A Critical Analysis of Global Warming coverage in the *National Geographic* (2000-2010)

Juanita Apostolis

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by

Juanita J. Apostolis

195119820

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Supervisor: Dr M Crous

DECLARATION

I, **JUANITA JOLEEN APOSTOLIS**, in accordance with Rule G4.6.3, hereby declare that:

- This treatise is the result of my own original research and that this work has not previously been submitted for assessment to another university.

- This research contained in this treatise is being submitted in partial fulfillment of the requirements for the degree Magister Artium in Applied Media Studies in the Faculty of Arts at the Nelson Mandela Metropolitan University in Port Elizabeth, South Africa.

- All sources used or referred to in this treatise have been documented and recognized.

I hereby give consent for my treatise, if accepted, to be made available to the Nelson Mandela Metropolitan University Library and for the title and summary to be made available to outside organizations.

SIGNED: Juanita J. Apostolis

……..

DATE: DECEMBER 2011

It was foretold long ago
That after Noah's deluge
The next destruction of the world
Would be by fire
And can't you feel the heat building up already,
The global warming up?
And so to fulfil the prophecy
Copenhagen is going to be
Just some more hot air
Presaging the sparks that would turn
Into the flames in which the world will be consumed
And then out of the ashes of ecocide capitalism
It won't be Christ on his second coming presiding
On Judgement Day
But Karl Marx returning like a revolutionary phoenix
Out of the ashes of the busting bubbles
Of the lopsided economies
Of our over-heated world*

- **Mbella Sonne Dipoko**

*Chief Mbella Sonne Dipoko was a popular Cameroonian writer and poet who was internationally known for his, often militant, writings. He wrote this poem in December 2009, just before the start of the UN Climate Change Conference in Copenhagen, three days before his death (*The Post Newspaper,* December 7 2009).

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ABSTRACT:

National Geographic is a magazine that inspires people to care about the planet through its articles of exploration, education, and conservation. Magazines are a significant source of knowledge and compete with a variety of other media, constantly rethinking where they can improve in comparison to other media. Research in this dissertation shows that some magazines offer high quality imagery for artwork, photos and advertisements, which remains critical for industries and readers. They often offer greater depth than radio, TV, or even newspapers, so that people interested in an analysis of news and events still depend on magazines for informative and general news. People often turn to media—such as television, newspapers, magazines, radio, and Internet—to help them make sense of the many complexities relating to environmental science and governance that (un)consciously shape our lives. Global warming, as a subject, demands both political and personal responses in all parts of the world, and effective decision making at both scales depends on timely, accurate information, according to Shanahan (2009:145). The quality and quantity of journalism about climate change will therefore be key in the coming years. *National Geographic* comprises a variety of themes, such as environment, science, wildlife, travel and photography. This study is an analysis of the writing and photography related to one theme - global warming. It provides a critical analysis of the coverage of the global warming discourse in one magazine, examined over an eleven-year period from 2000 to 2010. This theme is powerful in that it represents ethical responsibility and concern for nature and our world and the analysis attempts to define the objects of discourse within the coverage, thus, evaluating if the format of the coverage informs and educates the audience about global warming.

Key words: *National Geographic*, global warming, discourse analysis, media coverage, scientific writing versus populist journalism

CHAPTER 1

INTRODUCTION TO THE RESEARCH AND THEORETICAL FRAMEWORK

1.1 Introduction

Mass media, including magazines, are an important source of knowledge and *National Geographic* was selected for this study because of its renowned reputation as an informative magazine. According to the *National Geographic* website (www.nationalgeographic.com), it is a magazine that is seen as a global leader in empowering people to navigate the world, providing authoritative content that addresses today's complex issues, while uncovering the wonders of our time.

The website also states that the mission of the *National Geographic* Society, including the magazine, is to inspire people to care about the planet through its articles of exploration, education, and conservation. The main aim of this paper is to discuss and critically analyze various strands of discourse in the *National Geographic* coverage of global warming, and to present some results of the representation of global warming in the article content. The focus is an analysis of a selection of articles on global warming, over the period of 2000-2010.

The *National Geographic* Society is one of the world's largest nonprofit scientific and educational organizations. With a mission to "increase and diffuse geographic knowledge," the Society is dedicated to inspiring people to care about the planet. Its main objectives are research and exploration, to learn about the world, education, to share that growing knowledge with members and conservation, to encourage the protection of our planet, its people and its natural resources. (www.stateofthenewsmedia.org).

Throughout its 122-year history, *National Geographic* has encouraged conservation of natural resources and raised public awareness of the importance of natural places, the plants and wildlife that inhabit them, and the environmental problems that threaten them. The *National Geographic* brand touches around 250 million people worldwide. There are several versions of the magazine: the English-language editions and local-language editions produced as joint ventures with local publishing partners. Then there is the *National Geographic* Channel and the growing list of

related brands in the United States such as *National Geographic* Kids, Adventure and *National Geographic* Traveller (www.nationalgeographic.com).

According to Sean Flanagan, the worldwide publisher for the English-language edition, "'*National Geographic* started as a society, but evolved into a media company with a mission," (qtd in Aiken, 2004). This mission is funding projects such as expeditions or education outreach initiatives, including studies of shipwrecks such as that of the Titanic and educating women in Afghanistan. Aitken (2004) points out that:

> [t]o date, as part of the magazine's research agenda the society has funded more than 7,500 scientific research projects. Flanagan says 50 per cent of the United States sales force has been there for 15 years; few media owners can boast that kind of loyalty. It all comes back to the society's activities, which enrich the media brands. As Siegfried says: "When you buy *National Geographic*, you are buying a BMW; you wouldn't go into a BMW showroom and ask for a discount. Quality is not cheap.

1.2 Research context

When a search was compiled to list all of the articles on 'global warming' in the *National Geographic* archives, it was constructed to include any article that used the terms 'climate change' or 'greenhouse gases' instead of 'global warming' as these terms are used synonymous in meaning. During the search, any false positives that were singled out, such as articles which included the words "climate" and "change" or "global" and "warming", but did not discuss climate change or global warming were then deleted.

The obvious problem associated with this method of data collection is that the website may not have accurate archives. Thus, this search was double-checked on a *National Geographic* CD-Rom, which has all 120 issues, in full colour, from 2000 to 2010. Each search was carried out and checked twice to confirm the findings. The searches generated a total of 55 articles.

The significance of these articles is reflected through the intention of the source and magazine and what message is communicated to the readers – and why. According to Clapp and Dauvergne (2005:17), each viewpoint has its own logic, which fits with its assumptions. Understanding these views helps to explain, too, the often markedly

different interpretations of the condition of the global environment. One article, for example, may well declare global warming to be the most serious threat confronting today's governments. The next article may declare it a hoax, a ploy to raise funds or perhaps to scare world leaders into action. This shows how different interpretations and different values - that is, different worldviews - can shape which information an analyst chooses to emphasize.

As the scope of the media is so far-reaching, in the United States and throughout the world, and so globally situated and influential, it is not surprising that it is the subject of a great deal of intellectual scrutiny. The discourse of the news media encapsulates two key components: the news story, or spoken or written text, and the process and structures involved in producing the texts.

The first dimension, that of the text, has been the primary focus of most media researchers to date, particularly as the text encodes values and ideologies that impact on and reflect the larger world. The second dimension, that of the process – including the norms and routines of the community of news practitioners – has begun to be the basis of the research agenda for the past several decades (Schiffrin 2001:416).

Several studies on the relation between science writing and journalism have been conducted in South Africa (Turner, 2008; Van Velden, 2008) and on global warming (Joubert, 2006; Cramer, 2008) but the focus in the present study is international, and in particular on the performance of a specialised form of science journalism. The articles under discussion are selected from the first decade of the 21st century (2000 -2010) and the analysis of an important topic such as global warming during this period would benefit not only scholars of journalism and media but also educators who have to teach this topic.

Media attention to climate change has fluctuated significantly since the 1980s but in many countries, there has been a markedly high volume of coverage in the last decade (Boykoff and Roberts in Carvalho 2008:2).

Carvalho (2008:2) adds,

> In the same period, research interest in the role of the media has grown considerably with scholars examining such aspects as the role of journalistic

norms in media coverage of climate change (for example, Boykoff and Boykoff, 2007), ideological filters in the representation of knowledge (Carvalho, 2007b), the activities of climate change 'sceptics' and their impact in the media (McRight and Dunlap, 2000), the influence of different forms of science reporting in perceptions (Corbett and Durfee, 2004), and narrative cycles in climate change news (McCommas and Shanahan, 1999).

Research has shown that the number of pages in leading news magazines devoted to national affairs has declined and that more coverage is directed towards entertainment.

Further studies (Loven, 2002) show that media standards have slipped and that there is more outright opinion, speculation and analysis than merely stating the facts – something that would be essential in science reporting. Loven (2002) found that government restrictions imposed on journalists could be a cause for the decline in factual reporting. Researchers also cited newsroom cutbacks and the competitive, 24-hour pace of journalism as possible reasons for the decline in standards.

1.3 Problem statement, thesis and aims

The goal of this study is to determine the representation of global warming in *National Geographic*, a highly reputable magazine. Carvalho (2000:4) adds, "Given the multi-dimensional nature of the problem, along with a degree of uncertainty about specific aspects, climate change is a very challenging issue for the media to cover. As a marketplace of arguments, the media certainly has a role to play in building up a consensus, or not, around the issue."

The questions that direct this research are the following: How is a discourse on global warming produced and constructed in *National Geographic* throughout a decade? What arguments were advanced by different social actors and how were they conveyed by the magazine?

For the purpose of the analysis a random sample, comprising a total of 20 of the most prominent feature articles on global warming in the *National Geographic* magazine out of a total 120 issues, were selected. It does not include argumentative items such as editorials, columns or commentaries but rather in-depth or relevant features on the subject.

A random selection of articles were chosen that were seen to be ‘in-depth’ features and not just an article with a reference to the term ‘global warming’, ‘climate change’ and ‘greenhouse’. The articles are listed in addendum A. Where there is no article represented by a particular year, that is because there were no articles on global warming in that year (for example, 2003).

The articles were randomly selected, purely on the basis that all the magazine articles on global warming over the decade are given an equal probability. In other words any article in any year had the same chance of selection as any other. This minimized bias and simplified analysis of results. In particular, the variance between individual results from each magazine issue within the sample is a good indicator of variance in the overall selection of the articles on global warming, which makes it relatively easy to estimate the accuracy of results.

The aim of this study is to understand the links between the discourse of social actors, the social representations on global warming and the the discourse of the media. The goal is to identify the interpretations of climate change in the discourse of the variety of social actors referred to in the articles (such as any policy institutions, scientists, non-governmental organizations, corporations, etc). A second aim was to analyse the media’s discursive reconstruction of climate change and understand what the dominant discourses and the relations between them are.

According to Carvalho (2008:3), the scientific community, as far back as the 1950s, was the first to create the social problems of climate change insofar as it gathered, interpreted and presented data that propose a connection between concentrations of greenhouse gases (GHG) in the atmosphere, global mean temperatures and human sources of GHGs emissions.

When looking at the text as a whole, this study attempted to examine what sort of perspective was being presented i.e. what angle or point of view. This was seen as outlining the details into a coherent whole. First and foremost the study looked at the specific photographs, diagrams, sketches, and other embellishments that were used to get the reader’s attention; looking at whether any headings or keywords were used to emphasize certain concepts by giving them textual prominence and of course, looking at the ‘voices’ in the articles conveying a message that certain points of view are more correct, legitimate, reliable, and significant while leaving out other voices.

According to (Whisnant n.d. 4), discourse theory teaches us to be very attentive to small shifts in how ideas are expressed in language. Language, therefore, as well as other forms of symbolic exchange, is the primary object studied by discourse theory. It creates a world, knowledge and truth and says something about the people who speak it and it has power. The research looked at what was 'said' or 'implied' in the global warming articles and what kind of truth was formed through the content.

Other aims relating to this include the:

(a) To establish the utterances and statements pertaining to the discourse on global warming and the metaphors within the coverage of global warming in order to determine the representation of global warming that is communicated to the readers;

(b) to determine whether the role of the magazine is being redefined to suit the economic needs of the sponsors and advertisers in the magazine and

(c) to establish the conclusion of the articles with regard to what arguments were advanced by the different social actors and authors and how were they contested either by scientists or by readers with an interest in science.

1.4 Research design: theory and methodology

This study focuses primarily on the analysis of texts and could therefore be described as qualitative content analysis. Several researchers use content analyses to explore science in climate change communication. Wilkins in Good (2008:3) states that the content analysis of *The New York Times, The Washington Post, The Los Angeles Times, Time* magazine, and the *Associated Press* highlighted that coverage of climate issues seemed to be "closely tied to the goals and aims of the scientists they cover" and while this approach served scientific, economic, and governmental communities, other 'human values' were left out of the reporting.

Good (2008:4) illustrates further how "Bell's (1994:235) content analysis of broadcast news in New Zealand uncovered that, on average, one in six climate stories contained significant misreporting, all a result of exaggeration; and Zehr's (2000) content analysis explored scientific uncertainty as a theme in major newspapers in the United States between 1986 and 1995, finding that scientific uncertainty was an

important theme, and one that contributed to the delegitimization of public knowledge".

Coverage of climate change in major U.S. newspapers, after declining in the mid-1990s, began to climb back. In 2004 the American public could read extensive cover-story articles in respected journals such as *Business Week* and *National Geographic*, stoutly declaring that global climate change was truly a serious and immediate problem (Weart 2009:147).

In this study a critical discourse analysis forms the theoretical approach for the analysis of the content. One could also infer that the analyses form part of cultural studies, which according to Johnson (1987: 41-42) refers to "an intellectual and political tradition, in its relations to the academic disciplines, in terms of theoretical paradigms, or by its characteristic objects of study." And further: "We need histories of cultural studies to trace the recurrent dilemmas and to give perspective to our current projects." In the third chapter of this study the theories used in this study will be explained in more detail.

1.5 Research hypotheses

The main hypotheses that flow from the problem statement (the swaying from factual science-based reporting to less detailed information) are the following:

- What content is emphasized when science journalists write about global warming in *National Geographic*?

- Are certain recurrent images used to act as discursive metaphors for global warming?

- Do the articles provide less in-depth scientific discussions of global warming and climate change and focus more on the human factor?

- What role is played by economic factors when deciding on content dealing with global warming?

1.6 Ethical considerations

The research was entirely literature-based. Identification of individuals in the magazine was avoided and any subjects, particularly in visual images, if applicable, are described in terms of their clothing, activity, or gender.

1.7 Conclusion and outline of the study

Chapter 2 provides a literature review on the global warming coverage past and present in *National Geographic*, as well as gives a short overview of existing studies on the topic.

Chapter 3 will explain the theoretical framework of the study, in particular the theory of discourse analysis.

Chapter 4 will undertake the content analysis and present the findings of this study, whereas chapter 5 will be the conclusion, providing the findings of the study and also make recommendations for further study in future.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Ben Goldacre (*The Guardian*, 8 September 2005) asks the question: "Why is science in the media so often pointless, simplistic, boring, or just plain wrong?" The reason is often that the journalists are not equipped to write about science and as Claassen (n.d.) points out in his series of power point slides on ethics in journalism, accuracy is one of the first ethical principles to which a journalist must adhere. (http://www.frayintermedia.com%20claassen.pdf)

In the case of a journalist writing about science it is also important, according to Claassen, that the journalist should remember that "science demands evidence" and does not rely on anecdotes that are usually selective. In this literature review on *National Geographic* magazine I will point out to what extent the magazine has managed to provide enough evidence to substantiate claims about the topic of this study, namely global warming.

2.2 Criticism of *National Geographic* magazine

Little should be needed to convince anyone living in the United States of the significance of *National Geographic* in American culture. The magazine's success, declared an editor of the magazine in 1915, "proves how strong the love of this kind of geography is in every breast" (Rosenberg 2007:1).

Rosenberg (2007: 12) quotes Gilbert H Grosvenor who in 1919 added that to be successful as a magazine it must always rest", on "retaining the confidence of the public in the absolute accuracy and impartiality of its contents." This approach worked but this assertive denial of politics, while backed by a select avoidance of political discussion - a decision with political import of its own – was in essence mere rhetoric; Rosenberg found it to be one of the *National Geographic*'s "strategies of innocence" (2007:12).

Research suggests that even though the *National Geographic* Society is not a traditional media owner, the magazine has still come under criticism. In their book

Reading National Geographic, Catherine Lutz and Jane Collins (1993:5) argue that the D.C.-based *National Geographic* Society is intimately tied to the American establishment and "cultivates ties to government officials and corporate interests." The photos and the articles work jointly in promoting emotions rather than an understanding of scientific reality, and they can also contradict each other.

When analyzing content in magazine articles, one begins with the title and the imagery before even reading the content. According to Michaels (2004), one may see, for example, in a magazine picture of a flooded rice field in Bangladesh, with the comment that "as global temperatures and sea level climb [rice farming] becomes an ever more precarious means of support." However, in 2001, Cecile Cabanes calculated sea-level rise for the last half-century around the world. In Bangladesh, there was a net fall in the 1990s. In the last 50 years, it has risen there an infinitesimal seven-tenths of an inch, far too little for anyone to notice, in Bangladesh or anywhere else. This statement, according to Michaels (2004) shows this to be a misleading statement.

Michaels (2004) provides more examples of misleading statements in *National Geographic*: “People in North Carolina adapt and prosper, living with sea level rises of 12 feet in 10 minutes, or a decent hurricane storm surge. If seven-tenths of an inch in 50 years is a problem, it's a social, not a climatic, one.” In the next column: "The famed snows of Kilimanjaro have melted more than 80 percent since 1912." Again, indeed, true. In the ’natural’ warming of the first part of the 20th century, Kilimanjaro lost 45 percent of its cap. From 1953 through 1976, another 21 percent. That occurred while the planet cooled. Since 1976, in the era of ’human’ warming, another 12 percent, or the slowest melt rate of the last 100 years. *National Geographic* forgot to tell us this. Or that from 4,000 to 11,000 years ago it was much warmer in Africa than today and Kilimanjaro's cap was much larger than now. Seven misleading statements in three pages were found. (Michaels 2004).

2.3. Photography

Photographs are also significant in conveying important messages. According to Barthes (1977:12), “the press photograph is a message and this message is formed by a source of emission, a channel of transmission and a point of reception.” This channel consists of (a) the staff of the newspaper who serve as the source of the

emission; and (b) the reporters who take the photos and do the layout and the so-called point of reception is the public, which reads the paper.

As for the channel of transmission, this is the newspaper or magazine itself, or, more precisely, a complex of concurrent messages with the photograph as centre and surrounds constituted by the text, the title, the caption, the lay-out and, in a more abstract but no less 'informative' way, by the very name of the publication.

Barthes (1977:15) adds:

> The structure of the photograph is not an isolated structure; it is in communication with at least one other structure, namely the text - title, caption or article – accompanying every press photograph. The totality of the information is thus carried by two different structures.

Thus, the content of the articles and the images go hand in hand in conveying their message to the readers.

As Barthes has pointed out, the “photograph is not only perceived, received, it is read, connected more or less consciously by the public that consumes it to a traditional stock of signs.” (1977:19) Independently of what the photographer or the caption-writer may intend as the message of the photo, the reader can imagine something else.

On the basis of the literature referred to above, the importance of the *National Geographic* magazine and the quality of coverage related to climate change is evident. This study gives a brief history of the magazine, and follows with a discussion of the nature of its coverage, the choice of content, reasons for success and value to readership.

An analysis of the content will determine whether the discourse on global warming has, over the selected period, intended to inform and educate the audience or has it just evolved into coverage of the calamities of nature as entertainment. The study critically analyzes various objects of discourse within the global warming coverage including the layout of the text, the photography and any relevant metaphors within the text. Subsequently the photographs and metaphors will, if present, emphasize any apparent emotionally charged phrases or images that will stress whether the

coverage contributes to a better understanding of global warming (informative) or seems to be more focused on the drama of this phenomenon.

Lutz & Collins (1993:12) also criticize the publication's photography and describe how *National Geographic* photographs have been electronically manipulated. In one photo of bare-breasted Polynesian women, their skin colour was darkened as an example of Othering the exotic. In their book they document how *National Geographic* photographers have encouraged their subjects to change costumes when their clothing was seen as "too drab" for the magazine. Summarizing their analysis of *National Geographic* photographs from 1950 to1986, they point out the following themes:

> The people of the third and fourth worlds are portrayed as exotic; they are idealized; they are naturalized and taken out of all but a single historical narrative; and they are sexualized. Several of these themes wax and wane in importance through the postwar period, but none is ever absent (Lutz & Collins 1993: 89).

Photographs thus transmit certain messages of interpretation and, by definition, this message is the scene itself, the literal reality, according to Barthes (1977:14). These messages are not, however, the sorts of observations that most people generally receive from the media. Instead, the media present sensational statements and dramatic images that leave lasting impressions of calving glaciers, drowning polar bears and all manner of human-caused climate calamities. Bell (2010) claims that media often intentionally target "impressionable young minds" and "sensitive big hearts" with messages of fear and guilt.

According to Barr (2007), "Barthes's theory rests upon the argument that every photograph communicates not only a denotative meaning, where the outlines of images are captured and reprinted and depict an actual event through objects of proportional dimension, but also a secondary connotative meaning, which viewers perceive according to their interaction with and understanding of a complex system of culture codes." Barthes (1977: 20) views connotation as "the imposition of second meaning on the photographic message."

Barr (2007) further adds that according to Barthes images in a particular photograph denote a particular context and these images report some or other narrative of the

events captures in the photo. For example, a photograph of a woman in a full-length white dress surrounded by flowers in a church describes, in the purely objective sense, the uniform worn by women at ceremonies where they become lawfully committed to a man.

Our interpretation of the photo image of the woman in white depends on whether we are familiar with the cultural codes depicted in the photo (Barthes, 1977: 28). Meaning, however, is the result of a fusion between the cultural codes and the viewer's personal experience with and understanding of the codes. Considering that, the subject of the previous photograph connotes a bride, the cultural code we have assigned a single woman just before she becomes wed. The white dress signifies the colour of purity, implying the bride is sexually pure entering the marriage and the flowers, which symbolize a celebratory situation, indicate that the moment is happy and worthy of celebration, as marriage is (in Western society) perceived to be a positive and desirable state. The viewer of the photo first selects signifiers with which s/he can make a "cognitive connection" (Barthes, 1977: 29) and interpret from his or her cultural knowledge of the world.

Edward Said is most famous for describing and critiquing 'Orientalism', which he perceived as a constellation of false assumptions underlying Western attitudes toward the East. In his most famous book, *Orientalism* Said (1978: 35) claimed a "subtle and persistent Eurocentric prejudice against Arabo-Islamic peoples and their culture." He argued that a long tradition of false and romanticized images of Asia and the Middle East in Western culture had served as an implicit justification for Europe and the United States' "colonial and imperial ambitions." Just as fiercely, he denounced the practice of Arab elites who internalized the American and British Orientalists' conceptions of Arabic culture. Said argued that Western writings on the Orient, and the perceptions of the East purveyed in them, are suspect, and cannot be taken at face value. According to Said (1978:56), the history of European colonial rule and political domination over the East distorts the writings of even the most knowledgeable, well-meaning and sympathetic Western 'Orientalists' (a term that he transformed into a pejorative).

Said argued that the West has stereotyped the East in art and literature, even more so in modern times, Europe has dominated Asia politically so that even the most outwardly objective Western texts on the East have been permeated with a bias that Western scholars could not recognize. Western scholars appropriated the task of

exploration and interpretation of the Orient's languages, history and culture for themselves, with the implication that the East was not capable of composing its own narrative. They have written Asia's past and constructed its modern identities from a perspective that takes Europe as the norm, from which the 'exotic', 'inscrutable' Orient deviates (1978:41).

2.4. Inaccuracies

Although *National Geographic* has a mission statement that says that it intends to expand people's view about the world and geography as a field of study, it has been criticized for inaccuracies and, by academics from several disciplines, for its Orientalism and perpetuation of stereotypes about the global South (Moseley 2005:2).

(Thompson & Harrub 2004:1) add to the list of inaccuracies in their statement. "After publishing an article on an Arcaeoraptor bird fossil, *National Geographic* found itself embroiled in one of the hottest scientific controversies in decades. In an "open letter" dated November 1, 1999, and addressed to Peter Raven, Secretary of the *National Geographic* Society Committee for Research and Exploration, Dr. Storrs L. Olson, the eminent curator of birds at the prestigious Smithsonian Institution's National Museum of Natural History, castigated the Society, Dr. Raven, Christopher P. Sloan (author of the *National Geographic* article), and Bill Allen, the magazine's editor, for what he called "an all-time low for engaging in sensationalistic, unsubstantiated, tabloid journalism".

National Geographic found itself in the embarrassing position of having to retract the entire article because, as it turned out, the Archaeoraptor fossil was a fake - a neatly contrived composite of a bird and a dinosaur tail. In the March 2000 issue of *National Geographic*, the magazine published a "letter to the editor" from Xu Xing, one of the scientists who first examined and discussed the fossil find (Thompson & Harrub 2004:3).

Thus, criticism of *National Geographic* magazine has focused on misleading statements in articles, inaccuracies, Orientalism and other stereotyping (in the photography as well as the printed text).

2.5. Global warming coverage - past and present

Weart (2009:76) states that concern amongst climate scientists began to rise in the early and mid-1980s. Computer models of the climate were rapidly improving and winning the trust of experts. According to National Aeronautics and Space Administration (NASA) (www.nasa.gov: 2005), scientists around the world continue to try and solve the puzzle of climate change by working with satellites, and other tools and computer models that simulate and predict the Earth's conditions. The National Weather Service of the United States uses radar on the ground and images from orbiting satellites with a continual eye on Earth. They use reports from a large national network of weather reporting stations, and they launch balloons in the air to measure air temperature, air pressure, wind, and humidity. They put all this data into various computer models to give them weather forecasts and as Weart (2008:76) suggests,

> the modelers now said they were quite confident that a global warming of several degrees would come within the 21st century. To an ordinary citizen, a change of a few degrees might sound trivial. But the scientists understood that it was serious, and science journalists passed along their predictions of sea-level rise and other problems.

This was just one example of a process that brought the perils of climate change into newspapers, magazines, and even occasionally television in the early 1980s. The stories usually rested upon statements by leading scientists including Stephen Schneider, Wallace Broecker, Nobel Prize winner Melvin Calvin and others. Politicians, ever alert to shifts in what the public was worrying about, had to take notice (Wearth 2008: 84).

Weart (2008:131) adds:

> Many climate scientists in the 1980s were taking a more unequivocal or even activist stance. A much smaller number of skeptics opposed them. Some of these skeptics argued publicly that the 20th century's global warming (if it existed at all) had come only because the sun had temporarily become more active. During the 1990s they produced some fairly plausible data and theories on why global warming either was not happening, or was not caused by humans. Most other experts found these arguments weak.

One of the experts referred to by Weart (2008: 131) in the historian of science, Naomi Oreskes. She has reviewed nearly 1000 abstracts of technical articles on climate change, published in peer-reviewed scientific journals between 1993 and 2003, and Oreskes found that "none of the papers disagreed with the consensus position." This study of her would be cited in the media repeatedly over the next decade, and the author was even invited to testify to a Congressional committee, a rare use indeed of historical expertise.) In the minds of nearly all scientists, or at least those not connected financially to the energy industries, the case for human-caused or anthropogenic global warming was as well proven as anything in geophysics.

The consequences of global warming, if this phenomenon is indeed scientifically true, can and will be quite devastating. Thus, it would seem crucial that the information communicated to any particular audience be backed up with informative and scientific evidence. The focus on the information communicated through *National Geographic* should be quite apparent and have a clear direction about what the article is about and what information should be conveyed to the reader, and should not leave any readers asking themselves “what did I actually gain from this information?” The magazine in itself is meant to educate us, or as the slogan on the website (www.nationalgeographic.com) reads: “Inspiring people to care about the planet since 1888.”

The editors of *Nature* magazine remarked in 2000 that "[t]he focus of the climate change debate is shifting from the question of 'will there be climate changes?' to 'what are the potential consequences of climate change?'" Weart (2008: 138) remarks that even some of the few remaining skeptical scientists admitted, although often reluctantly, that the greenhouse effect would make itself felt eventually. Some went on to claim that this would bring net benefits. Others retreated to the position that, in any case, it made no sense to regulate emissions, for the only reasonable policy, as one prominent critic insisted, was "to adapt to climate change."(Weart 2008:138)

The idea of just regulating emissions and not getting rid of them in sum could also be seen as a second agenda originating from large capitalist ventures. There have been alternatives to oil, such as the example illustrated in a *National Geographic* magazine article about biofuels (“Green Dreams” - October 2007). It states that

countries around the world are using various kinds of biofuels. For decades, Brazil has turned sugarcane into ethanol, and some cars there can run on pure ethanol rather than as additive to fossil fuels. And biodiesel - a diesel-like fuel commonly made from palm oil - is generally available in Europe. Unfortunately things are not always this simple and these biofuels are often not of the same quality and cannot be used as in the case of oil.

However, as Weart (2008:143) points out present conditions seemingly do affect global warming, and hence the Kyoto Protocol was created in February 16, 2005 as a worldwide effort among nations to control greenhouse gas emissions. When the then US president George W Bush announced that he never impose the limits on CO2 that the previous administration and the rest of the world had agreed to at the Kyoto meeting, it led to severe criticism from his European counterparts.

The protocol was first proposed in 1992 and was supported by the U.S. president George H.W. Bush, who attended the U.N. Framework Convention where the U.S. agreed, along with other Annex 1 countries (China, Canada, Japan and nations of Europe included) , to “return their emissions to 1990 levels,” or below. Clinton, succeeding Bush, also supported the protocol, but emission levels kept rising and not much was accomplished during his term. The Bush administration pulled the United States out of Kyoto in 2001 (it was one of only two nations to do so with Australia being the second), where George W. Bush, who once promised solutions for controlling CO2 emissions during his campaign, now took a different stand that no longer supported Kyoto because, as he said to the public, the “state of scientific knowledge of the causes of, and solutions to, global climate change” are “incomplete” (qtd in Weart, 2008: 143).

According to Kolbert (2006:152), greenhouse gases are increasing by 20% (since 1990) and the United States accounts for 34% of Annex 1 emissions. From 2000, the Bush administration began using a “greenhouse gas intensity system”, which measured the ratio of emissions to economic output as a way of measuring emissions as a whole. Kolbert argued that the system is misleading and favours industrial development because, while greenhouse gas levels are actually rising, according to this system they are supposedly falling.

Kolbert (2006:157) adds that the improper feed of information to the public is also supplemented by books and web groups funded by huge corporations such as

Exxon, Mobil and General Motors, who distribute information contradicting proven and alarming scientific evidence about global warming. Articles falsely states, among many other things, that weather cannot be predicted ahead of time, that global warming is not real and has not been proven, or that a warming climate is something to celebrate.

According to Weart (2009:149) around the time of the Kyoto Protocol one sensed an outcry on the side of some business leaders that something had to be done to protect the environment. John Browne, the CEO of the oil giant BP, stressed the importance of imminent action and around 2005 a number of leading companies in the United States joined in and pledged to limit their emissions. These included General Electric and Wall Mart and CEOs were showing genuine concern about global warming.

Business Week thus called 2006 the year global warming went from “controversial to conventional” (Weart, 2009:149) for much of the corporate world. An environmental consultant agreed that suddenly CEOs were expressing genuine concern about the issue. As the *Wall Street Journal* reported, it seems that the global-warming debate is shifting from science to economics.

The biggest question going forward, no longer is whether fossil-fuel emissions should be curbed. It is who will foot the bill for the cleanup. A wise corporation would take the lead in discussing just which business operations should be taxed or regulated. If you’re not at the table, as the article in Journal remarked, you’re on the menu.

The greatest media attention of all went to a documentary film, titled *An Inconvenient Truth* by Al Gore. According to Olsen (2007) this film was received with much acclaim and tells the story of Gore's early conversion and lifelong commitment to environmental issues as the unifying theme of his long political career.

Regarding Gore’s film Weart (2009:171) writes that,

> in the year following at its May 2006 opening, it garnered the third highest box-office receipts of any documentary in history. Meanwhile an associated book reached the top of the best-seller list. Critics pointed out a few points where Gore had been misleading (he showed a sea level rise without explaining it would take centuries, and used images of hurricanes without noting that their relationship to global warming was conjectural). But scientists

> generally gave the film high marks for explaining a complex subject with accuracy and grace. The film by itself could not do much to shift American public opinion as a whole. But it did strongly impress the sort of people who saw documentaries, including key policy-makers.

Criticism of the documentary was also prevalent. According to Sussman (2010:1030, a High Court judge even ruled on whether the film should be shown in schools as it contained 'nine scientific errors'. And this is in essence the foundation of any scientific groundwork on the subject of global warming. If there are errors contained within information that is considered to be valid only with scientific evidence, then all credibility in what is being communicated through media will be tarnished.

2.6. Global warming uncertainty

On the *National Geographic* website, there is an interactive online edition, which has a department called Research and Exploration. When this section published a special issue on global warming, one article, titled "Benign Greenhouse" (June 1993) and written by Virginia state climatologist and environmental science professor Patrick J. Michaels, asserted that global warming will not be disastrous and in fact could bring the benefit of longer crop growing seasons.

Boyce Rensberger at *The Washington Post* picked up the story (1 June 1993), right down to the headline, "'Greenhouse Effect' Seems Benign So Far." He attributed this premise to the vague standby "scientists say." The front page article, however, devoted the first 15 paragraphs to Michaels' views before quoting a dissenting opinion by James Hansen, director of the Goddard Institute for Space Studies in New York City. Hansen, who also wrote an article that appeared in the June issue of Research and Exploration, believes that the earth will warm significantly due to increased concentrations of carbon dioxide that have been released by burning fossil fuels. Hansen's views have also been voiced by the 200 scientists on the International Panel on Climate Change.

Predicting environmental trends in science is a process mired in imprecision and uncertainty. But some scientists and journalists fear that recent reporting and anti-environmental books have elevated that uncertainty to the realm of fact.

According to *Science Daily* (2007), “despite decades of ever more-exacting science projecting Earth's warming climate, there remains large uncertainty about just how much warming will actually occur. Two University of Washington scientists believe the uncertainty remains so high because the climate system itself is very sensitive to a variety of factors, such as increased greenhouse gases or a higher concentration of atmospheric particles that reflect sunlight back into space”.

And ultimately the barrage of skewed uncertainties and misinformation could have serious consequences for the environment, especially if politicians are hesitant to heed warnings because they want more proof.

One would assume that *National Geographic* would use its heft, being the third largest magazine in America (following *TV Guide* and *Reader's Digest*) to give a fair and balanced presentation. The discourse of the magazine, in general, was therefore assessed in order to determine whether the discourse around the theme of global warming has remained consistent in informing and educating the audience and has not opted for coverage of entertainment, sensationalism or opinion.

National Geographic can be, as we have seen, influential in how people interpret what is happening in the world around us, in wildlife, in other countries and in our environment. The critical analysis that follows therefore asks the question whether the discourse of the environment in *National Geographic* magazine, does accurately represent what it aims to represent in the first place, namely to inform its readers on how to take care of the planet.

2.7. Readers responding to *National Geographic* on global warming

On the web page for *National Geographic* News (first published online in 2004 and updated in 2007) the authors name and explain the signs of global warming. But as critics of the *National Geographic*'s fast facts about global warming have pointed out, certain predictions cannot merely be accepted as significant and valid beyond reasonable doubt.

Donald Ericson, in his letter to *National Geographic* on 15 October 2007, opens with the remark, “Shame on you!” and takes the magazine to task for not giving its readership the correct facts about global warming. He even goes as far as to call the magazine's articles on the rise in the sea levels and the carbon imprint as “spin

doctors who are now working in the science of climate." Ericson ends off by calling concerned individuals like Al Gore "the climate clowns" and *National Geographic*, together with them "will end up with egg on their faces from being proven wrong. You and the other climate clowns are giving the greenhouse effect of CO2 too much credit in the warming of the planet."

National Geographic is also accused of double standards. On the blog www.thegreenlife.org. the magazine is accused of "greenwashing", explained as "disinformation disseminated by an organization so as to present an environmentally responsible public image." In an advertisement paid for by Shell the text reads as follows: "What do we really need in today's energy-hungry world?" The answer, "More gardeners." The advertisement then goes on to praise Shell for funding the Flower Garden Banks National Marine Sanctuary in the Gulf of Mexico. The blog concludes:

> The cost of advertising in *National Geographic* runs in the six-figure range. Shell has been running the Flower Garden Banks ad in *National Geographic* and other publications, as well as on the web, for years. That puts Shell's marketing tab for the ad into the millions, if not tens of millions, of dollars. Shell saves budget space for this pricey environmental program by limiting its direct funding for the sanctuary to $5,000 per year. When companies spend more on marketing their environmental programs than on funding them, that's greenwash.

Similar criticism is expressed against *National Geographic Traveller* where a reader complains that the magazine does not consider limiting the carbon footprint but rather encourages people to travel.

On the website http://environment.nationalgeographic.com/ the editorial board of the magazine explains how they intend to limit their carbon footprint and these include "purchasing wind-power renewable energy credits, purchasing certified offsets to offset the carbon emissions of travel, reducing electrical consumption by 16 per cent, reducing natural gas usage and eliminating all bottled water sold." Being aware of their predicament that they are contributing to the carbon footprint, the editor remarks:

> We recognize that travel contributes to the overall human footprint that affects the Earth's climate. We have identified ways to reduce the greenhouse gas emissions associated with our travel programs and are offsetting carbon emissions we cannot eliminate. We have established an advisory board to guide our reduction efforts and our investments in high-quality offset programs—such as those that develop new renewable energy sources.

In an interesting article entitled "Life cycle carbon footprint of the *National Geographic* Magazine" Terrie Boguski (2010) shows that the life cycle of the *National Geographic* magazine produces about 0.82 kg of carbon dioxide equivalents per life cycle of the average magazine. The amount of GHG emissions per life cycle of each magazine produced is about the same amount of GHG emissions produced by driving an automobile (8.5 km/liter gasoline) for about 3 km. This is ironic, given the fact that the magazine is one of the major anti-global warming exponents.

National Geographic has been one of the main exponents of writing on global warming with articles about the melting of the polar ice caps, the dangers of carbon emissions and the dying of the world's marine resources but as is evident from the criticism, the magazine is in a somewhat predicament: one the one hand it wants big capital (reads: major carbon producers) to financially support the magazine yet on the other hand it has to criticise issues that are harmful to the environment.

2.8. Local research on global warming in the media

At the University of Stellenbosch, under the tutelage of the well-known George Claassen, several students completed dissertations on the way in which global warming is depicted, particularly in the local media. Claassen is also a regular contributor to the Afrikaans newspaper *Die Burger* where he writes about science in order to popularise it.

In 2006 Joubert wrote a dissertation on the complexities influencing climate change reporting. Joubert (2006: iii) quotes Wilson who states that climate change is one of the "complicated stories of our time" as well as the fact that journalists are not all informed about what it entails. She also points out that global warming is a very demanding and complex issue because even the "established scientific community" (2006:1) does not grasp it completely. For a journalist who has to write about it, it becomes even more difficult because he or she has to consider so many factors,

ranging from opinions expressed by environmentalists, opinions expressed by pseudo scientists, by scientists and by government officials who have to try and curb the carbon emissions (Joubert, 2006: 44). But, according to Wilson (quoted in Joubert, 2006: 46) the best person to ask for information about such a topic remains the scientist, who relies on facts to prove his point.

Climate change is also the topic of Cramer (2008) who examines how climate change is presented in three newspapers in the Western Cape. She has chosen to focus on the newspapers in this area because of the biodiversity of plant life and how it will be affected by major climate changes. In her overview on the coverage of climate change in the media Cramer (2008: 10) points out that already in the 1950s the geophysicist Robert Revelle has remarked that there will be a rise in the carbon dioxide levels in the air due to the burning of fossil fuel.

Cramer also shows that it is quite difficult to report on something like climate change and global warming due to the "incremental nature thereof" (2008: 20) and even if it has "apocalyptic consequences" the problem is that "these cannot be seen yet." Yet, Cramer feels that reporting on issues such as climate change and the effect on the environment should be treated with more urgency and merely relegated to columns dealing with the environment and the protection of the environment (2008: 99).

Since climate change and global warming are topics associated with science the question of how to cover science in journalism is also relevant in this regard. Turner (2008) examines this in her study and points out that most South Africans learn what they know about science from reading about it in the newspaper. Journalists, who now have to act as educators, have the responsibility to empower their readers by providing them with the correct scientific information.

Another aspect that relates to this is the role of the editor in publishing material of a more scientific nature. Turner (2008: 150) calls the editor "the final gatekeeper" because he decides what should go into the newspaper or not. This is in according with the so-called gatekeeping factors (Turner, 2008: 18) that she explores in her dissertation. These factors include the science writers, their level of formal education, career paths, interest in science, which science debates they regard as important, why it is important to write about science and the relationship between the science writer and his or her reading public.

Van Velden (2008) also investigates the way in which scientific topics are presented to a newspaper audience. Van Velden shows that amongst newspaper readers one often finds a low level of cultural literacy (2008: 15) and it depends on the reporter to fill the gaps in the reader's education and coins the term "responsible scientific reporting" (Van Velden, 2008: 17). Journalists have to educate themselves about scientific matters but as in the case of global warming, they have to realise that scientific events are usually incremental (as alluded to by Cramer above) and usually they have to do a follow-up on how it evolved. Van Velden also examines the ethics of science reporting and feels very strongly about it. To him misrepresentation of the facts is one of "the worst transgressions of ethics in science" (2008: 19).

CHAPTER 3

THEORY AND METHODOLOGY

3.1. Introduction

The theoretical approach of my analysis is a discourse analysis of the selected articles from *National Geographic*. Mills (1997: 1) introduces her study on discourse by pointing out that the term

> has become common currency in a variety of disciplines: critical theory, sociology, linguistics, philosophy, social psychology and many other fields, so much so that it is frequently left undefined, as if its usage were simply common knowledge.

Yet, as Lightfoot (1996: 23) observes:

> Finding a definition for discourse has been and still is a contentious issue that is not likely to be resolved in any immediate future.

He then concludes by suggesting a few definitions of the term:

> A system of statements which construct and object: an ideological position from which a subject speaks / acts / interacts with the social order; an institutionalised use of language and language-like systems; and language in the contextual and conversational settings in which it is daily used and understood.

If one studies the dictionary and more general explanation of discourse, it implies "having to do with conversation and holding forth on a subject, or giving a speech" (Mills, 1997: 2). In the philosophical and critical theoretical sense of the word there are a variety of definitions for the term. Even in the field of linguistics it implies an analysis of "the structure of naturally occurring spoken language" (Crystal in Mills, 1997: 3). Van Dijk (2001: 352) amends this definition to include the notion of power relations inherent to any discourse and tries to establish the role of power in

establishing the dominance of the speaker or the initiator of the discourse over the hearer.

Discourse can be described as written or spoken conversation, and the thinking that underlies it (Johnson, 1995). It is a statement, or group of statements which provides a language for talking about – a way of representing – a particular kind of knowledge about a topic (Hall 1992:291). It is important to note that these statements do not always have to be spoken or written; discourses can also manifest in images, actions, practices, cultural norms, and many other things.

One of the major thinkers using the term discourse in his work is Michel Foucault, who views discourse as "the general domain of all statements" (Mills, 1997: 6) and who is particularly interested in the institutionalised nature of discourse. Some of the best-known work of Foucault has shown, for instance, how transformations in medical discourse produce a whole network of medical institutions; likewise, changes in legal discourse, he argues, had an impact on our court system and methods of criminal punishment (Whisnant, n.d.: 5).

3.2. Foucault and discourse analysis

The three central concepts in Foucault's theoretical project are discourse, power and knowledge (McHoul and Grace, 1993: 1) and it is in particular in works such as The Order of Things (1970) and The Archaeology of Knowledge (1972) where he discussed his views on discourse in more detail. His inaugural lecture as professor at the Collège de France in 1970 is also published as "The Order of Discourse".

Foucault sees discourse as, amongst other things, referring to all utterances or texts that have meaning, as well as the underlying cohesion between groups of utterances (1989: 90). Such utterances include statements, images or representations or even someone's particular version of an event. To distinguish a particular discourse, Foucault opts for the criteria of "formation, transformation and correlation." Formation implies that there are certain conditions which make it possible for objects or concepts to form part of a particular discourse. In the case of transformation it refers to certain prohibitions which prevent new concepts from becoming part of the discourse, whereas the third refers to what McHoul and Grace (1993: 44) describes as "an ensemble of relations."

A Foucauldian analysis of the representation of global warming in *National Geographic* would ask questions such as the following: How did the issue of global warming become on the agenda of the magazine? How did global warming become part of the social discourse? What steps are followed to measure global warming? How does the discourse on global warming in *National Geographic* tie in with the broader discourse on the topic?

Another concept in Foucault's theory of discourse is that of the discursive formation. Foucault (1989: 31) distinguishes between three elements of a discursive formation, namely the statement, the event and discourse. Statements are often grouped together when they refer to the same object. In the case of global warming the discursive formation consists firstly as some form of knowledge: a set of statements on the topic is presented and believed to be "the truth". The event refers to particular statements made about a particular topic. Since the Kyoto Protocol in 1997 scientists have made certain statements about global warming and climate change. It does not mean that climate change has only been identified in 1997 but we could take this date as the starting point for writing about the discourse of global warming and in doing so choose a random date and event for a historical analysis and description thereof.

According to Foucault (1980: 131-133) truth is characterized by five traits:

> "Truth" is centred on the form of scientific discourse and the institutions which produce it; it is subject to constant economic and political incitement (the demand for truth, as much for economic production as for political power); it is the object, under diverse forms, of immense diffusion and consumption; it is produced and transmitted under control, dominant if not exclusive, of a few great political and economic apparatuses (university, army, writing, media); lastly, it is the issue of a whole political debate and social confrontation ("ideological" struggles).

In his inaugural lecture, "The Order of Discourse" (included in Carusi, 1992: 109-139), Foucault examines the way in which all societies control, organise and redistribute the production of discourse by means of certain procedures. Certain prohibitions and taboos prevent us from saying what we want to and should we not adhere to it, then we are excluded. Apart from such exterior factors, Foucault also

isolates certain internal procedures that control a particular discourse, such as commentary on a particular text within the discourse.

Another interesting aspect about discourses is the fact that not all regimes of discourse are, in the words of Foucault (in Carusi, 1992: 123) “equally open and penetrable; some of them are largely forbidden […] whereas others are open to all winds and put at the disposal of every speaking subject, without prior restrictions.” Often a discourse is produced in a closed space and outsiders are not welcome to participate.

3.3. The method of discourse analysis

The method of discourse analysis focuses on daily media discourse and is based on diverse theoretical and methodological approaches. According to Olausson (2009:425), in late modernity, relations of power and dominance are maintained through discourse that naturalises such relations and makes them part of the natural order of things. Starosta (in Burch n.d. 10) states that critical discourse analysis observes what is said, implied, and not said, along with who benefits from the given account. Pietikainen and Hujanen (in Burch n.d.10) add that ‘each news text entails representation of the issues and people in question, which contributes to the contribution of the identities of these groups’.

Anderson and Entman (in Olausson 2009:423) state ‘the news media – a crucial power in framing environmental issues with significant implications for the democratic processes – have a pivotal role in the attribution of responsibility for both the creation and resolution of societal problems. Pellizzoni (quoted in Olausson 2009:423) adds that the ‘the matter of responsibility is of great significance considering the salience of and scientific uncertainties surrounding environmental issues’.

The discourse in the media will give us insight into the complex and often competitive power play between science, (mass media) and politics. It is the interconnections of these different discourses that make climate change such a highly politicized and disputed matter. We can view those different discourses as regimes of knowledge that are competing about what is true and false, and as such being responsible for creating different truth effects. From reading Foucault one knows that even the notion of “truth” is a debatable issue, since truth is unattainable and one could immediately ask: Whose truth? Foucault (1980: 133) defines “truth” as “a system of ordered

procedures for the production, regulation, distribution, circulation and operation of statements."

Foucault's discourse analysis is vital for us to question the relationship between power and knowledge and the way in which power is produced in discourse. In any society one finds a so-called power order which regulates the discursive practices within a particular culture. Ewald (in Sheridan, 1990: 221) points out that in every power order one can distinguish three parties: the individual or the institution wielding the power, those who are his subordinates and who have to exercise that power and lastly those who are subjected to such power.

When analysing power relations Foucault (2000: 344) suggests four aspects to be considered: Firstly, there is a system of differentiation which makes it possible for the individual to react to the actions of others. Secondly, if an individual reacts to someone's actions one should ascertain why he is reacting and what does he want to accomplish. Thirdly, one could analyse the measures put in place to exercise power over the individual. In the fourth instance, we should establish how power is being institutionalised through the enforcement of certain rules and regulations.

A central metaphor illustrating Foucault's theory of power is the Panopticon, the jail designed by Bentham (Foucault, 1977: 95). In this prison one has a central watch tower used by the wardens to keep track of the movements of the inmates. The cells are constructed in such a way that the inmates can be observed at all times and as a result of the ring shaped form of the prison, the inmates are able to observe one another as well.

In discussing possible examples of a discourse analyses, Mills (1997) comments in particular on the way in which Fairclough has "[inflected] Foucault's analysis of discourse with a political concern with the effects of discourse" (Mills, 1997: 149). It refers, for example, to the way in which people are positioned into roles through discursive structures. A science journalist is positioned to play the role of informer and has to give the facts to his or her readers about global warming. Interdiscursivity implies that the journalist has to draw on the expertise of others, for example scientists. For our sake, it would be interesting to look at the relationship between scientists and journalists within the discursive formation, the power relations at play and the way in which the journalists present their findings. As mentioned before, there is a close relation between Shell and *National Geographic* and this intricate

power relation between the two would definitely affect the way in which *National Geographic* reports on Shell.

Discourse analysis with its origins in linguistics would also assist the readers of *National Geographic* to see how ambiguity is used in the titles of articles, how a particular vocabulary is used and how specific images are constantly repeated as some sort of metaphor acting as representative of a particular discourse; in this case the polar bear on the piece of melting polar ice.

Since a discourse analysis is mostly aimed at the "explication of qualitative data" (Van Dijk, 1983: 26) my analysis will focus on the observable data presented in the respective editions of *National Geographic*. Two criteria that are applicable in this regard are functionality and meaningfulness (Van Dijk, 1983: 25-26). If a discourse consists of the utterance of a sequence of sentences in a social context then we need to examine how functional the properties of that utterance with respect to the social context. Is there a logical coherence between the sequence of sentences and what is the functionality thereof?

If we consider a heading such as "Sea Temperature Rise" and its subheading, "Warmer Oceans Have Far-Reaching Effects" in *National Geographic* (2008) the functionality and meaningfulness depend on our understanding of the social context, the broader debate on global warming – and interestingly enough, also the power relation implied in the heading. Some authority – be it a scientist or the journalist – knows that the sea temperature is rising and that it will affect us if the oceans get warmer. Within the discursive formation of global warming experts (no one is mentioned in the article, but there are references to scientific research and researchers) profess to know some form of truth and present it to the reader of the magazine.

3.4. Jäger and Maier's Methodological Aspects

According to Jäger and Maier (2009: 50-52) there are six aspects of Foucauldian discourse analysis that could be applied when analysing discursive utterances in magazines or newspaper articles:

(1) Context – dealing basically with why the article was selected, why it is typical of articles in a particular magazine together with other issues such

as the status of the author and on what occasion this particular article was published.

(2) Surface of the text – the layout, the kind of pictures, the headings and subheadings, what topics are touched on and how do these topics relate oroverlap

(3) Rhetorical means – what argumentative strategy is followed and what implications and allusions are mentioned in the article; what collective pictures or photos or symbols are used; the vocabulary and style and what persons are mentioned and are there any references to science, scientific sources or particular scientists who will act as authorities.

(4) Content and ideological standards – what concepts of humankind, technology and society are presupposed and conveyed in the article.

(5) Other peculiarities of the article: What does it imply? Why a particular image?

(6) Discourse position and overall message of the article.

The discourse position (mentioned under 6) is defined by Jäger and Maier (2004: 49-50) as follows:

> [It] describes the ideological position from which subjects, including individuals, groups and institutions participate in and evaluate discourse.

For example, the media take up discourse positions. A newspaper would call itself “independent” or “impartial” but this is not a possible position to assume in discourse analysis. Foucault (1980: 118) regards the “notion of ideology” as somewhat problematic and should be used with circumspection because (1) it always stands in opposition to something else and (2) it stands in a secondary position relative to something functioning as its infrastructure, e.g. a material or economic determinant.

These aspects will form the basis of my discourse analysis of the coverage of global warming in *National Geographic* - as will be discussed in the next chapter.

CHAPTER 4

RESEARCH FINDINGS

4.1 Introduction

Having explained the theoretical framework of this study in the previous chapter, I will now undertake an analysis of the selected articles and provide the reader with my findings.

4.2 Research findings report

4.2.1. Context

The articles selected were chosen randomly (as mentioned in Chapter 1) and the articles chosen were those that seemed to be 'in-depth' features and not just an article with a reference to the term 'global warming', 'climate change' and 'greenhouse'. The only article that was not a lengthy article was the short piece in February 2001. It was felt that this was relevant due to the significance of the 'cause' for concern in the brief article titled "Rising Tide of Concern", including a side panel encouraging society to "get involved". Where there is no article represented by a particular year, that is because there were no articles on global warming in that year (for example, 2003). The full list of articles selected is listed in Addendum A.

A general finding in the context of the articles in *National Geographic* was the frequency (or infrequency) of articles on global warming. Over the chosen decade of *National Geographic* articles, there were only a few articles from 2000 to 2004, but then there was a shift with an increase in certain years, such as 2006 and 2007. There were approximately five main feature articles on global warming from 2000 to 2004, yet there were four main features in 2007 alone. As often happens with such issues, after the wave of attention surges forward, it then recedes. The number of media reports on global warming fell almost as fast during 2008 as it had risen during 2006. A peak in media coverage occurred in early 2007, mainly driven by the Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report and Al Gore's documentary *An Inconvenient Truth*.

4.2.2. Placement of articles

Looking at where the articles were placed in the magazine, it was found that most of the articles did not stand out as leading articles. This is significant because the prominence of an article is obvious when it is placed on the front cover or near the beginning of the magazine.

Exactly half of the articles were placed in the first third of the magazine (first 50 pages) and the other half were in the second third of the magazine (pg 50-100). Only two articles were placed in the first few pages (department section of the magazine), one being the brief (2 page) issue in February 2001 and then the one article "Signs from the Earth" in September 2004.

Three of the articles (this includes the September article mentioned above) were featured as a front cover issue and these were featured in 2004, 2007 and 2010. This is also significant because of the events that took place at the time, such as the 4th Intergovernmental Panel on Climate Change Assessment Report (IPCC AR), which marked a clear 'boom' in media attention. The conjunction of the AR with the publication of Al Gore's book and the release of his movie, as well as the Stern report, may have led to a more receptive (if not avid) media attitude towards reporting on climate change knowledge. The international political summits that are generally perceived as most iconic, such as Rio's and Kyoto's, clearly led to an enhanced media interest. Global warming had become a contentious issue in the media so it would only make sense that *National Geographic* would have an issue with global warming as a core feature.

The Kyoto Protocol's entry into force on 16 February 2005 and, as mentioned above, the publication of the Summary for Policymakers of the 4th IPCC AR (on the 'Physical Science Basis') on 2 February 2007, at the 10th Session of the Working Group I in Paris (Carvalho 2005:11) played a significant role in media attention.

4.2.3. Authors

Many of the authors, of the selected articles, were award-winning writers, with experience in science, international affairs or the environment. Some went on to

write books about global warming, such as Gretel Ehrlich, who wrote *In the Empire of Ice: Encounters in a Changing Landscape.* Cochran (2010) states “the volume chronicles her experiences among indigenous Arctic people living on the thawing edge of climate change. The authors of the articles were studied briefly to get an understanding of their background, and to determine whether any obvious agenda was behind their articles”.

Tim Appenzeller, another well-respected author and former science editor of *National Geographic*, won the Walter Sullivan Award for Excellence in Science Journalism (2005) from the American Geophysical Union for his article “The Case of the Missing Carbon” (February 2004). His biography on www.sciwrite.org states that he is a generalist who has roamed throughout science during more than 20 years as an editor and writer for various publications. During the first four of his eight years at *Science*, he edited and wrote news stories on physical sciences, working with staff writers and a large number of freelancers.

Tim Appenzeller once thanked Dennis Dimick (who co-wrote “Signs from the Earth” September 2004 with Appenzeller) in stating that “if any magazine could persuade readers that human influence on climate is a reality - and not just a noisy debate in Washington - ours could.” (www.agu.org.) He dreamed up the idea of a series of articles that would document how climate is changing and why, with this story on the carbon cycle to lay the groundwork.

In June 2007, Tim Appenzeller, in *National Geographic*, wrote another article, on the topic of global warming melting the ice caps, entitled “The Big Melt”. The article explains how fast the polar ice caps were melting. However, as Bailey (1994:172) points out, “the title was sure to sell hundreds of thousands of copies with the global warming fear in such high circulation. All of this fame and fortune is being created, and for what? From here, it seems, it has been created on the basis of a terrestrial cycle that will happen no matter how long we let our cars idle outside.”

The author, John G Mitchell (who died in 2007), was an American environmentalist and former editor of *National Geographic* from 1994 until 2004. His writing, according to Sullivan (2007), "verged on the poetic," and refused to succumb to cynicism. His article “Down the Drain” (2002) summarized some of the history of the Great Lakes as well as future issues. The narrative essay begins with the story of a homeowner in Traverse City who has seen his waterfront property change over the

years due to the dropping water levels. Water levels are lower now than ever recorded in history. The author notes that the water level changes affect more than just homeowners and points out the effects on the boating and fishing industry and the region's multi-billion dollar tourism industry.

Elizabeth Kolbert ("Changing Rains" – April 2009) wrote *Field Notes from a Catastrophe: Man, Nature, and Climate Change*, a 2006 non-fiction book that attempts to bring attention to the causes and effects of global climate change. Kolbert traveled around the world to areas where climate change is affecting the environment in significant ways. According to the Gosnell (2006), Elizabeth Kolbert took on "field trips," not only to places where climate change is affecting the natural world but also to ones — labs, offices, observatories — where humans are trying to understand the phenomenon of human-induced global warming. Kolbert also brings to our attention the attempts of large corporations such as Exxon Mobil and General Motors to influence politicians and discredit scientists.

Her article "Changing Rains" concludes that the rainfall changes of the future could affect societies as they have done in the past. According to Kolbert:

> The rainfall changes that devastated these early civilizations long predate industrialization; they were triggered by naturally occurring climate shifts whose causes remain uncertain. By contrast, climate change brought about by increasing greenhouse gas concentrations is our own doing. It, too, will influence precipitation patterns, in ways that, though not always easy to predict, could prove equally damaging. ("Changing Rains" - April 2009)

It is noticeable that the books that many of these authors have written are made known at the end of their article thus in their own way, they are also economically driven in wanting to sell copies of their own books. This suggests what Foucault (in Carusi, 1992: 122) calls "societies of discourse", which function to "preserve or produce discourses." They function within a closed space and admission to such a discourse is restricted.

Bill McKibben is the author of a dozen books about the environment, beginning with *The End of Nature* in 1989, which is regarded as the first book for a general audience on climate change. He has previously criticized the media for not informing humankind with balanced information.

Assessing McKibben's contribution to the discourse on global warming Paehlke (2004:95) writes,

> McKibben does not focus on the ownership structure of media barons, nor does he emphasize their ideological predispositions. But he suggests that the media have rendered humankind in some crucial ways less and less informed by the fact of their continued existence and operation. A media-saturated, highly educated, postagricultural, postindustrial humankind is, of all things, missing a great deal of fundamental information.

McKibben is well-known and is the founder of the grassroots climate campaign 350.org, which coordinated 15,000 rallies in 189 countries since 2009. *Time* Magazine (2010) still calls him "the planet's best green journalist" and the Boston Globe (2010) said that he was "probably the country's most important environmentalist".

However, it seems to be no coincidence that, after McKibben published "Carbon's New Math" (October 2007) in *National Geographic*, he brought out a guide to help people initiate environmental activism in their community titled Fight Global Warming Now. Thus his information may be more balanced, according to his view, but his intentions could be two-fold, namely to inform the public and reap a few benefits at the same time.

Many of the authors, award-winning journalists, most of whom covered national or international environmental issues, all showed some form of attention-grabbing discourse in their articles on global warming. Whether it was optimistic, alarmist or politically or economically driven, the content is at the very least believable when they speak about global warming – and the discourse thus gives these individuals a degree of social, cultural and even possible political power.

4.3. Surface of the text

All the articles dealing with aspects of global warming had titles that have connotations with fear, a weather-related calamity or transformation. Titles such as "Drying of the West", "The Big Melt", "Ground Zero for Global Warming", "Down the Drain" or "Rising Tide of Concern" do not exactly evoke feelings of warmth and

comfort. Titles such as these evoke feelings of panic or concern. The article "Meltdown – The Alps under Pressure" is an economical concern for those who reside near ski resorts or who rely on tourism that goes together with a ski season.

Another example is "The Big Melt" with the sub-heading that reads "Glaciers in the high heart of Asia feed its greatest rivers, lifelines for two billion people. Now the ice and snow are diminishing". This illustrates a sign of despair and that there is no hope for the two billion people of Asia as their 'lifeline' is evaporating. The discourse behind global warming and its representation is evident through its ominous presence in a language bursting with expressions such as "The New Cold War" (March 2000), "The Big Melt" (April 2010) or "Alps under Pressure" (February 2006). The first expression suggests a new political world order where not everybody is on board but it can also refer literally to the cold ice at the poles covering the world. The term "big melt" suggests an impending catastrophe. The third refers to a particular landmark that will probably disappear. The original meaning of "Cold War" as referring to the conflict between the USA and the USSR after World War Two, now gains a new meaning within the global warming discourse.

4.4. Rhetorical means

Most of the articles studied for this research dissertation mention the Intergovernmental Panel on Climate Change (IPCC) as a major participant in the discourse on global warming, in particularly its assessment reports. But other rhetorical devices are also typical of the discourse.

4.4.1. Quoting the scientists

Several quotations from or references to scientists, geologists or climatologists are included in the articles but a large majority of scientists were not named. They were simply referred to in expressions such as "many scientists agree" or "many scientists have proven". Such discursive utterances question the credibility of what is being said or not being said. However, to say that a 'scientist said so' to uninformed readers opens up a power imbalance as the scientist is the expert and the reader is not, thus the reader will take the scientist's word for it. This therefore conveys information about power relations as in who is depicted in power and over whom. And who is depicted as powerless and who as passive?

The quotations from named sources (the IPCC or a geologist from a university) are naturally seen as more credible than those from an unknown source. Those that are shown as victims in the articles or victims of global warming (e.g. ice hunters or Greenland farmers and Australian farmers) are seen as the passive sufferers who will need aid (from the more powerful institutions or governments) in order to survive and feed their families. This is another indication in the narration of 'Othering' where only certain groups globally are portrayed as suffering. This leads to a division between groups, which in turn lead to one group being more superior and powerful, than the 'other'. This, does, however, give a human face to the discourse on global warming when subjects who are suffering are also included, interviewed and photographed.

4.4.2. Photos

In terms of photography and content, all the articles, when counting the number of pages, except for "Carbon's New Math" consisted of more photos than content. For example, the article "Polar Bear Park" (December 2005) is a 12-page article of which 9 pages are dominated by photographs. As Huckin (1997) has suggested, when one looks at an article such as this one, one needs to look at what sort of perspective is being presented — what angle, slant, or point of view. Choosing and placing specific photographs or diagrams in a particular order or using photography predominantly to get the reader's attention shows that the emphasis is on the photos and not the content.

The notion of a story told in pictures is crucial to the photographic process at *National Geographic*. One picture editor quoted by Lutz & Collins (1993: 56) said outright, 'This is not travelogue, it is not journalism, it is not an art magazine, it is storytelling'. The ideas and themes that bind a set of photographs are a priori charge that emerges from the Planning Council and the editorial staff. The photographs are expected to have a sense of scene, a sense of drama.

As Weart (2008:146) adds, no report on climate seems complete unless it showed a block of ice breaking from a glacier to plunge into the sea; the exotic image has become a self-contained symbol of global warming. Starting around 2005 an even more popular icon emerged turning up frequently even in cartoons — the polar bear, said to be threatened with extinction. The images of the solitary bear in an hostile, unfriendly and alienating environment tends to frame it as the sole survivor in what is thus an apocalyptic discourse. According to Lorenzoni (2006:74), the polar bear has

become a powerful discursive symbol in the fight against climate change. However, as MacNaghten (2003) argued, such an image can create a perception of climate change impacts as geographically distant.

A powerful symbol in the discourse on global warming is the polar bear for those attempting to generate support for addressing climate change. Looking at Addendum B (with figures 1-4), a simple semiotic analysis is given in 4.7 below to illustrate Barthes's theory that photography does convey certain meanings.

As Barthes pointed out, the "photograph is not only perceived, received, it is read, connected more or less consciously by the public that consumes it to a traditional stock of signs." (1977:19) Independently of what the photographer or the caption writer may intend as the message of the photo, the reader can imagine something else. Thus, the message can be interpreted differently to what the author intended and this supports Barthes's assumption that every reading of a photo is "at once arbitrary and rational" (1977:31).

4.4.2.1. Analysis of photographs

A large portion of the selected articles had photographs of blocks of ice (glaciers), polar bears or some reference to ice. The photography also portrayed these areas as isolated and cold and gave a sense of 'foreign remoteness' through the images of massive and stark areas with just one explorer, scientist, polar bear or ice hunter in the background. Similar photographs were also present with large areas of dry barren land or parched farmlands. The remoteness or desolate impression of the photograph gave a sense of 'this danger' being too far away to affect us in our current residence in our cities and towns and also one of hopelessness.

Most of the focus in the photography is on the environment, such as in big landscapes, drying (dying) fields that once flourished ("Drying of the West" – February 2008; "Australia's Dry Run" – April 2009), ski resorts laden with imitation artificial blankets to keep the economy booming ("Alps under Pressure" – February 2006), or signs from the earth with images of animals and weather and this sense of urgency that something "catastrophic" is happening ("Signs from the Earth": September 2004). Similarly, there are many other images that convey the effects of global warming.

Figure 1 is from “Down the Drain”, September 2002. The caption reads “Lake Powell's ‘bathtub ring’"; a residue from water immersion records how far the water level has fallen in the giant reservoir. Inflow from the Colorado River has been below average every year but one since 1999, when Powell was last full. It's now below 50 percent capacity and dropping.”

This photograph is one of a ski boat in Lake Powell, pulling a water skier behind it, and it is clearly visible on the wall of the reservoir where the water level had diminished rapidly. It suggests that one can still enjoy life (hence the man skiing behind the boat) even though there is a serious issue of water loss in this reservoir, which many people are dependent on for their own resources. It signifies hopelessness because the rapidly diminishing water level in the reservoir is inevitable and this can mean a grave concern for the nearby community. What will happen when it diminishes to the point where they can no longer rely on it? It denotes a positive viewpoint in the photograph as people (on the boat and skiing) are still enjoying life regardless of the dangers of losing a natural resource. The photo connotes that one can argue that society would see this photograph as alarming and a sign that the danger of global warming is ‘real’ and happening fast. It would be more alarming for the society that is directly affected by this reservoir and its supply but for a culture or society in distant parts of the world, who do not necessarily rely on reservoirs for their water supply; it might not have the same effect. From an economic point of view this photo also conveys the ideas of losing of tourist potential, jobs and appreciation of nature by visiting tourists who will spend their money.

Figure 2 is from the article “Life at the Edge”, June 2007. The caption with the photograph states, “In some bear habitats disappearing sea ice is already forcing bears to make longer, riskier swims.”

This photograph shows a lonely bear with the anthropomorphic sad expression of fear perched on a little piece of ice - all the ice is melting and he has become a symbol for global warming. It suggests a sense of hopelessness for the bears as they too are fighting for their own survival. What is not obvious in this photograph is the severity of how quickly the ice is melting or statistically how this affects the bears and their population i.e. could this result in a near extinction of bears or is it just a matter of bears relocating further north. The direct impression of the photograph is of stranded bears on floating ice, which seem to almost be “howling” in despair. The

social meaning behind this image would not influence society too much considering it is too far-removed for most cultures to be overly concerned with how it would directly affect them.

Figure 3 is Photograph from “Australia’s Dry Run”, April 2009. The caption reads “What will happen when the climate starts to change and the rivers dry up and a whole way of life comes to an end? The people of the Murray-Darling Basin are finding out right now.”

This photograph conveys a distinct impression of drought and hard times for Australian farmers. Parched lands, rivers drying up and farmers struggling to feed their families. One sees a family, with a little girl covering up her eyes (in despair or is it photographic manipulation?) and the father and his son reflected in the mirror (emphasizing the togetherness of the family in times of hardship). It is an obvious image of desolate times yet the family will have to keep living and will have to adapt to these circumstances and make it work for them. Looking from a different point of view, one can argue that the mirror is a symbol of a prompting a new way of looking at this situation, or alternatively, from a cultural point of view, any reflecting surface (which includes the surface of water) plays an important role in many religions and cultures. Thus, it could be a symbol of appealing to the “gods” for help.

Figure 4 is from “The Big Melt”, April 2010. Both photograph A and photograph B are part of the same image. The image of the man is an overlapping extension of the full photograph. The caption reads “Glaciers in the high heart of Asia feed its greatest rivers, lifelines for two billion people. Now the ice and snow are diminishing.

This photograph conveys a glorious image of an impressive glacier in the Himalayas that serves as a “vital freshwater cache” for a large population. The photograph also shows a father with his two sons, who seem to be playing and throwing some cards into the air. The obvious assumption would be that the children are playing amidst a possible future disaster but upon reading the article, one discovers that the Tibetan boys are actually throwing prayer cards into the river during a Buddhist ceremony in their barren province. This illustrates what Barthes pointed out in that “cultural codes, or meaning derived from history, customs, and formalities of a given culture, afford the photograph a secondary meaning that connotes meaning based on those cultural codes” (1977: 28). For a non-Buddhist viewer it could denote mere playing by the child or symbolise how everything is collapsing like a pack of cards.

These photographs highlight a small portion of the photography in the selected articles but the analysis is to establish that there are meanings in the photography portrayed. These meanings are interpreted by the direct impression one gets when looking at the photo but that there are second meanings embedded in the photograph which largely depends on our cultures, society and backgrounds. As well as how the photograph directly impacts on our life. In other words, a photograph may not affect us if we see a lonely polar bear floating on an ice shelf. It will leave the impression of global warming being an ominous threat to our earth but as it is too far removed to directly affect most people, it will be disregarded. Yet photos of barren reservoirs that could be a lifeline for one's own community will be a more directly related threat and may prompt society to take a course of action.

Either way, it illustrates that the photography evokes feelings or emotions and in most of the global warming photographs, it evokes a feeling of desolation, fear, threat to our existence or danger.

4.4.3. Headlines

A clear observation that was also made in this study was the accentuated urgency and gravity of the matter. Dramatic and negative events and damage are mentioned in the cited headlines, such as "Rising Tide of Concern" (February 2001), "State of the Planet" (September 2002), "Signs from the Earth" (September 2004), "Life at the Edge" (June 2007), "The Big Thaw" (June 2007), "The Big Melt" (April 2010) or "Greenland Ground Zero" (June 2010) – the last appealing to the paranoia related to the attack on the World Trade Center in 2001.

Articles that are about the victims and not about 'what' is causing the suffering tend to influence the reader to lean towards giving a voice to the 'other' by presenting the personal narrative of the farmer or ice hunter. This omission of information about certain agents of power is often done on purpose. In other words, the focal point is not about the massive fuel driven industry that is possibly causing the global warming, in turn causing the farmer's anguish – the attention is diverted to the farmer, hence disregarding the root of the problem.

From another angle, the power is also in the voice of the victim. It suggests a form of populist discourse where a distinction is made between the 'people' (the ones

suffering from the effects of global warming) and the ‘selected few’ (the scientists who are warning us about it) and this distinction urges change. This is ironic as the effects of global warming will (and is) affecting everyone and not just a certain group.

4.4.4. Graphs

Quite a few climate models or graphs were used in the articles but graphs, however impressive, tend to interest only the more data-minded type of person. For the average individual, the graphs can be confusing and are thus often overlooked. One associates graphs with scientific papers and a scientific discourse aimed at an informed discursive ensemble consisting of people with the same interest and knowledge.

4.5 Content and ideological statements

An additional finding in the articles was the frequent reference to human accountability or anthropogenic causes of global warming. At least half of the articles made some sort of reference to global warming being an activity driven by humanity. Halsnæs & Shukla (2007) point out that in a media summary of a report on global warming by the UN's Intergovernmental Panel on Climate Change it is stated that, "most of the observed increase in globally averaged temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations”

The relation between anthropogenic emissions of carbon dioxide and the already perceptible climate change is depicted as beyond rational questioning and has become a “naturalized” understanding of the issue.

One particular article in “The Case of the Missing Carbon” (September 2004) by Tim Appenzeller, makes at least eight references to human accountability for the “dumping” of carbon dioxide into the atmosphere. Tim Appenzeller’s articles emphasized human accountability throughout the content. Phrases such as ‘activity driven by humanity’, ‘humans dump CO2’ and ‘humans were the hurricane’ are just a few examples of how Appenzeller blames humanity for causing global warming by dumping carbon dioxide into the atmosphere. He then proceeds to show a positive side to global warming in that global warming, ironically, may be helping forestall

even more warming, by speeding the growth of carbon-absorbing trees. He then mentions some research that would be encouraging news for those researchers working on schemes that would allow humanity to keep burning fossil fuels without dire consequences for climate. Appenzeller concludes that the answer is not known yet but that time is moving and something will have to be done soon. Yet many conclusions are drawn from the “subtlest of clues” which do not “differ by more than a fraction of a percent”.

However, according to Alexandar (2007) any legitimate scientific study on climate -- including the United Nations Intergovernmental Panel on Climate Change -- that suggests human influence is the dominant cause for global warming, and you will discover dozens of qualifiers like 'could,' 'possibly,' 'potentially,' and 'may'.

Some examples from the articles are:

- The line, “melting polar ice sheets *could* eventually…” (“Rising Tide of Concern” - February 2001);
- “Human activity *almost* certainly drove most of the century’s warming, a landmark report from the IPCC” (“Signs from the Earth” - September 2004); “Scientists fear global warming *could* drive bears to extinction” (“Life at the Edge” - June 2007);
- “The coasts *could* drown, *could* flood…” (“The Big Thaw” - June 2007).

The articles, in summary, largely suggest that global warming is ’possibly’ but not necessarily proven to be driven by human activity. This suggests that we, the readers are intended to see this global catastrophe as our fault. “People would see this as a generalized "pollution," the material and moral evils intertwined. Some, including prominent scientists, wondered if we had invited divine retribution” (Weart 2008).

It could be seen as a method of distraction and because, as Immerwahr (in Weart 2009:143) suggests, many readers just become anxious and baffled, "people literally don't like to think or talk about the subject. Their concern translates into frustration rather than support for action."

That said, in *National Geographic*, it would seem that the way in which science has been framed with climate change in the articles studied here, the discussion

successfully moved beyond “is the climate changing?” This is a question that carries with it the journalistic “responsibility” to create space for both the “yes” side and the “no” side. Or to science-based discussions of “what are the current effects of an already changing climate?” Likewise, when the Kyoto Protocol is framed with climate change/global warming in the articles, the story is often critical of the United States administration and its failure to ratify the protocol (i.e. these are stories that are not necessarily working to maintain the status quo). However, it should be kept in mind that stories framed with “science” and “effects on the economy” were the most “popular”. Based on this, framing of climate change stories should continue to be monitored and scrutinized (especially in light of how “unpopular” the solutions frames were).

4.6. Other peculiarities of the articles

One of the first selected articles to appear in the magazine in the time period covered (March 2000) began with the title of “The New Cold War: Stalking Arctic Climate Change by Submarine”. It shows a sense of fear when having to “stalk” and pursue this unknown and frightening new phenomenon of global warming. The article tells us how the Navy is assisting the scientists in understanding why the Arctic is warming markedly. In this sense, when one is confronted with the ‘unknown’, one will often need aid or assistance from someone more powerful such as the government or the Navy. The Arctic, “earth’s least explored frontier” is an isolated place yet the notion is that even the Navy cannot conquer this slow moving enemy.

The mission was to commit to a series of scientific submarine cruises and map parts of the Arctic’s mostly unchartered seafloor. These glaciers or parts of the Arctic are referred to as an ‘Arctic monster’ or an ‘imagined monster lurking in the blank spots of our knowledge’ and we are told that only a “fool would travel north of the Arctic Circle clad in anything less than nuclear submarine”. This shows the dominant and significant presence of the Navy and that the scientists would be ‘foolish’ to attempt to travel to the Arctic without the assistance of the Navy. The article stresses that data about the ocean has more than doubled since the Navy stepped in. Even the photography illustrates how powerful the submarine looks emerging through the thick ice.

Words such as “perhaps” or “evidence not conclusive” (“The New Cold War” - March 2000) or “is the Arctic showing signs” leads to uncertainty and no solid evidence that

global warming is in fact present. The authors substantiate this uncertainty with phrases such as “the Earth has a history of warming and cooling dramatically” and to add to this statement, the program director at National Science Foundation maintains that the “problem in the Arctic is a lot of variability”.

Most of the articles had climate models and scientific diagrams which support the credibility of the information provided. These were quite dominant in various articles, less so than substantial quotations from scientists. A few geologists and scientists were quoted but this amounted to less than 20% of total word count. All the articles did appeal to some emotion – fear, nostalgia, concern or uncertainty and the emotional appeal was the heart of the rhetoric.

4.7 Discourse position and overall message of the article

In the article (“Down the Drain” - September 2002) another element enters the discourse and that is of nostalgia and a yearning for the past when everything was still unscathed. The author John G Mitchell, from whose discourse position the article is written, wants to stand alongside a lake “remembering the barefoot boy” and go back to being a child skipping stones across the lake. It is the ever-optimistic youthfulness in humans where one yearns for that ‘perfect’ moment. The emphasis in the article is that global warming, however, is something unpredictable or with no fixed value and Paul Simon (a former U.S. senator) makes a comment in the article that one has to do what is “politically and economically feasible”. This dismissive attitude is that humans who do not know how to deal with an issue such as global warming will therefore *just* manage with whatever is dealt our way, and this is because our current way of living is also inevitable.

The type of discourse mentioned above is indicative of the economic impact of global warming, which is a chief discourse in many of the articles. Clearly, according to Oilprice.com (2009), estimating the economic impact of global warming is no simple task, and is fraught with political discourse. But there is one sure sign that global warming is having an economic impact: Investors are starting to consider it an opportunity. The discursive position taken in by the author suggests a pro-economic and pro-capitalist stance.

In the “Down the Drain” (September 2002) article, a compelling fact is that the industries that remove the freshwater or pollute it are justified as “creating jobs” when

ultimately, what they are doing, polluting and lowering the water levels, will negatively impact on tourism – a top source of income for the region and people working in it. The author goes on to provide background on how nature regulates the amount of water in the Great Lakes:

> Current withdrawals for municipal drinking and industrial uses amount to barely a drop in the bucket, for most of the water eventually finds its way back to the system after treatment or in the flow of recharged groundwater. The only significant diversion that does not get back into the system is the 2.4-billion-gallon-a-day (about 9-billion-liter-a-day) draw Chicago extracts from Lake Michigan.

Further on, Mitchell goes on to state that Nestle Waters North America (Nestle bottled water) also had permission to take 210 million gallons (800 Million Litres) of water out of the Great Lakes annually. Nestle actually takes it from an underground aquifer near Muskegon, Michigan that feeds the Great Lakes. Paul Simon, a former Illinois senator commented in the article that "tapping the Great Lakes is going to happen" and Simon believes, "it will be only a matter of time before piping bulk exports of water out of the region becomes politically and economically feasible."

Thus, this well-known and well-respected author's discursive position is characterized by a narrative about the history and the possible future of the Great Lakes (with reference to a homeowner and how it has affected him on a personal level) and the impact it had on the local economy. There is very little direct reference to global warming and solutions to it. There is even mention of how global warming has had a positive environmental impact in that "periodic low water levels have turned the wetlands and exposed bottomlands into biologically productive ecosystems". This discourse has a strong economic undertone imposing how people should adapt to and mitigate climate change.

As stated earlier, it is the interconnection of these different discourses that make climate change such a highly politicized and disputed matter. We can view these different discourses as regimes of knowledge that are competing about what is true and false, and as such, create different 'truth effects'.

According to Foucault (1972, 1980), the notion of 'truth' should be understood as a system of procedures for the production, regulation and diffusion of statements, and is embedded in, and produced by, systems of power. Since truth is unattainable and

there is no position outside discourses, it is fruitless to ask whether something is true or false. Instead, he argues, the focus should be on *how* effects of truth are created in discourses. What is then to be analyzed are the discursive processes through which discourses are constructed in ways that give the impression that they represent true or false pictures of reality.

For example, he pointed out that a very powerful discursive practice in political argument was to change verbs into nouns ('nominalisation'), and to use passive rather than active forms of verbs. So politicians do not say 'we are going to privatise the railways'. They say: 'There will be privatisation of the railways'. Or in the case of Senator Simon quoted above: "There will be bulk exports of fresh water needed for the industry."

Kress (in Antaki n.d.) argues that this choice of grammatical form is a discursive practice. Its effect is to constitute the transfer of public goods into private hands as 'agentless'. That promotes the interests of certain groups in society.

Solutions for the future were mentioned in one or two articles, such as in the article "Green Dreams" (October 2007) which deals with biofuels and alternatives to oil and coal. But, as McKibben states in his article, "Carbon's New Math", also published in the same issue (October 2007), "these approaches have one thing in common. They're more difficult than simply burning fossil fuel. What comes next will be more expensive and more difficult."

Thus, it is a question of one step forward and two steps back. It seems an impossible task to clearly understand the 'how', 'why' and the 'what now' of global warming when the articles discuss the probabilities of what has happened, who is to blame, what *could happen* and how are we possibly going to change the way forward, without adapting our life too much.

The doubtful or uncertain tone of the discourse is introduced by using words such as 'may', 'might', 'could', 'will', 'can', 'must', 'it seems to me', 'without a doubt', 'it's possible that', 'maybe', or 'probably'. Moods of heavy-handed authority or deference can be created simply by choice of verb or modal phrases, which assert or deny the possibility, impossibility, contingency, or necessity of something.

The economy and the powerful actors behind the economy (for example, any actor that has some involvement in the economy such as politicians, multinationals or media) play a pivotal role in global warming. Carvalho (2008:3) points out in her research that the United Kingdom has shown the power of politicians in setting the media agenda and structuring the discourse. A 'balanced' discourse in some of the articles balanced the opposing views as if they had equal support in the scientific community.

Articles such as "The Alps under Pressure" discuss the effects of global warming on ski tourism and commerce (February 2006). "Green Dreams" (October 2007) and "Changing face of Greenland" (June 2010) are other examples. The environmental bottom line is larger than "just" the loss of biodiversity and wild habitat. The environmental bottom line is perhaps best understood as being three dimensional, with the preservation of nature being one dimension, pollution a second, and the sustainability of economically important resources a third (Paehlke 2004:141).

National Geographic in turn showed that more than half of the selected articles were features on the 'state of the planet'. In other words, most of the articles featured real life incidents about people and countries that were feeling the effects of 'global warming'. Quotes from a scientist, a geologist or the IPCC were included but did not dominate the content. The article content was superseded by the drama of the situation and how these unfortunate humans are beginning to suffer from the effects of global warming.

Looking at the articles selected and if one addresses the joint responsibility of the United States, the *National Geographic* and the actors involved, one has to ask whether national interests override global concern. Are the causes of climate change linked to social and industrial behaviour and to policy making? In other words, are the articles informing and educating us of a serious threat such as global warming (which should ideally be the responsibility of the actors mentioned) or are the articles leaning towards how society and the economy can 'live' with this threat (with certain adjustments) and even benefit from it.

In the course of time, ideas about the environment have changed quite drastically with major implications for politics, environmental policies, and consequently, for social life. Dryzek (2005: vii) illustrates this idea in the following statement: "What is the earth? We have long known that it is a planet, but the idea that it might be a finite

planet with limiting capacities to support human life has only received widespread attention since the late 1960s". This drastic shift in thinking has led to the most basic consequence that we now have a politics of the Earth, whereas once we did not.

Another discursive strategy that constitutes the certainty frame is the construction of 'scare stories'. Einsiedel and Coughland (in Olausson 2009:431) demonstrate in their study how environmental stories, unlike other science stories, are marked by negativity.

The results of this study here show that the news stories are fear-generating and explicitly relate serious risks and various sorts of harm to the phenomenon of climate change. The serious and uncontrollable nature of this environmental risk is emphasized by the choice of words, for instance 'galloping greenhouse effect' and 'disastrous effects.' Attention-getting words and expressions like 'increased mortality,' 'diseases,' 'treacherous bacteria,' 'catastrophe,' and 'accidents' establish the negative and frightful context in which climate change is discursively constructed.

Examples from *National Geographic* are the following:

- "The New Cold War" (March 2000) article refers to the "imagined monster lurking" on "earth's least explored frontier" and that "the consequences could be grave", however, concluding that hopefully the "Arctic Ocean will cool again, leaving us not with catastrophic climate change but simply with a better understanding of one of the planet's least known places".

- "Rising Tide of Concern" (February 2001) emphasizes a "worst case scenario" and that low-lying islands are lying on "ground zero". The consequences are listed as "flooding, erosion, tainted drinking water, displaced populations, and loss of farmland and biodiversity".

- The "State of the Planet" article (September 2002) refers to the earth as a "dead zone" and if nothing is done about the planet's health, our "oceans are doomed".

- Further comments such as "prostitution of the snow" ("The Alps under Pressure" - February 2006), "ecological catastrophe", "crisis devastating" or as Jia Son (a 52-year- old Buddhist quoted in the article) states, "the gods

> must be furious" ("The Big Melt" - April 2010) – all of these articles construct devastating consequences of climate change.

It seems as if the coverage is concentrated around extreme weather events and projections of catastrophe which creates a "language of imminent terror", according to Moser *et al*. (2007). Boykoff and Boykoff (2007:1197) add that the predominance of catastrophe frames over solution frames may help explain the apparent value-action gap with climate change; the current discursive setting has generated concern over climate change but not inspired much action.

Weingart *et al*. (in Olausson 2009:432) shows how scientific hypotheses about global climate change were transformed in German print media into a general prediction of a coming climate catastrophe. This prediction was constructed by means of dramatic, negative, and sensationalized presentation. They give examples from headlines such as "Death in the Greenhouse" which suggests that humankind is living in some sort of greenhouse and about to die.

Dunlap & McRight (2000:500) state that,

> [i]n the last three decennia the role and power of climate science have changed, first and foremost due to the overwhelming attention that global warming has received in the mass media. The media have played a crucial role in bringing global warming into the arena of public discourse but also in gaining political momentum around the issue. While early news stories relied heavily upon science as a source for knowledge and understanding, over time economic and political specialists edged out scientific experts as the dominant sources for generating news stories.

This sheds light on how climate change as a scientific discourse has increasingly become a public and popular discourse that inevitably shapes our worldviews and thus involves power.

The United States entertainment industry, as mentioned earlier, Al Gore and even documentaries have given us various interpretations of global warming, thus the media have become a powerful interpreter. The media thus wield the power. As Carvalho (2006: 7) adds, the media employ a quasi-religious register of death and doom, and use language of acceleration and irreversibility.

Unfortunately as Sheppard (2007) states, the *New York Times* notes that the whole global warming bandwagon has evolved into “less an issue and more a doom-laden religion demanding sacrifice to Gaia for our wicked fossil fuel-driven ways.”

The choice of words in the quotations below (“are” and not “might be,” “will” and not “might”) indicates the central assumption of the construction of collective action frames. Tthere is no doubt about the existence of climate change and its effects:

- “The world *is* warming” and “the sea levels *are* expected to climb” (“Rising Tide of Concern” - February 2001),
- “world *is* heating up now and fast’ (“Signs from the Earth” - September 2004) and
- “bears *are* in trouble” (“Polar Bear Park - Refuge in Winter” - December 2005).

The risks connected to climate change, as portrayed by the press, all call for action at national or local levels. The responsibility for dealing with these issues is attributed to municipalities, local and national authorities, politicians, and sometimes companies such as national power plants.

In a study of German print media, Weingart *et al*. (in Olausson 2009:429) found that the media called for political action in order to limit the damages of global warming. They also concentrated on identifying scapegoats for the shortcomings in adapting society to the consequences of the changing climate. Similarly to how global warming is framed in German newspapers, the Swedish press focuses on the lack of responsibility taken by national and local institutions, adding a dramatic perspective of ‘bad news’ to the frame: connection between anthropogenic emissions of carbon dioxide and the already perceptible climate change is portrayed with an air of self-evidence.

4.8 Conclusion

After “The Cold War” article in *National Geographic* (March 2000), there were no further in-depth features in 2000 or in 2001, although there was a taste of what was to come in the February issue of 2001. In a section of the magazine called *Earth Pulse*, there was a double page article titled “Rising Tide of Concern”. It shows a diagram and climate model with paragraphs next to various illustrations. Each paragraph next to the diagram has its own heading, “Worst case scenario”, “Warming and Rising”, “Erosion”, “Ground Zero” and so on. It demonstrates, in brief, that there is an environmental phenomenon and uses examples of what could happen and what is already happening. For example, “low-lying islands can become uninhabitable” and “Louisiana’s Mississippi’s River Delta losing 35 square miles of wetlands every year” and the opening paragraph “sea levels are climbing and people are in harm’s way.”

The conclusion of the double page spread is that coastal and island dwellers risk losing their homes, or even their lives, as a consequence of rising tides. The world is warming, causing seawater to expand and accelerating the melting of mountain glaciers. Melting polar ice sheets could eventually add to the rise. Sea levels have fallen and risen over the millennia. Even if the pollutants that contribute are reduced, the climb of gases is expected to continue in the 21st century. The consequences will be flooding, erosion, tainted drinking water, displaced populations, and loss of farmland and biodiversity. Lastly, the article suggests getting involved and stipulates that more information can be found on the websites of the Climate Institute in Washington DC or the IPCC. This article is in contrast with the first one in March 2000 which emphasized the uncertainty of global warming whereas this spread states that it ‘is’ in fact occurring and that we will have a dilemma on our hands in the near future. Ironically, there is an advertisement for a new low-emission car on the very next page.

Two in-depth features were published in 2002 with the titles “Down the Drain” and “State of the Planet” (alluding to the State of the Nation addresses delivered by the United States president), and then nothing in 2003. It was in 2004 that the magazine heated up with one of the longest and in-depth features of global warming, “The Case of the Missing Carbon” (February 2004). This was followed by “Signs from Earth – Global Warning – The Heat is on” (September 2004), which seems in its

entirety a detailed feature, yet the ominous sub-sections of '7 signs' and '7' are too reminiscent of the biblical '7 deadly sins' and the 'end of the world'. The features increased in 2005 and 2006 and were most prevalent in 2007 and were all relevant to the political events at the time. In 2008 and 2009 there were a few features including a slightly less dramatic article with a word of caution. These features were more in line with the current effects of climate change i.e. what has already occurred. 2010 jolted straight back into 2007, a time of forewarning and drama.

Overall my findings concluded that the articles were framed primarily into two types of articles (1) those relating to science and (2) those relating to the economy. Many of the articles seemed to draw conclusions from anecdotal evidence and although they might not be unscientific, they are still unreliable because they do not follow from the evidence and might easily be incorrect. As Shermer (2008) states, "thinking anecdotally comes naturally, whereas thinking scientifically does not."

On the one side are scientists who state that global warming is imminent yet there are also scientists who claim that rising levels of carbon dioxide and other gases emitted through human activities are an effect rather than the cause of global warming. On the other side are farmers, hunters and people who claim that they have firsthand experience of the effects of global warming. Examples are "Artic Hunters on Thin Ice" (January 2006) or "Changing Greenland – Viking Weather" (June 2010). These anecdotal associations are so powerful that they could cause the readers to ignore the scientific evidence, whatever it may be.

CHAPTER 5

LIMITATIONS, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

The question raised by these findings, is whether those with power have impressed their definitions of the situation of climate change upon those that read the content of the magazine.

5.2 Limitations encountered during the study

Limitations are encountered in every study and in order to understand media discourse on climate change, research needs to go beyond journalism and examine the discourses of different social actors who form part of the discourse on global warming.

Journalists usually portray a discursive re-construction of reality. In other words, they do not necessarily witness or experience the reality of climate change without the mediation of others. A variety of social actors serve as sources of information for media professionals, in a direct or indirect way. The media's representation of this issue seems to be very much a function of the initiative of social actors to organize their claims and to project attention to the types of 'incidents' that have occurred. The media depiction will obviously depend largely on the preferences and options of the media professionals, but necessarily builds on the ways social actors construct climate change in their multifarious discourses

This emphasizes how much can still be explored in the discourse on climate change.

5.3 Summary of research

The following remark by the ecologist Paul Ehrlich (in Clapp & Dauvergne 2005:103) sums up the philosophy behind the earth's problems encountered today:

> The resource that worries me most is the declining capacity of our planet to buffer itself against human impacts. Look at the new problems that have come up, the ozone hole, acid rain, global warming. If we get climate change

> and let the ecological systems keep running downhill, we could have a gigantic population crash.

When a reporter told Julian Simon (an economist) about Ehrlich's comment above, Simon was quick to retort: "a population crash? That sounds an even better way to make money. I'll give him heavy odds on that one." (Simon in Clapp & Dauvergne 2005:103). This is a clear example of what Foucault (1980: 118) describes as ideology in a secondary position because global warming now becomes secondary to an economical determinant.

Similarly Ronald Bailey (1994:168) begins chapter 10 of his book *Eco-Scam* with the following:

> "No problems, no news," runs one old maxim of journalism. As we have seen many players have strong interests in hyping environmental problems into "global emergencies" or "worldwide crises." Crises keep donations flowing to environmental advocacy groups, advance the careers of certain bureaucrats and politicians, attract funds to scientists' laboratories, and sell newspapers and TV airtime.

Bailey's argument is supported by a number of examples in the United States of America. Al Gore, who starred in the documentary (and published a book) *An Inconvenient Truth* and has received several awards for being a "friend to the environment", but this has only fueled our fear of extinction (AlGore.com). From his book and documentary film, Gore has made millions of dollars and has advanced his career astronomically by exploiting our anxieties about nature. Morgan Freeman was featured in a commercial (along with other prominent people) for Lexus, promoting the car company for creating a vehicle that produces fewer emissions, all for a healthier environment. Even insurance companies are offering a "carbon offset" option on their policies. Theoretically, if we pay companies an extra fee per month (or whatever their rate is), they can offset the carbon emissions from your vehicle.

Thus, the media, such as in the articles in *National Geographic* have played a crucial role in bringing global warming into the arena of public discourse but also in gaining political momentum for the perceived crisis (Dunlap & McCRight 2000: 500).

5.4 Recommendations and opportunities for further research

A suggestion for future research would be to study the motives behind the content of the magazine and the consequences of those motives being acted out. This is important to study because, in the words of Lutz and Collins (1993:89), "*National Geographic* over the course of a century helped to set an important cornerstone of its readers' definitions of the world."

Further suggestions would be to analyse other media channels' representation of the global warming discourse by the same authors or actors to see if there are similarities or differences in the discourse. This could substantiate one's argument for presupposing the predicted discourse portrayed by that particular author.

National Geographic can be researched in terms of alternative themes, such as wildlife, science, education or additional themes relating to the environment, to decipher whether there are similarities in the discourse with such articles; and whether these matters are clearly represented to the readers.

Throughout this dissertation, I have sought to provide insight and details that substantiate this study but there is a clear need for further research in this arena of climate science and media.

5.5 Conclusion

This study reviewed the coverage of the global warming discourse in the *National Geographic* magazine, including the photographs and attempted to evaluate whether the format and content of the news coverage has aimed to inform and educate the public over the selected period, or whether the coverage has swayed towards less detail and more dramatic coverage.

What is clear from this study is that *National Geographic* did not have consistent annual features on global warming from 2000-2011, nor was the length of the articles consistent over this period. Each author presented his or her discursive position on the global warming discourse and tried to convince the reader that the author spoke from a powerful and informed position and that his or her discursive utterances are believed to be "the truth".

Added to this finding is the overwhelming presence of photography that takes more than 50% priority over the content in all of the articles, including overshadowing the introduction of most of the articles. Photos form part of the discourse and allow for a variegated response from the viewers/readers. By including a photo of a solitary polar bear the author depicts his or her position of discursive power by appealing to the emotions through visual stimuli. The author forms part of the so-called “internal procedures” (Foucault in Carusi, 1992: 117) that constitute the discourse. He decides what should be included, what commentaries will be affixed and what ideological stance is to be elicited from the photo under discussion.

It is clear, however, that contribution by the *National Geographic* to the global discourse of global warming is, typical of a poststructuralist approach, open-ended and part of an ongoing process of signification.

All these factors have in fact directed us to one simple conclusion. The media - in particular *National Geographic* in this study- and what has been printed about global warming, over the past decade, has left us none the wiser on a subject matter that is not crystal-clear. The magazine has enlightened us in a variety of ways about Greenland farmers, the eating habits of polar bears, how ice hunters make walrus soup and, of course, that there is a lot of ‘change’ in our earth’s climate, which is accelerating and speeding and leading to a huge environmental and economic impact.

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Addendum A: CONTENT ANALYSIS OF *NATIONAL GEOGRAPHIC* ARTICLES

Article Title	Author	Line Count (est)	Number of images per article *	Date of Article	Placement of article in magazine (approx 150 pages per issue)
1. Artic Submarine – The New Cold War	Glen Hodges	350	8 photographs in 11 pages	March 2000	Pg 30
2. Rising Tide of Concern	n/a (section out of Earth Pulse)	40	Double page spread diagram	February 2001	Introduction (only 2 pages – brief section)
3. State of the Planet	Michael Klesius	490	7 in 14 pages	September 2002	Pg 102
4. Down the Drain	John G Mitchell	340	9 in 18 pages	September 2002	Pg 34
5. The Case of the Missing Carbon	Tim Appenzeller	450	17 in 28 pages	February 2004	Pg 88
6. Signs from Earth – Global Warning – The Heat is on** **(Divided into three sections: Geo Signs, Eco Signs and Time Signs)**	**Tim Appenzeller and Dennis Dimick**	**1700**	**49 in 75**	**September 2004**	**Front Cover and first article Pg 2**
7. Polar Bears in Hot Water	John L Eliot	120	9 in 11	December 2005	Pg 46
8. Living on Thin Ice – Last Days of the Ice Hunters?	Gretel Ehrlich	400	16 in 22	January 2006	Pg 78
9. Meltdown: The Alps under Pressure	Erla Zwingle	520	11 in 17	February 2006	Pg 96
10. Life at the Edge – Vanishing Sea Ice	Paul Nicklen	85	20 in 23	June 2007	Pg 32

11. The Big Thaw	Tim Appenzeller	480	11 in 16	June 2007	Front cover – article on pg 56
12. Carbon's New Math	Bill McKibben	220	2 in 6	October 2007	Pg 32
13. Green Dreams – Biofuels	Joel K Bourne Jnr	560	13 in 21	October 2007	Pg 38
14. Frozen Ground – Permafrost	Barry Lopez	230	17 in 19	December 2007	Pg 136
15. Drying of the West	Robert Kunzig	680	15 in 23	February 2008	Pg 90
16. Australia's Dry Run	Robert Draper	680	3 in 5	April 2009	Pg 34
17. Changing Rains – Outlook:Extreme	Elizabeth Kolbert	210	17 in 25	April 2009	Pg 60
18. The Big Melt	Brook Larmer	340	13 in 19	April 2010	Pg 60
19. Greenland – Ground Zero for Global Warming** - True Colors	Mark Jenkins	160	9 in 13	June 2010	Front Cover – article pg 34
20. Changing face of Greenland – Viking Weather	Tim Folger	450	12 in 19	June 2010	Pg 48

*This would be the total number of images (photographs and/or diagrams) in ratio to the total number of pages for that article. Thus, if the article was 12 pages in length, then the photography or diagrams that took up half a page or more would be counted against the content.

Note: Important to note is that all the articles were dominated over 50% by photography (and/or diagrams)
** The article in bold (no 6) was the most promient article out of the 20 selected articles in terms of length and prominence in the magazine i.e. on the front cover including the fact that it was a lengthy article.

Addendum B- Photographs

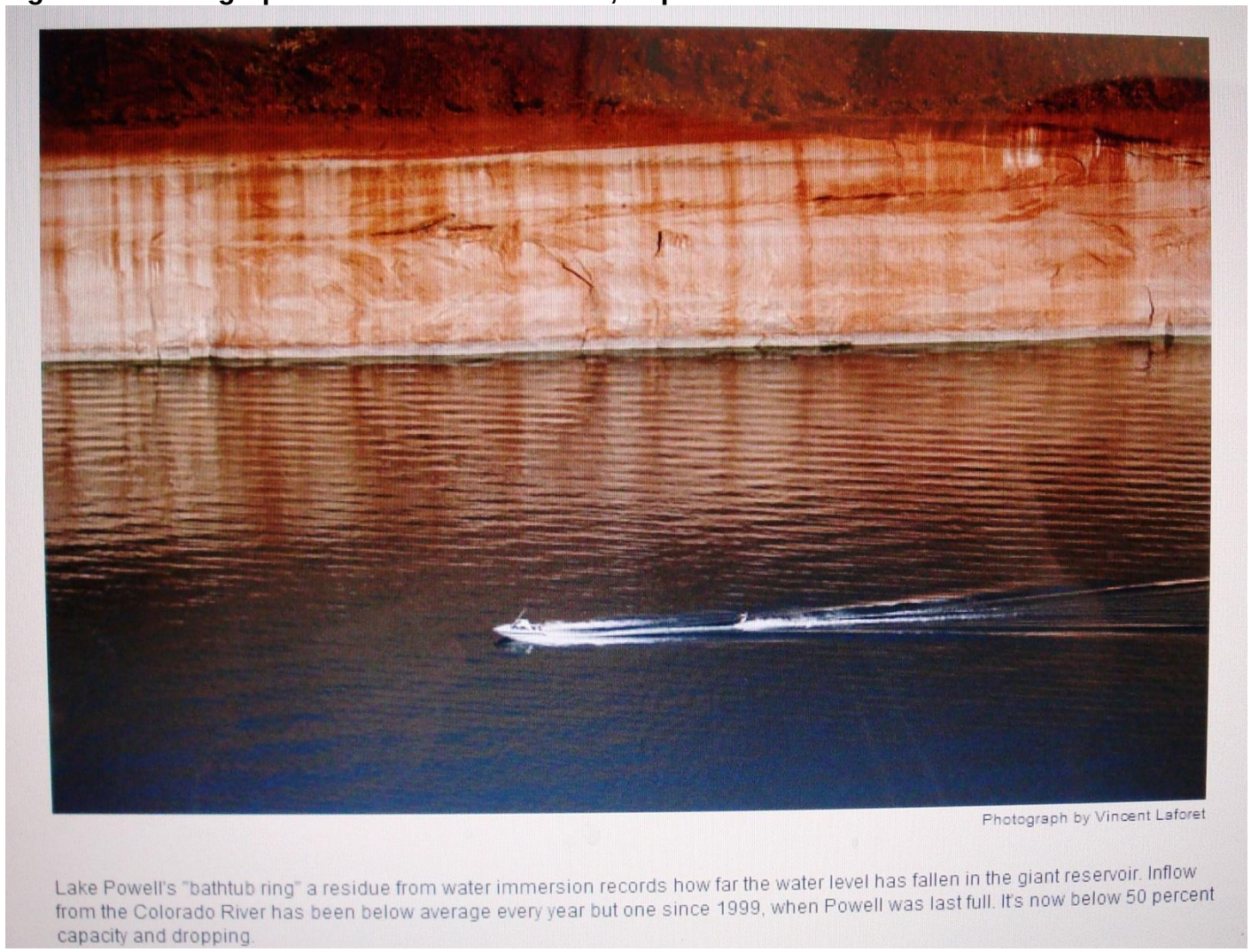
Figure 1 is from “Down the Drain”, September 2002. The caption reads “Lake Powell's "bathtub ring" a residue from water immersion records how far the water level has fallen in the giant reservoir. Inflow from the Colorado River has been below average every year but one since 1999, when Powell was last full. It's now below 50 percent capacity and dropping.”

Figure 2 is from the article “Life at the Edge" , June 2007. The caption with the photograph states, “In some bear habitats disappearing sea ice is already forcing bears to make longer, riskier swims.

Figure 3 is Photograph from “Australia’s Dry Run”, April 2009. The caption reads “What will happen when the climate starts to change and the rivers dry up and a whole way of life comes to an end? The people of the Murray-Darling Basin are finding out right now.”

Figure 4 is from “The Big Melt”, April 2010. Both photograph A and photograph B are part of the same image. The image of the man is an overlapping extension of the full photograph. The caption reads “Glaciers in the high heart of Asia feed its greatest rivers, lifelines for two billion people. Now the ice and snow are diminishing.

Figure 1 - Photograph from "Down the Drain", September 2002



Photograph by Vincent Laforet

Lake Powell's "bathtub ring" a residue from water immersion records how far the water level has fallen in the giant reservoir. Inflow from the Colorado River has been below average every year but one since 1999, when Powell was last full. It's now below 50 percent capacity and dropping.

Figure 2 - Photograph from "Life at the Edge" June 2007

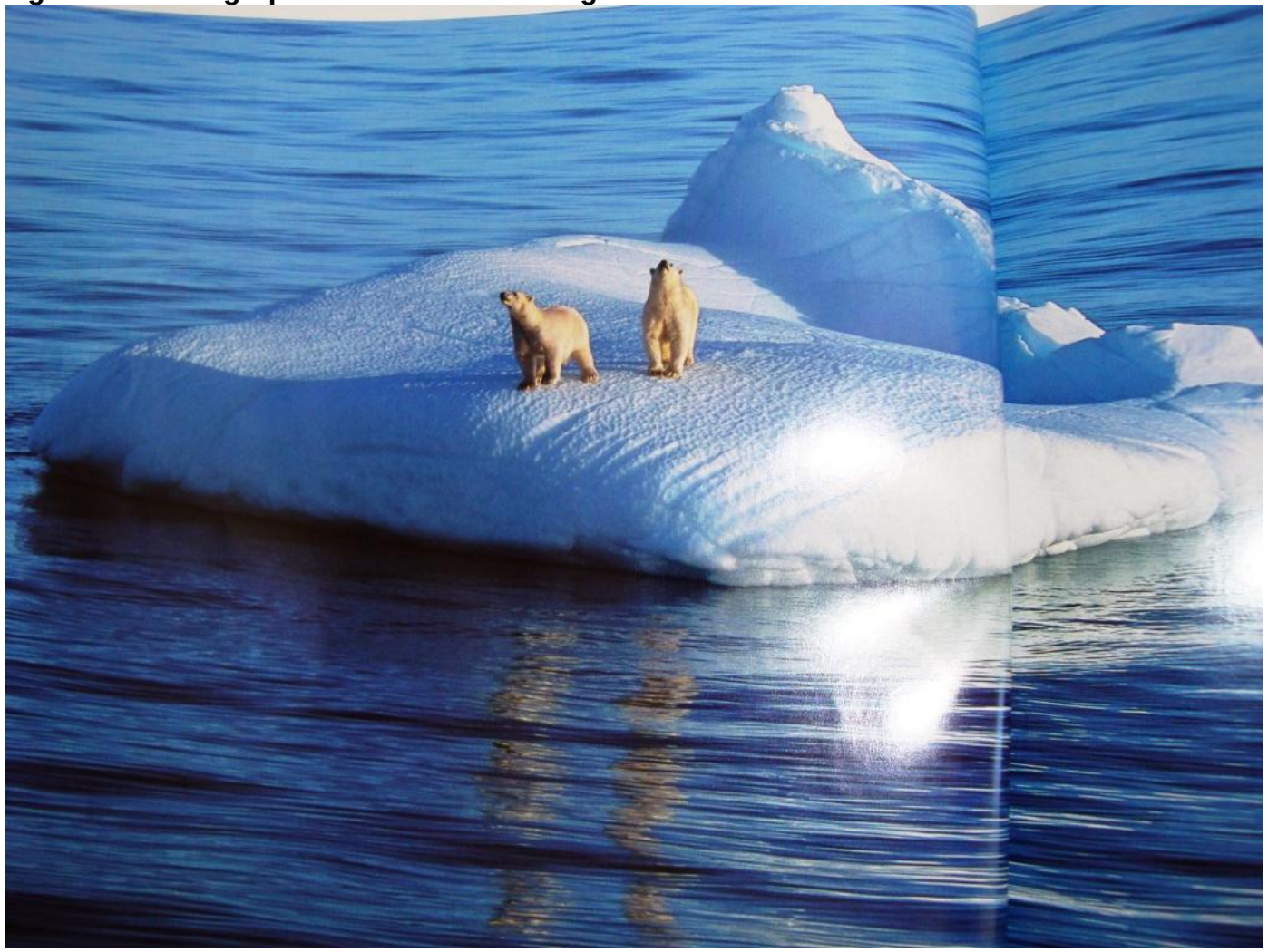


Figure 3:Photograph from "Australia's Dry Run", April 2009.

Figure 4 - Photograph from "The Big Melt", April 2010 (A)

Figure 4 - Photograph from "The Big Melt"(B)