially more of the sun's heat than whiter frozen coverings—thus accelerating temperature rise in polar regions (Intergovernmental Panel on Climate Change 1990b, 7-1).

[294] "The last century has witnessed a massive loss and retreat of mountain glaciers, a reduction in the areal distribution of permafrost, and evidence of later freeze-up and earlier break-up of river and lake ice in many northern countries" (Intergovernmental Panel on Climate Change 1995b, 29).

countries not the U.S.,[295] and seven times in 2001, again in the context of changes occurring in other countries. The 2001 IPCC information that North American glaciers were already starting to melt[296] was not selected, even though by 2001 the IPCC was reporting substantial reductions in the planet's ice and snow cover;[297] and had itself referred to apparently emerging U.S. popular awareness of shrinking glaciers: ". . . a recent article in a travel magazine (Conde Nast) outlined vacations to view retreating glaciers in North America, Europe and Africa while they were still there" (Intergovernmental Panel on Climate Change 2001b, 753). This failure on the part of *New York Times* journalists to select expert documentation of physical changes happening in the U.S. again suggests an overwhelming preference for political definitions of the issue as a matter of debate over possible emission reductions; and an inability to imagine physical changes as already occurring.

6.3.4 Prefer political definitions even if they ignore emerging physical realities

Information selection omissions can often be as revealing as information inclusions. Although scientific evidence of shrinking glaciers featured (in 18th place) in **Table 4**, information about melting sea ice and the consequent opening up of the Arctic to shipping did not. Shrinking glaciers have shorter-term implications for the leisure activities of skiing, mountaineering and hiking, and longer-term implications for water supply and hence for both agricultural industries and urbanised settlements. Opening up of shipping channels through the Arctic has both economic and international political implications. Given that *The New York Times* apparently prides itself on informing political discourses, it is curious that in 2001 news selectors did not select the IPCC advice that the rapid warming of the Arctic and consequent large reductions in sea ice would have economic implications:

[295] (Simons 19 December 1995)
[296] (Intergovernmental Panel on Climate Change 2001b, Chapter 15: North America, par 15.2.2.2.1: Mountains.)
[297] See 2001 IPCC Synthesis Report, Table SPM-1: *20th century changes in the Earth's atmosphere, climate, and biophysical system*. Changes in ice and snow cover comprise five of the 12 categories listed, including expert advice that Arctic sea-ice extent and thickness had thinned by 40% in recent decades in late summer to early autumn; that non-polar glaciers had shown "widespread retreat" during the 20th century, and that snow cover had decreased in area by 10% since satellite observations had started in the 1960s (p 6).

> . . . there will be economic benefits—including new opportunities for trade and shipping across the Arctic Ocean, lower operational costs for the oil and gas industry, lower heating costs, and easier access for ship-based tourism.
>
> (Intergovernmental Panel on Climate Change 2001b, 804)

New York Times journalists gave significant emphasis to potential economic benefits to the U.S. of global warming and climate change,[298] but this information about potential economic benefits arising from melting sea ice in the Arctic was not selected. Nor were the substantial political implications of this geographical change discussed. An available shipping channel across the Arctic could involve large savings in ship fuels, substantially cutting the costs of export cargoes shipped between Europe and the U.S. However, an ice-free ocean across the northern borders of Europe, Russia, the U.S., Canada, Greenland and Iceland, where previously access had been restricted to nuclear submarines, also has large international and national security implications. These were not discussed in the pages of the *New York Times*.

Two information selections related to expert certainties and political discourses contesting these certainties appear in **Table 4**: that global warming had started (item 10) and that human activities were causing global warming (item 12). Closer analysis of the news texts containing these information items shows that almost all of these particular information selections were made in 2007. In 1990, there was one (unattributed) selection of the information that global warming had started; and two further selections, one unattributed and one crediting IPCC advice, in 2001. In 1995 there were two selections, attributed to the IPCC, of the expert advice that human activities caused climate change. That the bulk of selections of these two pieces of IPCC advice occurred only in 2007 shows the slow uptake of expert information about a physical environmental risk and the dominance of political definitions of an issue over expert advice. It strengthens the argument that until physical changes began to be clearly evident, the risk was framed, overwhelmingly, as political not physical. It is also significant that while the IPCC was credited as the source of the information that global warming had started in more than half these information selections (53.3%), the information—published almost entirely in 2007—that humans were responsible for global warming was credited to the IPCC in fewer than a quarter (21.4%) of the selections. This suggests that while social discourses still required the credibility of expert sources to be attached to information about the onset of a global environmental phenomenon, the idea of human responsibility for the risk had, by 2007, become sufficiently embedded in

[298] See Chapter 6, Section 6.2.4.

social world discourses to be treated as a received wisdom which did not require expert assurances.

6.3.5 Attribution of expertise

The social world is unlikely to support action changing established behaviour, technologies or industrial processes unless the need for such action is convincingly demonstrated by expert advice. If experts are not perceived as credible, or if their advice is reported without acknowledging the originating expert authority, the social world is less likely to give credence to information about the physical world. The quantitative analysis shows that the world's official authority on global warming and climate change—the IPCC—was credited as the source of information about this environmental risk only half the time at best and, in the case of the most frequently selected information, fewer than one time in three.

In overall information frequencies (**Table 3**) there was a relatively even distribution of attribution or non-attribution where information appearing in IPCC reports was selected—231 cases (44.5%) where the IPCC was not mentioned; 288 (55.5%) where it was.[299] **Table 4**'s list of most frequently selected information items departs significantly from **Table 3**'s list of overall information selection frequencies in the extent to which the IPCC was acknowledged as the source of so-called expert advice. In the highest-frequency selections which comprise **Table 4**, there was a much greater tendency for the IPCC not to be credited. Just over one-third of the total selections in **Table 4** attributed the information to the IPCC: 222 selections (35%) credited the IPCC, 406 (65%) did not. The disparity is greatest in the 11 categories dealing with energy-related solutions (items 1, 3, 5, 6, 7, 9, 11, 14, 15, 16, 17). In fewer than 20% of these cases was information attributed to the IPCC: 68 selections where the IPCC was credited as the authority, 286 (80.7%) where it was not.

Where information related to predictions or observations about changes to physical systems, it was attributed to the IPCC more often than not. Items 2, 4, 8, 10, 15, 18 and both of the 20= listings all deal with physical processes and risks. In these cases, the IPCC was credited as the

[299] These overall frequencies of attribution or non-attribution were taken from the raw, disaggregated list of 519 information items (See Appendix One).

originating authority 129 times (57%); the information was unattributed somewhat less frequently: 97 times (43%).

The lower attribution rates in the highest-frequency selections listed in **Table 4** compared with the overall information selection frequencies of **Table 3** may indicate that the highest-frequency items involved information deemed by news writers to constitute 'received wisdom' not in need of attribution to establish its credibility and relevance to the discourses of *New York Times* audiences. The low incidence of attribution to the IPCC in selections of information about energy-related solutions suggests that when technological remedies were being discussed, *New York Times* journalists assumed that their audiences preferred U.S. expertise over any international advice. In many texts where energy-related solutions were selected but the IPCC was not mentioned, a U.S. expert was chosen instead for attribution. This perhaps indicates the importance of the local in establishing popular trust in information. It may be also that the virtual absence of coverage of a wide range of expert IPCC recommendations for technological, economic and regulatory actions indicates a news writer assumption that international expertise in these fields was assumed to be unwelcome or uninteresting to national or local U.S. audiences.

News writer decisions not to credit the IPCC as the expert advisory agency on global warming and climate change in almost half their stories about IPCC advice offer further evidence of a journalistic perception that the environmental risk was a political rather than physical issue. A factual basis for statements is less relevant to political discourses, where arguments can be won or lost on the basis of ideas, rather than carefully attributed facts. Establishment of the credibility of experts is more important when a topic is represented as being factually based; and indeed, in those **Table 4** items related to physical phenomena, the IPCC is credited as being the source of information in more than half of all cases (57%).

This analysis of when the IPCC was credited and when it was not suggests that international scientific expertise is preferred for advice on the processes of global planetary physical systems. Conversely, for advice on solutions related to industrial processes, international expertise is not generally used as an information source. This may indicate a news writer assumption that an international scientific advisory body is expected to provide credible advice about physical planetary processes but is not expected to have similarly credible expertise when it comes to business, technology and industry.

The IPCC was mandated by the United Nations General Assembly to provide the best available scientific advice on the risks of global warming and climate change. Yet, while reports from weapons inspectors working for the United Nations Monitoring, Verification and Inspection Commission (UNMOVIC) —another international advisory body—were generally accepted in U.S. discourses as providing authoritative and credible advice, reports from the IPCC were not. Instead, U.S. political discourses framed official advice from the world's best climate scientists as contested and controversial. The qualitative and quantitative analyses of Chapters 4 and 5 support this chapter's quantitative analytical findings that *New York Times* journalists selected information which related to political discourses, rather than information which reflected scientific experts' priorities of warning about looming physical risks, and providing details of potential remedial and preventive actions.

The tendency to select politically relevant information rather than information which clarified scientific certainties and expected physical risks, and to downplay the credibility of the advising international scientific agency, was not restricted to *New York Times* journalists. Painter's (2010) survey of international media coverage of the 2009 United Nations Conference on Climate Change, held in Copenhagen in December 2009, found that of more than 400 print news media articles published in 12 countries, only 9 per cent of these stories spent more than half their word count discussing the known science (Painter 2010). Almost 80 per cent spent less than 10 per cent of their total word counts on discussion of the science of climate change. Additionally, Painter found that the sources cited as authorities in news stories reporting on the Copenhagen Conference were overwhelmingly political rather than scientific. This 2010 finding supports this thesis research finding, that *New York Times* journalists preferred to define the physical risk of global warming and climate change as a matter of political debate, with little connection to the physical world. It suggests that *New York Times* preferences for framing a physical environmental issue as a matter primarily of politics may indicate a wider trend among journalists reporting on the issue.

Two important qualifications, however, are, first, that the Copenhagen Climate Conference was not a meeting of scientists, but a political meeting organised to discuss an international climate treaty. IPCC reports, on the other hand, document scientific knowledge of global warming and climate change. This thesis analysis examines *New York Times* mediations of IPCC reports, not international political discussions about what to do about a scientific issue. It could be expected that news mediation of a scientific report would involve more use of scientists as sources, while news stories about political meetings would tend to use political

sources more frequently. Second, Painter's and my own methodologies are not comparable. His survey assessed the proportion of word count assigned to the science of climate change. My research compared news media information selection preferences with the information priority preferences of IPCC scientists. Painter's survey therefore provides indicative but not conclusive support for my own findings.

Both of these research analyses do support a critique of journalistic interpretations of ethics in reporting expert advice about climate change. Regardless of how contentious international discussions over potential policy responses to a global physical threat might be, journalistic ethics demand that audiences be given relevant information about expected risks to their health, wellbeing and economic security. My own research into *New York Times* selections from IPCC reports, and Painter's (2010) survey of news media coverage of the 2009 Copenhagen Conference on Climate Change, both show that a journalistic fascination with the machineries of power obscured a more basic journalistic responsibility to warn audiences about looming risks to personal health and economic security, and to provide details of expert advice about strategies for avoiding or reducing such risks.

A further factor in journalistic decisions about which sources to use, and how to cite them, became apparent in a qualitative evaluation of what sources were cited when the IPCC was not. In many cases, a national scientific expert was selected instead for attribution. In almost every such case, the national experts quoted were also members of the IPCC. Preferring to emphasise national scientific expertise over international scientific accreditation may be based on a journalistic appeal to patriotic discourses about the superiority of U.S. science. It is also likely that *New York Times* journalists recognised the importance of the immediate and the local. The 'my back yard' factor is relevant to audience interest in any topic. If an event is happening locally, it offers audiences direct identification with that event. Events happening far away are of more indirect interest, since a local audience's perception is that faraway events will not directly affect local populations. *New York Times* journalists may have assumed that their audiences were more likely to accept scientific information if it was sourced from nationally-based scientists, rather than from international scientific experts. They may have assumed that national scientific experts would be considered by U.S. audiences to be a part of 'us' rather than 'others', and therefore more trustworthy than international experts.

6.3.6 Conclusion

For populations to agree to take action to avoid environmental risk, there needs first to be acceptance that any such risk is real and requiring action. If expert advice is not seen as credible, populations will not accept the need for action. In the U.S., global warming and climate change were framed in political and economic discourses as controversial and uncertain. Scientific concerns about physical changes which would threaten populations, industries and environments were given little salience. The scientific rationale behind expert warnings was only rarely explained in *New York Times* coverage of the issue. *New York Times* journalists paid little attention to high-priority expert concerns about disruptions to food and water supplies, or increases in deaths and injuries from storms, floods, erosion and wildfires. Additionally, the credibility of the advising international expert agency was downplayed or ignored, with the IPCC cited as the source of scientific expertise in a little more than a third of the most frequently selected information items.

To persuade their audiences, *New York Times* journalists could have engaged with national controversies over whether IPCC advice could be trusted by emphasising the high level of international scientific expertise involved in preparing the IPCC reports, and the high level of scientific certainty about the fundamental processes causing global warming and climate change. They could have provided convincing scientific evidence of particular expected risks to U.S. regions, and associated scientific recommendations for planning and actions which would reduce or avert those risks. All of this information was available in all IPCC reports from 1990. Instead, it appears that *New York Times* journalists preferred to emphasise politically relevant IPCC information and to ignore IPCC information about risks and preventive strategies directly relevant to U.S. populations, environments and economies.

New York Times information selection is seen, from quantitative analysis of overall (**Table 3**) and most frequent (**Table 4**) information selections, to prefer engagement with information relevant to political discourses rather than information prioritised by scientific experts. This chapter's quantitative analysis of information selection frequencies therefore confirms findings in Chapter 5's qualitative comparison of IPCC reports and *New York Times* 'coverage of record' of these reports. Politically relevant information was heavily preferred over scientific warnings of physical risks to U.S. populations and property.

Quantitative analysis of information frequencies also shows reluctance on the part of selectors to credit the IPCC as the originating source of climate science information. This international scientific advisory body was cited in just over half the *New York Times* stories which reported IPCC findings and were published within the analytical windows. More strikingly, when it came to the most frequently selected information items, the IPCC was cited far less often: just over one-third of the time. This may suggest a journalistic assumption that audiences would give less credence to international expertise. However, the qualitative finding that IPCC scientists who were employed by U.S. institutions and universities were credited with their national titles, rather than their IPCC membership, also indicates a journalistic assumption that audiences are more prepared to accept familiar expertise.

Analysis of information selection frequencies in *New York Times* coverage of IPCC reports shows that politically relevant information was heavily preferred by news selectors. Information about aberrant developments in the physical world deemed by IPCC scientists to be of high importance to the social world was given far less attention. Little attention was paid to scientific explanations of why the global warming was happening, how this would change climate and sea levels, and what to do about it. Confirming the findings of Chapters 4 and 5, this quantitative analysis shows that global warming and climate change were represented by *New York Times* journalists as political but not physical, and as a global problem which had little national or local relevance. Journalists preferred information related to a narrow range of solutions, all involving reductions in greenhouse gas emissions. They did not select high-priority IPCC advice about the urgent need for emergency and disaster preparedness planning. Nor did they select information about specific large risks to U.S. environments, populations and economies, such as intensifying drought in the south-west and other regions where agriculture was a major industry, and increasingly damaging storms, floods, wildfires and heatwaves. Throughout the analytical period, extensive expert advice about potential management, technological and planning actions which could substantially reduce the risks for U.S. populations was almost entirely ignored.

CHAPTER 7 Selective distortion of information: news section information selections

7.1 Introduction

This chapter examines in detail the differences in selections of IPCC information made by the various 'specialist' sections of *The New York Times*. Content analysis of *New York Times* coverage of official expert advice about global warming and climate change which was placed in 'local' and 'specialist' sections shows a clear distinction in selection preferences between news workers focused specifically on geographical place—the physical world—and those focused on the various discursive communities which made up the imagined audiences of the different 'specialist' sections—the social world.[300] Information selections for the geographically placed 'NY-Region' section gave high salience to information about the physical world inhabited by readers of that section. 'Specialist' section news selectors, on the other hand, preferred information which was relevant to existing social world discourses assumed to circulate among the imagined audiences of any one 'specialist' section. Information deemed important by experts was ignored or minimised if it was considered irrelevant to, or in conflict with, the social world discourses of the various 'specialist' section audiences.

The news media tendency to assign greater salience to information which is related to the immediate physical environment of a news medium's audiences has been noted by a number of scholars[301] who have observed that direct experience of weather extremes tends to increase news media coverage of the longer-term issue of climate change. Until an environmental risk poses direct risks to a particular population: until, as Ungar puts it, it is ". . . an immediate and concrete risk with everyday relevance", it will remain in a "public limbo" (Ungar 2000, 297). My research supports these observations. It shows that unless news media audiences were directly experiencing unusual weather; *or* unless news selectors were focused on a discrete physical region, expert information on 'real' processes and systems operating in the

[300] See Chapter 4, Part Two, for discussion of information selections for 'political' and 'news' sections; see Chapter 3 for discussion of 'lifestyle' section selections.
[301] (Mazur 1998; Ungar 2000; Carvalho and Burgess 2005; Anderson 2009)

physical world was re-shaped to fit unrelated 'realities' constructed by social world discourses.

'Specialist' sections select information deemed important enough to the discourses of the particular imagined audiences to which specialised sections appeal, to warrant more detailed treatment. If a topic appears only infrequently in 'specialist' sections, it can be concluded that news selectors do not believe it to be relevant or important to the discrete discursive communities assumed to pay attention to various 'specialist' sections. Miller and Reichert (2000) have identified the selective nature of news media framing in general, arguing that when it comes to complex environmental issues, policy implications relevant to particular stakeholders will be discussed, while other implications are ignored (Miller and Reichert 2000). The content analysis validates this argument. Expert advice on the risks of global warming and climate change was cherry-picked depending on news selector assumptions about their particular imagined audiences. The wide variations in information selected for the audiences of the various *New York Times* sections explain in part why there was such a disparity between expert certainties and concerns about global warming and climate change, and the broad uncertainties about the reality of the risks which circulated in social world discourses.

7.2 News structural organisation

Sheldon Ungar (2000) has theorised that the increasing specialisation of science has caused a paradox. As specialised knowledge increases, so also does overall societal ignorance about any one topic:

> As proliferating technical terms and ideas . . . are overlaid with new facts and frequent revisions, specialty knowledge domains become forbidding to outsiders. All but the most persistent non-specialists are effectively precluded from keeping up with developments.
>
> (Ungar 2000, 299)

Ungar's observation applies just as well to the impacts of news structural organisation on news mediation of expert information as it does to the impacts of scientific specialisation on

overall non-expert understandings of scientific information. The non-expert social world needs information about an environmental risk before it can decide whether action should be taken. Scientific information first reaches the social world via the 'prestige press' newspapers.[302] Scientific information about a complex global environmental risk is slotted into specialised newspaper sections. Aspects of expert information become compartmentalised in the news selection processes, deemed suitable or irrelevant depending on which discursive communities are being appealed to by which particular newspaper sections. If expert information is not considered relevant to the discourses assumed to circulate among a particular section's frequent readers, they will, as Ungar has observed, be precluded from keeping up with developments.

News media section information selections are based on editorial assumptions about that information's relevance for the different audiences imagined to be particularly interested in particular sections. Extrapolating from Ungar (2000), in the case of expert information about global warming and climate change, restricted and compartmentalised information selections for different sections of the *New York Times* left the readers of any one section ignorant about many relevant aspects of the environmental risk. For example, 'Business' section readers received hardly any information about the underlying rationale explaining why experts were certain that there was a problem which required urgent action; while for 'Science' section readers the risk was represented as global and political but of little concern to U.S. populations.

This compartmentalisation of information arises because of the structural organisation of editorial responsibilities within any one news medium. In most newspapers, different individuals have responsibility for the content of the different sections. Although there is almost always editorial discussion over what is appearing in any newspaper issue, editorial selection responsibility tends to rest with two individuals: the editor with overall selection and placement responsibility for that section; and the journalist with overall responsibility for a particular subject area.

This organisational practice arises for practical and financial reasons. The practical rationale behind allocation of selection responsibilities is that specialist section editors and journalists are assumed to be familiar with the discourses circulating in the imagined community of any particular section's frequent readers. The information which they select, the stories which

[302] See Chapter 3, Sections 3.2 and 3.3.

they create and the assumed audience discourses to which journalists appeal in their stories are expected therefore to appeal to readers of that section, ensuring its ongoing popularity. The financial rationale follows: if a section is popular with its readers, this popularity will contribute to the news medium's overall profitability.

The disadvantage, in terms of accurate re-mediation of expert information about environmental risks, is that section editors and journalists select different information about that risk, to appeal to particular imagined discursive community profiles. Such institutional distortion of expert understandings of an environmental risk illustrates Ulrich Beck's observation that environmental risks are ". . . particularly *open to social definition and construction*" (original emphasis) (Beck 1992, 23). Different sections selected quite different information about global warming and climate change. All selections were based on perceived audience preferences, not those of experts.

Experts defined the risk as involving fundamental physical processes and inevitable physical reactions which would impact on the social world. Analysis of *New York Times* selections and placements of IPCC information shows that news selection processes for the various sections minimised or ignored expert advice about the physical world unless it could be shown to be relevant to existing social world discourses. Miller and Reichert have observed that the news value of objectivity ". . . obliges reporters to report facts, but it does not assure that they are getting the right facts" (Miller and Reichert 2000, 50). Neither do news organisational processes assure that news audiences are getting the 'right facts'; or at least, the facts which experts believe the non-expert social world should be aware of.

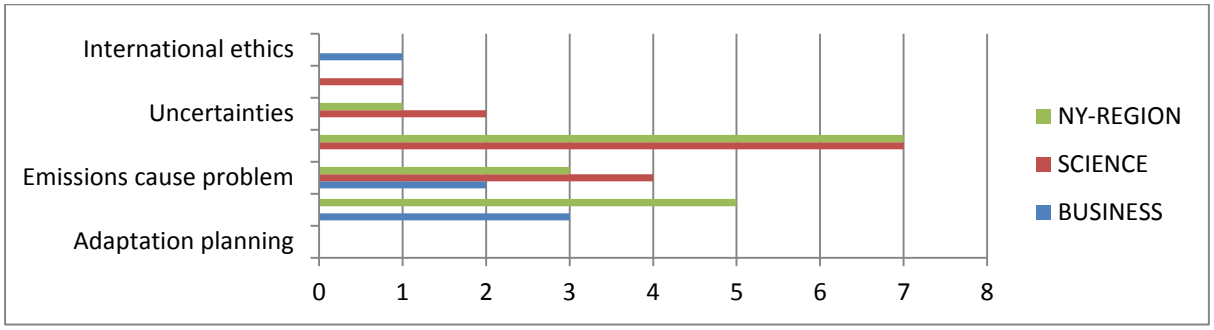
Chart 11 shows that the 'Health' and 'Technology' sections only began running stories referring to global warming and climate change in 2001. One news structural reason for this may have been the organisational protocol of having one journalist with overall responsibility for maintaining expertise in any one issue. This practice can mean that other journalists interested in the topic do not pursue this interest because they do not wish to "poach" on a designated specialist's preserve. In any case, readers particularly interested in health or technology received almost no relevant information about how their health might be affected, or about promising and profitable new technological options.

Thus, a combination of differing news section ideas of audience preferences, a news media focus on audiences rather than on experts and professional territoriality worked against the chances that a news medium's audiences overall would receive the "right facts" about an

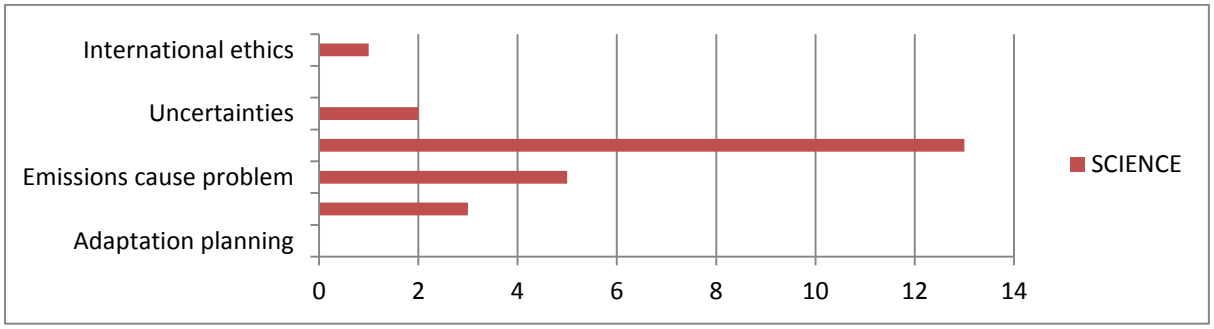
environmental risk. Rather than privileging information about developments in the physical world which experts consider threatening to human and environmental human health and safety, news selection processes privileged the existing discourses of news media audiences, which involved ideas about the social world, not the physical world where humans reside.

Chart 11: 1990–2007 'Specialist' and 'local' sections: information selections

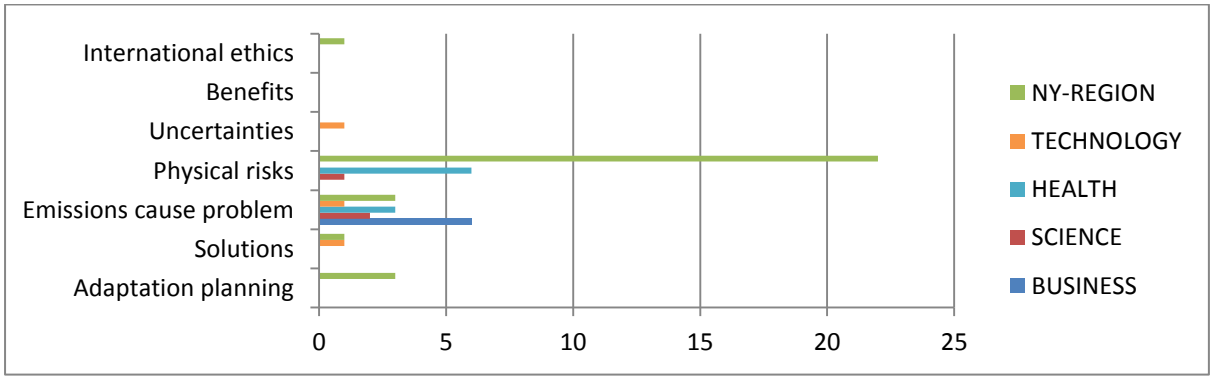
1990 **n=36**



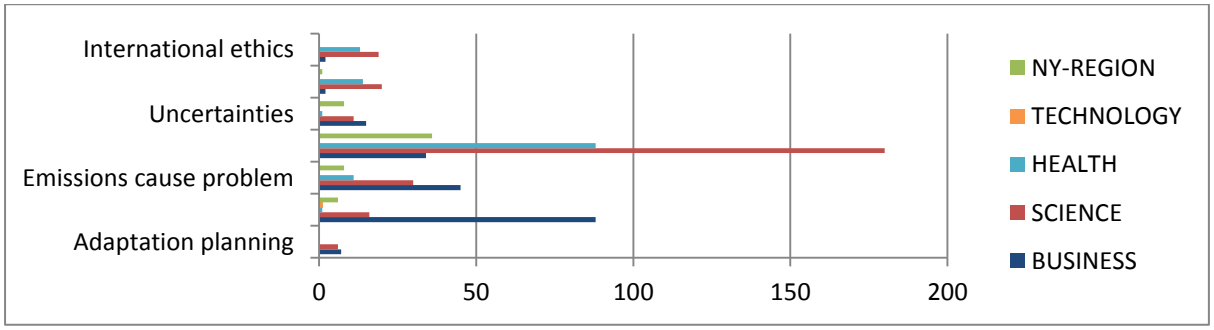
1995 **n=24**



2001 **n=51**



2007 **n=663**



7.3 Selective distortion of information: *New York Times* 'specialist' and 'local' section placements: 1990–2007

Until 2007 when physical manifestations of the risk such as temperature, climatic and seasonal aberrations began to be experienced by *New York Times* audiences, almost all sections represented the risk as a matter of policy and political discussion: a theoretical social world discourse rather than an evolving physical phenomenon which would directly affect humans and the environments in which they lived. **Chart 11** shows that throughout the analytical period, *New York Times* selections of information about global warming or climate change virtually ignored expert advice about local and national physical risks to populations, environments, infrastructures and industries.[303] Expert advice about likely threats to business profitability and potentially profitable new technologies was not selected.

Over the entire analysis period, the 'NY-Region' section contained more warnings of local risks than other nationally-oriented or 'specialist' sections.[304] This difference shows the importance of place and the personal: the 'here' and the 'me'. 'Local' news selectors preferred information which was relevant to 'here': a specific physical environment inhabited by a geographically placed audience (the 'me'). 'Specialist' news selectors preferred information which was relevant to discourses assumed to be circulating in the social worlds of the audiences of the various 'specialist' sections: the 'here' being placement in a specific discursive environment and the 'me' being audience identification with that discursive context.

In the 'Business', 'Health' and 'Science' sections, global warming and climate change was framed largely as a sensational future global problem which was politically controversial but which would not physically affect *New York Times* audiences. **Chart 11** shows that these sections selected proportionately few pieces of information explaining scientific understandings of fundamental physical processes which inevitably would be changed by a warmer atmosphere: a high priority for IPCC experts.

[303] See Chapter 3 Section 3.13.
[304] See Chapter 6, Section 6.2.2 for further discussion of the dearth of selection of national or local risks.

For ‘Business’ section readers, the risk was represented as an unexplained threat to historically successful industrial processes, and as the rationale for apparently unreasonable demands for increased taxation. Until 2007, ‘Business’ section readers received no information about the likely physical consequences of global warming and climate change, and little information about their underlying causes. Information about potential solutions was somewhat more plentiful in the ‘Business’ pages, but this was framed largely as solutions which might inconvenience the business community: reducing emissions from power generation and motor vehicle use, and additional taxes.

The ‘Science’ section’s highest-frequency information category dealt with the physical risks of climate change. ‘Science’ section news writers ignored potential physical risks to their audiences. Instead, any such risks were framed as a problem for ‘others’ living ‘elsewhere’. In the ‘Science’ section, global warming and climate change were represented as a sensational global problem without any particular local risks; or as an international political discourse which had no connection with the physical world inhabited by *New York Times* audiences.

Chart 11 shows that ‘Health’ and ‘Technology’ sections did not begin selecting information about this environmental risk until 2001, suggesting that news selectors of these sections did not imagine that global warming and climate change would have any direct or physical impacts on their audiences.[305,306] Like their ‘Science’ section counterparts, ‘Health’ section news writers framed the risk as a problem for ‘others’, not ‘us’. Rather than detailing expected risks to human health in the U.S., information selections for this section tended to take an international and philosophical approach, appealing to readers’ ethical concerns as global citizens wishing to be made aware of the situation of less-fortunate people living elsewhere. Somewhat surprisingly, information about direct risks to human health and safety in the U.S. was not found at all in the ‘Health’ pages, throughout the 17-year analysis period.

For ‘Technology’ section readers, the environmental risk might well not have existed at all. Although advances in technological developments were seen by the IPCC as key aspects of reducing the risks of global warming and climate change, throughout the analysis period the

[305] Even in 1990, IPCC experts warned of increases in heat stress, the effects of diminishing air and water quality, reductions in water supplies and an expected increase in vector-borne diseases (such as malaria or dengue fever). See Intergovernmental Panel on Climate Change 1990b, Chapter 5, pp 5-27 – 5-31.
[306] The 1990 IPCC reports also placed significant emphasis on the need to develop improved and new energy technologies to reduce greenhouse gas emissions. See for example Intergovernmental Panel on Climate Change 1990c, Table 3: Examples of Short-Term Options, p xxxvi.

'Technology' section selected virtually no information on remedial or substitute technologies. Within all analytical windows from 1990–2007 the 'Technology' section published just two stories which mentioned global warming and climate change: a 2001 feature on wind power[307] and a 2007 opinion piece about the future of hydrogen-fuelled cars.[308]

Over the entire analysis period therefore, the specialised nature of news media selection responsibilities meant that readers of the different 'specialist' section were given very different and often conflicting information about the risks of global warming and climate change.

7.4 1990: Selective distortion of information

In 1990, information selections for 'specialist' and 'local' sections showed broad discursive acceptance of global warming and climate change as a significant environmental risk. However, in all sections, the physical implications of the risk were minimised while implications for policy debates and industrial processes were magnified. News writers' semantic preference for "global warming" rather than "climate change" demonstrates a focus on the cause without consideration of the effects. Such language permits the primary focus to remain political rather than physical: to give salience to discourses about potential emission reduction policies (since increasing emissions are the primary cause of global warming); and to underemphasise the resulting threats from climate change such as expected risks to human health and safety, the environment, industrial and transportation infrastructures and industrial profitability.

Rather than privileging the expert definition of the risk as inevitably threatening physical environments and human health and safety, the *New York Times* 'Business', 'Science' and 'NY-Region' sections redefined the issue and greatly restricted its parameters. Global warming and climate change became a matter of political debate over emission reduction policies and the imposition of new taxes. Physical risks were framed almost entirely as a

[307] (Lake 22 February 2001, see later in this chapter, Section 7.7.5)
[308] (Pogue 4 April 2007, see later in this chapter, Section 7.8.5)

problem for 'others', not 'us'. One 'NY-Region' story did mention local physical impacts,[309] but the overall emphasis of this story was on policy debates over emission reductions. The 'Health' section did not select any information about global warming and climate change in 1990. The absence of any coverage of the issue in the 'Health' and 'Technology' sections offers evidence of an overall *New York Times* framing of the issue as unrelated to the physical world inhabited by *New York Times* audiences.

7.4.1 1990: 'NY-Region' section

The 'NY-Region' section in 1990 contained almost as much information about global warming as the two 'specialist' sections: 16 information selections altogether, compared with 20 for the 'Science' and 'Business' sections combined. This relatively high frequency suggests that 'NY-Region' news selectors assumed that the issue was a part of, or at least relevant to, discourses circulating within and among their imagined audiences. These 16 information selections were contained in four 'NY-Region' stories published within the analytical window. In all four cases, global warming was framed as a political issue which was locally relevant, contextualised as a matter of State or national governmental policies.

Three of these stories briefly mentioned global warming as part of a suite of governmental policy initiatives deemed relevant for local audiences. For example, Kirk Johnson reported that:

> The [Connecticut] Assembly also approved several bills with potential long-range effects, including one that would require the state to reduce energy consumption by 30 percent in the next 10 years, and reduce fossil fuel use as a way to fight global warming.
>
> (Johnson 10 May 1990)

This information was repeated in Johnson's 13 May 1990 story which summarised final State legislative decisions before State elections began.[310] A third story with a political focus was an interview with Susan Merrow, the newly elected president of the Sierra Club—a national

[309] (Rierden 14 October 1990. See next section (Section 7.4.1); see also Chapter 3, Section 3.13.)
[310] ". . . [Connecticut] lawmakers approved bills. . . including measures that would seek to reduce the state's contribution to global warming through more efficient use of fossil fuels" (Johnson 13 May 1990)

environmental lobby group.[311] Merrow lived locally, thus fulfilling the news value of relevance to 'NY-Region' audiences. Here, the main theme was the value of political lobbying in improving protection of natural environments and wildlife species. One brief mention (". . . he's been pretty wishy-washy on global warming") criticised the (George H.) Bush Administration's lack of action on global warming.

The last 'NY-Region' story on global warming published within the 1990 analytical window highlighted the issue, as was apparent from the headline: "Putting the Heat on Global Warming" (Rierden 14 October 1990). This story focused almost entirely on State governmental policies to reduce greenhouse gas emissions. The article, an interview with Mary Mushinsky, a State Senator, was one of the few in any section, over the entire analysis period, which gave details of substantial local physical impacts.[312] However, expert recommendations for urgent strategic adaptation or emergency planning were not included. None of the 1990 'NY-Region' stories selected expert information which explained the physical processes which caused the risk. The problem was defined in terms of its impacts on policy, transportation and energy use.

7.4.2 1990: 'Business' section

The two 'Business' section stories published within the 1990 analytical window[313] framed the environmental risk of global warming and climate change as the reason for extra taxes or as a threat to U.S. intellectual property rights. Both demonstrate the early broad discursive acceptance of global warming and climate change as an issue which might require governmental or industrial intervention.

The first was largely about top U.S. business executives' views on acceptable ways to reduce the national deficit. One brief sentence near the start of the story noted that the (George H.) Bush administration might introduce "user charges" to reduce greenhouse gas emissions

[311] (Hamilton 24 June 1990)
[312] Mushinsky warned that sea level rise could ". . . take away 20 percent of the wetlands bordering the shoreline". Saltwater intrusion would contaminate coastal aquifers and wells, the weather would become hotter, air pollution would increase, tree species would die as the climate became too hot, and cooler weather animal and bird species would disappear (Rierden 14 October 1990).
[313] (Hershey Jr. 14 May 1990; Wald 31 October 1990)

(Hershey Jr. 14 May 1990).[314] A later quote from an automobile manufacturer also framed the issue as a matter of taxation: Roger B. Smith of General Motors said that ". . . he could support a 'greenhouse' or 'carbon' fee, taxing fuels like oil and coal that pollute the air". Smith's statement is significant because it is the only occurrence, over the entire analysis period, of any suggestion from business or governmental leaders that industries might accept some form of carbon tax. Even in 2007, it was opinion-writers not industrialists who chose occasionally to raise the idea of carbon taxes.[315] His statement also demonstrates business attempts to blur environmental risks by lumping global warming and climate change in with contemporary concerns about urban smog under the generalised and non-specific label of "pollution". Redefinition of greenhouse gases as substances which "pollute the air" avoids any mention of dangerous physical systemic changes. Instead, greenhouse gases are re-categorised as air pollution which in 1990, particularly in U.S. urban areas, signified urban smog or acid rain, rather than the more broadly catastrophic global warming and climate change.

The other 1990 'Business' section story which gave some substantive attention to global warming and climate change framed clean energy sources as useful to other countries but not the U.S., and future risks as coming largely from developing nations. An unenthusiastic article about Israeli developments in the field of solar power[316] suggested that solar power might be of use to developing countries if they received U.S. technological and financial support (connoting a potential drain on either U.S. Government or industrial financial resources, and/or a threat to U.S. intellectual property rights). It dismissed any idea that solar energy might be useful in the U.S. because industries there had access to ". . . vast resources of cheap fossil fuels" (Wald 31 October 1990). The connection between these fossil fuels and ongoing global warming was not made. The news writer then mentioned that if developing countries chose to burn more coal to generate electricity, this "probably" would lead to "worldwide climate change". This framing shifts blame for global warming away from the established industrial nations which in 1990 were the main source of the increasing quantities of greenhouse gases in the atmosphere, and onto newly industrialising nations which needed more energy generation to support their growing business activities—which, probably not

[314] This 14 May 1990 story was published eleven days before the official release of the first IPCC report on the science of climate change. Publication of information before release of expert statements can raise popular interest in the topic, or can contest the expected expert view thus diluting or negating imminent expert advice.
[315] Throughout the analytical period, the idea of any "cost" imposed for greenhouse gas emissions was strongly contested in U.S. business discourses, and in political ideological discourses of "less government" and "lower taxes". See Chapter 4.
[316] (Wald 31 October 1990)

coincidentally, posed increasing competitive threats to U.S. business. Although this article was published two weeks after the official release of the IPCC's first report on the impacts of climate change, it did not select any information about climate change impacts and their relevance to the business community.

7.4.3 1990: 'Science' section

In 1990, the eight 'Science' section stories which mentioned global warming framed the issue as global not local, with large remaining uncertainties which required extensive and expensive scientific research. One story, unusually, provided a longer-term context for expert concerns about contemporary atmospheric concentrations of greenhouse gases. An unauthored report described new French and Soviet research examining Antarctic ice cores, which found that there was more methane in the atmosphere in the 20th century than at any time in the past 160,000 years. This story also laid the blame relatively firmly on human activities: "Human-induced sources are believed to account for about 60 percent of the methane currently emitted" (New York Times 15 May 1990). The emphasis on the geological record was consonant with expert priorities in 1990.

Overall, however, 'Science' section news selectors did not follow expert preferences. The emphasis in all 1990 'Science' section stories was on the complexity (and, by implication, inaccessibility to non-experts) of scientific research enterprises. All the 1990 'Science' section stories involved news of scientific research being carried out in faraway places such as Africa, the Antarctic, the global oceans or space—apart from one story about Princeton University scientists' desire to build a very costly fusion energy research facility.[317] Unlike 'Business' section writers, *New York Times* 'Science' section writers usually included information about the underlying scientific understandings that greenhouse gases trapped heat and that more warming gases meant a warmer atmosphere. However, this scientific information tended to be diluted in news texts by being closely associated with scientific qualifications about other remaining uncertainties; for example:

[317] (Broad 9 October 1990)

> Although scientists agree on the theory of greenhouse warming, which holds that various gases like carbon dioxide trap heat in the atmosphere, debate continues as to whether the increases in these gases have actually begun to warm the global climate.
>
> (Browne 6 November 1990)

In 1990, IPCC experts were certain that global warming was inevitable if emissions were not immediately and substantially reduced, and that the resulting climate change would be disruptive and at times dangerous. However, scientific accuracy demanded that they be able to show a record of decades of measured temperature and climatic aberrations before they could say with certainty that global warming had started.

Although there were clear indications of likely U.S. impacts in the 1990 IPCC reports, 'Science' section writers almost entirely ignored these. The exception was a William K. Stevens story which took as its main theme the news that Northern hemisphere snow cover was the lowest it had been since satellite measurements began in 1972.[318] He went on to briefly mention resulting changes in the physical U.S. environment: ". . . for the most part, the winter snow season now begins a little later and ends a little earlier in the northern United States and Canada". Stevens immediately added a longer rider giving greater salience to scientific uncertainties:

> It is too early to tell whether the shrinking snow cover in North America, Europe and Asia results from natural climatic variations or from global warming that many scientists believe will result from a continuing buildup of carbon dioxide and other heat-trapping chemicals in the atmosphere . . .
>
> (Stevens 30 October 1990)

"Many scientists" and "believe" are substantially less certain than the categorical language of the IPCC's 1990 report from its Science Working Group:

> We are certain emissions resulting from human activities are substantially increasing the atmospheric concentrations of the greenhouse gases . . . these increases will enhance the greenhouse effect, resulting on average in an additional warming of the Earth's surface.
>
> (Intergovernmental Panel on Climate Change 1990a, xi)

Even as early as 1990, *New York Times* 'Science' section writers tended to echo the 'sceptical' lobby's misleading argument that because there remained scientific uncertainty

[318] (Stevens 30 October 1990)

about the effects, certainties about the fundamental physical processes causing global warming must also be suspect.

Similarly, global physical risks of sea level rise and increasingly severe storms were given very low salience, while scientific uncertainties were given greater emphasis. An article on a global scientific effort to track Antarctic icebergs to better determine the direction and strength of currents in the Southern Ocean briefly referred to the risks of sea level rise and immediately implied that these risks were not at all certain: "[Melting of the] Antarctic ice sheet . . . would greatly alter the earth's sea level and climate. At present, this ice sheet is believed to be more or less in equilibrium " (Browne 16 October 1990). Without accompanying expert advice about scientific certainties of the processes which were causing global warming and changing climate and which were expected to disturb the equilibrium of ice sheets, the reader could well be left with the impression that such a substantial global change was highly unlikely.

7.4.4 1990: Conclusion

In 1990 the *New York Times* 'specialist' and 'local' sections curtailed and minimised the risks of global warming and climate change, even in the naming of the environmental risk. News writers referred to it almost entirely as "global warming", with virtually no mention of the climate change which IPCC experts advised inevitably would follow the warming of the atmosphere (and which was featured in the very title of the IPCC: the intergovernmental panel on *climate change*, not *global warming*). Re-naming the risk permitted news media writers to narrow their focus to the cause of the problem—increasing human emissions of greenhouse gases—and to ignore expert warnings of its effects of potentially catastrophic increases in climatic extremes and sea level.

News selector attention focused on potential political actions to regulate for emission reductions. Little attention was paid to a much wider range of potential actions which could reduce emissions if initiated by individual industries, and at regional, local and individual

levels.[319] Such actions were not on the political agenda and were not raised by *New York Times* journalists.

Perhaps because news media value conflict, much of the *New York Times* news selection focus turned to the most controversial aspects of this environmental risk: aspects of potential solutions which were most strongly resisted by industrial and ideological lobbies. Because news selector attention was on a narrow range of controversial options for political regulatory action, expert warnings of specific national and local physical risks to human health and safety, and ecological and environmental integrity were minimised. The consequence of this neglect was that associated expert advice for the urgent development of strategic adaptation and emergency planning was also ignored—as were innovative technological solutions.

In 1990, apart from the 'NY-Region' section's mention of saltwater contamination of coastal aquifers and wells, there was no selection of IPCC information about the physical threats which sea level rise and increasingly severe storms, rainfall and droughts were likely to pose to industrial, governmental and domestic buildings, or to transportation, telecommunications and utilities infrastructures. Having framed the risk as almost entirely a matter of social world political discourses, news selectors appear to have accepted their own definition. This permitted them to exclude any dissonant expert advice which involved consideration of changes to the physical world which might directly affect the physical or financial wellbeing of *New York Times* audiences.

7.5 1995: Selective distortion of information

In 1995 there was growing expert documentation of physical manifestations of global warming and climate change being experienced globally and in the U.S. In that year, for example, ". . . the most active hurricane season in the Atlantic ocean since 1933" affected south-eastern U.S. states and the Caribbean (World Meteorological Organization 1996, 4)

[319] From 1990, the full IPCC reports advised on the potential for major emission reductions with greater energy efficiency. They also covered a range of other options, including energy generation from industrial wastes; co-generation (also described as "combined heat and power) plants; improvements in agricultural management practices which could significantly increase quantities of atmospheric carbon returned to soils and trees; urban design techniques which could reduce and capture atmospheric carbon. See all IPCC Working Group Three reports from 1990.

while ". . . intense heat and humidity" in central and eastern U.S. and ". . . severe forest fires" in Canada caused more than 1000 deaths (World Meteorological Organization 1996, 6). *New York Times* 'specialist' news selectors appear to have been unable, in 1995, to imagine the risk as pertaining to the physical world inhabited by their audiences.

The growing strength of sceptical arguments in 1995 is seen in the near-total absence of information about global warming and climate change in *New York Times* 'specialist' and 'local' sections in that year. In 1995, the 'Science' section was the only 'specialist' section which selected information about this environmental risk. It was ignored entirely by the 'local' NY-Region section. It would appear that in 1995 most 'specialist' sections assumed that the risk was irrelevant to the interests of *New York Times* audiences: further evidence of an overall framing of the issue as political but not physical.

7.5.1 1995: 'Science' section

In 1995 the 'Science' section, which was the only 'specialist' section to touch on the issue, framed it as politically controversial. Its journalists attempted to address contemporary arguments being promoted by the 'sceptical' lobby by providing concrete evidence of physical planetary changes. Three stories briefly mentioned global warming and climate change, with main themes on different topics. One of these noted a recent increase in glacier retreat;[320] one drew connections between climate change and accelerating species extinctions.[321] Both topics appealed to contemporary U.S. discourses. The idea of melting glaciers fed into contemporary discourses on global warming and climate change, providing credible evidence, for non-experts, of warmer temperatures. Information about worldwide species extinctions appealed to contemporary ethical and environmental discourses which held that it was desirable to preserve the diversity of the natural world. The third article which briefly mentioned global warming and climate change[322] appealed to national pride in U.S. scientific and defence force capability, and also invoked non-expert understandings that when temperatures warm, ice melts. As the headline explained: "Navy Is Releasing Treasure

[320] (Simons 19 December 1995)
[321] (Stevens 25 July 1995)
[322] (Broad 28 November 1995)

of Secret Data on World's Oceans". The main theme was the value of the extensive oceanographic data collected by the U.S. Navy during the Cold War. Although global warming was mentioned only briefly in this long feature article, it was given some salience, being chosen to explain how submarine data on the shape and depth of Arctic ice might be useful to present-day researchers:

> . . . such archival readings are seen as unrivalled yardsticks for judging long-term processes like global climatic change and planetary warming. Indeed, the Navy keeps decades of detailed readings on the thickness of the Arctic icecap, which is considered one of the most sensitive and reliable indicators of global temperature change.
>
> (Broad 28 November 1995)

As well as appealing to national pride in the U.S. Navy's capacity to gather useful data about the global environment, this explanation also gives salience to a physical impact which non-experts could readily understand: melting ice. Regardless of political contestation, it is difficult to gainsay such evidence of warming.

The three stories which took global warming and climate change as a main theme were all written by William K. Stevens.[323] His intention appears to have been to engage with sceptical arguments by providing credible information which supported IPCC assessments. These three stories rebutted dominant sceptical discourses: that even if it happened, global warming would have minimal impacts; that there was no evidence that global warming was even starting; and that in any case, any preventive action would be ruinously expensive.[324]

Stevens' first article within the analytical window, published on 15 August 1995, addressed the sceptical argument that even if global warming did happen, its impacts would be minimal. He reported recent scientific evidence which suggested that tropical ecosystems were much more sensitive to changes in temperature than had previously been believed. To establish the relevance of this evidence to contemporary discourses on global warming and climate change, he went to a prominent national scientific expert for comment,[325] quoting Dr James Hansen's opinion that the research validated IPCC estimates of how much warming would occur when carbon dioxide concentrations in the atmosphere had doubled.

[323] (Stevens 15 August 1995, 26 September 1995, 10 October 1995)
[324] See Chapter 4, Section 4.2.3.
[325] The news preference for national expertise rather than the internationally-based IPCC indicates the importance of the 'local' in establishing the credibility of expert advice.

The second article taking global warming and climate change as a main theme was one of the few over the entire analytical period which selected information about how climate change would affect the U.S. environment.[326] This story reported research by U.S. and Australian scientists which showed increases in ". . . drought, above-normal temperatures, wintertime precipitation and heavy rainstorms in many areas of the United States" from 1980–1994 (Stevens 26 September 1995).[327] The scientists involved had concluded that global warming had caused these increases. Stevens emphasised the credibility of the evidence with an implied appeal to national pride in the excellence of U.S. scientific research:

> The results from the former Soviet Union were inconclusive. Because the Russians have changed their techniques for observing and measuring rainfall many times . . . reliable data are available only for the last 20 to 25 years . . . In the United States, however, there was a clear pattern [from] 1910 to 1990 . . .
>
> (Stevens 26 September 1995)

Here, unusually, a longer-term context for contemporary expert alarm was selected, made more palatable to audiences by the insertion of an appeal to patriotism.

A third article focused on cost-benefit analyses which suggested that it would be far more economic to take action to reduce greenhouse emissions than to ignore the risks in the short to medium term.[328] This story acted as 'coverage of record' of the 1995 report from the IPCC's Third Working Group, which assessed possible ways of responding to climate change. The strength, in 1995, of discourses framing global warming and climate change as primarily a matter of economic debate is shown in both the headline: "Price of Global Warming? Debate Weighs Dollars and Cents"; and in the full text. Here, the journalist, William K. Stevens, canvassed various economic arguments and took a position of advocacy, arguing that it was cost-effective to reduce emissions in the shorter term, rather than delaying such actions.

[326] See Chapter 3, Section 3.13 discussion of **Tables 1** and **2**, which show a dearth of selection of national or local risks.
[327] Stevens did not include the information that heavier rainfall was one of the key indicators of climate change. All IPCC reports on the impacts of climate change explained that warmer temperatures meant more evaporation, and additionally a warmer atmosphere could hold more water, meaning heavier rain and snow when they fell.
[328] (Stevens 10 October 1995) For further discussion of this article, see Chapter 5, Section 5.4.2.

7.5.2 1995: Conclusion

The strength of sceptical discourses about global warming and climate change in 1995 is seen in the absence of any selections of information about the issue in any 'specialist' section apart from the 'Science' section, and in the similar absence of selections in the local 'NY-Region' section. *New York Times* editorial advocacy, encouraging audiences to assign some credibility to the issue, is seen in the preponderance of 'news' section stories which addressed global warming and climate change;[329] and in the 'Science' section's selection and salience choices. As the example of Stevens' advocacy over economic arguments shows,[330] 'Science' section stories confronted dominant sceptical discourses of uncertainty, and of disbelief that the risks could in any case be significant. They did so by giving salience to existing evidence of warming and climate change, and by directly contesting sceptical claims that any action to reduce greenhouse gas emissions would wreck industrial productivity and the national and international economies.

7.6 2001: Selective distortion of information

The content analysis shows that in 2001, the environmental risk of global warming and climate change appears to have fallen almost off the radar. Within the analytical window, the 'NY-Region', 'Science', 'Health' and 'Technology' sections published only one story each where global warming and climate change was taken as the primary theme. The 'Business' section published no stories with the environmental risk as a primary theme, instead making brief reference to it in four stories on the related topics of oil exploration, fuel efficiency and general pollution reduction. This scarcity of coverage suggests a journalistic assumption that there was little popular interest in the issue at this time. In 2001, social world discourses on global warming and climate change remained confused, with substantial doubts about the reality of the risk. These doubts were fed both by the 'sceptical' lobby and by social unwillingness to accept that human activity could change planetary processes.[331] Scholarly

[329] See Chapter 3, Section 3.11, **Chart 1**; also see Chapter 4, Section 4.3, **Chart 2**.
[330] Stevens 10 October 1995. For more detailed discussion of this story see Chapter 5, Section 5.4.2.
[331] See Chapter 4, Sections 4.2.3 and 4.2.12.

analyses of climate change discourses have also suggested that long-term environmental phenomena such as global warming and climate change are subject to the processes of the Downs issue-attention cycle.[332] Antony Downs (1972) argued that any issue, regardless of its importance to the social world, waxes and wanes in the amount of attention given to it by public opinion. It may be that by 2001 popular attention was fading from an issue which was represented in news mediations as being contested, uncertain and conceptually unpalatable.

7.6.1 2001: 'NY-Region' section

Chart 11 shows that in 2001, the 'NY-Region' section selected substantially more information about the physical risks of global warming and climate change than the 'specialist' sections. Apart from one summary article about an award made to local resident and noted climate scientist Dr James Hansen, which mentioned that "industrial pollution" would change climate,[333] all of the 2001 information about the physical risks of global warming and climate change was contained in one 'NY-Region' story published on the same day as the summary information about industrial pollution. This story was prominently placed as a feature article. Headlined "Global Problem, Local Alarm" (Rather 4 March 2001), it detailed risks threatening Long Island and potential strategies for dealing with these risks. Information available in the IPCC Policymakers Summary which was locally relevant was selected, along with IPCC advice on expected future temperature rises and their cause: increasing emissions of greenhouse gases. Unusually, Rather selected IPCC warnings about the almost-unprecedented nature of expected changes; even more unusually, he linked this temporal comparison to a local example:

> . . . the predicted temperature increase over the next century would exceed the cumulative global warming of the past 10,000 years, or nearly the length of time Long Island has existed.
>
> (Rather 4 March 2001)

[332] (Downs 1972; McComas and Shanahan 1999; Wilson 2000; Boykoff and Roberts 2007; Anderson 2009)
[333] (James 4 March 2001)

His story included extensive quotations from seven local sources who detailed local risks and vulnerabilities.[334] The news writer focus on a physical area inhabited by local audiences, and the selection of local expertise to give details of local risks, demonstrates the importance of the local in news selections of information about environmental risk. As Ungar theorised, if information cannot be explained as directly relevant to a news medium's imagined audiences (and if the authority providing the information is not also locally or at least nationally based) it will languish in a "public limbo" (Ungar 2000, 297), minimised or ignored by news selectors.

7.6.2 2001: 'Business' section

In 2001, the only information about global warming and climate change selected for the 'Business' section within the analytical window related to emissions. The issue was framed entirely as "global warming"—the cause. There was no reference to the climatic effects of global warming. None of the four stories published in the 'Business' section within the 2001 analysis window which included information about global warming took the issue as a main theme. Instead, it was mentioned briefly in stories about the potential exploitation of Canadian oil sands,[335] improving automobile fuel efficiency[336] and reducing automobile emissions;[337] and in one story detailing the cost benefits to businesses of reducing pollution.[338]

The story about oil sands exploitation devoted almost all of its space to positive representations of the development. It was prominently placed as the lead story on the front page of the 'Business' section with an even larger portion of the story continued on an inside page. The headline implied innovation: "Digging for Oil" (instead of the conventional

[334] Local sources consulted were: the executive director of the Long Island Regional Planning Board; a geologist working for New York Sea Grant, a local coastal research network; the U.S. Environmental Protection Agency; a Columbia University environmental scientist advising the Metro East Coast Regional Assessment, a group analysing local impacts of global warming; the president of the Group for the South Fork, a coastal conservation organization; the president of the Fire Island Association and chairman of the Long Island Coastal Alliance; and the city manager of Long Beach.
[335] (Brooke 23 January 2001)
[336] (Bradsher 20 February 2001)
[337] (Bradsher 16 March 2001)
[338] (Deutsch 9 September 2001)

"drilling"). The most prominent sub-heading reinforced the idea of innovation: "Canada is Unlocking Petroleum from Sand". A smaller sub-heading (". . . The company has sharply lowered the cost of extracting oil from sand") and a highlighted quote ("A method of getting oil once seen as too costly") emphasised cost benefits.

The photographs and graphics invited admiration of large enterprises, big machinery and strong workers. The photograph below the headline showed the extensive, towering structures of an extraction site, signifying large-scale and complex enterprises. One hard-hatted worker was shown walking past in the foreground: the hard hat connoting dangerous labour; the worker's movement connoting activity rather than stasis. A map showed the site of the development in the vicinity of the Canadian Arctic Circle, appealing to U.S. cultural mythologies of heroic exploration of remote and inaccessible locations. Another photograph showed two bulkily clothed workers bent over a piece of pipe connection, signifying strong workers able to handle big metal machinery. On the inside-page continuation, another photograph showed a huge mining truck loaded high with oil sands, with dust flying behind it signifying momentum and heavy weight.

The photographs and most of the text of this story represented exploitation of oil sands as beneficial and praiseworthy. There was no mention of the far greater global warming potential of oil sand exploitation compared with the conventional fossil fuels of oil and coal.[339] The summary mention of environmental concerns was a low-salience addition, included probably to satisfy the news ethic of providing balance in any story. It framed environmentalists as naturally in conflict with business interests:

> While the oil companies are racing ahead, though, Alberta's oil sands have also drawn the attention of environmental groups. . . environmentalists argue [that] the $22 billion invested here represents an enormous step in the wrong direction, prolonging North America's addiction to oil.
>
> (Brooke 23 January 2001)

Environmental concerns about the development were given just 12 per cent of the entire text, and were immediately followed by oil industry rebuttals. Since these rebuttals ended the article, they could be read as the last word: the correct conclusion, as opposed to environmentalist arguments.

[339] The IPCC's 2007 Working Group Three report on the Mitigation of Climate Change describes "oil sands, oil shales, heavy oils, and synthetic fuels from coal and gas" as "high carbon alternatives" which result in "increasing GHG [greenhouse gas] emissions" (Intergovernmental Panel on Climate Change 2007c, 13).

The other three 2001 stories in the 'Business' section which mentioned global warming framed fossil fuel emissions as an unavoidable by-product of essential and desirable industrial processes. One story on the development of hybrid cars framed the topic as a matter of U.S. competition with Japanese carmakers.[340] Environmentalist concerns about global warming were noted, but the risks of climate change were not mentioned. Another story on fuel efficiency represented emissions as an unavoidable side-effect of essential industrial and transportation processes:

> "Customers don't care about fuel economy, and they hardly care about emissions," Mr Oswald of DaimlerChrysler said . . . "We know that our product impacts air quality; the solution has to be high-volume, most-efficient vehicles" [said the vice-chairman of General Motors].
>
> (Bradsher 16 March 2001)

These quotes from automobile industry leaders re-framed the issue within much narrower parameters. Greenhouse gases were re-defined as yet another chemical in the air. Their connections with aberrant physical planetary systemic changes were ignored. No rationale for reducing greenhouse gas emissions was included in any 2001 'Business' section stories. There were no selections of information about physical risks, necessary adaptation and emergency planning—or about both threats and opportunities for business profitability.

7.6.3 2001: 'Science' section

The sparse coverage of global warming and climate change in the 'Science' section in 2001 framed the issue primarily as a matter of international political wrangling over emission reductions. In this year, the analytical window yielded just two 'Science' section stories which contained any mention of global warming and climate change, with a total of three selections of IPCC information altogether. In one lengthy article about a census of fish stocks in California's Monterey Bay,[341] half a sentence was given to the information that climate change could be partly responsible for the greater proportions of warmer temperature species found there compared with the 1930s.

[340] (Bradsher 20 February 2001: "Detroit's Answer to 'Hybrid' Cars")
[341] (New York Times 6 February 2001)

The story which took the environmental risk as a main topic focused on international political negotiations over a climate treaty, framing the issue as political and defining it tightly as a matter of emission reductions.[342] The United Nations Framework Convention on Climate Change[343] contains many more provisions than simply emission reductions. It refers, for example, to the need to avoid dangerous human interference with global climate; the need for adaptation planning in coastal zones, agriculture and water supply; and the need for technological development and assistance to developing nations. *The New York Times* 2001 'Science' section framing preferred a much narrower framing of the issue as a matter of controversial political attempts to force emission reductions on energy generators, industrial manufacturers and the transportation sector.

In this story, headlined "Bush Team Under Attack on Emission Talks", Andrew Revkin took an advocacy position, urging the [George W.] Bush administration to stop its delaying tactics which, the first sentence warned, risked leaving the U.S. ". . . on the sidelines" of international negotiations (Revkin 16 February 2001). This 'Science' section story used just two pieces of IPCC information, both geared towards advocacy of a political argument for action. One, a contribution to ethical arguments for action, was that the U.S. had five per cent of the world's population but produced a quarter of all global greenhouse gas emissions. The second appealed to political discourses doubting that humans could change planetary climate. In an apparent reference to the credibility of the information source, this representation of IPCC information credited scientists in general. "[N]ew scientific reports have shown the strongest link yet between recent warming and rising emissions of greenhouse gases." The IPCC was not named as the originating expert source of information in this story, which was primarily about international treaty negotiations. In not crediting the IPCC (which is mandated to inform climate treaty negotiations), and in selecting only two information items from IPCC reports, the journalist appears to have conceptually separated the processes of political and physical worlds. Political discourses about abstract future possible actions were privileged; expert advice about the physical world was minimised. While Revkin's information selections implied criticism of U.S. governmental inaction, his failure to employ the large arsenal of facts about physical world changes contained in the 2001 IPCC reports suggests that political definitions of the issue rather than expert advice about the physical world directed his information selection and framing choices.

[342] (Revkin 16 February 2001)
[343] (United Nations 1992)

7.6.4 2001: 'Health' section

Within the analytical windows, global warming and climate change appeared for the first time in the 'Health' section in 2001, when an Associated Press report on the release of the 2001 IPCC Science Working Group was placed, somewhat surprisingly, in this section.[344] It related only indirectly to health issues, mentioning air pollution, drought and the risks of sea level rise for low-lying non-U.S. countries. As **Chart 11** shows, the selected information categories covered physical risks—all of them global—and the need for international agreement on emission reductions. There was no mention of any risks to the health or safety of people living in the U.S. While the first paragraph summarised the IPCC findings that human emissions were escalating the risks of worsening droughts and disasters, the second linked expert advice firmly to international political debates. "The report, which could spur stalled world negotiations on curbing greenhouse gas emissions . . ." (Associated Press 23 January 2001). Almost half of the text discussed the report's implications for political debates. The issue was framed as political, and a problem for 'others' not 'us'.

7.6.5 2001: 'Technology' section

Like the 'Health' section, global warming and climate change surfaced in the 'Technology' section for the first time in 2001, with, again, a single story about the issue. This feature article on wind power[345] contained three pieces of IPCC information. One noted that most electricity is generated in the U.S. by burning fossil fuels. Two further information selections noted both the benefits and the disadvantages of wind power, presumably fitting the ethic of balance. Nearly half the text was devoted to the disadvantages of wind power. This story noted that the Danish wind power industry was a world leader in the field. It failed to acknowledge that this market position had been gained in large part through initial government incentives and subsidies.

[344] (Associated Press 23 January 2001) See Chapter 5 Section 5.5 for further discussion of this story.
[345] (Lake 22 February 2001)

By 2001 the reports from the IPCC's Third Working Group had detailed a broad range of emerging and already commercialised technological developments which would significantly reduce greenhouse gas emissions. One half-hearted article on one source of clean energy in no way reflects the richness of expert advice readily available to journalists in 2001. For 'Technology' section readers, ideas of clean energy technologies (or of new energy efficiency technologies) were still, in 2001, conspicuous only by their absence.

7.6.6 2001: Conclusion

In 2001, the 'NY-Region' section included substantial detail of expected physical risks to the local environment, and to local health and safety. In contrast, the 'Business', 'Health' and 'Science' sections contained minimal information about the environmental risks of global warming and climate change, preferring to frame the issue as a matter of political and policy debate. This difference between 'local' and 'specialist' information selections suggests that news writers providing information for geographically placed audiences focus more on the concrete physical location inhabited by those imagined audiences. 'Specialist' news writers place their audiences in abstract, discursively defined locations.

2001 was the first time 'Health' and 'Technology' sections acknowledged the existence of this environmental risk. The one 'Health' section story fitted more comfortably into a 'news' or 'political' section, in that it summarised the official release of the IPCC's 2001 assessment of the science of climate change, and drew strong connections with international political negotiations over a climate treaty. The one 'Technology' section story which mentioned "global warming" managed to sit on the fence over the possible value to U.S. industry of adopting new energy technologies. Eleven years after the release of the first IPCC report, audiences of these latter two sections still were given little or no indication that the issue might involve physical risks to human, environmental or economic welfare. Nor were audiences informed that it probably would require new technological innovations which could be profitable for businesses in the medium to long term.

7.7 2007: Selective distortion of information

Chart 11 shows that 'specialist' and 'local' section selections of IPCC information rose dramatically in 2007, from 36 in 1990, 24 in 1995 and 51 in 2001, to 663 in 2007. This exponential rise indicates a news selector assumption that the issue of global warming and climate change had become a significant part of popular discourses. The biggest rise came in the 'Business' section, where information selections leapt from six in 1990, none in 1995 and six in 2001, to 193 in 2007. One reason for this rise may have been recent moves by prominent business leaders to provide substantial funding for global warming solutions.[346]

For the first time, the 'Business' section included information about physical risks, observed physical changes, human responsibility for global warming and climate change, and the need for adaptation planning. Also for the first time, 'Business' news writers made connections between fossil fuel emissions and the physical processes which then warm the atmosphere, and selected information about possible solutions to the risk. In another change from previous years, several stories attempted to re-define business discursive community ideas of environmentalists as being inevitably in conflict with business interests. Instead, environmentalists were framed as collaborative partners with business. While in previous years the environmental risk had been represented as inconvenient to businesses, in 2007 'Business' section news writers became advocates for action to reduce the risk. Their stories encouraged readers to accept that human emissions had created a long-term environmental risk and that preventive action was needed.

The 'NY-Region' section continued to be the only section to give salience to physical risks to local populations and environments; to select information about the long-term nature of global warming and climate change; and to warn about direct economic risks to local property owners.

'Health' section journalists continued to ignore the issue. The only stories about global warming and climate change placed in this section during the 2007 analytical windows were written by 'Science' section journalists reporting on the political implications of newly released IPCC reports.

[346] See Chapter 4, Section 4.3.2 for discussion of 2006 initiatives by Steve Bing, Richard Branson, Warren Buffet and Bill Gates.

The ‘Science’ section continued to select significant quantities of information about physical risks to other countries and to virtually ignore any risks or observed changes to the U.S. environment, climate and temperatures. The environmental risk was framed almost entirely as a matter of international political debates over emission reductions. While global political action to reduce emissions was (and is) important, both the 2007 IPCC report on the impacts of climate change and the annual statements on global climate from the World Meteorological Organization documented emerging physical risks to the lived environments, health and safety of *New York Times* audiences. IPCC experts continued to urge strategic emergency and adaptation planning to reduce or prevent future and escalating physical risks. In 2007, ‘Science’ section news writers selected six pieces of information about possibly needed adaptation planning. All of these related to other countries’ needs.

The ‘Technology’ section published one story within the analytical windows which mentioned global warming. This was an opinion piece rather than a news story, suggesting a ‘Technology’ section editorial assumption that the issue remained too contentious to warrant treatment as a credible topic. In the course of the article, David Pogue provided evidence of the strength of contemporary ‘sceptical’ discourses:

> Predictably, my account last week of . . . hydrogen-powered cars generated all kinds of angry naysaying . . . The “no such thing as global warming” crowd spoke up; the “global warming isn’t human-driven” contingent was heard from. Most respondents, however, simply called hydrogen cars a dead end.
>
> (Pogue 4 April 2007)

‘Technology’ section readers in 2007 appeared, from Pogue’s report of their comments, to doubt that global warming and climate change were an existing and evolving risk, and to doubt also that new technologies could reduce emissions and increase profitability for their developers.

7.7.1 2007: ‘NY-Region section

Chart 11 shows that in 2007 the ‘NY-Region’ section continued its consistent record, maintained throughout the analytical period, of framing global warming and climate change

as involving direct physical risks to the environments inhabited by its geographically defined audiences. Most 'NY-Region' information about the physical risks was contained in one story.[347] As in 2001, this story was published shortly after the official release of the IPCC's Third Working Group report on possible response strategies, although it related to the IPCC report on the impacts of climate change which had been released three weeks earlier. As in 2001, it required investigative work by the journalists involved to find and interview local experts about possible local risks. Its selections and framing came closer to the priorities of IPCC experts than any story in any other *New York Times* section in 2007.

George Hendrey and Stephen Pekar's mediation of IPCC and local expert advice framed the risks as sensational and short-term, but with a longer-term context. Inclusion of a longer-term perspective was implicit in the headline ("Local Forecast: Bad") and explicit in the first paragraph:

> The recent heavy storms that left downtown Manville, N.J., under 10 feet of water; filled the basements of Mamaroneck, N.Y.; and flooded rivers and downed power lines in Connecticut may have provided a glimpse of our future.
>
> (Hendrey and Pekar 6 May 2007)

Allan, Adam and Carter (2000) have identified the difficulties for news media focused on events and the short-term in providing audiences with information about environmental risks which often evolve gradually, and over a much longer time-span. This research has confirmed that news selections tended to ignore longer-term implications or contexts.[348] Hendrey and Pekar, unusually, selected the IPCC advice that climate change was a long-term phenomenon. Also unusually, they selected information about observed aberrations in temperature and climate and linked these with economic risks:

> These predictions and actual experience are already depressing property values in low-lying areas and making it more difficult for some homeowners in flood-prone areas to get insurance. As climate change progresses, the economic impact will only increase.
>
> (Hendrey and Pekar 6 May 2007)

Throughout the analysis period, actual and intensifying U.S. impacts were almost entirely ignored by *New York Times* news selectors. This story, however, identifies some of the physical and economic impacts being experienced by U.S. populations. Such impacts

[347] (Hendrey and Pekar 6 May 2007)
[348] See Chapter 3, Section 3.12.

probably fed the development of greater popular awareness of the risk compared with news media framings and selections.[349]

Hendrey and Pekar then moved to the need for emergency and adaptation planning. Their article ended by advocating improved local planning. "Facing up to climate-driven perils will require comprehensive regional planning. We must begin to . . . start investing now, to keep the region safe for this century" (Hendrey and Pekar 6 May 2007). The 'NY-Region' section's rare selection of expert warnings about the need for adaptation and emergency planning to reduce the impacts of a long-term risk supports the argument that a sense of geographical place and personal involvement are important if understanding of direct physical risks is to enter non-expert social world discourses.

7.7.2 2007: 'Business' section

'Business' section framings of global warming and climate change changed dramatically in 2007. Instead of the previous largely pejorative framing of the issue as a matter of inconvenient emission reductions or extra taxes, 'Business' news writers in 2007 took an advocacy position, explicitly encouraging their audiences to accept that human emissions were creating a significant and long-term risk and that action was needed. They also actively advocated for acceptance of economic and fiscal emission reduction policies.[350] For example, David Leonhardt's story about the acrimonious debate between British economist Sir Nicholas Stern[351] and economists from Yale University moved from reporting into opinion. Having reported the main points of the debate, Leonhardt offered his own opinion, declaring that the Yale economists' argument that future generations would be better able to afford to deal with climate change had a "weak link":

[349] See Chapter 3 Section 3.11.
[350] These selections dealt with carbon taxes, emissions caps, emissions trading and offsetting clean energy projects.
[351] Sir Nicholas Stern, an economic adviser to the U.K. Government, headed the commission which wrote the *Stern Review on the economics of climate change* (2006). This report described climate change as ". . . the greatest and widest-ranging market failure ever seen" and called for ". . . an urgent global response" (Stern 2006, i).

> No one knows whether this is true, let alone desirable, because no one knows what life will be like on a planet that is five degrees hotter . . . In other words, it's time for a tax on carbon emissions.
>
> (Leonhardt 21 February 2007)

This example demonstrates journalistic advocacy. It also demonstrates a continuing *New York Times* preference for focusing on solutions not causes, and for defining solutions within the very narrow parameters of emission reductions and extra taxes.

While solutions were for the first time the highest-frequency category of information selections in the 'Business' section in 2007 (**Chart 11**), closer examination shows that almost all solutions mentioned in this section fell into the categories of emission reductions and possible development of clean energy sources. Within the analytical window, it was only in 2007 that the 'Business' section gave any salience to the potential financial rewards of developing technologies which increasingly would be needed. One article by James Kanter pointed out that European alternative energy businesses were reaping large profits from earlier governmental support of research and development work.[352] By 2007, U.S. businesses were still in the very early pilot scheme stages of development of alternative energy technologies. By that stage, as Kanter's story makes explicit, European businesses were in full commercialisation and exporting mode. *New York Times* 'Business' section audiences still were not advised of the physical risks which sea level rise, more severe storms, heavier rainfall and intensifying drought might pose to industrial plants, transportation and communications infrastructure, and to overall business profitability. Nor were they advised of the opportunities which new technological developments or new management practices could bring.

One article advocated the idea that taking action on global warming and climate change could be profitable ("Foundation to Offer $100 Million to Deal With Global Warming": Lohr 2007). This article sourced, not a business practitioner but a charitable foundation: suggesting a news writer assumption that the business community itself still did not actively accept this idea. Little salience was attached to the need for adaptation and emergency planning, which was mentioned only summarily at the very end of the article:

[352] (Kanter 23 January 2007)

> The Duke foundation also plans to support research in strategies for adapting to climate change, which includes steps like protection from floods, building dikes and emergency evacuation plans.
>
> (Lohr 9 April 2007)

Neither the news writer (nor, presumably, the charitable foundation) mentioned negative economic impacts, or expert advice about ways to avoid or profit from these.

Human responsibility for starting global warming and climate change was mentioned for the first time in the 'Business' pages in 2007, with 17 such selections. However, this IPCC conclusion[353] was not credited to scientific experts: rather, it was presented as the opinion of the journalists: another example of advocacy, suggesting a news assumption that the idea that humans were causing global warming and climate change was not yet a significant strand in the preferred discourses of 'Business' section readers.

More 2007 'Business' section advocacy is seen in the attempted re-framing of the relationship between environmental and business discursive communities. In a story about a call for emission reductions made jointly by leading corporations and environmental groups,[354] collaboration (rather than conflict) between businesses and environmentalists was emphasised in the text and in the headline and graphics. The headline ("A Coalition for Firm Limit on Emissions") connoted a joining of disparate partners for a common cause: limiting the emissions causing global warming.[355] The photograph, taken two years previously, was of the head of General Electric and a World Resources Institute representative, seated in front of a conference banner reading "*eco*imagination". The age of the photo raises questions about the frequency (or infrequency) of occasions when business and environmental group leaders sat side by side. However, it may be that this somewhat dated photograph was chosen because the photograph editor liked the significance of the "*eco*imagination" strapline behind the two subjects, with its connotations of creative solutions to the problem and concern for the physical environment.

[353] See Intergovernmental Panel on Climate Change 2007a, 3: ". . . *very high confidence* that the global average net effect of human activities since 1750 has been one of warming" (Italics in original).
[354] (Barrington 19 January 2007)
[355] The limits to emissions envisaged here were well below the IPCC's 1990 recommendation of immediate 60-80% reductions. This coalition proposed ". . . reductions of 10 to 30 per cent over the next 15 years" (Barrington 19 January 2007).

7.7.3 2007: 'Health' section

Although **Chart 11** suggests that in 2007, the 'Health' section began devoting significant attention to the risks of global warming and climate change, closer analysis shows a similar pattern as 2001, where a news story about release of the IPCC's latest report was placed somewhat inappropriately in the 'Health' section.[356] All of the 'Health' section's 2007 information selections were contained in two politically-focused versions of the same story published in different editions on the same day.[357] Another version of the same story was placed in the 'News' section[358] and a further rewritten version appeared in the 'Science' section the following day.[359]

While the headlines changed with each version, some paragraphs were shifted around and quotes from experts were added or removed, the text of each of these four versions remained essentially identical. There were no direct references to human health risks, apart from a very generalised mention of ". . . eventual inundation of coasts and islands inhabited by hundreds of millions of people". The advice of experts on changes to the physical planetary environment was linked firmly to international political negotiations, as the headline of one version demonstrates: "Global politics shift as experts say warming is setting in" (Kanter and Revkin 6 April 2007b). In all versions, the issue was framed as global, political, and of little concern to U.S. audiences.

The placing of two versions of the same story in the 'Health' pages suggests that the 'Health' section might have been being used as something of a trash bag by news editors short of space in other sections. Since patently there was room in the 'Health' section for two stories repeating information provided to readers of the 'news' and, a day later, 'Science' sections, it is puzzling why more specific information about risks to human health and safety was not developed. The 2007 Science Working Group's Summary for Policymakers documented observed adverse health impacts of climate change relevant to U.S. audiences.[360] It warned of

[356] (Associated Press 23 January 2001) See Chapter 5, Section 5.5, also Chapter 7, Section 7.6.4 for further discussion of this story.
[357] "Global politics shift as experts say warming is setting In" (Kanter and Revkin 6 April 2007b); "International report details impact of global warming" (Kanter and Revkin 6 April 2007c).
[358] "Earth is already struggling with impact of global warming, experts say" (Kanter and Revkin 6 April 2007a).
[359] "Scientists Detail Climate Changes, Poles to Tropics" (Kanter and Revkin 7 April 2007).
[360] ". . . such as heat-related mortality in Europe, infectious disease vectors in some areas, and allergenic pollen in Northern Hemisphere high and mid-latitudes [1.3, 8.2, 8.ES]" (Intergovernmental Panel on Climate Change 2007b, 9).

increasing future risks, both generally[361] and with specific reference to North America.[362] This Summary for Policymakers also urged policy initiatives:

> Critically important will be factors that directly shape the health of populations such as education, health care, public health initiatives and infrastructure and economic development.
>
> (Intergovernmental Panel on Climate Change 2007b, 12)

All of this information could be considered relevant to *New York Times* audiences interested in issues directly related to their own health. The absence of such information in the 'Health' section, even in 2007, suggests that 'Health' section selectors imagined the issue as abstract but not as concretely impinging on the health of U.S. populations.

7.7.4 2007: 'Science' section

In this section, global warming and climate change continued to be framed as global, a matter of international and national political debate, and a problem for 'others' rather than for U.S. populations. The 282 'Science' section information selections published in the analytical windows around release of the 2007 IPCC reports were contained in 26 stories. Social world constructions of the risk were preferred; observed and expected manifestations of a physical phenomenon in the physical worlds of *New York Times* audiences were given far less attention. The paucity of information about local or national risks suggests strongly that even in 2007, 'Science' news selectors still imagined the risks to their own audiences as theoretical rather than physical.

All information categories in **Chart 11** received 'Science' section selector attention in 2007, with the most frequently selected category being that of physical risks. Closer examination

[361] See Intergovernmental Panel on Climate Change 2007b, 12: ". . . increased deaths, disease and injury due to heatwaves, floods, storms, fires and droughts; . . . increased frequency of cardio-respiratory diseases due to higher concentrations of ground-level ozone related to climate change; and, the altered spatial distribution of some infectious disease vectors."

[362] "Cities that currently experience heatwaves are expected to be further challenged by an increased number, density and duration of heatwaves during the course of the century . . . Elderly populations are most at risk . . . Coastal communities and habitats will increasingly be stressed by climate change impacts interacting with development and pollution . . . Current adaptation is uneven and readiness for increased exposure is low" (Intergovernmental Panel on Climate Change 2007b, 15).

reveals that this information largely detailed physical risks to other countries. For example, in a story about the accelerating melting of the Greenland ice cap,[363] a low-salience reference to the implications of such melting for sea level rise, placed well down in the story, devoted 70 words to discussion of the potential risks to other countries' coastal and deltaic land, followed by just 17 about the impacts on one part of the U.S. " 'Here in Miami,' Dr Leatherman said, 'we're going to have an ocean on both sides of us' " (Rudolf 16 January 2007). If that extent of sea level rise were experienced in Miami, the corresponding risks to vast swathes of U.S. coastline would be huge. Yet, this national implication was not addressed at all. Rudolf returned immediately to changes being observed in Greenland. Another later story about the accelerating melting of mountain glaciers worldwide[364] did not mention that the IPCC had documented exactly such melting of U.S. glaciers.[365]

The three exceptions where a 'Science' section story's primary focus was on observed or expected risks to U.S. populations, industries or environments involved changes in wild and cultivated species: unfortunate for the natural world but non-disastrous for human populations. In these stories, news writers focused on the likely extinction of the Bay checkspot butterfly because of warming temperatures;[366] the likely reduction of grizzly bear numbers in the Rocky Mountains because warmer temperatures meant proliferating beetles which ate more pine nuts, denying that food source to the bears;[367] and a change in plant species suitable for gardens in specific regions because of warming temperatures.[368]

The second most frequently selected 'Science' section information category was social world discourses about whether or not human emissions were responsible for creating the risk. Human responsibility for the environmental risk had been detailed in every IPCC report since 1990. To IPCC experts, human responsibility was not news. The frequency of such 'Science' section selections demonstrates a news selector assumption that for the social world, this expert conclusion remained debatable.

Even as disastrous weather extremes continued to afflict the U.S. (and continued to be documented in World Meteorological Organisation annual statements), IPCC warnings of the need for planning to avoid or adapt to physical hazards were selected the least frequently.

[363] (Rudolf 16 January 2007)
[364] (Dean 30 January 2007)
[365] (Intergovernmental Panel on Climate Change 2007b, Chapter 15.2.2.1: Mountains).
[366] (Zimmer 23 January 2007)
[367] (Petit 30 January 2007)
[368] (Dewan 3 May 2007)

Chart 11 shows that information categories related more closely to social world constructions of 'reality': international ethics, possible benefits of global warming and climate change, remaining uncertainties about the credibility of scientific advice and potential solutions each received at least twice as much 'Science' section news selector attention as the need for strategic adaptation planning. For example, one story about Hurricane Katrina pitched as providing something different from the by-then stale news of the resulting destruction and suffering chose to focus on new information that the hurricane had felled or damaged 320 million trees, thus emitting large quantities of carbon to the atmosphere.[369] Emissions continued to be the most prominent way that global warming and climate change were defined. A 'new' angle on Katrina could have provided readily available expert information on escalating physical extremes and ways of protecting other similarly vulnerable communities and environments against future damage. Such stories were not found in *The New York Times*. **Chart 11** shows that even in 2007, the 'Science' section selected very little information on emergency and adaptation planning. Virtually all of this minimal information related to other countries rather than to the U.S.

Within the 2007 analytical windows, the 'Science' section also published two stories which focused on clean energy developments: twice as many as the 'Technology' section. Both represented such developments as future possibilities rather than available contemporaneously. One, on wind power,[370] demonstrated the same lack of enthusiasm as the 2001 'Technology' section story on the same topic discussed earlier in this chapter.[371] Wald's 5 May 2007 story was about a National Academy of Sciences report which said that wind power would reduce greenhouse gas emissions but would not help acid rain or urban smog. The headline ("Wind Farms May Not Lower Air Pollution, Study Says") and first sentence chose to emphasise wind power's inability to deal with other air quality problems, rather than its ability to reduce global warming. As discussed earlier in connection with car manufacturers' attempts to blur the risk by confusing it with other more general environmental problems,[372] defining global warming as a more general matter of air pollution ignores specific atmospheric processes and climate consequences. Over-simplification and over-generalisation dilute and diminish the dangers posed by this particular environmental risk. The other 'Science' section story with a primary theme of clean energy focused not on

[369] (Fountain 20 November 2007)
[370] (Wald 4 May 2007)
[371] (Lake 22 February 2001. See Chapter 7, Section 7.6.5)
[372] See earlier in this chapter, Section 7.4.2.

commercially proven new technologies but on the future potential of genetic modification of trees to increase biofuel production.[373]

The 'Science' section also published nine stories covering official release of IPCC reports. All framed the issue as in need of urgent action, but as a global problem with no local impacts. There was one brief mention that drought might increase in south western regions of the U.S. Since 2000 the World Meteorological Organization had been reporting widespread and intensifying drought in these and other regions of the U.S., along with increasingly deadly and damaging wildfires.[374] News writers ignored events already taking place in the U.S.—further evidence of an inability to imagine that a political issue could also directly and physically affect U.S. populations and environments.

Instead, the IPCC reports were linked firmly with their impact on international political negotiations over a climate treaty, as seen in the 'coverage of record' of the IPCC's final Synthesis Report.[375] In this story, the second sentence noted ". . . important risks if governments fail to respond". The news writer later selected a quote from a leading U.S. climate scientist to emphasise political rather than scientific matters: " 'This should light a fire under policy makers,' Dr Oppenheimer said" (Rosenthal 17 November 2007).[376] Even in 2007, with the IPCC and the World Meteorological Organization both documenting worsening climatic impacts on U.S. populations, environments and industries, *New York Times* 'Science' section selectors treated the issue as abstract rather than concrete, related to social world political discourses but not to the physical world inhabited by *New York Times* audiences.

7.7.5 2007: 'Technology' section

Within the 2007 analytical windows, just one story in the 'Technology' section mentioned global warming and climate change: an opinion piece on hydrogen-fuelled cars which contested the contemporary strength of "naysaying" discourses on global warming and

[373] (Pollack 20 November 2007)
[374] (World Meteorological Organization 2001, 2002, 2003, 2004, 2005, 2006, 2007)
[375] (Rosenthal 17 November 2007)
[376] See Chapter 5 for further discussion of the political framing of 'coverage of record' of IPCC reports.

advocated for large-scale development of zero emission cars.[377] The opinion writer, David Pogue, ended his column with a quote from *Popular Mechanics* which argued that "Though the price tag will be steep, we can't afford oil's environmental, economic and political drawbacks any longer" (Wise 1 November 2006, cited in Pogue 4 April 2007). It is an indication of the enduring strength of 'sceptical' arguments that the opinion writer felt the need to bring in another presumably authoritative source to support his arguments—and that that source was not the IPCC, whose credibility still was contested by the sceptical lobby, but an apparently 'factual' national magazine. As with the 2007 'Science' section', this single 'Technology' section story noting the existence of global warming as a risk framed its solutions as technological, involving emission reductions alone, and as a matter for future commercial developments rather than the wider uptake of a broad range of currently available technologies. Technological innovations which could aid adaptation and emergency planning were not selected.

7.8 Conclusion

Ulrich Beck has discussed the social construction of risk, observing that risks can be ". . . changed, magnified, dramatised or minimised within knowledge" (Beck 1992, 23). Apart from news selectors responsible for the 'NY-Region' section, the environmental risk appears to have been imagined by *New York Times* selectors and writers as not connected to the physical world inhabited by their audiences. This chapter's analysis of which IPCC information was selected for 'specialist' and 'local' sections shows that readers of each section were offered representations of the risks of global warming and climate change which at times were substantially different.

Analysis of section placements of IPCC information further confirms the qualitative and quantitative findings of Chapters 4, 5 and 6: that little news selector attention, in any section, was paid to expert warnings about direct risks to the health, safety and economic security of *New York Times* audiences or U.S. populations in general. 'Science' section readers were told about a sensational global problem which was not represented explicitly as also involving

[377] (Pogue 4 April 2007; also see earlier in this chapter, Section 7.3.)

local risks. ‘Business’ section readers mostly received information about regulatory and fiscal attempts to reduce emissions—usually with no supporting explanations of expert certainties about the physical processes causing the risk, or the expected threats to human health and property, and to business practices and profitability. The ‘Health’ section entirely ignored expert advice about risks to the health of people living in the U.S.; the ‘Technology’ section similarly ignored expert advice about a wide range of emerging and commercialised technologies which could reduce impacts of the environmental risk, increase business profits and contribute to political discourses about potential actions.

U.S. industry was not well served by *New York Times* preferences for defining the issue as political and abstract. There were no warnings about direct risks to industrial processes and infrastructure from sea level rise and increasingly severe storms, floods, erosion, wildfires, droughts and heat waves. It could similarly be argued that the lack of *New York Times* interest in alternative energy technologies or new adaptation and emergency reduction technologies hampered U.S. business chances of profiting from these technological developments. Development and commercialisation of such solutions requires industrial involvement and, as the European examples suggest, initial government intervention. For *New York Times* audiences, and for governmental and industrial decision makers, these potentially profitable business developments remained virtually invisible throughout the analysis period. Instead, readers of the various ‘specialist’ sections were presented with a cacophony of understandings about a concrete physical risk which became, through news media information selections and placements, controversial and confused strands of abstract social world discourses.

This chapter (and Chapter 4’s analysis of information selections made by ‘news’ and ‘political’ sections) shows that news organisational practices can unnecessarily hamper clear communication of information which is highly relevant to audiences’ lives. Selecting different aspects of a complex issue for different newspaper sections should not automatically mean that the overall representation of that issue is distorted or unbalanced. News sections (and journalists) can and at times do work together, taking a ‘mosaic’ approach to a complex issue. The key to coherent construction of a mosaic representing an issue in all of its complexity is to include all the parts of that issue. This research shows that news selections from expert advice were skewed. Expert explanations of the rationale for their concern were selected only infrequently. Expert warnings of direct risks to health, safety and economic prosperity were all but ignored. In the main, news selectors chose information according to its

relevance to political definitions of the issue. As a consequence, audiences were disadvantaged. They did not receive information about physical changes which inevitably would affect their health, and their economic security. Nor did they receive explicit expert advice on emergency and adaptation planning which could reduce both physical and economic risks.

Blame for the failure to fully or even adequately inform human populations of a looming physical risk does not lie entirely with the news media. The news media are focused on their audiences and if audiences are not interested in a topic, news selectors will only infrequently raise it. The lack of follow-up stories arising from the few times that direct impacts on U.S. populations and environments were mentioned in *New York Times* stories suggests a news selector assumption of a lack of audience interest in this aspect of the subject. Although Chapter 3 shows that popular discourses were faster to connect changes in the physical environment with global warming and climate change, compared with politically-based news media discourses,[378] these direct audience experiences of changes were mostly non-disastrous, involving warmer summers, heavier rain and changes in suitable garden plant varieties. It may be that until global warming and climate change begin to have near-disastrous impacts on particular populations, the non-expert social world pays little attention to the risks, no matter how severe they might be in the longer term.

[378] Chapter 3, Section 3.11.

CHAPTER 8 Conclusion

When human activities sparked the beginning of global warming and climate change, it took human society more than two decades to accept that these environmental risks were soundly understood by scientists; that they would cause large-scale and at times catastrophic changes in climate and sea level; and that urgent action was needed. This thesis research combined risk and media analysis to establish why it took the social world so long to accept that dangerous changes were developing in the physical world. It traced the information flow from experts to non-experts by examining the scholarly literature, and then closely comparing the scientific advice of the Intergovernmental Panel on Climate Change with selections from these reports made by *New York Times* journalists. The statistical analysis found that *The New York Times* represented the issue as a sensational problem for other countries which was controversial politically, but had no direct connection with the lived worlds of its audiences. The literature review found that climate scientists ignored non-experts' primary source of information about science—the news media—preferring to leave it to policy makers to communicate scientific information to non-expert publics.

The news media are a key component in the information flow. A review of the literature across Science and Arts scholarly fields found that most information about science reaches the non-expert public via the news media. Analysis of *New York Times* selections from the official Intergovernmental Panel on Climate Change expert reports shows a strong journalistic preference for selecting and emphasising information relevant to contemporary political discourses, to the detriment of information about human health, safety and economic security. *New York Times* news selectors gave little attention to well-founded scientific advice about the inevitabilities and scale of the risks of global warming and climate change to human populations, environments and economies. Throughout the 1990s, they entirely ignored similarly well-founded and detailed advice about potential actions to reduce or remove these risks. From 1990 to 2007, global warming and climate change were framed as 'political but not physical', 'global but not local', a problem for 'others' but not 'us'.

In *New York Times* stories, the 'real world' was constructed as the concerns of the social world—the world of human existence and interactions with other humans. Developments in the physical world—the physical planetary systems which sustain life on Earth—were not considered 'real'. From 1990, the IPCC gave detailed warnings about specific risks to the

health, safety and economic security of U.S. populations, and detailed advice about reducing these risks. The *New York Times* ignored almost all of this advice, even though it was directly relevant to *New York Times* audiences. Construction of 'the world' as predominantly social rather than physical illustrates risk theorist Ulrich Beck's observation that when faced with environmental risk, the social world engages in "organised irresponsibility", intently discussing everything but the physical reality of the risk itself. (Beck 1995, 69)

Climate scientists have long known that increasing emissions of greenhouse gases would warm the atmosphere. Climate science literature has long held that warmer temperatures would change climate and raise sea levels.[379] The first report of the Intergovernmental Panel on Climate Change, published in 1990, urged immediate action, both to reduce the emissions which were causing the problem, and to devise emergency and strategic plans to safeguard human health, safety and economic security. Initially, climate scientists were optimistic that human society would act swiftly to avoid catastrophe. Only a year earlier, the nations of the world had agreed to phase out the chemicals which were destroying the ozone layer, basing this agreement on incontrovertible scientific evidence.[380] It seemed that human society already had established a precedent for prompt and concerted action to preserve natural planetary systems which provide the essentials for life on Earth. In 1990 there was optimism on the part of climate scientists that similarly prompt action would avert the accumulating risks of global warming and climate change. The physical evidence was compelling, as was the scientific understanding of the catastrophic distortions in climate and sea level which would result from an increasingly warm planetary temperature. If human society had acted as promptly on global warming and climate change as it had on ozone depletion, the accelerating increase in warming gases in the atmosphere could have been stopped.

However, shortly after the release of the IPCC's 1990 report, the framing of this environmental risk changed. Instead of being understood as a matter of physical processes which inevitably would endanger human populations and economies, and natural environments, global warming and climate change became framed instead as an issue which was political, theoretical and uncertain: a matter of political debate but not of practical planning or action. For more than two decades, action to protect human populations was deferred. Human society debated whether or not there really was a problem. Greenhouse gas

[379] Weart 2007; Arrehnius 1896; World Meteorological Organization 1986. See also Chapter 4, section 4.2.1
[380] The ozone hole above Antarctica was discovered by the British Antarctic Survey in 1985. The Montreal Protocol on Substances that Deplete the Ozone Layer was agreed in 1987 and entered into force in 1989.

emissions continued to rise. The accumulating impacts of climate change and sea level rise continued to inflict increasing damage and destruction on human health and safety, and on the natural ecological systems on which human life depends.

Scholarly literature from the fields of climate science, discourse analysis, environmental science, geography, history, psychology and risk analysis shows that the reasons for human society's slow reaction to the risks included the influence of a well-funded and politically well-connected 'sceptical' lobby,[381] and a general reluctance to accept that human actions could change physical planetary systems.[382] Both of these influences could have been reduced if the social world had adequately understood the soundness of scientific understanding of the physical processes causing the change. These scientific understandings, however, were not adequately communicated to the social world. Responsibility for this communication failure lies both with scientists, who avoided the social world's primary information supplier: the news media; and with journalists, who focused on the intricacies of political debates to the exclusion of considerations about warning their audiences about dangerous developments in the physical world.

At the start of this investigation, it was apparent that there were impediments to the smooth flow of information between experts and non-experts. The scholarly literature in the fields of discourse analysis, journalism studies and science communication shows that while scientists are the primary definers of information about physical planetary processes, it is the news media who are the primary definers of scientific information for the wider non-expert social world.[383] This research therefore focused on the transfer of information between scientists and the news media. The analysis closely compared information contained in official reports about global warming and climate change issued by the Intergovernmental Panel on Climate Change, and news selections from these reports, published by *The New York Times*. The IPCC was selected because it is the global expert body on climate change, mandated to report to the United Nations General Assembly.[384] *The New York Times* was chosen because

[381] Demeritt 2001; van den Hove, Le Menestral and de Bettignies 2002; McCright and Dunlap 2003; Antilla 2005; Carvalho 2005, 2007; Bolin 2007; Oreskes 2007; Anderson 2009; Oreskes and Conway 2010. See also Chapter 4, section 4.2.3
[382] Swim et al. 2011. See also Chapter 4, section 4.2.12
[383] Wilson 2000a; Suleski and Ibaraki 2009; Pew Research Center's Project for Excellence in Journalism 2010. See also Chapter 3, section 3.2
[384] Agrawala 1998a. See also Chapter 3, section 3.4

journalists and other media use it as a primary source of information about scientific issues.[385]

The scholarly literature examining the sources of scientific information which appears in the popular media has found that while people get most of their information about science from television, firstly, and then from the Internet,[386] most of the original sources of scientific information for other popular media remain the news media and, usually, the 'prestige-press' 'quality' print news media. *The New York Times* is also used by scholars as a significant source of analytical information: almost all other scholarly analyses of U.S. news mediation of scientific information about climate change include *The New York Times* in their analysis.[387] This thesis research therefore adds to the existing literature which examines how *The New York Times* dealt with scientific information about climate change.

This methodology adds to existing scholarly understanding by examining not only news mediations of IPCC information, but also the IPCC information itself. All other content analyses of news mediations of climate change examined for this thesis reduce the available scientific information to a handful of summarised themes. They then use their selected news media as their primary objects of analysis, identifying summarised themes in specific elements of news media texts—headline, preferred speaker, page placement and/or the first paragraph and occasionally several ensuing paragraphs in the news text. No content analysis examined for this thesis considers all of the details of individual news media texts. Nor do they use the IPCC reports themselves as primary objects of analysis. This thesis research differs from existing scholarly research in quantitatively comparing the extensive range of information contained in the IPCC reports with journalistic selections from this advice. The methodology involves cumulative analysis which aims to confirm research results by using three sequential analytical approaches: qualitative analysis of IPCC reports and *New York Times* stories sourced from these reports; quantitative comparison of *New York Times* selections from IPCC reports with IPCC priorities; and qualitative examination of individual *New York Times* texts to confirm or illuminate trends evident in the quantitative comparison.

[385] Martin and Hansen 1996; Wilson 2000a; Bennett 2012: 215. See also Chapter 3, section 3.2
[386] (National Science Board 2010)
[387] McComas and Shanahan 1999; Nissani 1999; Carvalho 2000, 2005, 2007; McCright and Dunlap 2000, 2003; McManus 2000; Zehr 2000; Väliverronen 2001; Dimopoulos and Koulaidis 2002; Bucchi and Mazzolini 2003; dispensa and Brulle 2003; Weingart, Engels, and Pansegrau 2000; Boykoff and Boykoff 2004; Brossard, Shanahan, and McComas 2004; Brossard and Shanahan 2006; Antilla 2005; Schuck and De Vreese 2006; Boykoff and Boykoff 2007; Boykoff and rajan 2007; Boykoff and Roberts 2007; Boykoff and Mansfield 2008; Boykoff 2008; Liu, Vedlitz, and Alston 2008; Olausson 2009; Sampei and Aoyagi-Usui 2009.

The intensive nature of this research revealed substantial differences between scientific and journalistic information preferences.

Climate scientists gave priority to evidence of dangerous changes in physical processes, based on long-term historical records and projections of long-term future changes. *New York Times* journalists preferred aspects of scientific advice which pertained to very short-term political discourses. Climate scientists framed the issue as global and physical, and likely to affect populations and environments world-wide. *New York Times* journalists framed it as global, largely political, and unlikely to affect *New York Times* audiences or U.S. environments. This finding supports other scholarly theories proposing that news selections are based on journalistic perceptions of developments in contemporary political and economic discourses;[388] and that journalists tend to prefer the definitions of an issue made by political decision-makers.[389]

The disparity between scientific and journalistic framings of the issue identified in this thesis research arose in part from a conflict between scientific values of careful scrutiny of physical processes and journalistic values of selecting new information which preferably relates to the political, the conflictual and the recently sensational.[390] It was exacerbated by scientists' insistence that their role in communicating information was to advise policy makers, leaving it to policy makers to advise the media and thus the wider social world.[391] Policy makers by definition must be aware of political discourses, as must journalists: particularly those employed by a politically-focused 'opinion-leading' medium such as *The New York Times*. The scientific reliance on policy makers to communicate information about a physical environmental issue, and an associated aversion to dealing with the news media, therefore predisposed their information to be treated as a matter of politics rather than a matter of fundamental physical processes evolving in the natural world.

The *New York Times* was chosen for this close analysis of news media selections from expert advice because it is considered exemplary: a news medium respected by other journalists and used by them as the source of information about scientific topics. This research focuses entirely on *New York Times* selections from IPCC reports. Other recent research suggests that the preference for politically relevant information, rather than priority expert advice

[388] Bennett 1996.
[389] Hall et al. 1978.
[390] Bennett 1996; Allan, Adam, Carter 2000. See also Chapter 3.
[391] Bolin 1994, 2007. See also Chapter 4, section 4.2.9.

about direct physical risks to audiences, property and economic security, may be a more widely manifested aspect of news media culture. Painter's (2010) survey of journalists attending the 2009 Copenhagen conference on climate change found that of more than 400 print news articles written by journalists from 12 countries, less than one-tenth focused primarily on the known science (Painter 2010). Painter's research, and analysis of research conducted for this thesis, both suggest that the journalistic preference for information which is 'new', 'immediate' or related to political discourses[392] appears to override the journalistic ethic of telling news media audiences what they need to know about their physical safety or their economic security, if a risk is not immediately imminent. If an issue is immediately political and also threatens physical risks to audiences in the medium to longer term, this thesis research and Painter's survey results suggest that the news media preference is to emphasise the immediate and the political, and to ignore or minimise longer-term and potentially disastrous physical impacts.

The scholarly literature shows that non-experts—including policy makers—get most of their information about science from the popular media; and that the popular media, including journalists working for other news media outlets, get most of their information about science from newspaper stories written by respected science specialist journalists.[393] At a time when news media organisations are cutting back journalistic jobs and reducing the time available for journalists to specialise in particular fields, the remaining elite newspapers which retain journalists who specialise in science have a significant responsibility to represent scientific information accurately. This thesis research finds that *New York Times* misrepresented a physical environmental risk, framing it as political rather than as an imminent threat to the health, safety and economic security of *New York Times* audiences, and wider U.S. populations.

Misrepresentation of this physical risk arose because of an inherent conflict in the different focuses of journalists and scientists. Both professions aim primarily to establish 'the facts', but journalists are focused on the social world, while the focus for scientists is the physical world. The scholarly literature suggests strongly that journalists must provide information which catches their audiences' attention, otherwise their news product will not be popular and

[392] See Section 3.12

[393] Gerbner, Gross and Signorielli 1981; Fahnestock 1986; Friedman, Dunwoody, and Rogers 1986; Nelkin 1987; LaFollette 1990; Nelkin 1994; Bucchi 1996; Beck 1999; Wilson 2000; Wilson 2000a; Allan 2002; Bucchi and Mazzolini 2003; Boykoff and Boykoff 2004, Cook, Pieri et al. 2004, Mythen 2004; Brossard and Shanahan 2006; Suleski and Ibaraki 2009; Pew Research Center's Project for Excellence in Journalism 2010. See also Chapter 3, section 3.2

will not survive in the marketplace.[394] Scientific experts are not focused primarily on attracting audience attention. Rather, their priority in providing information on an environmental risk is to report new developments in their understanding of the processes of the physical world. These different focuses explain many of the significant differences between IPCC and *New York Times* representations of the environmental risks of global warming and climate change.

The literature shows that audiences actively engage with media texts, but only if their attention is engaged in the first place. It also shows that familiarity and relevance attract.[395] Consequently, when scientific information may directly affect the social world, journalists attempt to establish its relevance to their audiences by establishing connections between developments in the physical world and the lived world of their non-expert audiences. Information is selected according to its news values, which detail reasons why audiences might pay attention to that information in the first place.[396] These values place high priority on information which is new and, if possible, sensational and conflictual, since all of these factors are assumed to attract the attention of audiences. Additionally, the news media, and particularly those news media such as *The New York Times* which perceive themselves to be opinion-leaders in political and economic discourses, assume that they have a responsibility to inform their audiences about discursive developments in these areas. In the case of global warming and climate change, this perception skewed journalistic selections of expert information about the processes of the physical world. Examination of the information flow shows that scientists, journalists and policy makers all demonstrated Ulrich Beck's "organised irresponsibility": scientists were reluctant to engage with non-experts' primary sources of scientific experts; policy makers focused on international treaty negotiations to the exclusion of the safety and economic security of their own populations; and *New York Times* journalists neglected physical and economic risks to their audiences.

Expert priorities were to advise policy makers and, it was assumed, therefore the wider social world, that global warming was inevitable and that this would cause near-unprecedented and dangerous changes in climate and sea level. These expert priorities were re-arranged by *New York Times* journalists to fit their assumptions that their audiences were primarily interested

[394] Fiske 1987; Väliverronen 2001; Grossberg et al. 2006. See also Chapter 3, section 3.5
[395] Fiske and Hartley 1978; Hall et al. 1978; Hall 1981; Fahnestock 1986; Williams 1990; Beck 1992; Wynne 1992; Fairclough 1995; Allan, Adam, and Carter 2000; Fiske 2001; Väliverronen 2001; Dimopoulos and Koulaidis 2002; Bird 2003; Myers 2003; Zinken 2003.
[396] Tuchman 1978.

in news about political and economic discourses.[397] The 'sceptical' lobby had framed global warming and climate change as scientifically uncertain and politically controversial, and recommendations for emission reductions as economically disastrous.[398] This 'sceptical' framing circulated in many political and industrial discourses. This analysis shows that *New York Times* journalists framed their stories and selected expert information which was relevant to those discourses. Selecting information relevant to contemporary political and economic discourses is valid, particularly for an opinion-leading newspaper which is expected to provide information on such discourses. However, two factors were missing from these framing and selection decisions, and these two factors compromised journalistic ethics.

First, a misinterpretation of the news ethic of providing 'balance' for any story, encouraged by the 'sceptical' lobby,[399] combined with the news value assigned to conflict, encouraged journalists, mistakenly, to give equal weight to the arguments of this political lobby, and the evidence-based findings of the IPCC.[400] Other scholars have pointed out that the news ethic of providing 'balanced' information does not ensure that the 'right facts'[401] are reported, particularly in stories about scientific understandings of the physical world.[402] This thesis research shows clearly that where an environmental risk is perceived by the news media to be politically controversial, journalistic framings and selection choices heavily prefer political definitions of the risk over scientific definitions. Boykoff and Boykoff (2004) showed that a distorted understanding of the news ethic of 'balance' encouraged journalists reporting on the issue of climate change to give equal or greater coverage to 'sceptical' lobbyists whose credentials were political rather than scientific. The journalistic preference for information relevant to political and economic controversies, and the journalistic ethic of 'balance' resulted in misinformation about a physical risk.

A second, related factor is that the journalistic ethic of telling audiences what they need to know was compromised by the *New York Times* preference for political definitions of the risk. This political preference, with its ensuing minimisation of actual physical changes taking place or about to take place, endangered the health, safety and economic security of *New York Times* audiences. From 1990 onwards, the IPCC reports gave high priority to

[397] See Chapter 4, sections 4.2.5, 4.3.1, 4.4; Chapter 5, section 5.7; Chapter 6, section 6.3.4.
[398] Boykoff and Boykoff 2004; Anderson 2009. See also Chapter 4, sections 4.2.3, 4.2.5, 4.2.7.
[399] McCright and Dunlap 2003; Boykoff and Boykoff 2004. See also Chapter 4, section 4.2.3.
[400] Boykoff & Boykoff, 2004. See also Chapter 4, section 4.2.5.
[401] Miller and Reichert 2000.
[402] Anderson 2009.

warnings about substantial risks to U.S. populations and environments, and associated advice on ways of avoiding or reducing these risks. Readers of *The New York Times*, including the non-expert public, journalists from other news media, and participants in political and economic discourses, received little or no information about these imminent and substantial physical risks. Nor did *New York Times* readers receive similarly well-substantiated scientific advice on how to reduce or prevent these risks.

The journalistic preference for selecting information about political developments was further encouraged by the value assigned by the news media to information which is novel, immediate and sensational. These news values help ensure that the "news", which by definition implies an expectation of novel and recent information, will attract audiences by offering new and interesting information.[403] 'New' information about political discourses can arise daily or even hourly. 'New' information about global warming and climate change develops over much longer time-frames, unless the 'news' relates to short-term natural disasters such as storms, floods and wildfires. Having once informed audiences that a long-term environmental risk appeared inevitable, and that this would have increasingly severe consequences for human populations, environments and economies, *New York Times* journalists appear to have shifted their focus to the day-to-day changes in political discourses, since these represented novelty, as opposed to increasingly detailed expert advice about risks which had already been mentioned in earlier news stories.

This analysis shows that scientists and journalists assigned very different values to contemporary events and their contexts over the longer term. *New York Times* journalists showed virtually no interest in expert information about the historically unprecedented nature of contemporary global warming, or the expert expectation that its impacts would develop over very long time-scales of decades to centuries.[404] Such long-term contexts provided the rationale for repeated IPCC warnings that the risks were great, and that urgent action was needed to reduce or avert such risks. The journalistic preference for novel information about recent events, and the obstruction which these news values pose to the provision of clear information about longer-term risks, has been identified in the scholarly literature. Allan, Adam et al. have noted the differences between journalistic and scientific perspectives of environmental risks, suggesting that the news media are "event-centred" rather than "issue-sensitive" (Allan, Adam, and Carter 2000a, 9). Kitzinger's (1999) review of the literature

[403] See Chapter 3, sections 3.1, 3.4, 3.12, 3.14
[404] See Chapter 3, section 3.12. See also all IPCC reports (1990, 1995, 2001, 2007).

discussing news mediations of environmental risks established that the news values of providing information about immediate events, local situations or events which involved well-known local identities were given priority in news media treatments of scientific information about physical risks. News organisational processes also play a part. Wilson (2000) has pointed out that the daily pressures of the 24-hour news cycle mean that journalists tend to overlook "the underlying causes and long-term consequences" of longer-term environmental risks. Statistical analysis of journalistic selection preferences supports this existing literature. It shows that the journalistic preference for new or recent information substantially discouraged selection of scientific certainties about the very long-term nature of the risks.

Out of 1797 separate selections of information over the 17-year analytical period between 1990 and 2007, only 26 related to information about the long-term future risks of global warming and climate change, and even fewer—15—mentioned the long-term historical context which demonstrated the unprecedented nature of contemporary global warming.[405] To climate scientists, comparison of contemporary atmospheric conditions and temperature with the very long-term historical record provided compelling proof that global warming and climate change were a significant global risk which required urgent action. To journalists, salience was due primarily to information about the novel and the 'now'. Information about the past did not fit those criteria.

Kitzinger's (1999) finding that news selectors preferred information immediately relevant to local situations or personalities , combined with the preference for immediacy, is supported by this thesis research. Such information is seen by news selectors to represent 'sensational' information. These news values of sensationalism, a preference for locally relevant and recent information, and a strong tendency – identified in this thesis research – to frame any issue as political rather than physical, appear to have combined to discourage *New York Times* journalists from paying attention to likely U.S. threats. Expected global impacts included large-scale flooding of low-lying deltaic land in Bangladesh and China, the total inundation of small island atoll nations, and the melting of the Arctic. *New York Times* journalists chose to highlight these risks to other countries, rather than more slowly developing threats to U.S. environments, populations, property and economies. Set against expected changes in U.S. environments, the expected impacts on 'others' appeared far more

[405] See Chapter 3, section 3.12

sensational: particularly since the problem was perceived by news selectors as theoretical rather than physical.[406]

IPCC warnings of increasing drought in the U.S. south-west, increasing coastal erosion and intensifying storms, floods, wildfires and heat-waves were virtually ignored by *New York Times* journalists until 2007.[407] Almost two decades of incontrovertible evidence of the increasing severity of these 'natural disasters' is available in the IPCC reports, and in the World Meteorological Organization's annual reports on global climate. Over the entire analytical period, only 37 references to specific U.S. impacts were made in *New York Times* stories about global warming and climate change. Damage to coastlines, and flooding and erosion of essential infrastructure such as roads, rail, power lines and sewerage infrastructure would likely be costly. Expected substantial reductions in U.S. agricultural production might be considered relevant to commodity futures traders and that country's wider agricultural industries. It is curious that despite the *New York Times*' preference for information related to political and economic discourses, these significant risks to economic security and industrial profitability were only rarely selected for U.S. audiences. It is tempting to speculate that *New York Times* journalists were somewhat overwhelmed by the 'sceptical' framing of the issue as political but not physical, and a problem for 'others' but not 'us'.

All IPCC reports from 1990 contained detailed advice about a wide range of expected U.S. impacts. They provided extensive detail of potential emergency and strategic planning, potential remedies and available technologies which would prevent or reduce risks to human health, safety and economic security. Over the entire 17-year analytical period, almost none of these details were selected in *New York Times* stories. This is paradoxical, considering that one strong reason for the on-going profitability of the news media is the public perception that the news media provide credible and accurate information which is relevant to the lives of their audiences.[408] It is of concern that despite the journalistic ethic of telling audiences what they need to know, direct risks to the health, safety and economic security of U.S. populations were minimised or ignored; and that detailed expert advice about ways of coping with these risks similarly was ignored.[409]

[406] See Chapters 4 & 5.
[407] See Chapter 3, Table 1, section 3.13
[408] See Chapter 3, section 3.3. See also Boykoff and Mansfield 2008.
[409] See Chapter 5.

This research shows that *New York Times* journalists, whether its science specialists or its general news writers, gave more weight to political and economic discourses than they did to information priorities established in the more specialised discourses of internationally respected climate scientists.[410] IPCC experts gave priority to their certainties concerning fundamental physical processes and their inevitable impacts on global temperatures, climate and sea level. *New York Times* journalists gave priority to IPCC information which related to political discourses. These different priorities resulted in a skewed framing of the issue for *New York Times* audiences, permitting the issue to be represented as primarily political rather than primarily a matter of indisputable physical processes. The opinion-leading role of the *New York Times*, with its emphasis on political and economic issues, appears to have dissuaded its journalists, even the specialist science writers, from selecting priority expert advice about changes in physical systems which increasingly would threaten human populations, their environments and their economies.

Instead of aligning its framings of the issue with the priorities of IPCC experts, the *New York Times* framed the issue overall as political but not directly relevant to the U.S., except where carbon taxes or emission reductions might threaten business profitability. Until 2007, most *New York Times* stories about global warming and climate change were placed relatively evenly in the 'News' and 'Political' sections. The majority of these stories either followed the preference of the political discursive community to frame the issue as theoretical and a matter of political debate, or represented it as a sensational threat to the populations and environments of other countries. This overly political representation of a development in the physical world did not adequately inform *New York Times* audiences about the extent of scientific certainty about the inevitabilities of global warming and climate change as increasing amounts of warming gases were emitted to the atmosphere. It caused *New York Times* journalists to omit or significantly neglect expert warnings about direct risks to the health and safety of U.S. populations, the stability of natural environmental systems and the economic prosperity of its industries and agricultural enterprises.

Coupled with a general *New York Times* preference for information relevant to political and economic discourses even though global warming and climate change arise for physical, not political reasons, the various 'specialist' sections also provided their readers with quite

[410] Chapters 5, 6 and 7 show substantial differences in preferred information between IPCC scientists and *New York Times* journalists.

different framings of the issue. This explains in part why there was such a cacophony of understandings about the risk in U.S. discourses.

Throughout the analytical period, the 'Science' section ignored specific IPCC advice about expected U.S. risks and potential solutions and preventive planning strategies. Most 'Science' section framings followed the pattern of the 'News' and 'Political' sections, representing the risk as global, theoretical and some other country's problem. 'Science' section writers did pay some attention to possible solutions to the problem, but their selections from the wide range of IPCC recommendations were narrowly focused on emission reductions and international treaty wrangling between nations. Only in 2007 did the 'Science' section pay a small amount of attention to the IPCC's on-going warnings about direct risks to human health and safety, and the urgent need for emergency and adaptation planning.

Stories in the 'Business' section framed the issue as almost entirely a matter of controversial regulatory and fiscal policies to reduce emissions. IPCC priority information about expert certainties of fundamental physical processes which were being set in motion by increasing amounts of warming gases in the atmosphere appeared only occasionally in 'Business' section stories. Explicit IPCC advice about risks to business profitability and agricultural productivity was not mentioned. Nor did the 'Business' section contain any selections of IPCC advice about technological and planning developments which could reduce risks and economic losses.

Readers of the 'Health' section received no information about potential risks to human health and safety in the U.S., even these were extensively documented in all IPCC reports. Expected droughts in the South-west of the U.S., with their food supply implications; or explanations of why storms, floods, erosion and wildfires would intensify in a warming world with a resulting escalation in risks to human populations and property were not mentioned in the 'Health' section throughout the analytical period. There was no mention of expert advice about the types of emergency and adaptation planning which were urgently needed.

For 'Technology' section readers, the problem might well not have existed at all. Out of 474 news stories which mentioned global warming and climate change and which were published within the analytical windows between 1990 and 2007, just two appeared in the 'Technology' section. Although there was a wealth of information in all IPCC reports since 1990 about promising or already developed new technologies which would reduce the risks and, in many

cases, improve business profitability, almost none of this information was selected for 'Technology' section readers.

Throughout the analytical period, the only section to devote a small amount of attention to direct risks to local populations and environments was the local 'NY-Region' section. This indicates the importance of place and the personal: the 'here' and the 'me'. Local news tends to relate to a geographically placed audience, rather than, as in all other *New York Times* sections, an audience which is discursively located, ascribing to particular discourses circulating in politically or socially placed discursive groupings. A preference for information about physical changes when they relate to a geographically placed environment appears also to connect to a *New York Times* preference for sourcing information from nationally based climate scientists, rather than from the internationally credible IPCC.[411] This finding supports Kitzinger's 1999 finding that in reporting environmental risk, the local is prioritised. It may be that journalists assess information about physical environmental risks as more relevant to their audiences if the effects will impact locally; or if the information source is perceived to be local or national rather than international. In both cases, geographical proximity appears to be important. This understanding may benefit future attempts to improve the communication of scientific information about environmental risks to the non-expert social world.

Overall *New York Times* information selections analysed for this research also showed a clear preference for information sources which were nationally based, rather than sources explicitly connected to the internationally-based IPCC. Analysis of the frequency of selection of particular items of information contained in the IPCC reports found that *The New York Times* cited the IPCC as the originating source of information about global warming and climate change in just over half the overall number of information selections. For the twenty most frequent information selections, this proportion was even lower: just 35 per cent of these most frequently selected pieces of IPCC information cited the IPCC as the source.[412] This analysis did not quantitatively assess sources cited, apart from recording whether or not the IPCC was mentioned as a source. However, qualitative analysis of original news stories revealed that while in many cases where the IPCC was not mentioned, the sources were political or industrial leaders, in many other cases scientists working for U.S. based institutions and universities were cited instead. Just as local physical changes were preferred

[411] See Chapter 6, section 6.3.5
[412] See Chapter 6, sections 6.3.5 and 6.3.6

over political discursive connections, local or national scientific expertise also was preferred over international expertise.

Until 2007, only the geographically-focused 'NY-Region' section of *The New York Times* paid any attention to expected physical risks to local populations and environments.[413] Throughout the analytical period, IPCC sources tended to be either ignored or else re-designated as nationally-based scientists. These related findings suggest that a greater emphasis on communicating IPCC information about local or national risks, and on using national or local scientific expertise to communicate these risks, could substantially improve non-expert understandings of how to prepare for the inevitable threats posed by global warming and climate change. Locally, regionally or nationally organised briefings for news media would allow journalists writing for geographically placed audiences to inform their publics about specific threats and specific remedies. A risk framed as local rather than global is more immediate, and more likely to be acted upon. If policy makers – particularly planners such as emergency and disaster experts, engineers, architects and infrastructure designers – were also involved in these briefings, planners would be better informed about local and national risks and remedies, and perhaps more comfortable about dealing with journalists. The result would be the greater short and long-term safety of populations, the infrastructures on which they depend, and their economic security. Another result would be more satisfactory fulfilment of the journalistic ethic of telling audiences what they need to know, to ensure their safety and security.

Three further areas where this research has revealed a clear need for improvements are the IPCC reluctance to engage directly with the news media;[414] the preference, on the part of both news media and policy makers, to frame global warming and climate change as political rather than physical; and the lack of involvement of Humanities and Arts scholars in climate change research.

Global warming and climate change threaten the health, safety and economic security of human populations world-wide. Populations and their policy makers will not enact changes or prepare for looming risks unless they are clearly aware of the basis and the implications of those risks. The scholarly literature shows that people get most of their information about scientific issues from the media and, in particular, from print news media which are expected

[413] See Chapter 7, sections 7.6.1 and 7.7.1
[414] Bolin 1994, 2007; Schneider 1997. See also Chapter 4, section 4.2.9

to provide relevant and credible information.[415] If the news media could be persuaded to accept that their preference for selecting political aspects of this environmental issue was detrimental to the wider health, safety and economic security of their audiences, and if climate scientists could be persuaded to provide more locally and nationally relevant briefings to journalists, the wider social world would be better informed about risks and potential aversive or preventive actions. It would be useful, for a start, for journalists to read the relevant sections of the IPCC reports dealing with their particular geographical regions, and with potential and already developed technologies and planning strategies.[416] It would be useful also for IPCC scientists to explicitly brief journalists, depending on the geographical location of their audiences, on these sections of the IPCC reports.

Climate scientists have a well-demonstrated aversion to dealing with the news media.[417] The literature review conducted for this thesis suggests that this aversion is irrational, and that it would be more logical, in the interests of improved communication to non-experts, for climate scientists to work more cooperatively with the news media.

Much of the responsibility for improving communication of information about risks and prevention strategies rests with the IPCC since it is the international advisory body on global warming and climate change. At the international level, when IPCC reports are released, the IPCC could schedule briefing sessions for journalists which were separated geographically, permitting more detailed and relevant information to reach national and local audiences. At national and local levels, the IPCC could develop a series of briefings which could be organised by environmental type, risk type, emergency and disaster preparedness needs, and technological and strategic planning options. With news media cooperation, such briefings would provide a far greater safeguard of human health, safety and economic wellbeing than is currently being achieved by climate scientists and the news media.

Collaboration between scientists, arts and humanities scholars and the popular media also would improve communication of expert understandings about physical processes and their implications for the social world. The IPCC pool of experts contains few representatives from the arts or humanities scholarly fields. These fields examine social behaviour and

[415] Wilson 2000a; Suleski and Ibaraki 2009; Pew Research Center's Project for Excellence in Journalism 2010. See also Chapter 3, section 3.2.
[416] See Chapter 5. *New York Times* journalists selected their information entirely from the more political Policymakers Summaries of the IPCC reports, ignoring a wealth of detailed advice about particular expected impacts on U.S. populations, environments and economies contained in the full IPCC reports.
[417] Bolin 1994, 2007; Schneider 1997; Henderson-Sellers 1998.S

motivation. Scholarly articles about social world understandings of global warming and climate change cited in the bibliography of this thesis span a wide range of academic fields, from cultural theory, discourse analysis, history and media studies, to climate science, geography, health research and science communication. Patently there already is substantial scholarly interest, in physical sciences, arts and humanities, in considering how the social world interacts with a physical risk. Yet, in inviting experts to join its investigations, the IPCC—a grouping of almost entirely physical scientists—considered only the academic field of sociology. Sociological theory permeates all of the Humanities and most of the Arts, just as mathematics permeates most of the Science specialties. Greater involvement of all academic fields which study human behaviour and thinking could clarify details about how the social world could most effectively deal with this environmental risk, and how experts could more effectively collaborate with the news media and other popular media to better inform non-experts about likely impacts, and potential remedial actions.

Information is power. When a global environmental risk threatens every local community, world-wide, it is important to communicate information about that risk to communities, regions and countries. If specific information about the likely local and national dangers of global warming and climate change remains the domain only of international climate scientists and policy makers; and if the news media continue to ignore or belittle likely local and national physical risks in favour of political controversies; then the residents of each environment which will suffer the impacts are deprived of information about those risks, and the power to take preventive action. If the blockages to communication of information about global warming and climate change identified in this research were removed, human populations worldwide would be safer and healthier, economic security would be stronger, and natural environments would be better able to continue production of the air, water and food which are essential to life on Earth.

Appendix One

Grouped variables: alphabetical order

- ***1 Adaptation planning needed:*** *Adaptation plus emission reduction both needed, Adaptation strategies – dike building – INM, Adaptation strategies – emergency evacuations – INM, Adaptation strategies needed, Adaptation strategies needed – INM, Beach renourishment option, Desalination plants combat water shortages, Developing country infrastructure projects must plan for climate change impacts, Drought-resistant crops need to be developed – INM, Flood protection structures planned, Flood protection structures planned – INM, Hard engineering coastal protection reduces vulnerability, Hard engineering coastal protection reduces vulnerability – INM, Long-distance water pipelines adaptation option for water shortages – INM, Medium to long term risk prevention strategies needed, Sea wall option, Sea wall option – INM, Soft engineering coastal adaptation options – INM, Vulnerable regions must adapt promptly to climate change and sea level rise, Wetland protection option.*
- ***2 Alternative energy sources needed:*** *Alternative energy sources needed, Alternative energy sources needed – INM, Biofuels reduce global warming, clean energy – biodiesel – INM, Clean energy – biomass, Clean energy – cellulosic ethanol, Clean energy – ethanol – INM, Clean energy – geothermal, Clean energy – geothermal – INM, Clean energy – hydroelectricity – INM, Clean energy – hydrogen fuel cells – INM, Clean energy – solar, Clean energy sources already cost competitive with conventional energy generation, Clean energy sources need to be developed, Clean energy sources need to be developed – INM, Electricity can be generated from wastes – INM, Hydro power is clean energy – INM, New energy technologies could reduce emissions – INM, New energy technologies would benefit economy, society, Nuclear energy would reduce CO_2 emissions, Nuclear energy would reduce emissions - INM, Renewable energy – ocean thermal conversion – INM, Renewable energy – solar – INM, Renewable energy sources needed - INM, Tidal power potential – INM, Wind power reduces greenhouse gas emissions, Wind power reduces greenhouse gas emissions – INM.*
- ***3 Alternative energy technology risks:*** *Biofuel production could reduce food production – INM, Biofuel production can increase greenhouse gas emissions – INM, Clean energy – current cost and development limitations – INM, Combined cycle coal gasification technology doubts – INM, Cleaner coal pulverisation technology doubts, Ethanol production can pollute more than CO_2, Liquefied coal produces more greenhouse gases – INM, Water supply reductions reduce hydropower generation, Wind power has negative impacts on the environment – INM, Zero-emission vehicles rely on fossil fuel electricity generation – INM.*
- ***4 Carbon capture risks:*** *Carbon capture goal generation technologies are energy-intensive – INM, CO_2 storage technologies not commercially available – INM, Oceanic fertilisation effectiveness uncertainties – INM, With warming, carbon sinks*

turn into carbon sources, With warming, carbon sinks turn into carbon sources – INM, With warming, some sinks absorb more carbon – INM.

- ***5 Carbon capture:*** *Carbon capture can be profitable – INM, Carbon capture technologies needed, Carbon capture technologies needed – INM, Carbon capture – underground or deep ocean – INM, Carbon sinks – ocean fertilisation – iron for plankton – INM, CO_2 storage reduces emissions – INM, Ecosystems absorb CO_2, Trees absorb CO_2, Trees absorb CO_2 – INM.*
- ***6 Cryosphere is melting:*** *Arctic ice is melting, Arctic seaways are opening, Cryosphere is melting, Cryosphere is melting, INM, Global warming responsible for recent cryospheric changes, Increasing ground instability in cryosphere regions, Kilimanjaro ice cap is melting, Larsen ice shelf is collapsing, Mountain glaciers melting faster - INM, Observed Antarctic ice sheet breakup, Observed reductions in sea ice, Observed shrinking glaciers, Observed shrinking glaciers – INM, Permafrost is melting, Polar ice sheets already melting, Polar ice sheets already melting – INM, Snow cover is shrinking, Snow cover is shrinking – INM.*
- ***7 Cryosphere will melt:*** *Arctic may become ice-free, Arctic seaways will become ice-free, Avalanche risk will increase, Cryosphere will melt, Cryosphere will melt – INM, Glaciers will retreat, Glaciers will retreat – INM, Snow cover will reduce.*
- ***8 Developed countries should act first:*** *Developed countries best able to deal with global warming, Developed countries best able to deal with global warming – INM, Developed countries should act first, Developed countries should act first – INM, Developed countries started global warming, Developed countries started global warming – INM.*
- ***9 Developed countries should help developing countries:*** *Developed countries should fund reductions in deforestation in developing world, Developed countries should help developing countries reduce climate change vulnerability, Institutional strengthening to address climate change, Most-vulnerable countries require assistance in improving resilience, Technology transfer – INM.*
- ***10 Economic and fiscal policy instruments:*** *Businesses aim to become carbon-neutral - INM, Businesses should develop global warming policies – INM, Carbon credits could offset air travel emissions, Carbon credits could offset air travel emissions – INM, Carbon credits offset emissions – INM, Carbon tax – INM, Carbon tax would reduce global warming – INM, Carbon trading to reduce emissions, Emission caps on polluting industries, Emission caps on polluting industries – INM, Emissions credit trading could cut climate action costs, Emissions credit trading could cut climate action costs – INM, Emissions trading reduces emissions, Emissions trading prevents crippling business costs – INM, Fossil fuel taxes needed – INM, Higher fossil fuel prices make clean energy more competitive – INM, Renewable energy projects offset fossil fuel emissions – INM, Social and economic behaviour changes needed – INM.*
- ***11 Economic and fiscal risks:*** *Action possible but costly, Carbon offset credits may prolong fossil fuel use – INM, Carbon credits often do not reduce emissions – INM, Climate affects the economy, Climate change will damage economy, Climate change will damage economy – INM, Climate change will disrupt some tourism industries,*

Cost-benefit analysis of value of action difficult or impossible, Home insurance in flood-prone areas will be difficult to obtain – INM, Ice-based businesses and sports face losses, Inaction expands later costs, Inaction expands later costs – INM, Increase in insurance industry losses – INM, Property values in low-lying areas will drop – INM, Rapid action unrealistic, Sea walls often too costly as option – INM, Ski industry decline expected – INM, Snow losses reduce tourism – INM.

- ***12 Ecosystem risks:*** *Coral reefs at risk, Coral reefs at risk – INM, Droughts will increase peatland fire frequencies, Droughts will reduce forest productivity, Expected damage to forests, Expected impacts on bird populations and migration – INM, Expected species extinctions, Expected species extinctions – INM, Extra atmospheric CO_2 also benefits weeds, pests, wildfires, Extra atmospheric CO_2 also benefits weeds, pests, wildfires – INM, Extra atmospheric CO_2 enhances plant growth – rebuttal – INM, Forest types will disappear, Global warming risk to ecosystems, Global warming risk to ecosystems – INM, High altitude ecosystem species composition changes expected – INM, More algal blooms in warmer world, More atmospheric CO_2 acidifies oceans, threatening marine ecosystems, More atmospheric CO_2 acidifies oceans, threatening marine ecosystems – INM, Natural ecosystems more vulnerable than farmed crops, Oceanic food chain risks – INM, Seasons will change, Seasons will change – INM, Urbanisation blocks species migrations – INM, Warmer temperatures cause species changes, Wetlands at risk, Wetlands at risk – INM.*
- ***13 Emission reductions needed:*** *Action needed to reduce greenhouse gas emissions – INM, Air transport CO_2 emissions must reduce, Air transport CO_2 emissions must reduce – INM, Current emission reductions are inadequate, Downsize big, inefficient cars – INM, Emission reductions could reduce impacts, Emission reductions needed, Emission reductions needed – INM, Emission reductions possible without major lifestyle changes, Existing technologies can significantly reduce emissions, Existing technologies can significantly reduce emissions – INM, Fossil fuel use – reduction needed, Fossil fuel use – reduction needed – INM, Hybrid electric cars reduce emissions – INM, Landfill gas reductions needed – INM, Manure burning reduces methane emissions – INM, Methane emissions from manure need to be reduced – INM, Motor vehicle fuel efficiency must improve, Motor vehicle fuel efficiency must improve – INM, Motor vehicles major CO_2 source, Motor vehicles major CO_2 source – INM, Motor vehicles one-third of all CO_2 emissions, Substantial emission reductions needed – INM, Sulfur hexafluoride emissions need to be reduced – INM, Transport-related emissions major source of greenhouse gases – INM, U.S. greenhouse gas emissions must halve by 2050.*
- ***14 Emissions are rising:*** *Air transport emissions could rise significantly by 2050, Atmospheric CO_2 increase since 1800s, Atmospheric CO_2 increase since 1800s – INM, Atmospheric methane higher than ever before – INM, China about to overtake U.S. as greatest emitter, China about to overtake U.S. as greatest emitter – INM, China about to overtake U.S. as greatest emitter but historically low emissions, China & India developing faster, emitting more than expected, CO_2 atmospheric concentrations continue to rise - INM, Developing countries' emissions rising sharply – INM, Doubling of atmospheric CO_2 difficult to avoid, Forest destruction increases*

*atmospheric CO_2 concentrations – INM, Imported food means more air transport emissions – INM, Methane emissions increasing – INM, Without action, CO_2 atmospheric concentrations continue to ris**e.***

- ***15 Energy efficiency:*** *Greater energy efficiency, Greater energy efficiency – INM, Greater energy efficiency cuts power costs – INM, Greater energy efficiency improves GDP, More efficient coal generation plants reduce emissions – INM, More efficient fossil fuel use – INM, Reduced energy use means lower emissions, Reduced energy use means lower emissions – INM.*
- ***16 Food resources will drop:*** *African crop yields expected to drop, Agricultural disruptions, Agricultural disruptions – INM, Agricultural production will reduce in tropics, Agricultural production will reduce in tropics – INM, Climate change will disrupt agricultural production, Developing country harvest losses expected, Fisheries disruptions – INM, Food shortages may increase, Food shortages may increase – INM, Increased risk of drought in U.S. crop region, More droughts expected in U.S. mid-west – INM, Pest outbreaks will increase, Pest outbreaks will increase – INM.*
- ***17 Fossil fuels cause global warming:*** *Coal generation major greenhouse gas source, Coal generation major greenhouse gas source – INM, Electricity generation in U.S. emits more CO_2 than vehicles – INM, Electricity generation major source of CO_2 emissions – INM, Fossil fuel burning causes climate change – INM, Fossil fuel burning causes global warming, Fossil fuel burning causes global warming – INM, Fossil fuel burning increases atmospheric CO_2, Fossil fuel burning increases atmospheric CO_2 – INM, Fossil fuel burning major source of CO_2 emissions, Fossil fuel burning probably causes global warming, Fossil fuel burning probably causes global warming – INM, Industrial sources of most pollutants - INM, Most electricity generated by burning fossil fuels – INM, Oil sands, synthetic fuels increase greenhouse gas emissions – INM.*
- ***18 Global warming benefits:*** *Agricultural production will increase in temperate regions, Atlantic currents could cool Europe – INM, Atlantic currents slowdown could cool Europe, Clouds can cool atmosphere, Coral reefs may adapt to global warming – INM, Developed countries using new technology to adapt to climate change, Expected longer growing seasons, Expected longer growing seasons – INM, Expected reduction in deaths from extreme cold, Expected reduction in deaths from extreme cold – INM, Extra atmospheric CO_2 enhances plant growth, Extra atmospheric CO_2 enhances plant growth – INM, Farmers will adapt, Farmers will adapt – INM, High latitude crop and forest yields will increase, Humans will adapt, Longer growing seasons expected in high latitudes, Longer growing seasons expected in high latitudes – INM, Observed reduction in extreme cold deaths, Particle pollution and volcanic eruptions reduced recent warming, Ski industry uses technology to adapt to less snow, Ski regions could become havens from summer heat, Some global warming benefits, Some human health benefits, Some short-term global warming benefits, Temperate and high latitude forests absorb sun's heat – INM, Warmer temperatures reduce heating power demands.*

- ***19 Global warming will change climate:*** *Expected regional rainfall changes – INM, Global warming will change climate, Global warming will change climate – INM, Global warming will change weather patterns.*
- ***20 Greater extremes expected:*** *Storm surges will be larger, Tropical cyclone frequencies may increase – INM, Bushfires will increase, Desert climates will become more extreme, Expected heavier rain when it falls, Expected heavier rain when it falls – INM, Expected increase in tropical storms, Expected increase in tropical storms – INM, Flooding risk increases, Flooding risk increases – INM, Flooding risk will threaten low-lying islands, Flooding risk will threaten southern Asia river deltas, Flooding risk will threaten southern Asia river deltas – INM, Future summers will be hotter, winters warmer, Global warming could intensify El Nino cycles, Greater weather extremes expected, Greater weather extremes expected – INM, Heat wave risk increases, Heat wave risk increases – INM, Heat waves will increase, Heat waves will increase – INM, Increased risk of droughts, Increased risk of droughts – INM, Mid-continental regions drier, Monsoons strengthen with global warming – INM, More droughts expected in Africa, More droughts expected in Mexico, More droughts expected in Middle East, More droughts expected in southern Asia, More droughts expected in U.S. Southwest, More frequent heavy rain and snowfalls, More rainfall in high latitudes, Northern hemisphere expected to warm more than global average, Southern Europe expected to become hotter and drier, Southwest U.S. will become drier, Storm risk increases, Storm risk increases – INM.*
- ***21 Greenhouse gases trap heat:*** *Animal methane emissions – INM, Atmospheric CO_2 traps heat, Atmospheric CO_2 traps heat – INM, CFCs are greenhouse gases, CO_2 major greenhouse gas, CO_2 major greenhouse gas – INM, Correspondence between computer models and observed temperature, Dry cleaning solvents produce greenhouse gas emissions, Forest burning increases atmospheric CO_2 concentrations, Greenhouse gases cause climate change, Greenhouse gases cause climate change – INM, Greenhouse gases cause global warming – INM, Greenhouse gases trap sun's heat, Greenhouse gases trap sun's heat – INM, Methane a major greenhouse gas – INM, Ozone-depleting chemicals also enhance global warming – INM, Peatland draining or burning increases greenhouse gas emissions – INM, Rising atmospheric CO_2 will warm planet, Scientific consensus – global warming inevitable, Scientific consensus – global warming inevitable – INM, Storms damage forests, increase emissions – INM, Warming increases tropospheric ozone pollution, Wood burning creates greenhouse gas emissions – INM.*
- ***22 Human activity responsible:*** *Human activities cause climate change, Human activities cause climate change – INM, Human activities cause global warming, Human activities cause global warming – INM, Human activities probably cause climate change, Human activities probably cause global warming, Human activities probably cause global warming – INM.*
- ***23 Human health risks:*** *Heat-related illnesses and deaths increase, Human health risks from temperature extremes - INM, Increase in environmental refugees, Increase in environmental refugees – INM, Increased human health risks, Increased human*

health risks – INM, Infectious disease risk is increasing – INM, Infectious diseases increase, Vector-borne diseases increase.

- ***24 Long-term phenomenon:*** *Climate change will evolve slowly over long time period, CO_2 atmospheric concentrations expected to increase for decades, Even radical action doesn't impact for decades, Future climate change will be greater, Future warming will be greater, Greenhouse gases are long-lived, Long-term global warming impacts inevitable, Long-term global warming now inevitable, Once started, climate change accelerates for decades and centuries, Once started, global warming continues for decades, Only about half total warming happens in next century.*
- ***25 Major climate change risks:*** *Business as usual means devastating impacts, Climate change major global risk, Global warming is a real and present risk, Major climate risks with doubled CO_2 concentrations, Major climate risks with doubled CO_2 concentrations – INM, More harm than benefits expected, More harm than benefits expected – INM, Potentially massive global risk, Potentially massive global risk – INM.*
- ***26 Observed aberrant warming:*** *Both land and oceans have warmed, Eleven of 12 warmest years since 1995, Global temperature rising, Global temperature rising – INM, Global warming has started, Global warming has started – INM, Global warming probably has started, Global warming probably has started – INM, More 20^{th} century warming than past thousand years, Nine hottest years on record in past 12 years – INM, Rapid warming since start of industrialisation, Record warming since 1980, Record warming since 1980 – INM, Satellite data show warming, Satellites record warming upper atmosphere – INM, Stratosphere has cooled, Unusually warmer winter - INM [four are global, nine relate to U.S.], 1990s warmest decade in past thousand years, 2006 fifth warmest year on record – INM.*
- ***27 Observed planetary changes:*** *Already negative impacts on wildlife, Already observed changes in ecosystems, Already observed changes in ecosystems – INM, Already significant global impacts, Climate change has started, Climate change has started – INM, Climate change probably has started, Coral reef bleaching increasing, Droughts are becoming longer, more intense in some regions, Droughts are becoming longer, more intense in some regions – INM, Global warming responsible for recent changes in oceans, Global warming responsible for recent ecosystem shifts, Global warming responsible for recent ecosystem shifts – INM, Global warming responsible for recent weather pattern changes, Global warming responsible for recent weather pattern changes – INM, Human-created global warming already changing physical and biological systems, Observed Asian river delta changes, Observed climate changes in Sub-Saharan Africa, Observed destruction of Amazonian rainforest, Observed earlier flowering times, Observed earlier insect emergence, Observed geographic shifts in crop species, Observed global impacts, Observed impacts consistent with scientific theory – INM, Observed increase in frequency of hotter days, warmer nights, Observed increase in wildfires – INM, Observed local sea level rise changes, Observed regional rainfall changes, Observed regional rainfall changes – INM, Observed small island impacts, Rainfall becoming heavier, Regional climates already changing, Sea levels are rising, Sea levels are rising – INM, Seasons are*

changing, Seasons are changing – INM, Strange weather consistent with climate science theory – INM, Warmer temperatures already affecting water supplies, Warmer temperatures already causing species changes, Warmer temperatures already causing species changes – INM.

- ***28 Past context shows gravity of risk:*** *CO_2 atmospheric concentrations higher than ever before – INM, Contemporary global temperature only 5 degrees Celsius warmer than last ice age, Contemporary global temperature only 5 degrees Celsius warmer than last ice age – INM, Doubling of atmospheric CO_2 produces more warming than past 20,000 years, Expected warmer planet than at any time in human history, Expected warmer planet than at any time in human history – INM, Global average temperature higher than past 10,000 years, Greater climate change this century than past 10,000 years, Ice cores – CO_2 & temperature correlation – INM, Ice cores – methane-climate connection – INM, More rapid temperature rise than past 10,000 years.*
- ***29 Poorest suffer most:*** *Developing countries contributed least to climate change, suffer most, Developing countries expected to suffer worse impacts, Developing countries more vulnerable to climate change, Developing countries more vulnerable to climate change – INM, Greatest risks for poorest communities and regions, Greatest risks for poorest communities and regions – INM, High adaptation costs for Africa, Poorest communities and regions most vulnerable, least able to adapt, Tropical regions vulnerable to warming.*
- ***30 Research and development needed*** *Major investment in new technologies needed, Major investment in new technologies needed – INM, More research and development funding for clean energy sources needed – INM, New building materials need to be developed, New technologies can reduce global warming risks – INM, New technologies for efficient water use needed – INM, New technologies will save us - INM, Technological developments could reduce emissions – INM.*
- ***31 Risks may be greater than experts advise:*** *Clouds produce warming feedback effects – INM, IPCC reports over-conservative in stating risks, IPCC sea level rise predictions exclude land ice melting, IPCC sea level rise predictions over-conservative on land ice melting impacts, Risk of abrupt shifts in climate, Risk of non-linear responses to warming, Risk of rapid melting of Antarctic ice sheets – INM, Temperature rise of 1.5C or more escalates risks.*
- ***32 Sea level rise expected:*** *Coastal dwellers at risk, Coastal retreat inevitable, Coastal roads and other infrastructure at risk, Coastlines at risk, Coastlines at risk – INM, Densely populated coastal regions at risk, Densely populated non-U.S. coastal countries at risk, Increasing beach erosion expected, Long-term sea level rise expected, Long-term sea level rise expected – INM, Long-term sea level rise threatens hundreds of millions, Low-lying islands at risk of increased flooding, sea level rises and storm surges, Melting glaciers and ice sheets raise sea levels, Sea level rise, Sea level rise – INM.*
- ***33 Uncertainties*** *Causes of global warming remain uncertain – INM, Computer models uncertain, Computer models uncertain – INM, Global warming might be happening – INM, Ice cores – CO_2 & temperature – rebuttal – INM, More research*

needed, More research needed – INM, Much uncertainty remains, Much uncertainty remains – INM, Rising atmospheric CO_2 might warm planet – INM, Scientific uncertainty can reduce awareness of risk – INM.

- ***34 Urgent action needed:*** *Action now reduces costs, Action now reduces later costs – INM, Action now reduces later damage, Drastic CO_2 reductions needed, Drastic CO_2 reductions needed – INM, Immediate 60-80% reductions needed, Urgent action needed, Urgent action needed – INM.*
- ***35 U.S. emissions relatively substantial:*** *U.S. emissions continue to rise – INM, U.S. greatest contributor of industrial greenhouse gases, U.S.,U.S.SR largest greenhouse gas producers – INM, U.S. – 5% population, 25% emissions, U.S. – 5% population, 25% emissions – INM.*
- ***36 Water supply reductions expected:*** *Climate change will disrupt water supplies, Climate change will disrupt water supplies – INM, Expected reduction in water resources, expected reduction in water resources – INM, Melting snow and ice reduce water supplies, Melting snow and ice reduce water supplies – INM, Shrinking glaciers will reduce fresh water supplies, Warmer temperatures increase water demand.*

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