

Practices of Power and Knowledge in the Intergovernmental Panel on Climate Change (IPCC)

Hannah R. Hughes

Thesis submitted in fulfilment of the requirements for the degree of PhD

Department of International Politics
Aberystwyth University

September 2012

DECLARATION

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

Signed (candidate)

Date

STATEMENT 1

This thesis is the result of my own investigations, except where otherwise stated.

Other sources are acknowledged by footnotes giving explicit references.
A bibliography is appended.

Signed (candidate)

Date

STATEMENT 2

I hereby give consent for my thesis, if accepted, to be available for photocopying and for inter-library loan, and for the title and summary to be made available to outside organisations.

Signed (candidate)

Date

Thesis Summary

This thesis explores how and by whom climate change is written. Although climate change has the potential to impact all ways of life, not all have the power to determine its meaning. In order to identify the actors with the symbolic power to name climate change, the basis of this authority and the activities through which shared environmental problems are named, this thesis examines one of the central sites of meaning production: the Intergovernmental Panel on Climate Change (IPCC). Deploying the sociological approach and thinking tools of Pierre Bourdieu, the IPCC is positioned at the centre of the international political struggle over climate change. It is from within this social location that the thesis re-constructs the actors, activities and forms of authority constituting the IPCC's assessments of climate change as a practice of writing. In order to determine the forces structuring the IPCC's writing of climate change the thesis identifies the actors that make up the organisation and follows the assessment report along the pathway of its formation. Documenting the report's construction from the panel's decision to repeat the assessment process to government approval of the final product reveals the interrelationship and reinforcing nature of scientific, political, economic, and organisational order in the IPCC's assessment activities. As a result of these forces and the actors they empower, the meaning of climate change is being written in and through the order that generated the problem.

Acknowledgments

I would like to thank those that have supervised me along the way: Andrew Linklater, Michael Williams, Richard Jackson and Kamila Stullerova. I must confess I often left meetings wondering what exactly you were pointing at, but I held on to your advice and sure enough, through the process, your words became clear. I consider myself very lucky to have had this constant support, thank you. The thesis was made possible through an ESRC +3 award, with additional fieldwork support that enabled me to interview in North America and attend the 32nd Plenary Session in Busan, South Korea.

I am grateful to all those that gave up their time for interview and for those that helped me to attend the IPCC plenary session. I hope my work reflects your time and dedication to the process and you accept its limitations as my own.

The greatest thanks must go to all those that have stood behind me. Friends by the sea and across the sea, you always keep me strong and I love you very dearly. Little Harry poo and José you hold a special place in my heart, thank you for finding me and being just the way you are. Thank you mum and dad for always offering me a place to escape. Oh, and one final thank you to myself. Sometimes I really wanted to go outside and play in the sun, but I didn't, I stayed indoors and wrote this instead!

TABLE OF CONTENTS

THESIS SUMMARY	III
ACKNOWLEDGMENTS	I
LIST OF ABBREVIATIONS	IV
TABLE OF FIGURES	I
TABLE OF TABLES	I
1. INTRODUCTION	1
2. KNOWLEDGE AND POWER IN INTERNATIONAL ENVIRONMENTAL POLITICS	15
3. INTRODUCING PIERRE BOURDIEU TO CLIMATE CHANGE: SYMBOLIC POWER AND PRACTICAL KNOWLEDGE	45
4. CONSTRUCTING THE IPCC AS A PRACTICE OF WRITING	69
5. MAKING UP THE IPCC	93
6. THE OUTLINE	124
7. THE SCIENTIFIC ASSESSMENT	150
8. THE PANEL APPROVAL	187
9. CONCLUSION	229
APPENDIX A: LIST OF INTERVIEWEES	251
APPENDIX B: THE DRAFTING TEAM AUTHORS FOR THE AR4 SPMS	253
APPENDIX C: DELEGATES AND MINISTRIES	256
APPENDIX D: GOVERNMENT INTERVENTIONS	259
IPCC DOCUMENTS	262

List of Abbreviations

IPCC

AR4	Fourth Assessment Report
AR5	Fifth Assessment Report
CA	Contributing Author
CLA	Coordinating Lead Author
FAR	First Assessment Report
IPCC	Intergovernmental Panel on Climate Change
LA	Lead Author
RE	Review Editor
SAR	Second Assessment Report
SPM	Summary for Policymakers
TAR	Third Assessment Report
TS	Technical Summary
TSU	Technical Support Unit
WG	Working Group

Other

AGGG	Advisory Group on Greenhouse Gases
CDM	Clean Development Mechanism
COP	Conference of the Parties
GHG	Greenhouse Gases
FCCC	Framework Convention on Climate Change
IAC	InterAcademy Council
ICSU	International Council Scientific Union
IPIECA	International Petroleum Industry Environmental Conservation Association
INC	International Negotiating Committee
JI	Joint Implementation
NASA	National Aeronautics and Space Administration
NGO	Non-governmental Organisation
OECD	Organisation for Economic Co-operation and Development
SMIC	Study of Man's Impact on the Climate
SBSTA	Subsidiary Body for Scientific and Technical Advice

TERI	The Energy and Resources Institute
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNGA	United Nations General Assembly
UNISDR	United Nations International Strategy for Disaster Reduction
US	United States
USSR	Union of Soviet Socialist Republics
WCED	World Commission on Environment and Development
WCP	World Climate Programme
WMO	World Meteorological Organisation

Table of Figures

Figure 6.1 WG I's outline for the Fifth Assessment Report (AR5)	127
Figure 6.2 The main hall of the 32 nd Plenary Session	131
Figure 6.3 The AR5 Bureau	146
Figure 6.4 WG III outline in draft and as approved	147
Figure 7.1 Letter requesting expert nominations for the AR5 assessment process	154
Figure 7.2 WG I AR5 chapter teams	163
Figure 7.3 The first lead author meeting of WG III for the AR5	172
Figure 7.4 The "hockey stick" graph	177
Figure 7.5 The "burning embers" diagram	178
Figure 8.1 The format of the SPM	190
Figure 8.2 Arrangement of the plenary approval session	207
Figure 8.3 Introduction to the final draft version of the WG I's SPM for the AR4	208
Figure 8.4 David Warrilow co-chairing a contact group	215
Figure 8.5 The Saudi delegation at the climate change talks in Bonn 2010	216
Figure 8.6 The state of progress on day three of the WG II approval session	220

Table of Tables

Table 5.1 Countries that have hosted TSUs	110
Table 7.1 Authors and reviewers contributed by the top five countries	183
Table 8.1 TSU and SPM drafting team	197
Table 8.2 USA and UK authorship of WG I in the AR4	200
Table 8.3 Top 15 delegations ranked by the number of interventions	201
Table 8.4 Ministerial representation at the 9 th session of WG III, 2007.	209

1. Introduction

The thesis sets out to explore how, by whom and on the basis of what authority climate change is made an object of international political life. The site of this study is the Intergovernmental Panel on Climate Change (IPCC). The IPCC and its assessment practice have been central to the transformation of climate change from an object of scientific interest to an issue of international political action. The actors that constitute this organisation and the assessment activities they undertake impact how climate change is thought about and acted upon by all those invested in the international politics of climate change. As the effects of climate change and the political response ripple into ever more spheres of social life, the organisation's construction of climate change has the power to shape all practices of life as these are adjusted for and by this phenomenon. However, although all are impacted by climate change, not all have the power to determine its meaning. This thesis studies those with the authority to write the reality of climate change, investigating the properties of this symbolic power and its distribution.

The theoretical approach taken by this study challenges the idea that it is through scientific practice that climate change is known and acted upon. Whilst scientific knowledge was central to bringing climate change to the international community's attention and generating political activity, and scientific authority continues to structure how and by whom climate change is known, scientific activities are not the dominant means through which this phenomenon is constructed for and by international political life. In order to identify the various actors participating in IPCC assessments and the activities rendering climate change an object of action through its practice, this thesis introduces the sociological approach and thinking tools of Pierre Bourdieu. Pierre Bourdieu perceived the social world as a site of continual struggles to determine the meaning and thereby the order of social reality. Studying these struggles within particular social universes, Bourdieu illuminated the mechanisms of social domination and the

means of their reproduction in and through social practice. This thesis takes up Bourdieu's theory of practice, using it to explore the international struggle over the meaning of climate change and to identify those with the symbolic power to determine reality.

There have been a number of theoretical innovations and analytical approaches developed for the purpose of interrogating knowledge and power in the social construction of environmental problems. The epistemic community model, discourse analysis and normative frameworks each shed light on how international environmental issues are conceptualised for political action and the actors and social forces structuring how issues like climate change are known and acted upon. By introducing the sociological approach of Pierre Bourdieu this thesis contributes to this theoretical store, serving to enable further unpacking of the relationship between power and knowledge. In particular, the thesis explores the symbolic power to name issues like climate change and puts in place the theoretical tools required for identifying the properties of this power, the interests it serves and the extent to which international political order is re-made through these naming practices.

The thesis makes its second contribution through its analysis of the IPCC and its assessment activities. This study situates the IPCC within the international struggle over climate change and identifies it as the central site of meaning production. It is from within this social location and the pressures it creates that the project begins its investigation into the actors, activities and forms of authority that constitute the IPCC's assessment practice. Rather than focusing on discreet aspects of the organisation and its work, the thesis examines all the actors and activities that contribute to the production of IPCC assessment reports, conceiving of the organisation and its work as a practice of writing. In order to identify how relations within and between the units that make up the organisation structure this practice, the thesis documents the pathway travelled by IPCC assessment reports from the formation of the report outline to acceptance and approval of the final product by IPCC member governments. It is in and through documenting the actors and activities constituting the IPCC's practice of writing that it becomes possible

to discern the social, scientific, political, economic and institutional forces structuring how and by whom climate change is written.

1.2 Knowledge and power

The fact that not all ways of living degrade the environment to the same extent, that some suffer greater impacts from human-induced climate change than others, and that not all contribute to the writing of reality, makes knowledge and power or knowledge as power, central themes in the thesis. The climate is physically changing, with serious implications for the actors and activities inducing this change and impacted by its effects. The distribution of these impacts—who will pay, with what, and how much—has been the object of struggle since climate change first emerged on the international political agenda. As a central site for determining the legitimate means by which climate change can be known, the IPCC is at the centre of this struggle.

In order to unpack this relationship between knowledge and authority in the IPCC's practice of writing climate change, the thesis introduces the sociological approach of Pierre Bourdieu to the study of international environmental politics. The methodological approach and conceptual tools that Bourdieu developed for the study of the social world are increasingly taken up by scholars of International Relations (IR) for the purpose of illuminating the social practices that govern the international sphere. Bourdieu's approach is also well established in sociology, where it has been deployed to understand the practices of consumption in environmental degradation. However, Bourdieu's thinking tools are yet to make a mark on the study of international environmental politics, despite their potential for furthering understanding of how and by whom environmental issues are conceptualised as international political problems. To understand and shed light on the social struggles that characterise the international politics of climate change, this thesis employs the thinking tools that Bourdieu developed to interrogate the social universe and the practical nature of knowledge that this approach rests upon.

Attempts to illuminate the role of knowledge and power in the conceptualisation of international environmental issues have largely focused on the role of science and scientific actors in international agreements or regime formation. The most influential of these has been the epistemic community approach, which was the first comprehensive attempt to identify the function of science and scientific communities in the formation of multilateral responses to environmental degradation (Haas 1989, 1990). The model seeks to explain why international environmental agreements emerge when state interests diverge and there are high levels of uncertainty surrounding the nature of the problem. In such instances, epistemic communities are said to facilitate agreement by framing the problem for collective debate, indicating salient points for negotiation, assisting states identify their interests and proposing policy response options (Haas 1992a, 2). The power of these communities lies in their authority to know and define the problem, or to speak truth to power (Haas 2004), which is likely to be further consolidated by the institutionalisation of their views within national administrations and international secretariats (Haas 1992a, 4).

Those critical of this approach indicate that the relationship between science and politics is more complex than implied by the epistemic community model, which assumes a linear one-way transfer of knowledge from scientist to political actor. Discursive approaches, informed by the work of Michel Foucault, have proven particularly effective in revealing the complex relationship between knowledge and power, and highlighting the degree of contestation and struggle over issue formation. The work of Karen Litfin (1994) on the formation of the Montreal Protocol, indicates that the production of knowledge does not only empower the scientist; once produced, scientific knowledge is available for incorporation and interpretation in the discursive strategies of all actors. Here, the power of knowledge lies in discourse, and with those actors best able to construct a convincing frame of the problem. Both the discursive approach of Maarten Hajer and the normative framework of Steven Bernstein are illuminating here, indicating that the power of prevailing ways of knowing and acting in the world to structure the construction of international environmental problems. Thus, Hajer's research indicates

that, counter to the epistemic community logic, the institutionalised response to remediate the acid rain problem was not consistent with dominant frames of the problem.

Litfin, Hajer and Bernstein's work challenge dominant perceptions of scientific knowledge as a disinterested act and highlight the degree of contestation and struggle in the social construction of environmental politics. However, whilst each approach illuminates social, political and economic forces structuring how international environmental issues are thought about and acted upon, there remains work to be done in developing the analytical tools necessary for unpacking the interrelationship between these forces in the construction process. Drawing on the sociological approach of Pierre Bourdieu, this thesis aims to expand the theoretical depth and breadth of such analyses in order to reveal the reinforcing nature and practices of power and knowledge in the construction of climate change. Critical to identifying the authority to determine meaning, its distribution between social actors and how political order is re-made in and through the writing of reality is Bourdieu's stress on the practical nature of knowledge.

Bourdieu's work emphasises the practical mode of knowledge as the "basis of ordinary experience of the social world", positing this practical relation to the world against the dominant representation of the social world as either a subjective experience or an objective social physics (Bourdieu 1990, 52). The practical nature of knowledge challenges how scientific knowledge and expertise is thought about and analysed. In the majority of theoretical approaches, knowledge is either endowed with a substantive quality, as in the epistemic community model, or the subjective form of knowledge is stressed through a focus on discourse. As such, political constructions of environmental issues are portrayed as either arising from the accumulation of scientific knowledge or as the product of subjective interpretation of this knowledge. The work of Bourdieu requires we leave aside this dichotomy between the objective qualities of knowledge versus subjective interpretation and instead consider the significance of our practical relation to the world and the role of social practice in mediating between an objective world subjectively grasped.

The practical way through which life and the world are comprehended positions practices, or activities of life, at the centre of analysis, as through analysing shared social practices it is possible to grasp the relationship between an actor's social situation and their perceptions, attitudes and disposition in and on the world. This means we do not have to accept or reject the proposition that there is only one objective world, or a limitless number of subjective worlds, as subjective understandings of an objective world are mediated through shared social practices of working, living, learning and playing together. It is in and through these practices of life that we come to hold a shared way of thinking and speaking about the world, which structure and are structured by the perceptions and practices of our social location. These are not understandings and interpretations of the world passively learned and accepted; they are internalised through the same activities that make and reproduce the world in practice.

Bourdieu's work on social order and our practical relation to the world are brought together and can be studied through the productive nature of knowledge. Bourdieu perceived the social world as a site of continual struggle to determine the meaning of reality and thereby its social order. Scientific knowledge is a privileged system within this struggle because of its power to transform perceptions of reality and thereby how the world is acted upon and the social order these actions build. It is the productive nature of knowledge that makes naming more than an attempt to identify an object or label a phenomenon, as Bourdieu highlights:

By structuring the perception which social agents have of the social world, the act of naming helps to establish the structure of this world, and does so all the more significantly the more widely it is recognized, i.e. authorized. There is no social agent who does not aspire, as far as his circumstances permit, to have the power to name and to create the world through naming: gossip, slander, lies, insults, commendations, criticisms, arguments and praises are all daily and petty manifestations of the solemn and collective acts of naming...(Bourdieu 1991, 105)

Power in this approach is a symbolic power, unevenly distributed within and between societies. It is a power to authoritatively identify and specify reality, which attempts to

instil a corresponding perception of its truth, and as the world is comprehended and knowledge produced through practice it is impossible to decouple this power from the making of social order.

The struggle over climate change is a struggle to name the problem and thus a struggle to determine the means—by whom and through what processes—it can be named. The naming of climate change offers the potential for world making on an unprecedented scale. The way this issue is known or written as a social and political issue shapes the international political response, which has the potential to reconfigure all practices of life as these are aligned with emission reduction targets and adaptation strategies. Whilst the daily lives of all are likely to be impacted by climate change and the political response—regardless of responsibility for the problem—not all will partake in writing the meaning of the issue. Identifying those that have the power to name climate change and the social, political, economic and institutional properties authorising them to do so is core to the thesis.

1.3 The practice of climate politics

Analysing the IPCC and its assessment activities as a practice has profound implications for how we characterise this organisation and interpret its role in the international politics of climate change. The model of science and scientific knowledge as the basis for rational political action is pervasive within analyses of international environmental politics. As such, the establishment of the IPCC is said to have resulted from an epistemic community of climate scientists, with the IPCC's current role conceived as knowledge provider to the climate regime or as a constituent of the larger regime complex. These conceptions assume the place and function of the IPCC on the basis of its historical contribution to the founding of the UN Framework Convention on Climate Change (UNFCCC). Whilst the history of this organisation and its relation to the UNFCCC is vital to understanding the forces structuring the IPCC and its assessment practice, it is necessary to problematise the hold this conception of climate politics has over how the IPCC is thought and analysed.

The notion of regime is a powerful determinant of how we think about and analyse the international politics of climate change. Today regime is a common sense way of identifying the complex array of actors, activities and institutions that constitute the UNFCCC, structuring not only how the international politics of climate change is analysed, but also how it is practiced. Bourdieu's thinking tools make it possible to disrupt dominant conceptions of the climate change issue area and re-problematise popular constructions of its politics. Rather than conceiving of the objective of climate politics to be an international regime, this approach views the international politics of climate change as a field of forces and struggles. This notion of field is both a practical concept for carving up and studying social relations and a way of identifying what interests and governs relations between actors within a given social space. In contrast to regime theory, what these social struggles are over and what is generated through the process cannot be determined prior to study, as what actors claim to be interested in producing is not the same as what their interests produce.

The IPCC is at the centre of the international struggle over climate change because it arbitrates over the legitimate means to know and respond to this issue, and as a result creates and is subject to the forces of the field. The symbolic power of the IPCC and its constructions of climate change are apparent from the degree of scrutiny and contestation over the report's formation and findings. Those actors whose interests are challenged by the IPCC's representations of climate change have sought to undermine the legitimacy of the organisation and its products. These attacks continue to intensify, and the IPCC has to work tirelessly to maintain its position as the "leading international assessment body of climate change" (IPCC 2012d). This struggle to produce and promote competing representations of climate change is commonly perceived as damaging scientific consensus and hampering progress towards a legally binding agreement to reduce GHG emissions. However, without political contestation and struggle, climate change would be written in the interests of a few. Thus whilst considerable protestation over climate change aims to deny the significance of the issue, this is part and parcel of wider political

contestation over the terms by which climate change can be thought about and acted upon.

The international struggle over climate change continues to expand as the physical phenomenon exposes the contradictions and entrenched inequalities of the current order: an international political order that is the product of economic development powered by fossil fuel consumption. Those least well placed within this order—the least developed in the international system—are likely to suffer the worst impacts of human-induced climate change, with few available resources to respond and adapt, and limited means to promote a conceptualisation of climate change that challenges the status quo. Thus whilst human-induced disruption to the climate system is already having uneven impacts on the availability of water, the production of food and the death toll from extreme weather events, those best positioned to write the meaning of these impacts are actors whose understandings are generated from a privileged situation within the international political order. One of the main contributions of the thesis is its explication of how the world comes to be written in and through the interests of the writer. Thus contestation over the IPCC's assessment process and products is about more than reaching an international agreement to mitigate the problem, it is as a legitimate struggle to gain access to and participate within the writing of reality.

1.4 The IPCC as a practice of writing

By mapping the position of the IPCC within the international struggle over climate change and ascertaining its relation to other actors and institutions in this space it is possible to illuminate the forces structuring the development of the organisation and its assessment process. It is from within this context that we can begin to analyse the actors, activities and forms of authority constituting the IPCC's assessments of climate change. The historical development of scientific interest in climate change and its politicisation remain critical to understanding the structuring force of scientific conventions and the struggle between scientific and political authority in and over the order and conduct of

IPCC assessments. However, it is also necessary to look beyond the scientific and political dimensions of the IPCC, as this organisation is more than its scientific authors and member governments.

As a topic of scientific enquiry, the influence of human activity on the climate has a long and well-documented history.¹ The role of carbon dioxide emissions on global temperatures did not become a political concern however, until the 1980s. The politicisation of global warming was driven by a number of well-positioned actors, many of whom occupied central positions in the international fields of atmospheric and meteorological science. From these positions these actors were able to speak authoritatively to the political field, i.e. from within government research institutes, as scientific advisors, representatives to international scientific organisations and members of international research collaborations. A number of conferences, workshops and assessment exercises were organised throughout the decade, which brought interested policymakers and experts together and facilitated a “shift of emphasis” from scientific research towards political action (Paterson 1996, 31). At the same time, extreme droughts, floods and other unexpected weather patterns sensitised governments and general publics to the scientists’ predictions (Boyle and Ardill 1989, 1-4).

In 1988 climate change was raised at the UN General Assembly by the government of Malta, and a resolution passed in recognition of climate change as a common concern for mankind (UNGA res 43/53). Whilst indicating the necessity of a global framework to deal with climate change, the resolution expressed government’s unwillingness to respond without greater scientific certainty, and endorsed the establishment of the Intergovernmental Panel on Climate Change (IPCC) to review the state of scientific knowledge and recommend possible policy response options (ibid). The IPCC and its First Assessment Report (FAR) was not the first attempt to assess the climate change problematic. However, the scientific assessment activities that preceded the IPCC—such as *The Study of Man’s Impact on the Climate* (SMIC), published in 1971, and the

¹ For an introduction to the science of climate change, see Houghton 2009. For a detailed history of scientific interest in global warming, see Weart 2008. Also, Bolin 2007; Edwards 2001; Hart and Victor 1993.

Advisory Group on Greenhouse Gases (AGGG), established in 1986—were not assessments authorised for and by UN member governments.² Co-sponsored by the World Meteorological Organisation (WMO) and the United Nations Environment Programme (UNEP), the IPCC was the first of its kind. As such, the organisation's founders had to create a process for generating authoritative knowledge of the climate change problematic that would ultimately be subject to the acceptance and approval of IPCC member governments.³ It is this process, or practice of writing as it is identified, that is subject to analysis in the thesis.

The IPCC's task of assessing the climate change problematic is divided between three Working Groups (WGs), each charged with producing an assessment report and accompanying summary for policymakers (SPM).⁴ WG I assesses the physical science basis of climate change, WG II impacts, adaptation and vulnerability, and WG III mitigation of climate change. Although the IPCC and its assessment reports are generally associated with the expertise of its authors, the organisation is more than a knowledge provider; it is a practice for producing internationally recognised and government approved climate change knowledge. To achieve this, the scientific conventions of the authors have to be balanced with the political interests of the member governments and the administrative realities of generating a 3,000 page assessment report. In the process of developing an assessment practice that balances these competing objectives, the organisation has emerged as five distinct units: the intergovernmental panel, bureau, WG technical support units, a secretariat and hundreds of expert authors from around the world.⁵ Each of these units has a distinct role to play in the production of IPCC

² The SMIC report emerged from a scientific conference between scientific bodies in Sweden and the Massachusetts Institute of Technology (MIT), with 30 leading scientists from 14 countries participating. See Lunde 1991, 58-66; Kellogg 1987; Paterson 1996, 24-5. On the AGGG, see Agrawala 1999.

³ As stated by Bert Bolin, the first chairman of the IPCC, "It was clear to the leaders of the IPCC that we had to develop our own procedure for how to achieve the task that had been given us" (Bolin 2007, 50).

⁴ The assessment reports are the IPCC's main activity and the focus of the thesis. However the organization also produces other documents and sources of information on climate change, including: Special Reports, Methodology Reports, Technical Papers and Supporting Material. This material is usually produced in response to requests from the Conference of the Parties (COP) to the UNFCCC or other environmental conventions (IPCC 2012d).

⁵ The organization also includes a Task Force on National Greenhouse Gas Inventories. The function of this unit is to develop and refine a methodology for calculating and reporting national GHG emissions and

assessment reports and forms of authority in and over its conduct and it is this shared investment in the IPCC's practice of writing that enables the IPCC and its assessment process to be identified as a field of practice.

In focusing on the scientific and political dimensions of the IPCC and its work previous research has overlooked aspects of the organisation that would not be classified as either scientific or political. As a result one of the most significant units in the production of IPCC assessment reports—the technical support units (TSU)—remains unanalysed. And yet, this unit and its staff have greater day-to-day contact with the formation of the assessment than any other actors in the process. These units instil in authors a sense of purpose and value for the IPCC and its assessment activities and have the editorial power to ensure these are upheld in authors' scientific constructions of climate change. Thus, it is not only the authors' assessments of climate change or member governments' approval of the final product that determines the IPCC's writing of climate change. There are organisational imperatives, such as geographical representation, assessment procedures and expert and government review processes that structure the construction of climate change and determine by whom and through what activities this problem is rendered meaningful. In order to identify these actors, activities and the imprint they leave on the IPCC's writing of climate change the thesis maps the report's assembly pathway from the panel's decision to repeat the process to government approval of the assessment's findings. The aim is to provide detailed documentation of the actors, activities and forms of authority constituting the IPCC's practice of writing and through the process discern the social, scientific, political, economic and organisational forces structuring the construction of climate change as an object of international political life.

1.5 The pathway

The thesis begins by outlining some of the most significant contributions to the theorisation of knowledge and power in international environmental politics. Introducing

removals (IPCC website 2012). The function and role of this unit is not subject to analysis in the project because although it is not central to the production of the WG assessment reports.

Peter Haas and the epistemic community model, the discursive approaches of Karen Litfin and Maarten Hajer and the normative framework of Steven Bernstein, chapter two identifies four comprehensive analytical approaches for studying the social construction of environmental issues as shared social problems. Through these approaches the thesis begins to identify the range of actors involved in the politicisation of climate change and the discursive, normative and epistemic forces structuring how environmental degradation is known and acted upon. This review indicates that each approach is adept at illuminating particular aspects of the struggle over social reality. However, if the thesis is to explore the interrelationship between social, political, economic and organisational forces in the construction of climate change it needs the theoretical means to further unpack the relationship between power and knowledge in the naming of international environmental problems.

Chapter three introduces the sociological approach of Pierre Bourdieu, outlining how his concern with the reproduction of social order and his stress on the practical nature of knowledge can be re-deployed for thinking about and problematising the international politics of climate change as a struggle over meaning. It is here that the thesis begins to unpack the productive force of knowledge and knowledge systems to authorise meaning. The chapter outlines Bourdieu's thinking tools, indicating how they enable the properties of symbolic power to be interrogated and its distribution mapped. This is important both for constructing the IPCC and its assessment process as an object of study, but also for thinking through the scholar's relation to knowledge production and position within the struggle for meaning. In chapter four these insights and thinking tools are put to work for the purposing of re-thinking the international politics of climate change as a field of forces and struggles. Placing the IPCC in a central position within the climate field, the chapter begins identifying the internal and external forces structuring the development of the organisation and its practice for producing internationally recognised, government approved assessments of climate change.

The positioning of the IPCC within the climate field brings the project's methodology into focus. Chapter four describes the research process, indicating how the significance of

practice and our practical relation to the world came to the fore during observation of an IPCC plenary session. Watching the proceedings unfold and the relations and interactions between the actors in attendance made apparent the practical function of IPCC documentation, and the power of the actors and activities to imprint on the text. In order to illuminate the forces embodied within IPCC assessments of climate change the organisation and its assessment activities are reconstructed as a practice of writing. It is through reconstructing the organisation and the actors and activities that constitute its assessment practice that it becomes possible to identify the forces structuring the IPCC's writing of climate change. This is initiated in chapter five, which identifies the actors that make up the IPCC and their contribution to and authority over the IPCC's assessment practice. Outlining the work and relations within and between the panel, the bureau, the technical support units (TSUs), the secretariat and the authors indicates the extent to which the organisation is structured by the struggle for authority in and over the assessment's conduct.

Having identified those that make up the IPCC the thesis turns to the assessment report's construction pathway. Chapters six, seven and eight document the report's formation, detailing the actors, activities and social relations structuring the construction of: 1) the report outline, 2) the scientific assessment, and 3) government approval of the final product. This account provides documentation of how IPCC assessment reports are compiled and in doing so identifies the forces governing how and by whom climate change is written through the process. In doing so it illuminates aspect of the IPCC's assessment pathway that are not well understood outside of those overseeing the process. Thus, despite the influence of the outline on the direction of the next assessment the pathway of its construction and the involvement of member government's in all aspects of its development has not been documented previously. This thesis provides a full account of the IPCC report construction pathway and in the process reveals the properties distinguishing those with the power to write reality.

2. Knowledge and power in international environmental politics

In order to explore how and by whom climate change has become part of international political life it is necessary to put together theoretical tools for studying the making of social reality. That is a way to start thinking about how international environmental problems are known, through what processes and with what effects, so that the IPCC's part in rendering climate change treatable can be empirically studied. This chapter initiates this process through its investigation of how similar questions have been addressed by scholars of international environmental politics. The aim is to review some of the comprehensive theoretical approaches and frameworks developed for studying the people and the processes constructing environmental degradation for international political action. Drawn from the epistemic community model and discourse and normative analytical frameworks are particular ways to think about the place of knowledge in politics: the function it plays in identifying the issue, in empowering actors and in delineating the necessary course of action. The empirical investigations informed by and informing these theoretical approaches make apparent that the pathway from scientific discovery to international political action is not straightforward, and that power too has a place in determining how and by whom environmental degradation is known and acted upon. Turning to power, the chapter attempts to identify what power is, how it operates, and what and how it produces authoritative actors and legitimate actions according to the theories reviewed. This journey through ways of thinking about and theorising knowledge and power identifies the capabilities and limits of some of the most illuminating studies into the conceptualisation of international environmental politics. In doing so, it provides space for thinking about alternative conceptions of power and knowledge and the analytical tools that would be necessary for interrogating their part in the IPCC's conceptualisation of climate change.

Unsurprisingly, close attention has been paid to the role of scientists and scientific knowledge in the construction of international environmental problems. Scientific knowledge is vital for identifying the causes and consequences of environmental problems and initiating political action. As such, scientific knowledge empowers new sets of actors and forms of authority in the international political realm. Interest in the part played by scientists and scientific knowledge in facilitating international cooperative action on climate change and in other instances of shared environmental problems has shed considerable light on the power of the knowledgeable in the conceptualisation of international environmental problems. The epistemic community model provided the first systematic account of the part played by expert communities in defining shared problems and delineating a course of action – a model of science in politics that has proven popular for explaining the politicisation of climate change and the establishment of the IPCC. The following section then introduces Peter Haas’s conception of epistemic communities and provides historical background on the actors, international organisations and events that mobilised international political interest in climate change and led to the establishment of the IPCC.

As important as the epistemic community model is for codifying the role of expert communities in international treaty formation, its critics suggest that it overstates the authority of scientists and scientific knowledge in the problematisation of international environmental degradation. Here discursive approaches are illuminating. The work of Karen Litfin on ozone discourses and Maarten Hajer on the framing of acid rain reveal that there is more to knowing and treating environmental problems than scientific discovery. By shifting attention from expert communities to discursive practices these approaches highlight the degree of contestation and struggle over the framing of international environmental issues. Thus, far from rationalising politics, science is used and manipulated in on-going social and political struggles to dominate how environmental degradation is thought about and acted upon. Further insight is given to what constrains and orders the definition of environmental issues by Steven Bernstein’s study of liberal environmentalism. Bernstein’s normative approach indicates that whilst new ideas have the power to challenge international political order, those that are most

likely to succeed in shaping policy practice are those that find some fitness with current governing structures.

Each of the approaches reviewed offers important insights into the functioning of knowledge and power in international environmental politics. As we move through these different theoretical frameworks, space opens up for considering how forms of knowledge, other than the scientifically generated, shape understanding and interpretation of environmental degradation. This is most explicit in the final theoretical approach, which considers the role of epistemes or background knowledge in the governing of international political issues. By introducing the notion of episteme it becomes possible to examine the role of intersubjective understandings in distinguishing appropriate ways of knowing and responding to environmental change. The power of this form of knowledge is tied to its opacity. Sitting in the background, epistemes constitute and identify the authority to know reality and write its meaning for legitimate courses of international political action.

2.1 The epistemic community model

Since international environmental politics emerged as a field of study, scientific knowledge has shaped perceptions of environmental issues.¹ Reliance on the authority of this knowledge has grown as science and scientists have raised social and political awareness of the nature and extent of environmental degradation. Although the limitations of this knowledge have long since been subject to scepticism (Osborn 1948), the role of science in international environmental politics was under-theorised prior to the epistemic community model.

The epistemic community model arose from interest in how and why cooperation between states occurs. Peter Haas sought to understand why, despite differences over

¹ Stevis (2006) traces back international environmental politics' literature to the mid 1940s.

who should pay and reluctance to forsake short-term economic welfare, states cooperated in regimes where there were no clear mutual interests between states, or guarantees that protection costs would be equally distributed (Haas 1990, 347).² Haas (1989; 1990; 1992a; 1992b) suggested that such international environmental regimes stemmed as much from transnational communities of shared knowledge or epistemic communities, as state power. Investigating the formation of the Mediterranean Action Plan, Haas (1989) concludes that without the involvement and shared understanding of a community of ecologists and marine biologists it would be difficult to explain the creation of a regime between parties with divergent interests. One of the most important aspects of this approach is the component of learning, whereby over-time, international decision-makers come to accept the epistemic community's shared values and beliefs, resulting in a convergence of state interests.

Further refinement of the epistemic community model came in 1992 with a special edition of *International Organization*, where the role of knowledge-based communities was subject to a number of case studies. In the special edition, an epistemic community is defined as “a network of individuals or groups with an authoritative claim to policy-relevant knowledge in their domain of expertise” (Adler 1992, 101). Members of these communities are said to: 1) share knowledge about the causation of social and physical phenomena in an area for which they have a reputation for competence, 2) have a common set of normative beliefs about what will benefit human welfare in such a domain, and 3) share a common policy project. The epistemic community's knowledge and expertise is said to be in particular demand in instances where there is considerable uncertainty about the physical characteristics of an issue and how best to politically pursue a response. In such cases, the epistemic community helps states to identify their interests, frames the issues for collective debate, proposes specific policies, and identifies salient points for negotiation (Haas 1992a, 2). The power of such actors lies in their authority to know and define the problem, the interpretation of which is informed by their

² This model built on earlier research into the role of epistemic knowledge in international regimes by Peter Haas's father, Ernst Haas (1977).

broader worldview. Such power may be further consolidated by the institutionalisation of their views within national administrations and international secretariats (ibid, 4).

The epistemic community model has proven influential in interpreting the emergence of climate change as an international political issue (Lunde 1991; Paterson 1996; Haas 2000; Newell 2000). Matthew Paterson (1996, 144) concludes that “the international development of climate as a political issue...can plausibly be interpreted in terms of the effect of the development of an epistemic community on the subject”. Further claiming that, “In the IPCC we can see the epistemic community at its most organised” (ibid, 146). Even those more critical of this approach acknowledge the role of an epistemic community in raising the political profile of climate change (Vogler 1995, 204; Bernstein 2001, 161). Revisiting these accounts provides useful historical background on the emergence of the IPCC and enables an exploration of how science and scientific knowledge have been theorised in the politicisation of climate change.

The emergence of climate change on the international political agenda has been tied to scientific discovery, international organisations and scientific cooperation, which through conferences, workshops and assessments, transformed climate change from an object of scientific interest to an issue of social and political concern. Scientific interest in the effect of atmospheric gases on the global climate has a long history, dating back at least as far as 1824, when the French philosopher, Jean-Baptiste Fourier, hypothesised that the atmosphere trapped heat in a manner similar to a “hothouse”, or greenhouse.³ The role of heat trapping gases in the atmosphere and their effect on the prevailing temperature was elaborated over the 19th Century, and by 1886 the Swedish scientist, Svante Arrhenius, had quantified the contribution of CO₂ to the heat balance of the earth, indicating that a doubling of atmospheric CO₂ concentrations could increase average global surface temperature by 5.7°C (Bolin 2007, 4). Despite these discoveries and a series of papers on fossil fuel emissions and climate change by G. S. Callendar in the 1940s and 1950s, it took advances in computer modelling, rising CO₂ concentrations and increased support for international scientific cooperation to initiate sustained

³ For a detailed account see Weart 2008.

scientific interest in human's impact on the climate (Edwards 2001; Haas 2000; Miller 2001c; Paterson 1996; Weart 2008; Zillman 2008).

One of the first “authoritative assessments of the state of scientific understanding of the possible impacts of man’s activities on the regional and global climate” was generated by a three-week international scientific gathering held in Sweden in 1971 (SMIC 1971). This report is said to have become “required reading” for participants at the UN Conference on the Human Environment held in Stockholm the following year (Kellogg 1987, 121). This conference represented mounting concern over humans negative impact on the environment, including humans potential to alter the climate. It called for increased research and monitoring of carbon dioxide build up and established a new UN agency for the preservation of the environment: the United Nations Environment Program (UNEP) (Agrawala 1999, 159). In 1979, the first World Climate Conference was held in Geneva, organised primarily by WMO, it provided a major international platform for scientific interest in climate change (Agrawala 1998a, 607). The conference recognised climate change as a serious problem and issued a declaration calling on the world’s governments “to foresee and prevent potential man-made changes in climate that might be adverse to the well-being of humanity” (WMO 1979). Efforts were also initiated to create an international climate research program, which eventually led to the creation of the World Climate Programme (WCP). Co-sponsored by WMO, the newly formed UNEP, and the International Council of Scientific Unions (ICSU), the WCP was the first internationally coordinated program of climate research and proved critical for fostering greater scientific interest, furthering research into climate change, and supporting the translation of scientific knowledge into political concern (Paterson 1996, 28-9).

International scientific conferences and workshops continued into the 1980s. As the focus of these events shifted towards the social and political implications of climate change the gatherings increasingly sought and attracted the attention of a diversified range of actors, including the policy-oriented. Although different explanations are cited, authors agree that the 1985 Villach Conference was pivotal in this regard (Boehmer-Christiansen 1994a; Bernstein 2001; Bruce 1991; Franz 1997; Haas 2000; Hecht and

Tirpak 1995; Jaeger and O’Riordan 1996). Co-sponsored again by UNEP, ICSU, and the WMO, the Villach Conference is thought to represent the core of an epistemic community (Bernstein 2001, 162), and to have initiated the politicisation of climate change (Paterson 1996, 29). At this conference the 89 participants from 29 developed and developing countries and three sponsoring organisations confirmed global warming trends, and there was an apparent “shift of emphasis” away from more research required towards assertions of the need for political action (Paterson 1996, 31).⁴ The report that emerged from this conference appears to have been widely disseminated, forming the basis of the Brundland Commission’s recommendations in *Our Common Future* on action to protect the earth’s climate (Franz 1997, 22; WCED 1987).⁵

The 1985 conference at Villach also initiated the establishment of an international scientific committee, institutionalising some of the most pro-active members of the epistemic community. UNEP’s director, Mostafa Tolba, first tabled the idea of an advisory panel to guide climate change policy at the Villach conference (Agrawala 1999, 160). The role of this committee would be to explore policy options for responding to climate change, set research priorities and conduct assessments of the long-term impacts of climate change (ibid). Tolba’s idea was embraced by a number of conference participants and in 1986 the Advisory Group on Greenhouse Gases (AGGG) was established under the auspices of WMO, UNEP and the ICSU (ibid, 160-161). The AGGG was composed of a group of seven experts, each of whom had involvement in the AGGG’s sponsor bodies, had longstanding scientific careers and were linked to national

⁴ Participant numbers from Franz 1997, 10. For detailed analysis of the role of the Villach conference and assessment in moving climate change on to the international political agenda, see Franz 1997. Franz notes (ibid, 12) that the scientific conclusions were not significantly different from prior assessments, but that the implications drawn from the scientific analysis for policy making were markedly different: “The Villach 1985 report made bolder statements about the implications of the scientific findings for policy making, and urged more significant steps toward international cooperation on the issue of climate change, calling for governments to recognize that future climate change could be stemmed by attention to policies concerning future fossil fuel use, energy conservation and greenhouse gas emissions.”

⁵ Gordon Goodman, who head the Stockholm Environment Institute, and was a key participant of the Villach conference and a committee member of the Advisory Group on Greenhouse Gases, was directly involved in the work of the Brundtland Commission. Goodman was one of a “Group of Special Advisors” on energy to the World Commission on Environment and Development (WCED) and is widely credited with drafting the sections of the report concerned with climate change (Franz 1997, 20-21).

bureaucracies (ibid).⁶ It was envisioned that the AGGG would design and implement “constructive interventions into energy, climate, and socio-economic areas” (WMO 1985, 43 in ibid, 161). Although this first attempt to institutionalise scientific advice on climate change was not all together successful, and its work would come to be overshadowed by the IPCC (Agrawala 1999); the AGGG performed its role as an epistemic community by devising and disseminating climate change policy response options through its support of workshops and conferences.

The idea of hosting a workshop to build on Villach’s conclusions and to begin elaborating measures to limit or adapt to climate change was proposed by one of the AGGG committee members, Gordon Goodman at its first meeting in 1986 (Agrawala 1999, 161; Franz 1997, 23).⁷ Two workshops were arranged for 1987, the first of which is said to have advanced scientific understanding of the regional impacts of climate change, and the second, the policy discussions on mitigating these effects (Franz 1997). As the focus of this community’s efforts shifted towards the policy implications of climate change the professional backgrounds of invited participants began to diversify, with an increasing number of policy-oriented actors in attendance. At the first workshop in Villach, 48 participants from academia, environmental advocacy groups and some national environmental agencies attended (Jaeger 1998 in Agrawala 1999, 162). The second workshop, held in Bellagio, Italy, was a smaller gathering of 24, half of whom were said to be ‘regulars’ from previous conferences and workshop. The other half included a range of new policy actors, including representatives from the European Commission; the meteorological service in New Zealand; environment bureau of the United States and the Netherlands; a member of the British Commonwealth Secretariat, German Parliament and the Swedish cabinet; and several NGOs (Franz 1997, 23). This workshop advanced policy discussions by proposing that policies were necessary to keep temperature and sea level increases within ‘tolerable rates’, with 0.1°C/decade

⁶ For instance, Bert Bolin was a member of the panel and would become the first chairman of the IPCC in 1988. Bolin did a PhD in meteorology before becoming interested in carbon cycle science. From the 1960s onwards he became a central actor in the establishment of a number of international research programs, he led a UNEP, WMO and SCOPE assessment of climate change (Bolin et al. 1986), and in 1986 he became advisor on science policy to the Prime Minister of Sweden (Rodhe 1991).

⁷ For more on Goodman, see footnote 5.

suggested as a suitable global threshold for temperature increase (ibid, 23-24). The group also calculated emission reduction targets, with a 66% reduction in CO₂ suggested and proposals on how to achieve this (ibid).

The largest and most influential policy audience on climate change gathered in 1988, at the Toronto conference on 'The Changing Atmosphere: Implications for Global Security'. Three hundred and forty one delegates attended the conference, including 21 politicians and ambassadors; 118 policy and legal advisors and senior government officials; 73 physical scientists; 30 social scientists; 50 industry representatives and energy experts; and 50 environmental activists (Franz 1997, 25). Amongst the most notable of the policy audience was Gro Harlem Brundtland, the Norwegian prime minister and leader of the Brundtland Commission on Environment and Development (WCED), the Canadian prime minister, and a number of G7 ministers (Agrawala 1999, 162-3). In total, forty-six countries and 15 agencies of 24 International Organisations were represented (Franz 1997, 25). The conclusions of the Villach process fed into the Toronto conference through a background paper written by a member of the AGGG. The paper aimed to provide participants with a common point of departure through an account of the 1985 Villach conference and the 1987 Villach and Bellagio workshops (ibid). The conference declaration called for a 20% reduction in OECD emissions from 1988 levels by 2005, making it the most significant policy initiative on climate change to date (Agrawala 1999, 169).

It was not just the scientific initiatives that raised the political profile of climate change during the 1980s. 1988, in particular, was host to a number of events that moved climate change from a topic of international scientific concern to one of international political importance. Two of those events occurred in June of 1988. The first was a statement made by NASA scientist James Hansen in Congressional hearings, which were convened due to unusually hot and dry summer conditions in the US (Hecht & Tirpak 1995, 383-4; Jager and O'Riordan 1996, 16). Hansen stated that he was 99 percent certain the warming of the 1980s was not a chance event (ibid). Similar hardship from unexpected patterns of drought, floods and other extreme weather occurrences were felt across the world,

including in the USSR, Africa, India, China, Brazil and Bangladesh (Boyle and Ardill 1989, 1-4). These events increased political interest and media attention in the scientific predictions of global warming and in the upcoming conference at Toronto, which received unexpected levels of media attention (Franz 1997, 25-6). This momentum was built upon by Malta raising climate change as a matter for the UN General Assembly, and by December of 1988 a resolution has passed (43/53) endorsing the establishment of the Intergovernmental Panel on Climate Change (IPCC).

There are disparities between scholar's accounts of the establishment of the IPCC. Some credit UNEP's Mostafa Tolba and his letter to the US Secretary of State with the IPCC's formation (Agrawala 1998a; 1998b; Hecht and Tirpak 1995).⁸ Other accounts highlight that UNEP was more interested in a framework convention than a scientific panel, suggesting instead that the IPCC emerged from debate and corridor consultation at the 1987 World Meteorological Congress in Geneva (Zillman 2007, 870-871; 2008, 27-28).⁹ Officially, it was after consultations within and between the WMO congress and the UNEP governing council that a co-sponsored intergovernmental assessment panel on climate change was agreed (Bolin 2007, 47). The critical feature of this newly established body was its intergovernmental nature, which meant that the organisation created for generating international assessments of climate change knowledge was a governmental and scientific process. Divisions between US government departments appear to have contributed to the creation of an intergovernmental panel over the science-led organisation of previous climate change assessments. Although the Environmental Protection Agency and Department of State were supportive of a convention process, the Department of Energy opposed policy action and was critical of the Villach process because government officials had not been involved (Hecht and

⁸ Tolba wrote a letter to the Secretary of State, George Schultz, urging the US to take appropriate policy actions on climate change (Hecht and Tirpak 1995, 380).

⁹ The 1987 congress debated the Villach conference report, and Zillman (2007, 871) suggests that a defining moment of the debate was an impassioned plea by the principal delegate of Botswana. The delegate called on the "WMO to establish some sort of mechanism that could provide her with an authoritative assessment of what was known about human-induced climate change that would enable her to answer the difficult questions she was being asked by her government about whether the greenhouse effect was real and what, if anything, they should be doing about it."

Tirpak 1995, 380-381).¹⁰ The outcome of discussions between these parties was a US proposal for “an intergovernmental mechanism” to conduct a government-led, scientific assessment of the climate change issue (Agrawala 1999, 611).

Thirty countries accepted the WMO Secretary General’s invitation to the first session of the IPCC, including 11 developing countries (IPCC 1988). This session was concerned with formalising the structure and function of the panel, although many of these decisions had been prepared prior to the session (Bolin 2007, 49-50). The work of the panel was divided into three main areas: science, impacts and response strategies. The tasks of the three working groups were elaborated during the session and the IPCC chairman and working group chairs were elected (Zillman 2007, 873). This process institutionalised key members of the epistemic community responsible for raising the political profile of climate change in the 1980s, most notably the newly elected IPCC chairman, Bert Bolin. The establishment of the IPCC then, supports the epistemic community claim that in instances where an issue is new to the political agenda and where no institution exists to deal with the issue internationally, the epistemic community model can explain the source of institutions (Adler and Haas 1992).

Although the epistemic community approach has been used to explain and explore the origins of the IPCC and the politicisation of climate change, Haas (1990) is sceptical of its applicability to this issue area. He identified a number of factors inhibiting collective action on climate change driven by epistemic consensus, including the recalcitrance of the US, the cost of action and the unequal distribution of these costs between states (ibid, 358-59). Haas has been particularly sceptical of the IPCC’s role in fostering epistemic consensus, claiming that the intergovernmental nature of the IPCC stifles the epistemic community’s ability to function as theorised. In fact, Haas considers the IPCC an attempt by governments to gain control over the scientists and the diplomatic process,

¹⁰ Agrawala (1998a, 613) suggests that the Department of Energy (DoE) may have opposed the Villach process because it was conducting its own assessment at the same time and in doing so was competing for the same scientific expertise to participate. It seems that some scientists preferred to be involved in the international process than the DoE’s national assessment exercise. Officials from DoE also attempted to ‘market’ their own assessment at the Villach conference in 1985, which met with limited success. Agrawala suggests that these factors combined may explain the department’s negative attitude towards the international scientific process and the scientific consensus generated at Villach.

which had ascended too quickly up the political agenda in the 1980s under the epistemic community's influence (Haas 2000; 2004; Haas and McCabe 2001).

Haas suggests that the intergovernmental nature of the IPCC affected the ability of the epistemic community to operate as theorised on a number of counts. Using the 1987 Montreal Protocol as a case study to support the epistemic community model, Haas suggest that UNEP and its Executive Director, Mustafa Tolba, played a crucial role in securing international cooperation to protect the ozone layer. However, in the case of climate change, governments took negotiations for a convention out of the hands of UNEP and WMO and placed them in the hands of the General Assembly (Bernstein 2001, 166). In 1990 the UNGA passed Resolution 45/212 on Protection of the Global Climate for Present and Future Generations, which established the International Negotiating Committee (INC). The INC turned the responsibility for international cooperation on climate change over to national delegates rather than leaving it to scientific leadership from within the IPCC or its sponsor organisations. It was not only the removal of negotiating power that hampered the efforts of the epistemic community, the design of the IPCC also made it difficult to operate and implement independent initiatives, for instance the IPCC chairman is elected by member governments of the IPCC panel. This gives governments the power to impede the appointment of effective epistemic community members, as happened in 2002, when the US worked hard to prevent the re-election of Robert Watson and to have their preferred candidate—Rajendra Pachauri—elected in his place (Haas 2004, 581).¹¹

The failure of the epistemic community to engender greater international political action on climate change indicates the complex social and political components of understanding, defining and treating the climate change issue, complexities recognised as making it a much harder case for multilateral diplomacy than other environmental issues (Haas 2008, 2). As outlined by the above account, by the mid-1980s the climate change community had framed climate change for collective debate, proposed specific

¹¹ This is a discussion of Haas's perceptions of the IPCC as based on the epistemic community model approach. Analysis of member government's involvement in the IPCC begins in chapter 5, including discussion of the 2002 elections.

policies and identified salient points for negotiation (SCOPE 1986; WMO 1986), thus functioning as theorised by the epistemic community model. It is not that the scientific community failed to provide a definition of climate change, rather a complex interplay between scientific, economic and political realities in the conceptualisation of climate change resulted in the rejection of the scientist's definition of the problem and proposed policy options. However, this account of the politicisation of climate change and the IPCC's establishment also indicates flaws in the assumptions underlying the epistemic community model, particularly concerning the role of science in politics. Confronting Haas's account of truth and power reveals some of the limitations of focusing on epistemic communities in analyses of the problematisation process.

The misgivings Haas documents in relation to the IPCC are informed by his view that knowledge can improve politics, a theme that is developed throughout his work on social learning and its agents: epistemic communities (Haas 2000, 2004; Haas and McCabe 2001). Haas is concerned with 'usable knowledge': scientific knowledge that is accurate and politically tractable to politicians and policymakers (Haas 2004, 572). Authority and legitimacy are vital constituents of usable knowledge, and in order for it to be recognised as such, Haas stresses that the institutional processes for developing usable knowledge must remain insulated from political interference. The IPCC was set up to create usable knowledge, and according to the epistemic community model, this knowledge should have taught the decision-makers that cooperation on an international agreement to reduce greenhouse gases was in their best interests. Why then, after over twenty years of the IPCC, four rounds of assessment reports, and a UN Framework Convention on Climate Change are emissions still rising?

For Haas, the answer lies in the intergovernmental nature of the IPCC, which failed to separate truth from power and thus has not been able to produce legitimate, usable knowledge. Haas concludes that the IPCC has been designed "to keep science on a tight leash and, not surprisingly, IPCC scientist's have been unable to exercise sufficient discretion to develop more politically tractable advice" (2005, 396). However, for Haas the IPCC also failed at a deeper level, stalling not only international cooperation but the

creation of a different world order, one characterised by “shared cause-and-effect understandings, practices, and expectations” (Adler and Haas 1992, 389-90). For Haas, epistemic communities house the potential for rationalising politics, and creating a world order “based on shared values, rather than individual state interests, and on moral vision”, a realisation which was held back with the establishment of the IPCC.

Haas’s view of knowledge and politics has been strongly criticised for its rationalistic assumptions.¹² These criticisms reveal a number of flaws in how epistemic communities are theorised to function. Firstly, the epistemic community model assumes that it is both possible and preferable to separate scientific knowledge from social and political processes. Secondly, the model assumes the knowledge transfer pathway and social learning to be unidirectional: science educates politics. Thirdly, the model does not consider the interests of the epistemic community or the competition between communities of experts and how these forces shape the scientific frame of the problem. Taken together, these assumptions suggest that scientists and scientific knowledge diagnose environmental problems in the absence of social, political and economics forces. However, work done by scholars in this area, such as Peter Newell (2000), demonstrates how politics impinges on scientists in the form of self-censorship and knowledge selection in compiling IPCC assessment reports. This leads Newell to conclude that the knowledge/power transfer from scientific expert to policy community runs both ways, rather than the linear one-way transfer implied by the epistemic community model (ibid, 42).

The work of Litfin (1994), Boehmer-Christiansen (1994a, 1994b), Newell (2000) and Bernstein (2001, 2002) highlights the complex relationship between social, political and economic forces in the conceptualisation of climate change. Bernstein (2001, 174), for instance, suggests that part of the epistemic community’s limitation is its focus on single communities of experts. This neglects the competition between expert groups, for example, natural scientists were not the only authoritative experts interested in climate

¹² See for example Litfin 1994, ch 2; Vogler 1995; Jasanoff 1996; Peterson 2000; Newell 2000; Bernstein 2001, 2002.

change policy; development and environmental economists also actively sought, or were solicited, to influence policy formulation. Not only does the epistemic community model overlook the interests of the scientific community, it assumes the professional background of actors to be analogous prior to study. As Wendy Franz's (1997) account of the Villach conference makes apparent, and Litfin's work highlights below, in many instances scientists were unwilling to translate the science of climate change into policy response options for fear of appearing too close to policy and thereby undermining their scientific authority. Instead, over the course of the 1980s, the community interested in climate change expanded and diversified, with policy-oriented actors attending workshops and conferences that had previously been the preserve of actors interested in climate science and research. As Karen Litfin's work indicates, it is actors interested and invested in the policy sphere that have the know-how and authority to translate the science of climate change into political action.

Finally, when the epistemic community is the central unit of analysis, the workshops, conferences and assessments that bring these actors together are overshadowed. And yet, it is actor's participation in these activities that constitutes them as epistemic community members and legitimates them as climate experts, making these activities critical to the community's formation and to the formation of a shared understanding of climate change. These activities are not simply a component of the history of climate science and politics; conferences, workshops and assessments are constitutive of how climate change has become known and acted upon within and by the international community. As this thesis sets out to highlight, these activities *are* the international community's practice of climate change, through which climate change is known. In the following section then, I look to alternative approaches developed for theorising knowledge and power in the conceptualisation of international environmental problems. The aim is to highlight how these approaches have expanded our understanding of knowledge and power in this realm and to see what insights these approaches may offer a study of the IPCC and its role in the construction of climate change.

2.2 The power of discourse

The concept of discourse has become commonplace in the study of international environmental politics. This section provides an account of two important discursive approaches developed to illuminate the social construction of ozone depletion and acid rain. Underpinned by the work of Michel Foucault, the theoretical approaches developed by Karen Litfin (1994) and Maarten Hajer (1995) highlight the complex relationship between knowledge and power in discursive constructions of environmental problems. Importantly, these approaches acknowledge the degree of contestation and struggle that characterise the framing process, and both provide a number of conceptual tools for unravelling relations between actors that have proven popular for studying the social construction of climate change (Pettenger 2007).

Karen Litfin (1994) was the first to develop the discourse analytical approach in international environmental politics. Her turn to discourse was prompted by dissatisfaction with Haas's explanation for the formation of the Montreal Protocol and the epistemic community model's assumptions about the rationalising potential of science. Seeking to explain by whom and through what processes ozone depletion was framed for and by the treaty process, Litfin turns to discourse. Litfin understands discourse as a set of linguistic practices and rhetorical strategies embedded in a network of social relations (ibid 3). Her work suggests that the dominant discourse that emerged around ozone depletion was a powerful determinant of what could and could not be thought, delimiting the range of policy options and serving as "precursors to policy outcomes" (ibid, 37). Her empirical investigation also indicates that whilst scientific knowledge may facilitate cooperation, the production and interpretation of knowledge is a political process. Thus, far from rationalising politics, knowledge of ozone depletion fed into new and existing arenas of political contestation (ibid 19).

Litfin's discursive analysis interrogates the role and power of science and scientists in the treaty formation process as theorised by the epistemic community model. Whilst acknowledging that scientists played a facilitative role in initially framing ozone

depletion, Litfin's research indicates that many scientists were reluctant to step into the policy arena by making normative judgments about the social implications of their research. Litfin suggests that privileging the role played by scientists in the framing of environmental issues is also problematic because knowledge was not only a source of power for these actors. It seems that "once produced, knowledge becomes something of a collective good, available to all who want to incorporate it into their discursive strategies" (Litfin, 1994, 37). According to this approach, power does not lie solely with those who produce knowledge, but also with those who make use of it in their discursive strategies, manipulating and interpreting it to frame the problem. Litfin identifies those responsible for shaping the discourse on ozone depletion as *knowledge brokers*: intermediaries between the scientists who produce the knowledge, and the policymakers who consume that knowledge (ibid, 4). This is an important addition to the epistemic community model, and runs counter to its causal logic; knowledge brokers translate scientific knowledge, which Litfin suggests underscores that interpretation is more important than scientific fact (ibid, 37).

Litfin concludes that the formation of the global ozone treaty was the outcome of a discursive struggle amongst "various networks of power/knowledge", in which issues of framing, interpretation and contingency were central (ibid, 178). Litfin's discursive practices approach demonstrates the power of discourse to structure the debate, and suggests that political power lies with those actors with "discursive competence": those that are apt at interpreting information and framing the issue. It also suggests that contingency can play a decisive role in supporting a particular framing of the problem, such as the discovery of the ozone hole over Antarctica, which shifted the terms of the debate in favour of those who erred on the side of caution (ibid, 189). This approach indicates the inseparability of knowledge and power, "knowledge structures the field of power relations though linguistic and interpretive practices, through organizational strategies, and through the contingencies of particular contexts" (ibid, 23). However, knowledge is not powerful per se, knowledge requires recognition i.e. others have to be convinced of its validity (ibid, 197). Thus, it is "in discourse that power and knowledge are joined together" (Foucault 1998, 100).

The discursive approach and analytical focus of Maarten Hajer's (1995) work shifts attention from the role of scientists and scientific knowledge in treaty making to the problematisation of environmental degradation more broadly. Hajer seeks to understand how issues are defined in the policy process and how emergent environmental discourses have constrained political action and enabled social change. He develops a discursive analytical framework with which to trace the development of environmental thought through the 1970s, discerning how emergent discourses made sense of and framed ecological crisis and how this challenged prevailing institutional responses to environmental degradation. He suggests that by the 1980s, ecological modernization had become the dominant way of framing environmental issues, and explores the impact this had on the treatment of acid rain in the UK and the Netherlands. Hajer's interest in the making of social reality and the analytical means he develops for studying this indicates the complex social dynamics that constitute the problematisation process and exposes some of the difficulties in deconstructing these.

Taking an argumentative turn, Hajer conceives of politics as a struggle for discursive hegemony, whereby actors try to convince others of their definition of reality (ibid, 59). He aims to illuminate this struggle by developing a discourse analytical framework, in which he combines Foucault's later work with insights from social-psychology (see chapter 2). Hajer understands discourse as "a specific ensemble of ideas, concepts, and categorizations that are produced, reproduced, and transformed in a particular set of practices and through which meaning is given to social and physical reality" (ibid, 44). In Hajer's analytical approach to discourse, language is not the sole focus of analysis, the institutional context is also important as this "codetermines what can be said meaningfully" (ibid, 2). He identifies environmental discourse as fragmented and contradictory: "an astonishing collection of claims and concerns brought together by a great variety of actors" (ibid, 1). Despite this however, coherent definitions of the causes and consequences of environmental problems emerge, and Hajer seeks to illuminate how discursive order is created and maintained. His analytical approach introduces two concepts: *story-lines* and *discourse coalitions*. *Story-lines* are narratives of social reality that make it possible to combine elements from different domains and knowledge

systems in a manner that provides actors with a set of symbolic references suggestive of a common understanding (ibid, 61). In the struggle to contest and promote particular story-lines, *discourse coalitions* form, which is the concept Hajer uses to identify the actors and practices that construct and coalesce around a given story-line of the problem (ibid, 65).¹³

Hajer's work indicates how the conceptualisation of environmental problems has changed since environmental degradation first emerged on the international political agenda in the 1970s. At this time, pollution was not considered a structural problem, but rather as something that could be controlled and contained through quality control targets and abatement strategies (ibid, 25). Hajer provides a genealogy of environmental discourses that came to challenge this way of thinking, from those that popularised the notion of ecological crises, such as the *Limits to Growth* thesis (Meadows et al. 1972), to those that held modern society responsible for systemic environmental degradation, as captured by the text, *Small is Beautiful* (Schumacher 1974). Whilst these environmental discourses challenged the prevailing order, Hajer's account indicates that neither became hegemonic. Instead, strands of these environmental discourses converged with the institutional practices of international policy-forming organisations, such as the OECD and UNEP. According to Hajer, the historical roots of the ecological modernisation discourse lie in this convergence between discursive and institutional forces, which produced a discourse that made continued development compatible with environmental care (ibid, 101-102).

The discourse of ecological modernization acknowledges structural design faults within modern society that produce environmental problems, but assumes that through modern political, economic and social institutional reform, care for the environment can be internalised (ibid, 25).¹⁴ Thus story-lines around ecological modernization present

¹³ Hajer defines discourse coalitions as: "the ensemble of (1) a set of story-lines; (2) the actors who utter these story-lines; and (3) the practices in which this discursive activity is based" (ibid, 65).

¹⁴ Ecological modernization was a concept first introduced by two German political scientists, Joseph Huber and Martin Janicke in the 1980s. Although originally an interpretation of how environmental policy had developed in Germany and the Netherlands (Langhelle 2000, 305), it is now deployed as both a social theory and a new policy-oriented discourse in environmental politics. For an introduction to ecological modernization and historical accounts of its development see Buttel 2000; Fisher and Freud 2001; Mol and Spaargaren, 2000. Hajer's contribution is in tracing the emergence of the ecological modernization

environmental protection as a “positive sum game”, environmental degradation becomes a management issue, and in principle economic growth and ecological problems can be reconciled (ibid, 26). Hajer’s research suggests that by the mid-1980s, ecological modernization was “seen as the most legitimate way of conceptualizing and discussing the environment as a policy-making problem” (ibid, 101). Through his research of the acid rain problem then, Hajer demonstrates how different story-lines competed to define the acid rain issue, with dominant discourse coalitions eventually forming around the ideas, concepts, and categories of ecological modernization. Despite the eco-modernist framing of the acid rain problem however, Hajer discovered that in both the UK and the Netherlands the institutional response to acid rain was more consistent with end-of-pipe abatement strategies than the new policy discourse (ibid, 268).

The discursive approach developed by Hajer enabled him to illuminate dramatic changes in the conceptualisation of environmental degradation over the 1970s and 80s, and elements of this conceptual apparatus have proven popular with scholars interested in the social construction of climate change. Those that have employed these tools suggest that ecological modernization—as political theory and practice—has been influential in framing the climate change debate and is an on-going force in the international political response (Bäckstrand and Lövbrand 2006, 2007; Bailey, Gouldson and Newell 2010; Levy and Egan 2003; Oels 2005). The work of both Karen Litfin and Maarten Hajer is important for disrupting dominant conceptions of science and politics, highlighting that the conceptualisation of international environmental problems is a more contested arena than assumed. Litfin’s empirical work indicates that scientists and scientific knowledge must compete with other actors and forms of authority in the construction of international environmental problems. Thus, far from remaining a separate and privileged domain, scientific knowledge becomes a force within on-going social and political struggles. Hajer’s work illuminates how knowledge and social values are already configured in prevailing and emergent environmental discourses, which structure the construction and treatment of international environmental issues. And both

discourse during the 1980s and demonstrating its impact on the framing of the acid rain problem in the UK and the Netherlands.

discursive approaches make apparent that power is not concentrated in either scientific or political centres as suggested by Haas, but rather is diffused across and between a range of actors and social domains in the problematisation process.

Although both discursive frameworks reconfigure power and direct a critical gaze on a wider range of actors and social processes involved in the problematisation process, neither Hajer nor Litfin systematically theorise the constitution and distribution of power within and between these actors and social domains. Thus, whilst Hajer indicates that the framing of acid rain was domain specific, and that actors within a given institution were constrained by conventional understandings, agreed upon rules of the game, and existing institutionalised routines (ibid, 275-6), he does not elucidate how domain specific ways of doing and knowing are negotiated and reconstituted in constructing shared understandings and a political response. Here it is necessary to ask whether discourse is enough. Although neither discursive approach focuses exclusively on language, discursive practices are still extracted and privileged over other social practices through which the world is comprehended. This has effects, it distorts the significance of language in the making of reality, which needs to be analysed alongside other social activities influencing how the environment is thought about and acted upon.

The aim of the following chapter is to begin to assemble the thinking tools for shifting analytical attention from our discursive relation to the world to our practical relation, in order to reconfigure how we analyse the conceptualisation of environmental problems as international political issues. First however, I turn to the theoretical approach and empirical insights of Steven Bernstein, whose work on the *Compromise of Liberal Environmentalism* has shed further light on the relationship between knowledge and power in the construction of international environmental politics. Bernstein (2000, 2001) is interested in the conception of environmental governance and explores the role that ideas play in generating governing structures. Two theoretical aspects of his work are explored below: 1) the development of a normative framework for explicating the generation of liberal environmental governance, and 2) a chapter written with

Emmanuel Adler on the place of epistemes, or background knowledge, in the construction of global governing relations.

2.3 The power of ideas

Steven Bernstein sets out to explain how 1970's environmentalism, premised on the incompatibility of environmental protection with socio-economic and political practices, evolved into liberal environmental governance, which predicates environmental protection on the promotion and maintenance of a liberal economic order. The normative approach developed to explain this shift, illuminates some of the processes that constrain the definition of climate change as a social and political problem, which according to Bernstein's conclusions, must fit with the current economic order to be widely accepted.

Bernstein's constructivist explanation for the compromise of liberal environmentalism centres on his understanding of norms, norm-complexes and social structure. Bernstein uses these terms to build a comprehensive framework to explain why some norms get selected over others and to explore the implications of this for governing international environmental problems. Bernstein suggests that international norms are the basis of global governance, and as such "define and regulate appropriate state (and other key actors') behaviour, and assign rights responsibilities regarding the issue in question" (ibid, 5). Norm-complexes are the sets of norms—institutionalised as rules, principles, standards etc.—that govern political relations in that issue area (ibid, 6). When new problems like climate change emerge, a space opens up for rethinking present governing structures and for criticising the social and political values that underpin these, as is characterised by the problematisation of environmental degradation in the 1970s. However, when these ideas attempt to become more than criticism and to initiate social and political change they are confronted with extant norm-complexes governing social and political relations. Bernstein suggests that these new ideas must "compete against

existing social purposes” and are only likely to become institutionalised as governing norms by “finding a fitness with those structures” (Bernstein 2001, 216).

For Bernstein then, the key to understanding the evolution of international environmental governance is grasping the interaction of new ideas with extant social structures (ibid, 178). Building on constructivist scholarship in IR and theorising social structure as institutionalised norms, Bernstein explores the interaction between ideas and their environment. He suggests that international social structure consists of three basic levels “ordered in a hierarchy of prioritized values that coordinate and define international interactions” (ibid, 186). According to this approach, first level norms are the most fundamental and thus difficult to challenge, because they define the identity and legitimacy of the primary actors in the international arena (ibid, 187). The second level norms define the basic obligations these actors have as members of an international society, and level three norms constitute and regulate social relations between these actors (ibid). It is at level three that new ideas are most likely to be accepted and institutionalised as governing norms if they find some “fitness” with existing structures for governing interactions between states. Elaborating on the social and political process through which particular ideas are “selected”, Bernstein suggests this “fitness” is determined by three factors: 1) the perceived legitimacy of the new ideas (who they came from and with what claim to authority); 2) the extent these new ideas fit with prevailing governing norms; and 3) the degree of fit with key actors’ identities (ibid, 184).

In the case of environmental protection, Bernstein finds that new ideas governing international environmental protection only became widely acceptable once they had found some fitness with norms of liberal economic growth and development. In this account, the 1992 UN Conference on the Environment and Development (UNCED) is a central event in the development of a liberal environmental norm-complex. Bernstein indicates that the success of this summit lies in the fact that it generated a legitimate way of comprehending global environmental degradation and “delineated a range of appropriate behaviours and policy practices...that then set the pattern for action on specific environmental problems” (ibid, 71-2). Accordingly, the Rio Declaration

institutionalised the right to development with common but differentiated responsibilities for environmental protection as governing norms (ibid, chapter 3). For Bernstein the notion of sustainable development then *is* the compromise of liberal environmentalism, legitimising a form of international environmental governance that “predicates environmental protection on the promotion and maintenance of a liberal economic order” (ibid, 213).

These conclusions have significant implications for understanding the processes by which environmental issues are conceptualised and defined as social and political problems. In contrast to Haas, who saw the direction of discovering, defining and understanding environmental problems proceeding from science to politics, Bernstein’s approach suggests that the conceptualisation of environmental issues like climate change is a less linear and predictive process. It is not necessarily the case that problems like climate change are discovered, understood and defined by scientific communities before they can be governed, because current governing norms are likely to constrain the definition and framing of the issue before the physical extent of the problem is realised. Thus, although scientists may play an important role in raising the profile of the problem, once on the agenda, social structure or the political environment shapes policy-relevant research as much as vice-versa.

Bernstein’s research indicates how the ascendancy of a liberal economic order has impacted the institutional arrangements of the IPCC. For instance, he highlights how the content of Working Group (WG) III’s report on climate change mitigation has increasingly focused on questions that fit with a liberal environmental research agenda. This is reflected in the increase in economists in the authorship of WG III for its Second Assessment Report (SAR) and in the content of this report, which focused on cost-effective policy responses (ibid, 224-5). Bernstein’s research suggests this reorganisation of WG III aimed to enhance the political relevance of the IPCC’s assessment of policy options, and was driven more by governments than the scientific community (ibid,

171).¹⁵ Bernstein also highlights that it is not only the IPCC's assessment reports that have moved in line with a liberal economic order, cooperative solutions to climate change are more likely to be accepted if they fit with norms of liberal environmental governance, a clear example being the Kyoto Protocol (ibid, 118). The agreement reached between developed countries over GHG emission reduction targets were linked to three market mechanisms, and similar market mechanisms are likely to be strong components of the post-Kyoto agreement (Bernstein ibid, 118; Bernstein et al. 2010).¹⁶

Although Bernstein's theoretical approach does not deal with knowledge per se, it demonstrates the power of ideas, norms and social structure (ibid, 189). Ideas are powerful because of their potential to become accepted norms, and norms have the power to define and regulate behaviour as well as assign rights and responsibilities. Power operates through existing normative structure, which endows some actors with authority in a given issue area. This approach turns the attention from the power of actors and scientific knowledge to social structure and the potential for new ideas to disrupt current power relations and institutionalise new sets of governing norms, constituting new powerful actors. Knowledge clearly has an important role in such an approach, endowing actors with authority and lending legitimacy to their ideas. However, the role or place of knowledge and power in stabilising or transforming the social structure are not explicitly developed within Bernstein's normative framework, which in many respects is the outcome of Bernstein's focus on norms. It is the framework's emphasis on the role and significance of norms that exposes Bernstein to criticism. Norms are embedded within a social fabric and may shape the form of governance, but they do not govern social relations, i.e. norms guide action, they do not act. Bernstein's theorisation of norms and social structure does not make this clear, and thus sometimes one is left wondering what is acting and where this acting is from. Although the essence of a wider social fabric is theorised with the notion of social structure, Bernstein reduces this social structure to

¹⁵ Although the IPCC chairman at the time suggests that he was critical to this shift, see Bolin 2007, 80-1 and chapter 5.6 for the context of this shift.

¹⁶ The three main market mechanisms within the Kyoto Protocol are: 1) Emissions trading; 2) Joint implementation (JI) among developed countries; and 3) Clean Development Mechanism (CDM). All three of the Kyoto mechanisms work on the same basic principle: "that assigning property rights to emissions and creating a market that allows them to be transferred will enable emission reductions to be achieved where it is most cost efficient, or cheapest, to do so" (Bernstein 2001, 118).

accepted and institutionalised norms, which effectively reduces the actors and activities that constitute international political society to norms acting and acting norms.

In many ways Bernstein corrects this emphasis on norms in a chapter co-written with Emanuel Adler (2005). In this chapter, Adler and Bernstein introduce Foucault's conception of episteme to explorations of knowledge and power in global governance. This chapter is not on international environmental politics specifically, but is introduced here because it builds on the conceptual approaches identified above and introduces a definition of episteme that enables explication of the role of shared understandings, or background knowledge, in the conceptualisation of international environmental problems. This is important. The notion of episteme opens space for theorising forms of understanding, other than the scientifically generated, that structure environmental thought and action in international relations. I will start then by outlining Adler and Bernstein's conception of episteme, before indicating why, although an interesting concept, it is not yet sufficiently developed for studying relations of knowledge and power in the IPCC's conceptualisation of climate change.

In order to understand the role that background knowledge or intersubjective understandings play in shaping social perceptions of reality, Adler and Bernstein introduce Foucault's definition of episteme, "as the deepest layer of social knowledge, which, productive of what social reality is, helps constitute the global order of things" (Foucault 1970 in Adler and Bernstein 2005, 295). With this notion of episteme, Adler and Bernstein attempt to redirect attention from the role of "normative, ideological, technical, and scientific understandings" in governing relations to "background intersubjective knowledge". That is, the "collective understandings and discourse – that adopt the form of human dispositions and practices that human beings use to make sense of the world" (ibid, 295). The authors use the analogy of a bubble to imply how epistemes structure perceptions of reality, proposing that humans live within a plurality of bubbles, and it is within these that individuals and groups "act, interact, reason, plan, judge, symbolically represent reality, and have expectations of the future" (ibid, 297). It is through epistemes then, that knowledge of environmental degradation is judged as

scientific and a sound basis for political action, indicating that background knowledge precedes and is the basis for evaluating scientific knowledge.

The power of background knowledge lies in its productive nature. Epistemes, structure how we define, order and categorise the world, which is often accompanied by the development of “formal and informal institutions” that fix these meanings in governing relations (ibid, 294). The power of epistemes is both productive and a disposition, producing powerful agents and actions by identifying and defining authority and legitimacy. A powerful agent is one who possesses the epistemes attributes and as such has the authority to validate knowledge and actions in a given issue area. However, each episteme has its own rules and defining features, which means that authority and legitimacy in one episteme does not automatically translate into or constitute authority and legitimacy in another. This highlights that authority and legitimacy are specific to background understandings, which generate and are generated from particular (epistemic) ways of thinking about, knowing and responding to environmental degradation. This is particularly pertinent to analyses of governing relations, as it indicates that actors at the global level must, to some extent, share epistemic understandings about how the world works, where authority lies, and how problems are to be known and spoken about for there to be meaningful action between parties (ibid, 307).

Accordingly, one of the central objectives of international negotiations and international institutions is the generation of shared understanding and shared norms that provide the basis for legitimate action. Adler and Bernstein illustrate the productive power of epistemes in this process, through their analysis of the liberal episteme in international trade negotiations:

A liberal episteme...reflects an understanding of the nature of the economy and market that holds efficiency as the highest value, favouring means-end rationality, and a faith in open markets as generators of economic growth and development...institutions of world trade have this liberal episteme at the core, with liberal goals beyond reproach. (ibid, 312)

The liberal episteme delineates what is to be considered a problem in international trade as well as constraining the solution. To enter negotiations on trade, actors meet on a

playing field designed by the liberal episteme, i.e. they must learn the rules of the liberal game before they can play. This playing field reflects current global power relations, and will ensure that these power relations are reconstituted in each match played on that field. The influence of the liberal episteme is not confined to matters of international trade either, as Bernstein's thesis on liberal environmentalism demonstrates, the liberal episteme also shapes the conceptualisation of environmental problems.

The concept of episteme developed by Adler and Bernstein is an important contribution and holds potential for illuminating the processes by which environmental problems like climate change are problematised. For instance, when the IPCC was established there was no other intergovernmental scientific assessment exercise on which to base its activities. Thus the history of the IPCC's establishment is characterised by the generation of rules and procedures for identifying who can participate in the assessment process and on what authority, as well as what qualifies as legitimate knowledge in the compilation of climate change reports. However, whilst Adler and Bernstein's approach corrects Bernstein's over-emphasis on norms, and indicates some of the intricacies and complexities of the social fabric, it does not provide the tools for deconstructing the complex social processes and power relations through which the episteme develops and constitutes subjects and practices as legitimate and authoritative. It is for this reason and in order to illuminate the social dynamics and power relations of understanding, interpreting and responding to climate change that the next chapter turns to the sociological approach and thinking tools of Pierre Bourdieu.

2.4 Summing Up

This chapter has given an account of some of the most comprehensive approaches developed for the study of knowledge and power in the conceptualisation of international environmental problems. Each of these approaches has shed light on the actors and activities that constitute the problematisation process, highlighting factors that constrain

the ways in which the environment is known and acted upon. Although the epistemic community model is often criticised for its linear conception of science and politics, it proved particularly adept at exploring the politicisation of climate change and the establishment of the IPCC. Revisiting accounts of the IPCC's formation indicates however, that scientists were not the only actors important to mobilising political interest in climate change; a growing number of policy-oriented actors participated in the conferences and workshops that transformed climate change from an object of scientific interest to an issue of international political concern. Here Karen Litfin's research on ozone discourses is illuminating. Litfin identifies the actors that interpret scientific knowledge and frame the issue for collective debate as knowledge brokers, indicating that the power of knowledge does not lie solely with its producers.

The work of Maarten Hajer brings into focus the full range of actors and social domains involved in the formation of environmental discourse. Studying the formation of ecological modernization, Hajer highlights how knowledge and social values are already configured in environmental discourses, which structures the construction and treatment of emerging environmental problems. Steven Bernstein's work also indicates that the political response to environmental issues is highly constrained. His analysis focuses on norms and social structure, demonstrating that new ideas about the meaning and implications of environmental degradation are unlikely to be institutionalised as governing norms unless they find some fitness with current governing structures. This has impacted on the formation and development of the IPCC and the climate change research agenda, which Bernstein's work suggests has increasingly aligned with the liberal economic order. Whilst the discursive and normative approaches provide a more accurate representation of the complex social forces and dynamics governing the conceptualisation of climate change, they remain focused on narrow aspects of social life. Discursive practices and institutionalised norms may delimit how we know and respond to the environment, but we do not only understand the world through language and I hope we are more than functioning norms. To get closer to understanding how and by whom climate change has become part of social and political reality, we need to better understand how the world is known.

Introducing the notion of episteme allowed for interrogating the part of background knowledge or intersubjective understandings in distinguishing authoritative ways of knowing shared problems and devising legitimate courses of action. Whilst the notion of episteme highlights the difficulty of bringing this form of knowledge to the foreground of power analyses, it makes apparent its critical role in distinguishing between legitimate ways of knowing and acting in and on the environment. As important as episteme is for identifying the significance of intersubjective understandings in the construction of international environmental politics, it is not a fully developed analytical tool. As this thesis is interested in revealing those with the authority to name climate change, the properties and distribution of this power, as well as its effects, it needs to put in place the analytical means for interrogating the social relations constitutive of the IPCC and its assessment process. It is for this reason that the following chapter introduces the sociological approach of Pierre Bourdieu. Bourdieu developed a comprehensive set of thinking tools for dismantling the social relations and practices constitutive of the IPCC and its problematisation of climate change. In doing so, Bourdieu provides both the theoretical means for exploring the productive power of knowledge and the thinking tools to enable this symbolic force to be studied in practice.

3. Introducing Pierre Bourdieu to climate change: symbolic power and practical knowledge

Climate change is a physical phenomenon. On geological timescales, the climate is always in a state of change or transformation. These changes, taking place over tens of thousands and millions of years, are not within the range of human experience, and the composition and effect of past atmospheres are reconstructed from rock and ice-core records. However, since the industrial revolution, the impact of human activities on the Earth's system has increased. Most significantly, there has been a marked increase in atmospheric carbon dioxide (CO₂) concentrations, rising from 280ppm pre-industrial revolution, to 396.78ppm over two hundred years later.¹ Driven by the use of fossil fuels and land-use change, rising concentrations of CO₂ and other greenhouse gases, most notably methane, are inducing a change in the Earth's climate system that are being experienced over the human lifetime. This is not the first time human activities have produced a geological signal, as human agricultural practices have had a profound impact on the environment (Kirch 2005). But never before have our ways of life had the capacity to induce the onset of rapid and global climate change. Whilst these changes have been discovered and represented through scientific practice, scientific knowledge of the physical extent and potential impacts of this phenomenon does not necessarily induce social and political change.

In order to explore the role that scientists and scientific knowledge have played in conceptualising human-induced climate change as a social and political problem, the previous chapter reviewed analytical approaches concerned with knowledge and power in international environmental politics. The epistemic community model and historical accounts of the politicisation of climate change made apparent that scientists and

¹ 396.78ppm is the May 2012 reading from the Mauna Loa monitoring station (NOAA 2012).

scientific knowledge were central in transforming climate change from an object of scientific interest to an international political concern. However, these accounts exposed the limits of scientific knowledge in constructing an international political response. Thus, whilst the effects of GHG emissions on global temperatures have been known for over twenty years and new sets of actors and activities have emerged to respond to this challenge, GHG emissions continue to rise. Despite being a privileged system for representing physical reality, this makes apparent that scientific knowledge has a more restricted capacity in the construction of social reality. Discursive approaches illuminated this situation by highlighting that rather than transforming political ways; scientific knowledge was incorporated into and manipulated by political acts of promoting and contesting particular courses of action. The chapter identified the institutional forces structuring the incorporation of scientific knowledge into political responses, including discursive, normative and epistemic. And by the end of the chapter, the analytical focus had shifted from the processes through which scientific knowledge is translated into political action to the importance of background knowledge in governing science's place in the construction of social reality.

It is from here that this chapter takes up the story, because if scientific knowledge is not the dominant force in constructing the meaning of climate change for political response, what is? To address this question it is necessary to carry on exploring the productive nature of knowledge in international environmental politics. In the previous chapter the work of Maarten Hajer brought to the fore the political struggle over the meaning of environmental degradation and the productive force of discourse in generating a response. The work of Litfin, Hajer and Bernstein highlighted the variety of actors invested in this struggle, indicating that scientific knowledge was not the only source of knowledge or authority that structured meaning production and governed political action. It is from these insights that this chapter begins to develop the theoretical basis for interrogating the practical nature of knowledge and putting together the conceptual apparatus for studying the IPCC's role in rendering climate change meaningful. The aim of the chapter is to delve deeper into the generative nature of knowledge and to gather the thinking tools for exploring how, by whom and through what social processes climate

change is being rendered socially and politically meaningful by the IPCC. As the leading international body for the assessment of climate change, the IPCC is the ideal site for addressing these questions, which to answer requires positioning the IPCC relative to other actors and organisations in the struggle over climate change and determining what constitutes the organisation's authority to identify and name the meaning of the issue. To achieve this the chapter introduces the sociological approach of Pierre Bourdieu.

The work of Pierre Bourdieu was first introduced into the discipline of IR in the mid 1980s by the work of Richard Ashley (1986). Since then interest in his thinking tools has grown steadily, with a marked rise in the application of his conceptual tools in the last few years (Bigo and Madsen 2011). These studies highlight the potential this approach offers to the study of International Relations (Bigo 2011; Jackson 2009; Leander 2006, 2009, 2011; Merand & Pouliot 2008), International History (Jackson 2008), and International Political Economy.² And demonstrate the relevance of Bourdieu's sociological approach to studies of European integration and security as an object of international political life.³ Although Bourdieu has proven influential in studying practices of consumption in sociology (Hand, Shove and Southerton 2005; Shove and Pantzar 2005; Shove 2003; Spaargaren 2011; Wilk 2009), as of yet there has been no systematic development of his thinking tools for the study of international environmental politics.⁴ This chapter then, provides an introduction to Bourdieu's theoretical approach and the thinking tools he developed for studying the social world, indicating the potential they offer for re-problematising the international politics of climate change as a struggle over meaning and a site of order making. In order to study this struggle and identify the authority to name problems like climate change, the following section introduces

² See in particular Leander (2002) and other contributions in the special edition of *Review of International Political Economy* 9:4.

³ On European integration, see (Adler-Nissen 2008; Kauppi 2003, 2010); on the changing role of NATO, see (Williams and Neuhman 2000; Huysman 2002; Gheciu 2005; Williams 2007; Pouliot 2008, 2010); on post-communist transformations, see (Derluguian 2005; Pop 2007). Bourdieu has been keenly taken up by scholars of critical security studies, where it has illuminated various aspects of this familiar problematic, including: internal and external security forces (Bigo 2001, 2006); human security (Stuvoey 2010); and alternative security practices, such as the role of Private Military Companies (Abrahamsen & Williams 2010; Leander 2005).

⁴ Charlotte Epstein (2004) introduces aspects of Bourdieu's theoretical approach in her study of the origins of the anti-whaling discourse, however, this is not a comprehensive treatment or an analysis built upon his theory of practice.

Bourdieu's notion of symbolic power. This conception of power makes it possible to identify the productive force of knowledge, which has the power to transform perceptions of the world and thereby action on the world. Turning to Bourdieu's philosophy of action, the productive nature and force of knowledge is further unpacked through an exploration of our practical relation to the world, which enables us to study how climate change is being made in and through the activities that constitute the struggle over its name.

3.1 Pierre Bourdieu

Although Bourdieu identified himself as a sociologist, he wrote on a variety of themes over his lifetime, producing work that spanned disciplinary divides and influencing those fields of study.⁵ The theme that tied these disparate works together was Bourdieu's political struggle to identify the enormity of social forces, such as "the weight of habits of thought, cognitive interests and cultural beliefs" (2000, 7). Bourdieu's interest lay in revealing how these social forces create and maintain systems of social domination and he developed a comprehensive set of thinking tools for interrogating the social order as reproduced through cultural practice. Before outlining Bourdieu's thinking tools and the practical relation to the world they rest upon I give an overview of some of Bourdieu's insights on the symbolic power of knowledge and the knowledgeable in the construction of social reality, indicating how these initiate the re-problematisation of climate change as an object of international political struggle.

Bourdieu regarded the social world as "the site of continual struggles to define what the social world is" (Wacquant 1989). Knowledge and the knowledgeable are privileged within these struggles, not because knowledge offers the potential to lessen or rationalise these struggles, but because it possesses a symbolic power to designate meaning. For Bourdieu then, "all knowledge, and in particular knowledge of the social world, is an act

⁵ Bourdieu inquired into topics as varied as art, literature, photography, higher education, sports and social classes, assimilating insights from and contributing to the disciplines of sociology, anthropology, ethnology, history, linguistics and philosophy. For a brief biography of Bourdieu's life and bibliography of his work, see Wacquant 2002; Wacquant 1998. For an introduction to Bourdieu and his theoretical approach to sociology see Bourdieu and Wacquant 1992; Webb, Schirato and Danaher 2002. For more critical accounts of Bourdieu, see Jenkins 1992; Swartz 1997; Calhoun et al. 1993.

of construction implementing schemes of thought and expression” (1986, 467). This is most clearly seen in the act of naming, which structures perceptions of what the social world is and thereby “helps to establish the structure of the world, and does so all the more significantly the more widely it is recognized, i.e. authorized” (Bourdieu 1991, 105). What is lost, or misrecognized in naming practices is that the authority to name is socially constituted. Thus, the schemes of perception transposed through the naming process are the product of a particular position within a given social structure, categorising the world in the image and the interests of the categoriser.⁶ When the act of naming is successful, it institutionalises the classificatory scheme from which it originates and effectively freezes a certain state of “power relations”, which “it aims to fix forever by enunciating and codifying” (Bourdieu 1986, 480). It is for this reason that Bourdieu suggested that the social sciences take “the operations of *naming* and the rites of institution through which they are accomplished” as their object of study. He developed a set of thinking tools for this purpose, including habitus, field and capital, which enabled him to map the social order and explain the mechanisms through which it is reproduced through practice.

The struggle to name is largely fought through symbolic systems, such as language, science, economics or art. As shared ways of knowing, constructing and communicating about the world, these symbolic systems provide the possibility of a “*consensus* on the meaning of the social world, a consensus which contributes fundamentally to the reproduction of the social order” (Bourdieu 1991, 166). This makes disciplinary knowledge systems, such as science, economics or international politics, more than neutral instruments for finding out about, knowing and representing the world, but “also *instruments of domination*” (Bourdieu and Wacquant 1992, 13). Through the production and deployment of these knowledge forms, actor’s claim the authority of the symbolic system to implement a view of reality, which exerts a productive force on perceptions of the social world in the form of a “knowledge effect”: a structuring force, structuring

⁶ The constitution of the categorisers’ interests is discussed below with the introduction of Bourdieu’s field concept.

actors' perceptions and receptions of the meaning of the world (Bourdieu 1991, 127). Bourdieu identifies this power of constructing reality as symbolic power:

a power of constituting the given through utterances, of making people see and believe, of confirming or transforming the vision of the world and, thereby, action on the world and thus the world itself, an almost magical power which enables one to obtain the equivalent of what is obtained through force (whether physical or economic), by virtue of the specific effect of mobilization – is a power that can be exercised only if it is *recognized*, that is misrecognized as arbitrary. (Bourdieu 1991, 170)

The power to give meaning is closely coupled with other forms of power, which determine and are determined by social location (Bourdieu 1989). Bourdieu identifies the relationship between these forms of power and authority with the notion of capital (see section 3.3), which enables the relationship between economic strength and symbolic power to be discerned.

This notion of symbolic power also alerts the researcher to their own power effect. Rather than focusing attention solely on the economic and political power of states and other actors in the international system, it brings the symbolic power of knowledge production into the equation. As the expert authorised to identify and write the meaning of interstate relations, the IR scholar is able to exert a knowledge effect on the creation and maintenance of international order. Thus the task of the social scientist becomes both to acknowledge their own power effect and to reveal how and where symbolic power is distributed within the field of study:

we have to be able to discover it [symbolic power] in places where it is least visible, where it is most completely misrecognized – and thus, in fact recognized. For symbolic power is the invisible power which can be exercised only with the complicity of those who do not want to know that they are subject to it or even that they themselves exercise it. (Bourdieu 1991, 163-4)

As a force, symbolic power is only able to exert an effect where the authority to write meaning and the meaning written is accepted and recognised as legitimate. This notion of complicity in power relations is often neglected. In the formulations of power reviewed in

the previous chapter, the power of knowledge was contained in discourses or ideas and implemented through the production and deployment of knowledge by the knowledgeable, thus only a privileged few were able to identify and exert it. Bourdieu offers a reminder that all are implicated in the way things are, even if only through acceptance of the current order as inevitable and immutable. Extending this to climate change means acknowledging that whilst the climate is physically changing, what that change means for how life is ordered and lived is not given.

The power to write the meaning of climate change rests with symbolic systems, and the symbolic power of these systems is bound up with economic and political power. To disentangle this and reveal how and by whom climate change is being conceptualised as a social and political issue requires re-problematizing the international politics of climate change. The political struggle over climate change is often misleading. It appears as a struggle over the physical nature and extent of climate change and as a battle to determine who acts to reduce GHGs, when and by how much. In reality, however veiled, it is a struggle over the implications of this physical phenomenon for the international order and ultimately over the meaning of life itself. When climate change emerged on the international political agenda it revealed that the industrial way of life—on which the current order of relations is built—is destroying the planet. This not only opens space for re-evaluating current patterns of existence on the basis of the environmental degradation they cause, it exposes the injustices of an order in which those who were yet to profit from industrialised development and thus least responsible for the problem, are the most vulnerable to the consequences of a changing climate. The re-evaluation of taken-for-necessary categories, such as consumption and economic growth, is taking place at all levels within and between nations, producing new ways of thinking about and relating to the environment in the practice of daily life. These however, are not the focus of the thesis. What is of interest here, is what climate change exposes about the international order and how the international order is being re-made through the struggle to determine its meaning.

Climate change reveals the bias of an order of relations—built upon historical patterns of exploitation and dispossession—that privileges the symbolic systems of the dominant to know and conceptualise the meaning of physical reality. In 1988 an organisation was created to assess knowledge of climate change that embodied the order of relations establishing it. The IPCC institutionalised historically constituted and geographically specific practices of knowledge production and authorised these as the legitimate grounds for knowing and responding to climate change. Thus, the same ways of knowing and doing life that created the environmental crisis in the first place are endowed with the symbolic power to write its meaning. This has not gone uncontested. As the site for legitimating means to know the problem and authorising knowledge and expertise, the IPCC is at the centre of the international political struggle over how and by what means climate change is to be written. Within this organisation the struggle has taken on particular features and characteristics, producing particular forms of authority and power relations. These need to be identified and mapped so as to delineate the impact they have on how climate change is conceptualised as a shared political issue within IPCC reports and by the IPCC assessment process. As an intergovernmental body, the organisation is a unique mix—usually referred to as a hybrid (chapter 5)—of governmental and scientific practices, offering an ideal site for studying the extent to which the international order is reflected in its practices of knowledge production and how these are contributing to re-writing the world in the same likeness.

Before introducing Bourdieu's thinking tools and indicating how these shape a study into the IPCC's practices of knowledge production, it is necessary to turn to the philosophy of action grounding Bourdieu's notion of symbolic power and the thinking tools designed to delineate its effects. Although this section identifies the productive power of knowledge to transform perceptions of reality, it does not indicate how particular visions of the world are generated or why altered perceptions of the world do not automatically change action in and on the world. The following section describes Bourdieu's stress on our practical relation to the world, and in doing so provides the basis for studying the social construction of climate change. It is the turn to the practical nature of being that opens up

space for thinking about and studying how objects of knowledge, like climate change, become made by and contribute to re-making social and political order.

3.2 Practical being

The nature of knowledge, and in particular the relationship between knowledge and action is central to addressing how we come to know and respond to environmental degradation. The theoretical approaches reviewed in the previous chapter were social constructivist in principle, emphasising that whilst there is an objective world, its meaning is intersubjectively interpreted and understood. The epistemic community model emphasised the objective side of this equation (Haas 1992a, 21-26). For its proponents then, international cooperative action results from shared understandings made possible through scientific representation of environmental problems. The discursive, normative and episteme-based approaches on the other hand, gave greater consideration to the interpretative aspects of understanding, and elaborated the discursive, normative and background mechanisms structuring the construction of shared ways of interpreting scientific knowledge. However, what is not confronted in these accounts is how we get from the world, to scientific representation of the world, to discursive, normative and epistemic interpretation of science in constructions of the world? How are shared understandings—be those scientific representations or subjective interpretations—made? It is in order to explore the making of a shared world that Bourdieu's stress on our practical relation to the world is introduced.

It is important to remember that Pierre Bourdieu was writing within a particular intellectual environment, or *habitus*, through which he realised his interest in and explicated the relationship between social order and social action. This section aims to situate Bourdieu within the academic debates he was positioned, whilst at the same time taking from his theoretical approach the insights and tools most useful for studying the making of climate change. Bourdieu was critical of dominant representations of the social world as *either* a subjective experience *or* an objective social physics, arguing that these representations are the product of the scholarly relation to the world, projected into the

world when it is taken as an object of study (Bourdieu 1990a, 25-29; Wacquant 1989, 33).⁷ Bourdieu suggests that this transposing of the scholarly situation on the world either ignores the structuring force of the subject's social location (subjectivism), or interprets it from the viewpoint of an observer, dislocated from the practical demands and forces that immersion in the world places on subjects (objectivism) (ibid, 52).⁸ To overcome this division between objective and subjective forms of knowledge and to study the relationship between an objective world subjectively grasped, Bourdieu suggests it is necessary to:

...situate oneself *within* 'real activity as such', that is, in the practical relation to the world, the preoccupied, active presence in the world through which the world imposes its presence, with its urgencies, its things to be done and said, things made to be said, which directly govern words and deeds without ever unfolding as a spectacle. (Bourdieu 1990a, 52)

Bourdieu identified this practical relation to the world and the practical mode of knowledge as the "basis of ordinary experience of the social world" (Bourdieu 1990a, 25). Situated within our everyday practical relation to the world, objects of knowledge are not objectively recorded, they are constructed through practice, "and the principle of this construction is the system of structured, structuring dispositions, the habitus, which is constituted in practice and is always orientated towards practical functions" (ibid, 52).

In order to explore the construction of social reality through practice Bourdieu incorporated into analysis both the objective structures of the social world (studied through the concept of field) and the perceptions of these and from these, as internalised within actors' habitus. Bourdieu refers to this approach as 'constructivist structuralism' or 'structuralist constructivism':

⁷ Bourdieu identifies overcoming this opposition between objective representations and subjective experience "as the most steadfast (and, in my eyes, the most important) intention guiding my work" (Bourdieu 1989, 15).

⁸ For more on the scholarly point of view and the bias it produces, see Bourdieu 1989; Bourdieu 1990a, chapter 6; Bourdieu 1998 chapters 1-3; Wacquant 1989.

By structuralism or structuralist, I mean that there exist, within the social world itself and not only within symbolic systems (language, myths, etc.), objective structures independent of the consciousness and will of agents, which are capable of guiding and constraining their practices or their representations. By constructivism, I mean that there is a twofold social genesis, on the one hand of the schemes of perception, thought, and action, which are constitutive of what I call habitus, and on the other hand of social structures, and particularly of what I call fields and of groups... (Bourdieu 1989, 14).

These two words – structuralism and constructivism – focus scholarly attention on the relation between social location, schemes of perception and social practice in the construction of social reality. Social reality is not passively apprehended, it is constructed, a construction that is subject to the structural constraints of the objective world and the internalisation of these as mental structures or schemes of perception, which are relative to the social location of the actor. It is through the productive nature of practice that social reality is comprehended and constructed, a two-way process of grasping and making, through which schemes of perception are transposed on objects of knowledge and objects of knowledge are comprehended through schemes of perception. Bourdieu theorised the internalisation of the objective world as dispositions within social agents through the notions of field and habitus, providing him with a mechanism for explaining the reproduction of social order in and through practice.

The notions of field and habitus are outlined below, of importance here is the contribution Bourdieu made to reconfiguring the relation between social action and knowledge of the social world. Bourdieu's attention to the practical way of being and comprehending the world is central to analysing the IPCC's role in the social construction of climate change. This approach puts practical knowledge, or more accurately our practical relation to the world, prior to the dominant way of conceiving of comprehension as representation in and through thought. It indicates that the activities constituting our practice of life—be those the activities of work, home, school or play—are formative of our comprehension of life and the meaning of objects in that life. Thus rather than suggesting that knowledge is prior to action, which is how the politics of climate change is commonly conceived; to understand how climate change is being

constructed we must turn to the activities through which climate change is being made part of social and political reality, as these practices of climate change produce a corresponding knowing of climate change. This switches analysis of the climate change problematic from its current focus on gathering scientific knowledge and the processes through which this is translated or interpreted for political action, to how scientific and political practices themselves render climate change suitable to everyday activities of life.

This approach alters what we take to be knowledge and knowing, shifting scholarly attention from the knowing mode of being to the practical mode of being. No longer is the scholar attempting to identify and dissect a substance called knowledge, thought to reside in actor's heads. Instead, knowing is analysed as a process – an understanding that unfolds over time and through practice – structured by and likely to reproduce the social conditions from which it is generated. This makes the objective structures of the social world and practices through which reality is constructed and comprehended the central focus of analysis. Within IR, this stress on the practical mode of knowledge has been incorporated within and contributes to the practice turn, which focuses scholarly attention on the social practices of world politics and the corresponding practical knowledge, or logic of practicality (Pouliot 2011, 22-31).⁹ For instance, Vincent Pouliot (2007, 2008, 2010) follows Bourdieu in arguing that actions in world politics are not predominantly guided by rational choice, communicative action, or norm-following conscious reflection, but instead “are the result of inarticulate, practical knowledge that makes what is to be done appear “self-evident or commonsensical” (2008, 258). Through the logic of practicality and his subjective methodology, Pouliot (2010) attempts to recover and analyse the place of practical knowledge in diplomacy. However, as with Adler and Bernstein's usage of episteme, Pouliot's desire to recover or apprehend actor's practical relation to the world through background knowledge distorts Bourdieu's relational ontology, reverting practical knowledge – as a process constituted through practical being – back into a substance from which the logic of practice can be deduced, interpreted and historicised (Pouliot *ibid*, chapter 3).

⁹ For more on Bourdieu and the practice turn, see Guzzini 2000; Leander 2006; Neumann 2002.

This project departs from Pouliot's approach by making Bourdieu's philosophy of action and relational ontology the starting point of its analysis (Bourdieu 1998, vii). This philosophy of action preserves and interrogates the relationship between the social activities of living and the comprehension of social life, analysing what this generates rather than the store of knowledge this is generated from. One of the central aims of the project, is to develop the means for studying this practical way of knowing and relating to the world, to illuminate what this way of being in the world produces (or reproduces), and to test the extent to which these world making processes can be identified and delineated through a study of the IPCC and the IPCC's construction of climate change. The intention in doing so, is to determine how this practical way of being in the world generates climate change as an object of knowledge and how transposed on this object – through the activities that make it – is the social order from which it is generated. To achieve this requires the actors' authorised to name climate change be identified and the basis of their symbolic power determined. And second, for the practices, or activities through which climate change is named to be studied, in order to determine how these are rendering climate change knowable, or more importantly to practical beings, do-able. By identifying the actors, the constitution of authority, and the practices through which climate change is emerging as an object of international political action, the thesis aims to illuminate the extent to which the current order is being challenged or re-made by the international struggle over climate change.

3.3 Thinking Tools

The aim of this section is to introduce the practical tools that Bourdieu developed to construct his object of study and to indicate how they are equipped to illuminate the IPCC and the social construction of climate change. Bourdieu had a distinct attitude towards theory and research practice. He regarded his theoretical approach as a *modus operandi* and developed a set of thinking tools designed for practice and refined through the process of empirical research. Outlined below are the central thinking tools, namely habitus, field and capital, which Bourdieu identified as “open concepts” – crafted for

constructing the social world as an object of study and tailored to the problematic in question (Bourdieu and Wacquant 1992, 95-96). As Bourdieu highlights, these concepts have “no definition other than their systemic ones, and are designed to be *put to work empirically in a systematic fashion*” (ibid, 96). This makes defining the precise ‘meaning’ of these concepts difficult, which does not result from or in a lack of scholarly rigour. It ensures that the concepts themselves are not taken up and applied, which always risks making them the study. Below these thinking tools are described according to how Bourdieu put them to work. The intention is to demonstrate how Bourdieu used these tools to transform an abstract conception of being and knowing – a philosophy of action – into a concrete research problematic, the study of which is revealing of the production of social order through social practice.

3.3.1.Habitus

Bourdieu introduced the concept of habitus when studying the changing patterns of marriage between rural men and women in his home region of Béarn (Wacquant 2004, 391). He used the concept to describe the effect of urbanisation on rural men, who were perceived as ‘un-marriageable’ by the city dispositions that were being adopted by local women (ibid). Through the notion of habitus Bourdieu explored the impacts of these social changes, which were inducing discrepancies between the subjective hopes of the men and present social realities. Internalised through the social practices of a particular field, class, or realm of social relations, the habitus, a system of “durable, transposable dispositions, structured structures predisposed to function as structuring structures” (Bourdieu 1990a, 53), generates thoughts, perceptions and actions compatible with the conditions which produce it and pre-adapted to its demands. Thus, when the social conditions generative of habitus alter—as they had for rural men in Béarn—ways of being and thinking that were previously well-adapted to their situation may become inappropriate and out of touch with present conditions.

The habitus is the product of conscious and unconscious learning and inculcation of the appropriate way of being. Bourdieu identifies the early encounter with, and experience of the social world—in the home, between parents and at school—as the most formative. It is the structures that characterise and determine those particular early social experiences captured within the habitus that form “the basis of the perception and appreciation of all subsequent experiences” (ibid, 54). As Bourdieu writes:

The *habitus*, a product of history, produces individual and collective practices – more history – in accordance with the schemes generated by history. It ensures the active presence of past experiences, which, deposited in each organism in the form of schemes of perception, thought and action, tend to guarantee the ‘correctness’ of practices and their constancy over time, more reliably than all formal rules and explicit norms. (Bourdieu 1990a, 54)

It is through the notion of habitus that Bourdieu is able to indicate that social reality “exists twice”: in the objective structures of the social world and internalised as habitus within the minds of social actors (Bourdieu and Wacquant 1992, 129). The habitus generates an infinite number of practices – thoughts, perceptions, expressions and actions – the only limits to which are the historical and social conditions of production (Bourdieu 1990a, 55). It is this internalisation of the social order, which enables Bourdieu to explain the reproduction of systems of dominations, as habitus (internalised order) conditions the thinkable by excluding the most improbable practices “as unthinkable, by an immediate submission to order that inclines agents to make a virtue of necessity, that is, to refuse what is anyway denied and to will the inevitable” (ibid, 54). It is the veil of naturalness generated by the fit between internal perceptions of one’s place in the external order that perpetuates relations of domination, as if there is no order of relations only the reality of the world.

This is an interesting notion in relation to the IPCC. Established in 1988, the IPCC is a relatively young organisation, which brings participants together from all over the world. The concept of habitus will be critical for identifying appropriate ways of being and conducting business within the organisation, and for determining how these ways of

being effectively order relations in the assessment process.¹⁰ The IPCC's ways of organising and conducting an assessment of climate change have been imported with and evolved from the early leadership and organisational influences present during its establishment. Thus, despite efforts to increase geographical and disciplinary representation within the organisation, the notion of habitus would lead one to expect member countries and participants joining later in the organisation's establishment to be taking social cues and organisational prompts from those already accustomed to the IPCC's way of doing business. The dominant cultural influences within the organisation means that for some, acculturating to this new social environment will be a relatively natural process, as these ways of conducting oneself and IPCC affairs fit with internalised schemes of perception. Finding one's place and becoming comfortable within the IPCC however, may be more of a prolonged process for actors whose cultural conditions are not reflected in the established order of relations. For these actors, it may be judged as more appropriate to observe from the sidelines and to submit to the order and leadership in place whilst this new culture is learnt.

3.3.2. Field

In order to identify and study the historical and social conditions that generate habitus, Bourdieu developed the notion of field. He used the term, understood as a particular "space of social forces and struggles", as a spatial concept to organize his empirical study of a given social realm (Bourdieu and Wacquant 1992, 102). A field may delineate a social universe or academic discipline organised around particular forms of interest, such as the artistic field, religious field, or economic field. Being a participant or member of a given social universe generates experiences, understandings and perceptions of oneself, one's position relative to other members of the field, and one's sense of purpose or meaning. These perceptions, internalised in habitus, are the relationship between field

¹⁰ Adler and Bernstein (2005) used the notion of episteme in a similar manner in their study of liberal governance (outlined in the previous chapter). The dominance of the liberal episteme means that liberal notions and ideals define appropriate ways of problematising and responding to shared international issues.

and habitus realised through practice, which effectively leads to the embodiment of social conditions:

...the habitus is what enables the institution to attain full realization: it is through the capacity for incorporation, which exploits the body's readiness to take seriously the performative magic of the social, that the king, the banker or the priest are hereditary monarchy, financial capitalism or the church made flesh. (Bourdieu 1990a, 57)

The habitus realises what Bourdieu refers to as the “the social made body”, so that “when the habitus encounters a social field of which it is the product, it is like a “fish in water”” (Bourdieu and Wacquant 1992, 127-28).

The structure of the field, the forces it exerts, and the struggles which actors engage in within that social space are organized around the fields' interests. Interests are specific to the field and are both the “condition of the functioning of a field...in so far as it is what ‘gets people moving’, what makes them get together, compete and struggle with each other, and a product of the way the field functions” (Bourdieu 1990b, 88). Bourdieu often used the analogy of the game to illustrate the relationship between habitus and field and the force exerted on actors through their interest and investment in the stakes of the field. In *Distinction: a social critique of the judgement of taste* he describes this game in relation to culture, where culture or to be cultivated is at stake:

Culture is a stake which, like all stakes, simultaneously presupposes and demands that one take part in the game and be taken in by it; and interest in culture, without which there would be no race, no competition, is produced by the very race and competition which it produces. (Bourdieu 1986, 250)

As a participant in a particular game, one's habitus is the incorporation of a ‘sense’ for that game, maintaining the *illusio*, which is belief in the stakes of the game and investment in the game itself (Bourdieu 2004, 50).

The relationship between field and habitus brings to the fore the relational ontology grounding Bourdieu's sociological approach. "To think in terms of field is to *think relationally*", which helps guard against the temptation to look for the real in the substance of the world – as it appears, already demarcated into easily identifiable individuals and groups (Bourdieu and Wacquant 1992, 96). Field and habitus directs attention instead to the "ensemble of invisible relations" formative of social reality, and ensures that the existence and extent of social groups is established through research practice rather than assigned through readily available categories (Bourdieu 1989, 15-16).

The notion of field is particularly useful for studying an organisation like the IPCC, which brings together actors from a range of different cultural and professional backgrounds. It is possible to differentiate between these actors using a number of criteria, the most evident groupings being nationality, professional affiliation and academic field. An important step in the research process will be determining how to differentiate between actors within the IPCC. This will require identifying the forms of interest and the strength of ties between particular groupings and delineating the force these exert over the conduct and content of the assessment process. It also means examining the extent to which the IPCC can be said to define its own field of practice. For such a field to exist, the IPCC would have to constitute its own interests – interest in the IPCC – identifiable according to the extent that actors invest in the production and reproduction of the IPCC and its assessment reports, and by the impact of this investment on the fields that constitute these actors as experts and qualify them to participate within the assessment process.

3.3.3. Capital

The structure of the field is determined by the distribution of capital. All fields and all actors within the field possess a "definite configuration of properties", specific to the field and actors in question (Bourdieu and Wacquant 1992, 107). These properties or forms of capital, as Bourdieu identifies them, are what enables or qualifies actors to enter

the field and determines relative positions between actors within that social space. It is an actor's position in social space that generates a particular point of view on the field as internalised in habitus, which makes identifying the forms of capital and mapping their distributions critical for positioning actors and determining their stance in and over the field. Like the notions of habitus and field then, this description of field and capital indicates the coupled relation between Bourdieu's thinking tools: capital does not exist and function except in relation to a field, and in turn, it is the distribution of capital that structures relations and confers power. Bourdieu identifies this as "a sort of hermeneutic circle: in order to construct the field one must identify the forms of capital that operate within it, and to construct the forms of specific capital one must know the specific logic of the field" (ibid, 109). Thus constructing the research object in terms of field, habitus and capital requires an endless "to and fro movement in the research process" (ibid).

The species of capital are dependent on the field and again, are only identifiable through the research process, as there are effectively as many species of capital as there are fields. Three principal types of capital can be identified: 1) economic capital – material wealth and financial assets; 2) cultural capital – knowledge, skills, technical qualifications and titles; and 3) social capital – the resources accrued by virtue of membership in a given group (Wacquant 1998, 221). These forms of capital are convertible and both the conversion rate and the species of capital are objects of struggle within the field, as actors seek to enhance the value of their particular skills whilst discrediting the forms of capital constituting the power of their competitors (Bourdieu and Wacquant 1992, 99). There is also symbolic capital, which is the capital accrued from *recognition* of one's importance within the field (Bourdieu 1991, 72). This particular form of capital, is an acknowledgement of status (or misrecognition at the arbitrariness of the properties and values on which this status rests), and is gained through possession and accumulation of the species of capital outlined above. Symbolic capital is also gained through recognition of specific characteristics and attributes valued within that field, which distinguishes those that possess these attributes as honourable and authoritative, and permits them to yield a particular power or force in and over the conduct of the field.

The notion of capital will be vital for identifying the forms of authority operating in the IPCC's assessment process, and the relative power these have to determine the legitimate ways of knowing and assessing the climate change problematic. As indicated above, the IPCC brings together different fields of practice. Each field has its own style and methods of work, and in relation to knowledge production, specific conventions for producing and measuring the legitimacy of the production process and its products. When fields are forced to work alongside one another, as they are in realising an IPCC assessment report, field-specific conventions must be negotiated and shared rules and procedures generated for producing a report approvable by member governments. The concept of capital will be critical for studying which fields have the power to determine these rules and with what effect. The IPCC and its assessment process then, are structured both by the struggles internal to fields and struggles between fields, as actors within fields seek to make a recognisable contribution within their field and fields compete over forms of authority to govern how and by whom climate change will be written in and through the assessment process.

The concepts of habitus, field and capital structure both how the IPCC is constructed as an object of study and how the organisation's assessment process is assembled and represented as a result of the research. In the following chapter these tools are put to work in order to re-problematise the international politics of climate change as a field of forces and struggles. Before that however, it is necessary to turn to one final aspect of Bourdieu's work, his notion of reflexivity, a practice critical to the construction of the research problematic. Through the practice of turning back on his scholarly situation, Bourdieu identified how the scholarly disposition projects particular visions of the world into the object of study, which have the symbolic power to make the world in this likeness.

3.4 Reflexivity

The final aspect of Bourdieu's sociological approach constituent of this project's analysis of the IPCC is his practice of reflexivity. The thinking tools outlined above were not only used by Bourdieu to illuminate the social universe under investigation, as his study of Béarn indicates, he also turned his "instruments of science" back on himself and the scholarly field that constituted him as a social actor (Bourdieu and Wacquant 1992, 36-46; Wacquant 2004). In *Homo Academicus*, he pointed this self-reflexive gaze on his intellectual domain in order to subject "the supreme classifier among classifiers" to the net of their own classifications (1988, xi). The aim was to objectify and subject to scientific scrutiny the schemes of perception constitutive of his own field-habitus. He viewed this reflexivity as necessary for establishing a more rigorous science of the social, whereby the objectifier attempts to subject his or her own historically constituted categories of perception to the same level of objective analysis as the object of study. The intention is to bring into sociological analysis the observer's relation to the observed and question the consequences of this relationship for scientific practice.¹¹

This reflexive gaze aims to delineate the extent to which scholarly categories of comprehension are inscribing or projecting a particular point of view into the object of study. For instance, in the previous chapter I positioned this project's investigation of the IPCC within the field of International Environmental Politics. In order to make a recognised contribution to this field one must think through and locate one's work in relation to the disciplinary specific ways of thinking about and problematising international environmental politics. The scholarly conventions through which this is achieved helps to generate and stabilise *epistemic doxa*, which is a shared way of thinking, speaking, theorising and writing the world of environmental politics. As necessary as this may be in the development of a mature field of study, it progressively leaves in a "state of unthought" the "presuppositions" of thought (Bourdieu 1998, 129). That is, as ways of thinking about and problematising international environmental problems become routinised, the concepts and frameworks deployed for constructing the research problematic are detached from the socio-historical and geographic situations

¹¹ Bourdieu writes extensively on this subject, see for example Bourdieu 1990a and 1990b, 1993, 2004; Bourdieu, Chamboredon and Passeron 1991; Bourdieu & Wacquant 1992. He also deployed this reflexive sociology on to many areas of his own life, see Bourdieu 2003, 2004, 2007, 2008.

from which these field specific points of view developed. Taking Bourdieu's notion of reflexivity seriously, means making these field specific points of view and the concepts and theoretical frameworks through which they are inscribed on the research problematic, part of the analysis.

The inscribing or projecting of a disciplinary point of view into and on to objects of study does more than limit how objects of knowledge are comprehended, it also exerts a knowledge effect, contributing to the construction of social reality. This chapter highlights Bourdieu's concern with social order and the role that symbolic systems play in its reproduction, which made apparent that knowledge does more than describe a static world, it exerts a force—a “knowledge” or “theory effect”—promoting a vision or point of view on the order from which it emerged.¹² As a scholar of environmental politics, I am not simply producing knowledge for the field; I am prescribing a particular way to think about and act upon the environment through my representation of politics. Scholars occupy a privileged position to promote their visions, which partly derives from common belief in scientific curiosity as a disinterested act. But as Bourdieu's theory of practice indicates, scholars too are positioned in a field of social forces and struggles constitutive of the scholarly habitus. Thus, enmeshed within the scholarly interest to discover and/or contribute to social change are other socially constituted interests. These are the product of location and trajectory in social space, which inscribe on the object of study the scholar's interest in being accepted, acknowledged and recognised in the field. The notions of habitus, field and capital enable us to reveal these effects and to delineate in whose interests we are writing the world.

This project takes Bourdieu's practice of reflexivity to heart. It only seems right that a project questioning the making of climate change considers its own positionality and the

¹² Bourdieu describes this theory effect in relation to Marx and the class struggle, suggesting that although there may always have been “manifestations” of class struggle, “that it is only after Marx, and indeed only after the creation of parties capable of imposing (on a large scale) a vision of the social world organized according to the theory of class struggle, that one could refer, strictly speaking, to classes and class struggle” (Bourdieu 1991, 133). Thus through naming and identifying patterns of social practice previously overlooked, the scholar transforms representations of the social world, “as well as simultaneously transforming the social world itself, at least to the extent that it renders possible practices that conform to this transformed representation” (ibid).

forces this exert on how the research problem is constructed as an object of study. In the following chapter, and in order to re-problematise the struggle over climate change as a field of practice, I turn to the notion of regime, exploring the extent to which this concept and the theory it arose from exert a force on how international environmental politics is thought and practiced. Identifying how regime conditions scholarly thought and climate change practice opens a space for re-configuring analysis of the climate change problematic as a field of forces and struggles. By reconfiguring the international politics of climate change as a field of practice it becomes possible to situate the IPCC's assessment process in relation to the field's politics and thereby begin to analyse the actors, activities and social forces that constitute this organisation's practice of writing.

3.5 Summing Up

The starting point of this chapter was the physical reality of human-induced climate change. The previous chapter revealed that scientific knowledge of this phenomenon is not necessarily sufficient to induce change in social reality. In order to study how and through what forms of knowledge climate change is becoming a constituent of social and political life this chapter introduced the sociological approach of Pierre Bourdieu. Bourdieu brings to our attention the practical nature of being, indicating that reality exists both in the objective structures of the world and in the perception of these as internalised in habitus. It is through practice that reality is made as such – with the activities of life generating a world comprehended through its practice. It is this relationship between the objective world and subjective interpretations of the world that enabled Bourdieu to explore the production and reproduction of social order. Through the notions of field and habitus Bourdieu identifies the relationship between social location, schemes of perception and social practice, indicating how through practice, schemes of perception particular to social location are transposed upon objects of knowledge. It is on this philosophical basis that the study of the IPCC's role in generating climate change as an object of social and politic life begins, and the chapter set about providing the tools to

enable this organisation and its assessment process to be constructed as an object of study.

In the final part of the chapter the thinking tools Bourdieu designed for interrogating the making of the world in practice are turned back on the scholar. Through his practice of reflexivity Bourdieu identified how the scholar's own schemes of perception are projected into the object of study. Earlier in the chapter, the discussion of Bourdieu's notion of symbolic power identified the particular power that symbolic systems have in generating representations of the world and thereby transforming perceptions of the world and thus actions in and on the world. The practice of reflexivity reveals how these representations are generated from within a particular location in social space, which transposed upon objects of knowledge, uphold the order of which they are the product. This power effect has implications both for the IPCC's construction of climate change and how the IPCC is constructed as an object of study. In order to illuminate this power effect – its generative potential and its constraints on how the world is known – the following chapter turns to the notion of regime. The notion of regime is unpacked both to illustrate the productive power of disciplinary specific ways of knowing and in order to open space for constructing the international politics of climate change differently. Deploying Bourdieu's notions of field and interest then, the following chapter depicts the international politics of climate change as a field of forces and struggles and sets about determining the place the IPCC occupies within this field and the forces this position exerts on how the IPCC assesses and constructs the climate change problematic.

4. Constructing the IPCC as a practice of writing

The introduction indicated that one of the central aims of the thesis is to explore by whom, on the basis of what authority and through what processes climate change is being made an object of international political life. The previous chapter laid the theoretical grounds for this study by introducing Bourdieu's stress on our practical relation to the world and providing a set of thinking tools through which the making of reality could be studied. The chapter illuminated the productive nature of knowledge through its explication of our practical relation to the world, which ties knowing and making together: it is through the activities of life that the world is simultaneously made and grasped. Here Bourdieu's notions of habitus and field indicate that reality effectively exists twice: both in the objective structures of the world and as internalised in schemes of perception. By transforming how the world is perceived then, knowledge systems have the power to transform how the world is acted upon, and the world these activities generate. The aim of this chapter, is to initiate the process of rendering this relationship between knowing and acting in the world – and its force in producing climate change – analysable through a study of the IPCC and its assessment activities.

In order to address how the IPCC is producing climate change as an object for social and political life this organisation and its assessment process needs to be constructed as an object of study. This is where Bourdieu's notions of field and interest are put to work. The IPCC is not the only organisation with a legitimate stake in the meaning of climate change and thus it cannot be analysed as an isolated unit. Mapping the IPCC's position and relation to other organisations within this struggle is vital, both to determine the IPCC's authority to designate meaning and to identify the forces its position within this struggle exerts on how the organisation conducts itself and its practice for producing assessments of climate change. The first step in locating the IPCC is overcoming

dominant representations of the international politics of climate change as a regime. As a mode for characterising and analysing international political activity around climate change, the notion of regime offers a particular way of thinking about and theorising the role of knowledge and generators of knowledge in the international political sphere. This tends to portray knowledge generation as a neutral process, leaving unconsidered the power of knowledge to reproduce particular constellations of relations in and through knowledge production practices. For this reason, the first section of the chapter is concerned with dismantling the international politics of climate change as a regime in order to re-think it as a field of forces and struggles.

Thinking in terms of field identifies the centrality of the IPCC and its assessment process in the struggle over climate change. The IPCC's privileged position in this struggle rests upon its symbolic power to designate meaning, which makes the organisation's authority and access to its assessment process objects of struggle within the climate field. It is in the context of the forces seeking to undermine its assessment products that the IPCC is to be understood as a practice of writing. In order to realise internationally recognised assessments of climate change that are acceptable to its member governments, the IPCC has developed a specific process for achieving its mandated task. This assessment practice must balance the interests and authorities of those that make up the organisation and protect it from the forces emanating from its social location. It is through the practice of writing—and the interest and investment in this practice by IPCC actors—that the IPCC maintains its authority in the climate field and ensures the continued legitimacy of its assessment products. The empirical study of the IPCC is concerned with unravelling this practice of writing in order to interrogate the forms of authority that this capacity to write the world rests upon and to decipher the reality generated through the process.

4.1 The climate regime

As a way of identifying and theorising cooperative activity between states and the organisation this generates, the concept of regime has proven influential. Pioneered within IR by John Ruggie (1975), the notion of regime was popularised by Keohane and Nye's *Power and Interdependence*, after which, according to the authors, "regimes" seemed "to be everywhere!" (Keohane and Nye 1989, 257). By 1983 a common working definition of regime had developed as the principles, norms, rules, procedures and programs around which expectations converge on a given issue (Krasner 1982, 1983), further promoting the development of a regime-focused research agenda (Keohane and Nye 1989, 258). The popularisation of regime was not confined to academic practice, as policymakers too, and "—not only from Western Countries but from the Soviet Union as well—have begun to think and talk about international cooperation in terms of international regimes" (ibid, 258). What developed as a label for identifying patterns of institutionalised collective behaviour (Ruggie 1975), is today a term commonly deployed to identify and analyse the complex array of actors, activities, material entities and other outcomes that constitute the UN Framework Convention on Climate Change (FCCC) (Bodansky 1995, 2001; Depledge 2005, 2006, 2008; Yamin and Depledge 2004; Miller 2001a; Rowland 1995).¹ The aim of this section is to consider the implications of regimes' routine deployment within climate change policy and academic practice for how the international politics of climate change and the IPCC's place within this is thought about and analysed.

The international politics of climate change amounts to a complex array of actors, activities and social and material institutions and the concept of regime provides a useful means of conveying and demarcating this in a single word. The immediacy with which this is understood makes the term difficult to avoid and at the same time a powerful determinant of what can and cannot be thought about the climate change issue area. One

¹ Interestingly, Ruggie's conceptualisation of regime stresses the generative capacity of regime, as delimiting "the language of state action" (Ruggie 1982, 380). His usage of regime and episteme indicates its productive force in how issues are known and acted upon, which is lost in today's routine deployment.

of the dangers of the common sense deployment of regime is that it detaches the notion from its socio-historical development from within the field of IR (and international law). Within IR, the concept of regime challenged dominant conceptions of international political reality by highlighting the stabilising force of international organisations, and in doing so served to promote a preferred order of relations (Keohane 2012; Keohane and Nye 1989, v; Keohane and Nye 1985).² Proponents of regime theory are working within certain assumptions about the international arena and seek to question the conditions of formation, regulative function and effectiveness of given regimes, often in order to prescribe cooperation in solving collective action problems arising within international society (Young & Levy 1999). Its success is evident from the fact that the concept of regime is routinely deployed within both academic and policy practice as a means to represent the reality of the Framework Convention and as an unproblematic problem-solving tool. Consequently, the international politics of climate change and its scholarly accounts have taken on particular self-evident features, making conference outcomes measurable in terms of success and failure (Dimitrov 2010; Harris 2007; Klein 2009; Stavins 2010; Vidal, Stratton and Goldenberg 2009) and interstate relations definable in terms of good guys and bad guys (Depledge 2005, 2008; Harris 2009).

When analysis of the international politics centres on and around the climate regime the IPCC is conceived as a knowledge provider and positioned either as the formative basis of the regime, as in the epistemic community model (chapter 2), as an institutional element of the regime (Yamin & Depledge 2004; Miller 2001a), or as a constituent of a wider regime complex (Keohane & Victor 2011).³ This is misleading, perpetuating assumptions about the neutrality of knowledge and the desirable outcome of social

² This is in reference to the dominance of realism in US scholarship.

³ Scholars have pointed out that the dominance of the regime approach has a similar effect on how non-nation state actors are conceived and analysed (Okereke, Bulkeley and Schroeder 2009). Steffen Bauer (2006), for instance, indicates that students of international regimes have overlooked the role and authority of intergovernmental treaty secretariats in global environmental politics, because they regard them as “something that happens to come with regimes as but one feature of the wider institutional setting”, rather than actors in their own right. This same oversight occurs when the IPCC is characterised as an element of the regime or as a constituent of the wider regime complex, which effectively only makes the role of the scientists and scientific content of the IPCC and its assessment process visible for their part in facilitating international cooperation, as in the epistemic community model (see chapter 2.1). However, as the following chapter reveals, the IPCC is far more than its expert authors, and there is more to the organisation’s relations than science and politics, as dominant representations suggest.

learning (Depledge 2006). As the previous two chapters highlight, knowledge production is not a disinterested act, and thus the interests of the IPCC and the actors that constitute the organisation have to be identified along with the interests of any other state and non-state actor invested in the struggle to determine the meaning of climate change. Furthermore, this approach positions the IPCC's relation to the UNFCCC and its situation within the broader international political struggle prior to study. Bourdieu's notions of field and interest indicate however, that social location is dependent on an actor's authority or symbolic power, which rests on the forms of capital possessed by that actor, and this can only be determined through the research process.

The force that regime is exerting on analytical thought is problematic, conditioning how the international politics of climate change is problematised and addressed. This conditioning delimits what we can know and discover about our relation to climate change and its meaning for political life. One of the most fruitful questions of the research process proved to be the simplest of all: what is the IPCC? And what makes it so? This is not an obvious question to ask when the realm of international environmental politics comes already labelled: a regime; an epistemic community; an advisory organisation; an institutional element of the regime; a constituent of a wider regime complex. However, the question of "what is?" opens up the already characterised to re-evaluation and this is critical. Just because the UNFCCC was once identified and interpreted as a regime and the IPCC as a knowledge provider does not mean this definition of reality has to be accepted, after all these are made up terms: an attempt to model reality; not reality itself. In fact, as Bourdieu's practice of reflexivity indicates, it is vital that scholars make the commonsense part of the analysis, as these representations of reality contribute to building the world from a particular viewpoint, one that is unlikely to be in the interests of all. This project breaks with dominant representations by problematising the international politics of climate change as a field of forces and struggles, and by conceiving of the IPCC and its assessment process as a practice of writing. Identified through empirical research of the organisation and its assessment activities: the practice of writing is a means of characterising what the IPCC is and does and what this practice produces. This research identifies an IPCC-specific way of

producing assessments of climate change and a shared investment in this objective by IPCC actors. To understand how the IPCC can be known as such and to map the historical emergence of this practice for producing assessments, the IPCC has to be situated within the social forces that govern the international politics of climate change.

As an intergovernmental panel mandated to produce assessments of climate change, the IPCC is constituted by what it does, and what it does—the actors and activities that realise an assessment—is governed by forces emulating from within and outside of the organisation. In order to identify these forces and the impact they have on how climate change is written, the IPCC needs to be located within the international political struggle over the issue. As the previous chapter indicates, Bourdieu used the concept of field to distinguish between social universes according to what interested those within that social space. The limits of the field are where this interest and the forces and struggles it engenders cease to have an effect. The IPCC is situated within the climate field – where the meaning of climate change is the central object of interest and struggle. The IPCC and its assessment reports have been critical for generating international political interest in climate change and thus the formation of the climate field, and both the organisation and its assessment process are a product of the forces this social and political interest generates. The following section identifies the IPCC's role in mobilising political interest in climate change and maps the IPCC's position relative to other organisations and actors within the climate field in order to determine how its location in social space has shaped the development of the organisation and its practice of writing.

The IPCC also constitutes its own field of practice, identifiable through actors' interest and investment in producing IPCC assessments of climate change. The IPCC is made up of a number of autonomous fields, each with its own long established conventions for practicing its profession and identifying authority: from the scientific disciplines that produce climate change knowledge to the member governments that accept and approve the final assessment products. When the IPCC was established in 1988, it had to develop a means to practice an assessment process that brought together these different ways of practicing the world in order to produce an assessment of climate change that was

acceptable to governments and internationally recognised as a legitimate mode of knowledge production. The practice of writing is the IPCC-specific way of generating an intergovernmental assessment of climate change that has developed over twenty years and four rounds of IPCC assessment reports.⁴ In order to provide an account of how this practice for producing intergovernmental assessments of climate change has developed and the forms of authority that have emerged in and over its conduct, the IPCC is delineated as a field of practice in section 4.3. Mapping the IPCC's position in the international politics of climate change and identifying it as a field of practice enables this project to identify the objects of struggle, forms of authority and interests shaping this organisation and to determine the forces these exert in and over how the IPCC writes the climate change problematic.

4.2 Interest in the climate field

The condition of a field is interest, as interest and investment is what produces struggle and generates the forces that structure a field. The emergence of interest in climate change has a long history, although until the 1980s this was largely as an object of scientific enquiry, to be discovered and represented through scientific practice.⁵ As described in chapter two, during the 1980s a group of actors, workshop and assessment activities brought climate change to the attention of a wider audience. The political interest these actors and activities garnered were critical to the formation of the IPCC and also for transforming climate change into an object of wider social concern. Once international political interest had been mobilised however, the international practice of climate change took on a momentum that was not within the IPCC's power to control. Thus, despite the fact that key actors within the IPCC and its parent bodies envisioned the IPCC as the site for negotiating a framework convention on climate change, the political force the organisation generated and the interests it was perceived to represent made this

⁴ As Miller (2001a, 251) indicates, it is only over time and through complex negotiation that a way has been found to create "globally credible science advice". On the IPCC specifically, see Miller 2004.

⁵ See chapter 2.1 for a more in depth account.

unacceptable to many within the international community.⁶ At the 41st UN General Assembly Resolution 45/212 was adopted, which established the International Negotiating Committee (INC) as the single intergovernmental negotiating process under the auspices of the General Assembly (UNGA res 45/212 1990, 148). Although this newly formed body was to take “into account” the work of the IPCC, and UNEP and WMO were invited to make “appropriate contributions” to the process, a separate ad hoc secretariat was established (Bodansky 1993, 474).

The formation of the International Negotiating Committee (INC) (UNGA res 45/212 1990) transferred the IPCC’s mandate for formulating policy response options to this newly formed body. And the 1992 adoption of the UN Framework Convention on Climate Change (UNFCCC) established the UNFCCC as the principal site for negotiating international political interest in climate change. Whilst the UNFCCC is central to the development and practice of climate change as an object of international political life, like the IPCC, the FCCC does not determine the limits of the climate field nor is it able to retain control over the outcomes of its negotiating processes. The political and economic ways of practicing climate change generated through the UNFCCC—reduction targets, market mechanisms, rules for measuring and verifying, mitigation and adaptation funds and the new institutional arrangements that oversee and implement these—do not stay in the hands of those that authorise their creation. In fact, as methods for embedding climate change in the practice of everyday life, these objects come to exert their own force both on the UNFCCC process and on the wider climate field.⁷ Although the IPCC did not become the site of international climate change negotiations, it remained a crucial force within the climate field, arbitrating over the legitimate forms of knowledge by which

⁶ In December 1989, the UN General Assembly adopted a resolution supporting the UNEP decision to begin preparations for the negotiations (Bodansky 1993, 473). However, when an open-ended ad-hoc working group of government representatives was convened by UNEP and WMO in September of the following year, participants could not agree on who should organise and conduct negotiations: “a negotiating committee under the auspices of WMO and UNEP, in essence carrying forward the IPCC process, or a special conference under the authority of the UN General Assembly” (ibid, 474). Whilst Western countries generally supported the former option, many developing countries, “who felt excluded from the IPCC, preferred the second option” (ibid). See also Miller 2001a, 255; 2004 59-61.

⁷ See for instance, Paterson (2009) on the ‘quasi-autonomous dynamic’ of the ‘carbon market’ and Bernstein et al. (2010) on how these markets have taken on a life of their own beyond the reach of states to control them.

climate change is to be known. Those managing the organisation have had to work hard to maintain this status and solidify their relation and importance to the UNFCCC process.

During the negotiation of the Framework Convention the IPCC chairman and other central actors within the organisation and its hosting bodies sought to concretise their institutional significance to the UNFCCC. This objective was again hampered by a number of developing countries,⁸ which felt excluded from the IPCC, did not agree with its representations of the climate change problematic, and did not want it formally recognised within the Convention text (Biermann 2002, 205-6; Miller 2001a, 255; Yamin & Depledge 2004, 465). Consequently, the IPCC's attempt to be signified as the official provider of scientific and technical advice to the UNFCCC in the convention text was unsuccessful. Instead, a provision was made within the treaty for the establishment of a Subsidiary Body for Scientific and Technical Advice (SBSTA) to manage the Convention's knowledge requirements with only oblique reference to relations with "existing competent international bodies" made in the text (UNFCCC 1992, article 9).⁹ The SBSTA was not formally constituted however, until the first meeting of the Conference of the Parties (COP 1) in 1995. In the meantime the IPCC was requested to respond to the Conventions needs for "objective scientific and technical advice" (UNFCCC 1992, article 21). This gave the IPCC leadership time to strengthen the organisation's position as leading knowledge provider within the climate field and to assert its relationship to the UNFCCC.¹⁰ Its success is apparent. The SBSTA and COP regularly request the IPCC to provide assessments and input specific information into the negotiating process (IPCC 2007b, 4), and both COP decisions and the Kyoto Protocol refer to the IPCC and its work (Yamin & Depledge 2004, 465), indicating the privileged

⁸ See footnote 6 above.

⁹ For a detailed analysis of SBSTA and its relation vis-à-vis the UNFCCC and the IPCC, see Miller 2001a; 2001b.

¹⁰ The decisions taken at the first Conference of the Parties in 1995 strengthened the IPCCs formal tie to the UNFCCC, "citing it as a source of 'the latest international scientific, technical, socio-economic and other information', as well as input on methodological issues" (Yamin & Depledge 2004, 465). The relationship between the IPCC and the SBSTA was also formalised, with the SBSTA charged with summarising and converting the IPCC's assessments into a format "appropriate to the needs of the Conference of the Parties" and seeking input and advice from the IPCC on methodologies e.g. for compiling national GHG inventories etc. (IPCC 2007b, 3).

relationship the IPCC has to the UNFCCC. A relationship requiring constant attention and management by lead IPCC actors.

The IPCC's position in the climate field rests upon its symbolic power to arbitrate over the legitimate means for knowing climate change, a source of power that is coupled to its relation with the UNFCCC. The IPCC competes for this position with a growing number of climate change knowledge and assessment products compiled by national governments, NGOs and other international organisations, and maintaining its relationship to the negotiating process is crucial for preserving the pre-eminence of its assessment products. This pre-eminence means that the IPCC and its assessment process has the capacity to authorise climate expertise and legitimate actors' stake in the international political struggle over climate change. Governments are well aware of the force that the IPCC's knowledge production has in and over the UNFCCC negotiating process and for this reason take a keen interest in the IPCC's procedures for producing assessments and the conclusions that this assessment process produces for the purpose of strengthening their own negotiating stance. This political interest in the IPCC exerts a force over the IPCC's practice of writing, which is apparent from the map provided of the assessment assembly pathway over the coming chapters. It is not only governments however, that seek to input into and yield influence over the assessment process.

Governments' interest in climate change diverts attention and resources from other international political concerns, including global health issues (Fidler 2010), biodiversity (Jinnah 2011a), desertification (Conliffe 2011) and other environmental problems (Axelrod 2011). If these issue areas are to retain the international community's interest they must either recapture attention from climate change or align themselves with and to the interests of the climate field.¹¹ In the case of global health, the IPCC assessment process has provided an important means for identifying the impact of climate change to human health (Confalonieri et al. 2007; Hashimoto et al. 1990; McMichael et al. 1996; McMichael et al. 2001), and for highlighting the synergies between tackling climate

¹¹ The strategic alignment of issue areas with the climate regime has been conceptualised as climate bandwagoning, see special issue of *Global Environmental Politics* (Jinnah 2011b).

change alongside other development issues (Fields et al. 2012). The primary concern and objective of actors within the global health field is likely to be recapturing political commitment and resources to long-standing global health issues. However, by becoming interested and invested in climate change and supporting research on the health impacts of climate change, the field of health can tie its interests with the interests of the climate field and promote themselves and the utility of their work through the position they take (Bowen et al. 2012). This also brings important benefits to the IPCC and supporters of the UNFCCC process, as health issues mobilise public and government support for addressing climate change, which in turn deepens support for further research and assessment activities (Haines 2008; Haines et al. 2007; Haines et al. 2009). This demonstrates how interest and investment in climate change shapes both the climate field and other fields in diverse ways: diverting energy and attention from more traditional field concerns whilst at the same time providing new forms of capital and revenue for research that empowers new sets of actors with different forms of expertise.

The IPCC's capacity to legitimate knowledge makes it the prime target for those contesting the science of climate change and the political significance of the issue. In many regards this is a battle to conserve current ways of thinking about and practicing prosperity, fought over knowledge that threatens the social position of the privileged. In an attempt to undermine the authority of the IPCC's scientific findings and contest the reality and urgency of climate change, those threatened challenge the credentials of IPCC authors and the scientific conventions of its assessment procedures. By publicly exposing inconsistencies in the process and content of a new report these attacks have successfully challenged every IPCC assessment report ever published, forcing the IPCC to defend its work and moderate its operating procedures to regain authority for the next assessment.¹² This is vital, if governments and other users of the reports come to question the IPCC as a legitimate source of knowledge, or if they suspect that the IPCC is no longer widely recognised as a legitimate source of knowledge, they may want to reduce their proximity

¹² An account of these events and the changes they have initiated in the IPCC's practice of writing assessment reports is provided over the coming chapters.

to the organisation to avoid becoming embroiled in the controversy and preserve their own reputation.

The IPCC came under sustained attack prior to and after COP 15 in Copenhagen in 2009 as a result of the so-called ‘climategate’ affair and mistakes discovered in the Fourth Assessment Report (AR4).¹³ The IPCC chair was targeted in these attacks and strongly criticised for his response to errors concerning the melting of the Himalayan glaciers.¹⁴ As the face of the organisation, calling into question the ability and integrity of the IPCC chairman poses a serious threat to the organisation’s scientific authority, undermining its symbolic power and position in the climate field. Traditionally, the IPCC Chairman addresses the UNFCCC COP during its high-level segment. However, the IPCC was not invited to present to the main plenary at COP 17 in Durban in 2011 (Gutierrez, van Alstine and Yamineva 2011, 8). This provoked consternation amongst IPCC panel members during the 34th plenary session and after informal communication between the IPCC Chair and the UNFCCC Executive Secretary the agenda was amended (ibid). Although these events may be unrelated, the criticism directed at the IPCC chair and its reports damages the IPCC’s authority and its position in the climate field. It is therefore only wise for the UNFCCC to reconsider the merits of its relationship with a damaged knowledge provider lest it too wants to damage its symbolic power and undermine its status as the central site for negotiating the international response to climate change.

This section uses the notions of interest and field to identify the origins and extent of political interest in climate change, to locate the IPCC within this struggle, and to identify the basis of the organisation’s symbolic power. The establishment of the IPCC and the UNFCCC illustrates that interest in climate change cannot be contained within or controlled by a single organisation or set of actors, which is revealing of the climate change phenomenon and the human attempt to comprehend it. By implicating the current economic order, climate change threatens current ways of doing life, the ways of

¹³ ‘Climategate’ refers to emails between IPCC scientists that were made public from the Climate Research Unit at the University of East Anglia, see Fred Pearce (2010) special investigation for the Guardian for an account of events. On mistakes surrounding the melting of Himalayan glaciers, see Carrington 2010.

¹⁴ For information on this attack on the IPCC chair, see chapter 5.3.

knowing and representing that buttress these, and those privileged within this order. At the same time, climate change offers an unprecedented opportunity for re-making the international political order, and the improvement this could bring to the social conditions of some at great social cost to others, makes the stakes in this struggle indeterminately high. The forces emanating from this struggle, and the activities and organisations established in an attempt to codify it, continue to ripple into ever more spheres of social life. The IPCC is centrally situated in this expanding social field, and the growing interest and stakes in climate change exert a force on what the IPCC is, the activities that identify it as such and the meaning these activities produce. In order to identify these forces and the effect they have on the IPCC's practice of writing the following section turns from the IPCC's location in the climate field to the IPCC as its own field of practice.

4.3 As a practice of writing

The climate field is made up of distinct fields of professional activity. Originally limited to scientific practice, today interest in climate change is generated by and constitutes a range of scientific, political, economic and bureaucratic activities. Actors draw their expertise and authority to know and respond to climate change from diverse disciplinary and professional realms. Each of these realms—included but not limited to, the physical, natural and social sciences, national bureaucracies, UN agencies, environment and development NGOs—has distinct interests in climate change, ways of practicing their profession and methods for generating climate change as an object of professional life. Collectively, over time, however, these distinct ways of doing and knowing professional existence are developing internationally recognised ways of practicing the climate change problematic. Like the climate field in which it is situated, the IPCC is also made up of distinct fields of practice, from the scientists that produce knowledge of climate change to the member governments that accept and approve IPCC products. Each of these fields has its own interests, methods and conventions for producing legitimate ways of knowing, and means for assigning and recognising authority. Over the past twenty years however,

actors' investment in realising an intergovernmental assessment of climate change has produced a unique organisation, assessment process and forms of authority that enable the IPCC to be identified as a field of practice.

The IPCC's practice of writing is mapped over the coming four chapters. The aim is to identify the actors and fields of practice invested in the IPCC and to determine the forms of authority and distribution of power structuring how climate change is written and by whom within the organisation. The practice of writing is the product of forces external to the organisation, which result from its position in the climate field, and forces internal to the IPCC, generated in and through the process of producing an internationally recognised and government approvable assessment of climate change. The coming chapters focus on identifying the actors, activities and forms of authority internal to the IPCC and reconstructing the assembly pathway that IPCC assessment reports travel. Mapping the IPCC as a practice of writing enables a detailed study of how – through what activities and on the basis of what authority – the reality of climate change is written and the order of relations this meaning upholds or has the potential to re-make. As the previous chapter indicates, the IPCC embodies the international order of which it is the product, an order that would be reproduced in and through the IPCC's practice for producing knowledge of climate change if the IPCC's practice of writing remained static and uncontested. It is the IPCC's symbolic power to write reality however, which makes its practice of writing—by whom climate change is to be written, on the basis of what authority and according to what scholarly, administrative, bureaucratic and diplomatic conventions—a central object of struggle within (and outside) of the organisation.

Producing internationally recognised assessments of climate change that can be accepted and approved by member governments is a delicate balance and the product of struggle between scientific conventions, political interests, administrative realities and the social and economic structures these embody. Objectively, in and through the structures of the world, the struggle for authority and power in and over the IPCC's practice of writing is fought over rules and procedures for producing IPCC assessment reports, geographical and disciplinary representation in the authorship and leadership of the assessments, and

the distribution of labour and access to the production pathway. Symbolically these battles are governed by the perceptions, opinions and attitudes of IPCC participants, as internalised in habitus. Less often cited, these cultural dispositions are a conservative force, as they have a capacity—despite organisational attempts to ensure balance—to recognise, acknowledge and reproduce the order of which they are the product.

The production of IPCC assessments reports began as a relatively informal process, one that relied on the conventions and experiences of the actors leading the process. However, as the political stakes in the climate change problematic increased and as the IPCC leadership sought to be at the centre of the international political response, pressure on the rules and procedures for constructing its assessment increased. Political involvement combined with relentless criticism about the inclusiveness and scientific authority of IPCC assessment products persistently brings the IPCC's rules and procedures into focus, and the codification of the IPCC's practice of writing is the product of struggle between scientific, political, bureaucratic and administrative authority in and over how an IPCC assessment is to be written, by whom, on the basis of what qualifications, and according to what geographical balance. Geographical representation of the IPCC's panel, bureau and authorship has been a force within the IPCC's practice of writing from the outset, as demonstrated by developing countries reluctance to accept the authority of the IPCC and its assessment of the climate change problematic. Objectively, the IPCC's struggle to legitimate and universalise its assessment products has played out through the creation of funds for developing country participation (chapter 6), co-chairmanship and author numbers (chapter 7). Symbolically, this is a harder battle to win, as in practice scientific and other cultural criteria identify and distinguish leadership through the assessment process and these forms of authority are tied to the material necessities required for building a distinguished career (chapter 7).

Access to the IPCC's practice of writing is power. This is as true for those within the IPCC as it is for those attempting to gain access to the climate field and legitimate their stake in the international politics of climate change. The objective of the IPCC's practice of writing is an intergovernmental assessment of climate change – knowledge that

ultimately has the symbolic power to challenge and legitimise particular ways of perceiving and acting on the world in the name of climate change. Access to the assessment's assembly pathway and the activities through which the reports are compiled—outlining, commenting, assessing, reviewing, editing, selecting the report's core messages, and accepting and approving the final product—offers the opportunity to shape how climate change is known. All those invested in the IPCC's practice of writing struggle for and over the forms of authority that enable increased access to and influence over how climate change is to be assessed. Interests in and objectives for access depend on actors' role and position within the organisation, and are largely the product of the scientific, governmental and bureaucratic fields that qualify actors to participate in the assessment process.

The organisation of the IPCC and its assessment process is a product of these struggles. Today the IPCC can be identified as five distinct units according to their role, interests and authority in and over the assessment process. These five distinct units have emerged over the course of the IPCC's lifetime and in response to the forces exerted on the organisation and its practice of producing assessments of climate change. The following chapter identifies these units as: the panel, the bureau, the working group technical support units, the secretariat staff and the authors. The chapter sketches the relations between these units, the activities they perform and the access and authority they have in and over the IPCC's practice of writing. Once the organisation of the IPCC has been mapped it is possible to follow the production of an IPCC assessment report along its assembly pathway, which as stated in the introduction, is divided into the formation of the report outline (chapter 6), the scientific assessment (chapter 7) and the acceptance and approval of the final product (chapter 8). This is a living organisation and a dynamic process that is constantly updating and adjusting to the demands and forces of its situation, not least the force that a changing climate exerts, and the practice of writing aims to capture the nature of this process rather than produce a fixed representation of its outcomes.

In order to identify who writes the reality of climate change and on the basis of what forms of authority, the IPCC's practice of producing assessments is unravelled over the coming pages. This is a highly complex and intricate process that has developed over twenty years and four rounds of assessments, realised through the time and investment of thousands of individuals. If such a process is to be analysed in order to reveal how power operates in and through the writing of the world then it needs to be laid bare, that is reconstructed – to the extent possible – as it is achieved in practice. This is what is attempted over the coming pages. The IPCC has been the site of previous studies, as reviewed in the following chapter, and these have revealed many facets that this study also aims to illuminate, including the relationship between science and politics in the problematisation of environmental issues and the disparity between developed and developing countries in the authorship of reality. However, this project breaks with previous ways of conceptualising the IPCC as an epistemic community, a science for policy institution or as an institutional entity of the climate regime. It re-orders how the IPCC is analysed through the thinking tools of Pierre Bourdieu and reconstructs the IPCC's assessment process as a practice of writing with the aim of shedding light on how the world is written in practice.

4.4 Method: materials, evidence and limits

This section provides an outline of the data collection process, indicating the forms of data that have been used to reconstruct the IPCC as a practice of writing. It was towards the end of the research process that the significance of the practical nature of knowledge came to the fore. This section recounts each stage of the research and how it shaped the project's interpretation of the IPCC and its products as an assessment practice.

The empirical study of the IPCC progressed in three stages. Firstly, I focused on the assessment reports, recording the nationality, expertise and career trajectory of the authors, and how this changed over subsequent assessments. Studying the executive

summaries of the chapters, the technical summaries and summaries for policymakers of the IPCC assessment reports was also used as a means for identifying disciplinary representations of climate change and the extent to which these had changed over the four assessment rounds. This research revealed the same trends that previous studies highlight, namely:¹⁵

- 1) The IPCC is dominated by North American, European and Australian authors and expert reviewers.
- 2) The literature reviewed is largely published in and predominantly about these regions of the world.
- 3) The natural sciences are better represented than any other knowledge system.
- 4) General circulation models are the preferred means of conceptualising the progression of future climatic change.
- 5) Economics dominates representations of the social dimensions of climate change.
- 6) There is an identifiable community of experts that have been involved in multiple assessments and in many instances these are associated or can be linked to a limited number of research institutions, particularly in the UK and the US.

Whilst this stage in the research provided a useful introduction to the organisation; professional biographies, tables of names and nationalities do not capture the complexity of the knowledges interwoven in IPCC assessment reports. Furthermore, identifying the geographical disparities in the authorship of the reports does not indicate the effect this has on the IPCC's assessment process in practice.

The initial research stage proved important however, for identifying key actors within the organisation to interview. I was particularly interested in speaking to long-standing IPCC participants and those that had contributed to multiple assessments in order to document how the assessment process had developed over time. In total thirty-nine interviews were conducted with IPCC authors, bureau members, government delegates, technical support unit (TSU) staff and a member of the secretariat (see appendix 1), as well as more informal conversations and email exchanges. The majority of these were face-to-face

¹⁵ See following chapter for full review.

interviews that took place in the UK and North America and over one quarter of respondents were interviewed in their place of work, which included a visit to the working group II TSU at the Carnegie Institute at Stanford University. Building a picture of the daily working environment of IPCC participants was critical for identifying and locating actors within a field of expertise and comparing and contrasting this to their role and place in the assessment process. During the interview stage the opportunity arose to attend the 32nd IPCC plenary session, hosted in Busan, South Korea in October 2010. IPCC plenary meetings are the annual or bi-annual meetings of the panel that are organised by the secretariat and attended by IPCC member governments, the bureau, TSU staff and organisations with observer status. This four-day long intergovernmental meeting was the most significant stage of the research process for two reasons. Firstly, I observed the distinct way each unit has for conducting its business and how these are adjusted when the organisation works together in performing a joint task, as it does during plenary proceedings. Secondly, it gave me an insight into the construction of IPCC documentation and the practical purpose this construction process and its end products serve.

All reports of IPCC plenary and bureau sessions, plus the documentation required for these sessions are available online. I tried to make use of these resources from the outset, however, I often found the documents difficult to decipher. The sense I was missing something was compounded during one of the interviews, when after the usual series of questions the interviewee impatiently referred me to the IPCC's rules and procedures. I had read over these a number of times and did not seem to be able to relate to them as participants within the organisation. It was only on observing the construction of these documents during the plenary session that I realised they were reference to practice.¹⁶ They were reference to practice both in the sense that they describe and prescribe how IPCC assessments are to be constructed, and because the documents themselves embody the IPCC and plenary specific practices that put them together, many of which are

¹⁶ Yamin & Depledge (2004, 2) make a similar observation in relation to the FCCC, stating that "documents alone give little insight into the functioning of the regime because it is difficult to glean the institutional practices, procedures and informal understandings that help define how the international climate process actually works."

customary practices not codified in the IPCCs rules and procedures.¹⁷ To be understood as such, IPCC documents have to be observed in the making, which makes apparent that the process through which these documents are constructed is as important as its contents. Within the context of the plenary sessions these documents become rich texts, packed full of signposts and references to the social forces and dynamics that govern the interactions between actors during the meetings. It was at this point that I began to see the significance of the assessment report's construction pathway, and it became clear that how an IPCC assessment report is assembled—its journey through the IPCC, who this provides access to and authorises to perform particular operations—is central to understanding the meaning produced through the process.

It was only through the research process that Bourdieu's stress on practice and the practical nature of knowledge became apparent, as did the purpose of the IPCC's practice of writing in maintaining the organisation's authority in and to the climate field. Over the coming four chapters the IPCC's practice of writing is reconstructed. This identifies the actors that make up the IPCC, the journey assessment reports travel through the organisation, the activities performed in realising the finished products, and the forms of authority in and over how climate change is written through the process. This depiction of the IPCC and its assessment process relies upon IPCC documentation, the InterAcademy investigation into the organisation (IAC 2010a; IAC 2010b), Earth Negotiation Bulletins of the IPCC plenary sessions, secondary literature and where gaps remained, further correspondence with interview respondents. I do not however, directly quote interview respondents in the text. I used the interview process to get to know the IPCC and its assessment activities; it was never meant as an exercise to gather information on any particular person or action, but rather as a means to reconstruct a collective process—a shared social practice—which could not be built from the perceptions or point of view of any single actor. For this reason, all attempts were made to support interview data with that of other sources, and here IPCC documentation,

¹⁷ As noted by Yamin & Depledge (2004, 470), 'In some cases, the IPCC has developed informal customary practices that, while well established, are not recorded in the text.' This explains why for many interviewees the questions I asked seemed self-evident, but to someone not familiar with IPCC customs the documents and procedures prescribed were often impenetrable.

previous historical accounts of the IPCC and the IAC (2010b) questionnaire data proved particularly useful.

4.4.2 Limits and limitations

The research process and my situation in the field have imposed limits on the extent to which the power relations structuring the IPCC and its practice of writing can be exposed. The most glaring bias of the research is apparent from the list of interview respondents (see appendix 1). These interviews combined with observations made at the plenary session gave good insight into all units of the IPCC. However, out of 68 IPCC participants contacted for interview, 39 interviews took place, and of these 77% were male, 90% were respondents living in the UK, Europe and North America and over 90% were from developed countries. Consequently, it has only been possible to reconstruct the IPCC from the view of the dominant. Underestimated in this account, is the myriad ways in which the power of the dominant habitus—with its capacity to recognise and impose appropriate ways of thinking and acting an IPCC assessment of climate change—is perceived and challenged. The lack of data from developing country and economy in transition participants makes it difficult to identify the interests of authors, bureau members and national delegates from these countries. Disinterestedness and lack of investment in the IPCC's practice of writing is most often cited in relation to developing country participants, and in accounting for this I have relied upon Bourdieu's sociological insights combined with the perceptions of those interviewed and secondary literature (chapter 7). It is likely that if interview respondents had been more equally distributed across the organisations' membership, the perspective on this practice would have been different.

4.5 Summing Up

This chapter has initiated the process of unravelling the IPCC and its situation in the climate field. In order to situate the IPCC in the environment conditioning its formation the chapter began by problematising the dominant conception of the international politics of climate change as a climate regime. When the international politics of climate change is thought through the concept of regime the IPCC is conceptualised and studied as a knowledge provider, facilitating the formation of and continued progression towards an international climate change agreement. This assumes the purpose of the IPCC, its relation to the UNFCCC and position within the struggle over climate change prior to study. However, Bourdieu's approach to research practice makes apparent that the interests of actors, the struggles these engender and the limits of their effects can only be ascertained through the research process itself. For this reason section 4.2 explores the IPCC's role in generating social and political interest in climate change and the force this has exerted on the development of the organisation. This reveals that whilst those leading the organisation intended the IPCC as the site for negotiating a framework convention, developing country objections saw the establishment of a new body, the International Negotiating Committee (INC), for the purpose of realising a treaty text. Developing country perceptions of the IPCC and its assessment process have been an important force in the organisation ever since, and one that, as documented over the coming pages, continues to structure nearly all aspects of its assessment practice.

The institutional significance of the IPCC to the UNFCCC and the SBSTA is today apparent, with both bodies calling upon the IPCC for input into the negotiating process and with regular reference made to its assessment materials in negotiated text. It is this relationship to the UNFCCC that guarantees the IPCC's privileged position within and to the climate field and its symbolic power to arbitrate over the legitimate means for knowing climate change. This power to authorise knowledge and expertise within the climate field makes the IPCC an object of interest both to those seeking to legitimate their stake in the climate field and to those seeking to undermine its knowledge of the climate change problematic. It is within this environment that the IPCC's assessment process as a practice of writing has developed. It is through its practice of writing that the IPCC seeks to: 1) realise its mandated task and produce internationally recognised and

government approved knowledge of climate change, and 2) to maintain its symbolic power to do so. The IPCC's practice of writing is a product of these external forces and also the relations within and between those that make up the organisation and its assessment process.

Like the field in which it is situated, the IPCC brings together and is constituted by different fields of practice, from the fields of climate expertise that produce knowledge and author IPCC assessment reports to the member governments that accept and approve the final product. In and through the production of the assessment reports, the IPCC has had to develop the means to bring these disparate fields together and develop a shared practice for the purpose of generating intergovernmental assessments of climate change. It is actors' shared investment in the assessment process and the activities and forms of authority that this investment has generated that enables the IPCC to be identified as a field of practice. The coming chapters document the emergence of the IPCC's practice of writing and the organisation that has developed through the process. Chapter five begins by exploring the actors that make up the organisation, identifying the IPCC as five units of work: the bureau, the panel, the technical support units (TSUs), the secretariat and the authors. The chapter identifies the activities that each unit undertakes in the production of the assessment, the authority they have over its conduct and how relations within and between these units structure how and by whom climate change is written. Chapters six to eight maps the pathway followed by IPCC assessment reports, beginning with the production of the outline (chapter 6), the scientific assessment (chapter 7) and government approval of the final product (chapter 8). The aim of the detailed account provided by these chapters is to identify the forms of authority and the social, economic and political forces structuring the IPCC's construction of reality.

Chapter two outlined the theoretical approaches taken by previous studies to explore the social construction of international environmental problems. Each of these approaches focuses on particular aspects of the relationship between knowledge and power as reflected in the empirical accounts they provide. The epistemic community model identifies the role expert communities play in conceptualising environmental problems

for collective response. These accounts identify expert actors and delineate the impact of the community's knowledge on international environmental action. The discursive approaches of Litfin and Hajer identify the productive nature of knowledge and the power of discourse to structure how international environmental problems are known and acted upon. Litfin's discourse analytical approach re-orders the relationship between actors and knowledge by highlighting that scientific knowledge is not only a source of power for its producers. This leads her to look beyond the scientists to their interactions with other actors as she details the formation of the dominant discourse and its structuring force on collective action. Hajer situates these competing discourses in their institutional settings as he explores the power relations contained within and struggled over in competing frames of the acid rain problem. Introducing the work of Bernstein shifts analytical attention from the structuring force of discourse to the power of ideas. However, his interest in the relationship between environmental ideas and social structure again focuses attention on the interface between actors, thought and action, generating an account that traces the evolution and interrelationship between environmental thought and political action.

Although this project is also interested in exploring the relationship between knowledge and political action, its grounding in Bourdieu's philosophy of action shifts attention to the activities through which actors, thought and institutions are tied together. In reconstructing the IPCC and its assessment activities as a field of practice, the thesis looks to illuminate the actors and forms of authority that order the organisation and to explore the extent to which—in and through the IPCC's practice of writing—these power relations are reproduced in the organisation's construction of climate change. As the empirical research reveals, all IPCC documentation embodies the relations and specific practices that put them together. Thus, it is through the detail provided of the actors, activities and power relations structuring the IPCC and its assessment process, rather than through an analysis of the documents themselves, that the thesis contributes to theorising the relationship between power and knowledge and addresses how, by whom and on the basis of what authority climate change is made.

5. Making up the IPCC

This chapter initiates the journey into the IPCC and its assessment process in order to study how, by whom and on the basis of what authority climate change is written. As the previous chapter highlighted, the IPCC, like the climate field in which it is situated, is made up of and constituted by actors drawn from distinct fields of practice, including fields of scientific, political, bureaucratic and administrative activity. Actors from these fields have distinct means of practicing their contribution to the assessment process and forms of authority in and over its conduct. Many of these activities and forms of authority have been overlooked in previous studies of the organisation, as both within the IPCC and the scholarly literature the focus is on the contribution of the “thousands of scientists from all over the world” that undertake the assessment of the latest “scientific, technical and socio-economic information produced worldwide relevant to the understanding of climate change” (IPCC 2012d). As a result, analyses have concentrated on the scientific practices of the organisation and how these interact and are impacted by the political involvement of member governments. Whilst the interaction between the scientific habitus and political interests in the climate change problematic have been important historical forces in ordering relations between those that make up the IPCC and the conduct of the assessment, these are not the only activities and sources of authority structuring how climate change is written in and through the IPCC’s assessment practice. As well as its authors and panel, the IPCC is a secretariat, a bureau and technical support units. Each of these units has distinct styles of conducting their work and authority in and over the assessment process, which must be incorporated into the analysis if their impact on the organisation’s practice of writing is to be measured.

The chapter identifies the IPCC as five distinct units: the panel, the bureau, the working group technical support units (TSUs), the secretariat and the authors. The IPCC could not

have been identified as such when it was established in 1988, and the chapter provides an account of how these units have developed in and through each repetition of the IPCC assessment cycle. For the majority of the actors that make up these units the IPCC is not a fulltime occupation: it is an author's contribution to climate change knowledge from within the field of science and a delegate's position within the meteorological office or ministry of the environment that authorises these actors to participate in the assessment process. However, over time and through participation in the IPCC process, distinct scientific, political, administrative and bureaucratic ways of practicing knowledge production have developed a shared way of realising an intergovernmental assessment of climate change. In achieving this, activities and authorities have been divided, distributed and struggled over within and between the units that make up the organisation as each vies to increase its access to and authority over the IPCC's practice of writing. It is the outcomes of these and on going struggles that define the organisation and its assessment practice today. This chapter seeks to introduce the actors, to identify the struggles structuring the IPCC's writing of climate change and indicate the properties distinguishing those with the authority to govern how and by whom climate change is written.

This unpacking of the relations constituting the IPCC's practice of writing begins with previous studies into the organisation and its assessment activities. As an object of research the IPCC has been of particular interest within IR and Science and Technology Studies (STS). The majority of these studies have used the IPCC as a site for exploring the relationship between science and politics in the construction of international environmental issues, the function and effectiveness of science advice and advisory arrangements in international cooperative action and the disparities between North and South in science for policy advice. Whilst these studies provide in depth historical accounts of the organisation's development and its assessment procedures, in focusing on particular dimensions and relations of the IPCC and its work they have overlooked those aspects that cannot be identified as political or scientific (conventionally understood). As a result the crucial role played by technical support units in realising IPCC assessments of climate change has been left unanalysed, and yet it is the everyday mundane

administrative tasks of these units, and the social interactions and power relations between these and other actors that bind the organisation and its practice of writing together. The aim of the first section of the chapter is to draw out and build from the insights of previous studies, whilst indicating why it is necessary to look beyond the science for policy dimensions of the organisation.

5.1 Constructions of science and politics in the IPCC

Established in 1988 under the co-sponsorship of WMO and UNEP, the IPCC was mandated to assess the science of climate change, its social and economic impacts and policy response strategies (UNGA res 43/53). This task was divided between three Working Groups (WG), each charged with assessing particular aspects of the climate change problematic: WG I, the physical scientific basis of climate change; WG II, impacts; and WG III, response options. Whilst the IPCC's mandate was adjusted after the First Assessment Report (FAR), published in 1990—when the responsibility for formulating policy response options was transferred to the newly formed International Negotiating Committee (INC)—the structure of three working groups and the IPCC's focus on producing comprehensive assessments of climate change knowledge have remained constant over twenty years and four rounds of assessment reports, with a fifth (AR5) scheduled for completion in 2014.¹ These intergovernmental reports and the accompanying summary for policymakers provide governments with a shared knowledge base from which to negotiate a political response. It is the IPCC's relation to the UNFCCC and its influence over political action, which has made the organisation an important site for studying the role and transformative power of science in politics.

As reviewed in chapter two, the early origins and historical development of the IPCC are conceived as the successful outcome of an epistemic community of climate scientists, performing their function as such by bringing the causes and consequences of climate change to the attention of policymakers and framing the issue for collective debate

¹ The remits of WG II and WG III have been adjusted over time, see section 5.6.

(Boehmer-Christiansen 1994a, 1994b; Haas 2000; Lunde 1991; Newell 2000; Paterson 1996). The establishment of the IPCC in 1988 is viewed as the product of this successful politicisation process (Paterson 1996). Despite the success of the IPCC's intergovernmental process in raising the political profile of climate change and initiating an international negotiating process, scholars have been critical of the political involvement of member governments in the IPCC, questioning the organisation's capacity to function as an information or scientific advisory institution to the climate change regime (Biermann 1999, 2002; Haas 2000, 2004; Haas and McCabe 2001). It is the intergovernmental nature of the IPCC and the proximity between science and politics this induces, which makes the IPCC and its assessment products an ideal site for exploring the impact of political involvement on scientific knowledge production.

Important contributions to this body of research originate from the Global Environmental Assessment project (Mitchell et al. 2006; Parson et al. 1997).² This multidisciplinary group of scholars expanded knowledge of assessment activities, conceptualised as “the entire social process” through which expert knowledge of a particular issue “is organised, evaluated, integrated and presented in documents to inform policy or decision-making” (Parson et al. 1997, 53). Like the practice of writing, the GEA's conception of assessments incorporates both the “products and reports, and the process that generates them” (ibid). Through this definition of assessments the project aims to improve understanding of how organised scientific efforts shape social response to global environmental change. The project's empirical studies illuminate the role that organisations like the IPCC perform in meditating between the separate worlds of science and politics in producing credible knowledge, indicating that success is reliant upon participants' ability to maintain the distinction between the worlds of science and policy in and through the assessment process (Guston 1999; 2001). Particularly illuminating is Clark Miller's study of the Subsidiary Body for Scientific and Technological Advice

² The Global Environmental Assessment project was a multidisciplinary project launched in 1995 to address questions concerning the ways in which organised efforts in scientific information provision shape “social responses to large-scale global environmental change.” For more information on the project see: <http://www.hks.harvard.edu/gea/index.html> (last accessed 13.10.2011.) Many of the scholars referenced in the following section participated.

(SBSTA),³ which indicates that the climate regime’s institutional arrangements are “amalgamations of social practice drawn from the worlds of both science and politics”, rather than two distinct domains as they may appear on the surface or as claimed by those within them (Miller 2001a, 483). Miller employs the notion of *hybrid* to refer to institutions that house these amalgamations of practice, suggesting that to maintain a productive relationship, boundary organisations like the SBSTA and the IPCC need to be able to manage hybrids “—that is, to put scientific and political elements together, take them apart, establish and maintain boundaries between different forms of life, and coordinate activities taking place in multiple domains.” (ibid, 487).

The terms “boundary organisation” and “boundary work” have proven popular with scholars studying the IPCC and measuring the effectiveness of its assessment activities (Fogel 2005; Lövbrand 2007; Miller 2001a; 2004; Petersen 2006, chapter 7; Siebenhuner 2003; Shackley & Wynne 1996; Skodvin 2000a; Shaw 2000, 2005; Yamineva 2010).⁴ However, by separating out and privileging scientific and political dimensions of the IPCC and its work, these studies overlook the actors and activities that are not classified as political or scientific and yet impact how climate change is written in and through the IPCC’s assessment practice. The fact that the working group technical support units (TSU) have not been subject to analysis in previous studies is testimony to this oversight. Although these units appear technical and administrative in nature, as detailed in section 5.3, scientific authority is an important criterion in appointing the head of this unit. As the only authoritative scientific figure working full time on the assessment, the TSU head has unrivalled access and influence over the conduct and direction of the assessment report. It is not only the scientific capacity housed within the TSU that makes them powerful actors within the IPCC’s practice of writing; the administrative and technical proficiency required to realise a thousand page assessment involving hundreds of authors and reviewers grants greater access to these units than any other unit invested in the process.

³ The SBSTA is a permanent subsidiary body to the UNFCCC, providing scientific and technological advice on matters related to the convention to the Conference of the Parties (COP). For more information, see: <http://unfccc.int/bodies/body/6399.php> (last accessed 19.12.2011)

⁴ The term “boundary organisation” and the notion of “boundary work” have come from the work of David Guston (1999, 2001) and Sheila Jasanoff (1990) respectively, both of whom contributed to the GEA project.

It is the TSU staff that enable an IPCC assessment in practice, and through the everyday task of realising the report, these actors have considerable input and influence over how and by whom it is written.

Key to identifying the different forms of authority and their force in and over the IPCC's practice of writing is Bourdieu's notion of capital (chapter 3.3.3), which makes it possible to distinguish between those contributing according to their particular forms of influence over the assessment. Here scholarly interest in relations between developed and developing countries illuminates the structuring force that economic capital exerts on investment in the IPCC process (Biermann 1999, 2000, 2002; Siebenhuner 2002; Yamineva 2010). From the outset, economic capital has shaped the level of developing country involvement in the IPCC (Kandlikar & Sagar 1997, 1998; Gupta 1997). Its impact on the perceived legitimacy of the process (Schneider 1991), and developing country resistance to the IPCC's representation of the climate change problematic (chapter 4.2), made the organisation quick to respond, and a trust fund was established to assist developing country participation (Agrawala 1998b; Skodvin 2000a, 130-1). Although these funds have increased membership and the number of developing country authors contributing to the assessment process, there remain high economic and cultural barriers impacting national investment and contribution to the IPCC's practice of writing. Studies on research expenditure and its link to output reveal how lack of resources impede developing country climate science, highlighting that the knowledge assessed in IPCC reports is predominantly written by developed country scientists and is about these regions of the world (Gettelman 2003; Kandlikar & Sagar 1997; Karlsson, Srebotnjak and Gonzales 2007; Gupta 1997; Lahsen 2004). The effect is not only a lack of data for some of the most climate vulnerable regions (Gettelman 2003; Siebenhuner 2002, 417-8), as publication record is a significant measure of scientific authority, developing country scientists appear and are often received as less qualified than their developed country counterparts (see chapter 7).

The role of the scientific habitus in identifying and measuring authority within the IPCC highlights another important source of capital over the assessment process. Whilst

cultural capital is commented on less within the literature, it has a marked impact on developing country investment in the IPCC's practice of writing (Lahsen 2004). Historically emerging out of scientific interest in Europe (see chapter 2.1), the international climate research agenda has been led by the investment and research interests of a few countries, most notably the US and the UK (Edwards & Lahsen 1999; Hart & Victor 1993; Hecht & Tirpak 1995; Kellogg 1987; Shackley 1999). Scientific interest in climate change is not matched in developing countries, where other pressing social and environmental issues command attention and limited resources. In India, for instance, scientific efforts have been concentrated on local pollution issues that were considered of greater social and political relevance (Kandlikar and Sagar 1999), with a similar situation in Brazil (Lahsen 2004, 167). Even a decade after the IPCC's establishment, Indian government funding agencies did not give much value to lead authorship in the IPCC reports compared to countries such as the UK, US and Germany, which meant there was little financial or cultural benefit for authors contributing to this time consuming process (Biermann 1999, 8). The lack of financial support and cultural recognition for the time and investment that IPCC participation requires means there is less incentive for some IPCC members to invest in the process than others, and it is only through interest and investment in the IPCC's practice of writing that influence can be sought and authority gained.

As the coming chapters make apparent, the relationship between economic and cultural capital and authority in and over the assessment practice is closely coupled, structuring relations between actors that make up the IPCC and its assessment products. In order to unpack this relationship and reveal how the scientific habitus, economic capital and political interests structure the assessment process in practice, it is necessary to identify the actors that make up the organisation. In this chapter the IPCC is identified as five distinct units: the panel, the bureau, the technical support units, the secretariat and the authors. Each of these units has a distinct role in the IPCC's practice of writing and forms of authority over its conduct. In order to identify the forms of authority structuring relations within and between these units and their power to determine the conduct of the assessment, the chapter provides an account of the historical development of the

organisation and the role that each unit performs in the construction of IPCC assessment reports. The organisation and its assessment practice is in part a product of the struggle between those that make up the IPCC to increase their autonomy and assert their authority over the order of relations and the conduct of the assessment. Whilst scientific and political authority remain the main determinants of this order, it becomes apparent that the IPCC assessment process and the codification of the rules and procedures for achieving it have become their own force within the IPCC's practice of writing.

5.2 The Panel

The Panel is the IPCC's member governments that meet once or twice a year in plenary session. Membership to the panel is open to all member countries of WMO and UNEP and currently 194 countries are members of the IPCC (IPCC 2012c), although only half of these regularly send representatives to plenary and as documented over the coming pages, even fewer actively participate in the assessment process.⁵ Governments are involved in every stage of the IPCC's practice of writing, from the construction and approval of the outline (chapter 6), to the nomination of authors (chapter 7), and the acceptance and approval of the final report and accompanying summary for policymakers (chapter 8). The panel's decision making power over the assessment process, its capacity to formulate rules and procedures for the assembly pathway, its role in the election of bureau members and nomination of authors and the fact that member governments approve the outline and final product give the panel considerable power in and over the IPCC's writing of climate change.

The national delegates that make up the panel are usually drawn from the meteorological office, the environment ministry, or in some cases from newly established departments of

⁵ 165 countries have a designated IPCC focal point (IPCC 2012b), and on average around 100 member governments attend plenary (from list of participants available in final reports of plenary sessions). However, as becomes apparent over the coming chapters a relatively small proportion of countries are actively invested and participate in the IPCC's practice of writing. For a survey of government participation in the TAR and AR4, see IPCC 2009b.

climate change.⁶ These actors are often engaged in IPCC work between plenary meetings as the national focal point to the organisation. As focal points, these actors are regarded as the intermediary between national governments, national expert communities and the panel. As such, it is their responsibility to oversee the national process for identifying and nominating authors and to manage the government review of draft reports (see chapter 7).⁷ It is this dual role of panel delegate and national focal point that enables governments fully invested in the process to access and influence all aspects of the IPCC's assessment practice. However, the IPCC is rarely the only or major focus of these government representatives, as they are likely to oversee national participation and representation in other international scientific bodies and climate change is likely to be one of several environmental issue areas they cover (from interviews with government delegates).⁸ For those governments invested in the organisation the IPCC constitutes intense periods of activity i.e. in preparation for the plenary and during author nomination and review periods, between these periods IPCC business is squeezed between other daily activities and institutions.

Although WMO and UNEP provide staffing provisions and along with the UNFCCC contribute to the trust fund, the IPCC is financially dependent on donations from member governments (IPCC 2010b). All IPCC expenditure is agreed by the panel, which gives governments control over the continuation of the IPCC, its assessment process and the expert meetings and workshops that support these. More directly related to the production of the assessment reports, the panel has the power to (re)formulate the IPCC rules and procedures adopted for compiling the assessment (2008b). This gives governments decision-making power over the assessment practice: the pathway the reports travel through the organisation and what is done and by whom in realising the finished product. The panel also elects the bureau: the management team put in place to ensure that these rules and procedures are followed in practice. Most importantly, the panel accepts and

⁶ For the first IPCC meeting, WMO requested governments to nominate representatives “at as high a level as possible and include persons knowledgeable of science, environment and related policy issues” (quoted in Zillman 2008, 28).

⁷ For details of the focal point role, see IPCC 2010c.

⁸ For example, the IPCC delegate/focal point may also be a member of the national delegation to the UNFCCC and SBSTA, or they may also be responsible for international policy on biodiversity, water and environmental engineering (from delegate lists and interviews with focal points).

approves the final products, which as revealed in chapter 8, means that governments actively participate in wording the report's political implications. This power in and over the IPCC's practice of writing is not equally distributed amongst panel members, and whilst the properties and particularities of delegates and delegations is explored in chapter 8, it is worth outlining historically how influence has been obtained and wielded by particular governments and their representatives in the panel sphere.

Those countries that played a lead role in the founding of the IPCC and in the production of its first assessment lay the cultural foundations on which the practice of writing has been built.⁹ The IPCC's FAR was originally envisioned as an exercise for a small group of core members and although all WMO and UNEP members were invited to the IPCC's first plenary session, only 28 countries sent delegates.¹⁰ The first IPCC chairman, Bert Bolin, led efforts to correct this and in 1989 the panel set up a special committee to assess and increase the participation of developing countries (Bolin 2007, 55; IPCC 1989a). By this time however, the mandates and work plan of the three working groups (WG) had been established and the principles for their operation formulated, principles that would later be codified and adopted as the rules and procedures governing IPCC work and the preparation of its assessments of climate change (IPCC 2008b). Thus, whilst membership to the panel rapidly expanded from 1988 onwards (Agrawala 1998b), and in theory it is possible for any member government to gain or increase influence in and over the IPCC's practice of writing, the necessity that delegates become interested and invested in the organisation means countries must possess the economic resources to support this and act according to the rules and styles of operating laid down before them. As the first IPCC chairman indicated to the panel at the 5th plenary session in 1991, "it was most important

⁹ For example, Zillman (2008, 29) suggests that Australian "emphasis on the importance of objectivity, the involvement of subject matter experts and the use of peer-review procedures during its interventions at the First Session, significantly shaped the character of the IPCC in its early years". And it was on US insistence that peer-review was incorporated into the assessment process (Zillman 2009, 873). That these principles were accepted by the parties without debate from the outset of the IPCC assessment process (see Bolin 2007, 49-52) indicates the shared nature of scientific practice and corresponding values within and between these countries.

¹⁰ Participating countries: Algeria, Argentina, Australia, Brazil, Canada, China, Denmark, Finland, France, Germany Democratic Republic, Germany Federal Republic, India, Israel, Italy, Japan, Kenya, Malta, Mexico, Netherlands, New Zealand, Nigeria, Norway, Saudi Arabia, Senegal, Sweden, Switzerland, USSR, UK, US, Zimbabwe (IPCC 1988).

that the developing countries were given adequate opportunity to take part because the process then led to mutual learning, benefitting not only the developing countries but also the developed countries...So orderly conduct of business in a free and scientific manner with participation by all or as many as possible should be the IPCC working mode” (IPCC 1991a, 7). By designating the values of the scientific habitus as the IPCC’s working mode the chair empowered those embodying this particular style of work.

Another important source of authority for governments is the election of a bureau member (chapter 6). Governments with an elected bureau member are able to attend and intervene in bureau meetings, which provides them with greater knowledge of the assessment process and input into its management. Knowledge of the process is power during plenary meetings and report approval sessions, as these delegates have more substance on which to base their interventions and authoritative reasons for altering proposed text (chapter 8). This is particularly apparent in instances where a developed country has chairmanship of a working group and hosts the technical support unit (TSU). These national delegates are likely to be amongst the best informed of IPCC actors, and this knowledge and support of the process translates into a view that needs to be heard, if not accommodated, during the plenary and report approval sessions. The US is one of the most powerful members of the panel in this regard. Actors from within the US played a critical role in the establishment of the IPCC (Agrawala 1998a; 1998b; Hecht & Tirpak 1995). The US has hosted a WG chair and TSU for every assessment and is by far the largest donor to the IPCC’s work (IPCC 2010b). Its role in the establishment of the organisation, chairing of WG assessments and hosting of the TSUs has ensured that from the outset US political interests, cultural ideals and principles of scientific legitimacy, expertise and authority have and continue to underpin the development of the IPCC’s practice of writing and the representations of climate change it produces.

5.3 The Bureau

The IPCC bureau oversees and manages the production of IPCC assessment reports and in this function is an intermediary between the member governments of the panel that authorise the assessment and the expert authors that produce the report. The bureau meets twice a year, including prior to plenary, which is viewed as an opportunity to rehearse plenary matters and to forge common advice and positions (interviews with bureau members and delegates). Other sites of work for the bureau include plenary meetings, author meetings, and the WG approval session for the final report. The purpose of the bureau and operating style of bureau members depends on these locations and is shaped by the disciplinary or professional fields of expertise and the nationality of actors. In relation to the panel, the bureau's main purpose is to provide scientific and technical advice to guide the panel (IPCC 2011), and the opinion of the bureau has a significant bearing on panel decision-making. This power to influence the panel rests on recognition of the scientific authority of the bureau and bureau members, which as Bolin's words above indicate (IPCC 1991a, 7), have historically installed in IPCC proceedings the conventions and values of the scientific habitus.

Today the bureau and the panel are distinct units within the IPCC, each with specific functions and forms of authority over the assessment process. This distinction between the bureau and panel has developed over time and in response to pressures from within and outside of the organisation. As the previous section indicates, the IPCC's establishment was led by a relatively small group of individuals identified as representatives of governments, the parent organisations (WMO and UNEP), and/or prominent members of the international climate science community (see chapter 2.1). The original structure and work programme of the IPCC was largely agreed between these actors before the first IPCC session and accepted during the plenary without much debate (Bolin 2007, 49-50; IPCC 1988; Zillman 2007, 872). A bureau of fifteen was appointed to oversee the work of the First Assessment Report (FAR), which included the

chairman of the IPCC, a vice-chair, a rapporteur and a chair and vice-chair for each of the three WGs (IPCC 1988).¹¹ It was decided that to “provide for the best possible coordination” that appointed bureau members should be, “where possible, Principal Delegates of their respective countries in IPCC” (ibid, 6), indicating the fine line between the bureau and the panel at the time of its establishment. However, as political interest in climate change has increased so has government’s interest in the work of the IPCC and the desire to exert authority over its assessment activities.

Made up of 30 members, today’s bureau is more geographically representative. It includes the IPCC chairman, three vice chairs, a developed country and developing or economy in transition (EIT) country co-chair for each WG and six vice-chairs representing the six WMO regions.¹² The line between bureau and panel membership is today distinct, with few of today’s national delegates serving on the bureau and vice versa (interview with bureau members). This has meant a loss of authority for bureau members in relation to the panel. As the previous section indicates, key bureau members, particularly the IPCC chairman, played a central role in instilling the values that were to order plenary proceedings and thereby structuring relations within the panel.¹³ From the perspective of bureau members, the blurring between bureau and panel actors was a unique feature of the IPCC and one that enabled “the harmonious resolution of difficult situations which arose in the work of the panel” (Zillman 2007, 877). Bureau members were able to deploy scientific conventions and the authority these command for the purpose of containing and channelling the political forces within the panel. However, over time sections of the panel have become resistant to these challenges, seeking to instil a more familiar operating style in panel proceedings that oftentimes is judged as confrontational and obstructionist by the scientific habitus.

¹¹ Except for WG III, which because of governments’ interest in the assessment of policy response options had five vice-chairs. For more details, see Bolin 2007 49-52; IPCC 1988. For an account of how US government departments vied for chairmanship of the three working groups see Hecht & Tirpak 1995.

¹² It also includes the two co-chairs of the Task Force on National Greenhouse Gas Inventories. However, as indicated in the introduction these are not analysed as constituent of the IPCC’s practice of writing.

¹³ As John Zillman (2007, 873) indicates: “In the initial stages of its work, the Panel operated essentially according to the General Regulations and meeting procedures of the WMO with its Vice-Chair, two of its three Working Group Chairs and several other members of its Bureau all being experienced in the WMO and/or UNEP systems.”

The development of cultural contestation between the bureau and the panel over the conduct of IPCC proceedings is epitomised in the controversy surrounding the election of the IPCC chair, which indicates the competing cultural and political forces structuring the IPCC's practice of writing.¹⁴ In 2002 the incumbent IPCC chairman, Dr Robert Watson, was not re-elected for a second term in an election process that divided opinion within the panel (Lawler 2002; Zillman 2007, 875).¹⁵ This was the first time in the IPCC's history that it was necessary for the panel to take a vote on the position of chair, a decision usually reached by acclamation between panel and bureau members. This precedence and the lack of codified procedure for its resolution further complicated the process. Although the IPCC chair is said to be stateless, the two most commonly cited explanations for this event are US opposition to Watson's reelection and the necessity of the chairmanship being held by a developing or EIT country member (Bolin 2007, 185-87; from interviews). The US supported the election of Dr Rajendra Pachauri from India, who unlike his predecessors was a WG III expert with a PhD in industrial engineering and economics. There is a perception amongst some within and outside of the IPCC that WG III does not do real science, a prevalent attitude towards the non-physical sciences amongst physical scientists.¹⁶ Pachauri was neither recognized for his contribution to climate science or for work on earlier international environmental processes, which automatically called his credibility into question (Lawler 2002).¹⁷ US support for

¹⁴ For more on "cultural contestation" and how it develops between different units of an organisation, see Barnett and Finnemore (1999, 724).

¹⁵ Elected for chairmanship in 1996 by the US government, his reelection was opposed by the State department, which is said to have been under pressure from the Council on Environment Quality during the Bush administration (McRight and Dunlap 2010, 120).

¹⁶ As revealed by Lahsen's (2008) sociological analysis of physicists' attitudes towards climate science and climate scientists and Shackley's quote of one of the climate skeptics that Lahsen's study analyses: "...why are the opinions of scientists sought regardless of their field of expertise? Biologists and physicians are rarely asked to endorse some theory in high energy physics. Apparently when one comes to 'global warming' any scientist's agreement will do" (Richard Lindzen (1992) quoted in Shackley 1996, 204).

¹⁷ In contrast, Bert Bolin the first chairman of the IPCC (1988-1997) had a PhD in meteorology, made notable contributions to carbon-cycle science and was a central actor in the establishment of a number of international research programs. He led a UNEP, WMO and SCOPE assessment of climate change (Bolin et al. 1986), and also acted as advisor on science policy to the Prime Minister of Sweden (Rodhe 1991). Sir Robert Watson (IPCC chairman 1997-2002) has a PhD in Chemistry. Prior to his chairmanship of the IPCC he chaired the Scientific and Technical Advisory Panel to the Global Environment Facility (1991-1994) and became Senior Scientific Advisor to the World Bank's Environment Department in 1996. He was also the associate director for Environment in the Office of Science and Technology Policy in the Executive Office of the President in the White House.

Pachauri's election was perceived by some as an attempt to undermine the scientific integrity of the IPCC, or at the very least to contain its influence over the climate field at a time when the Administration was hostile to the UNFCCC negotiating process and its Kyoto Protocol (Haas 2004).¹⁸

Since his election in 2002, Pachauri has been criticised for not upholding the objectivity required of an IPCC chairman and by playing too strong an advocacy role towards the international political response to climate change (Tol, Pielke and van Storch 2010).¹⁹ Pachauri's authority and suitability were further undermined by events that surrounded the publication of the AR4, particularly his dismissive response to errors uncovered in the WG II report (Pearce 2010).²⁰ As media attention turned on Pachauri's character, possible conflicts of interests were identified between his position as chair and his work for TERI, an energy research institute in New Delhi (Booker 2009; Monbiot 2010b). The controversy surrounding these events and their impact on the IPCC's legitimacy led the IPCC chairman and the UN Secretary General to request the InterAcademy Council to review its processes and procedures (IAC 2010a). The IAC's recommendations were discussed by the panel at its 32nd plenary session in Busan, at which the panel took several decisions that sought to further codify the IPCC's practice of writing and the panel's authority over it (IPCC 2010a). For Pachauri this meant his position as chairman was effectively negotiated during the proceedings, with particularly hostile interventions and open attempts to undermine his leadership made by the US and Canada (Schiermeier 2010; personal observations).²¹

¹⁸ Although Pachauri perceived his election as "a mandate for his plan to emphasize the socioeconomic effects of climate change on specific regions of the world" (in Lawler 2002).

¹⁹ As Tol, Pielke and van Storch (2010) identify: "In recent months, Pachauri has participated in overt political advocacy, such as by calling on people to eat less meat and on the United States government to pass a certain climate policy. He has endorsed 350 parts per million as the right target for the atmospheric concentration of greenhouse gases, despite the IPCC offering no recommendation on such a target. Being a scientific advisor sometimes means recusing yourself from engaging in the political processes that you are advising."

²⁰ Chapter 10 of the WG II report made a claim about the melting rate of Himalayan glaciers, which was taken from a non-peer reviewed source and turned out to be based on speculation, for a full report of the error and ensuing media coverage see Pearce 2010.

²¹ Pachauri's position as chair was not openly discussed during plenary proceedings, which is not surprising as there does not appear to be an appropriate replacement and the fifth assessment is well underway. However, agenda items clearly related to the media controversy, such as the conflict of interests policy item (Gutierrez, Mead and Schulz 2010; IPCC 2010a).

Despite the panel's attempt to demarcate itself from the bureau and the cultural contestation between the panel and the bureau over the right to determine the order of proceedings, the panel remains reliant on the bureau to oversee the production of IPCC assessment reports. The developed country co-chairs are amongst the most powerful actors in this regard. Recognised for a combination of scientific contribution and experience of similar international environmental processes, the WG co-chairs are responsible for the management and production of the WG assessment. Working 50% on the IPCC process, the host government provides co-chairs with technical and administrative support in the form of a technical support unit (TSU), which is housed in or near the co-chairs institution (section 5.4). This enables the developed country co-chair to lead on every stage of the reports compilation: drawing up the report outline (chapter 6), selecting the authors (chapter 7), overseeing the assessment (chapter 7), preparing the summary for policymakers (chapter 8), and chairing the approval of this document in plenary (chapter 8). The WG vice-chairman assist the co-chairs in this role and the degree to which the vice-chairs and developing and EIT country co-chairs are able to imprint their expertise on the process depends on their scientific credentials, experience of assessment processes and the extent to which they invest themselves in IPCC work, with considerable variance noted between bureau members, as discussed further in chapter seven.

The IPCC is not the full time job of any bureau member. These individuals are supported in IPCC activities by their government or the IPCC trust fund and have significant professional responsibilities outside of the IPCC, the majority being associated with universities, research institutes, international organisations and related research programs. The pressure of time and lack of financial resources particularly constrains the investment of developing and EIT country bureau members. Developing country expertise is highly sought after by international organizations, and these individuals may have to balance the IPCC with commitments to other international agencies and assessment efforts (interviews with bureau members). Unlike their developed country counterparts, the majority of these bureau members do not receive research assistance to support them in

this capacity. As involvement in the IPCC process does not tend to offer developing and EIT country participants the same degree of cultural recognition, experts from these regions may be both less able and less willing to invest themselves in the process (Yamineva 2010, 58-9). The economic and cultural capital structuring developing and EIT country bureau members capacity to invest in the IPCC process is augmented by the attitudes and perceptions of developed country bureau members, many of whom do not regard their counterparts as adequately qualified for the task (see chapter 7.1).

5.4 The Technical Support Units

The construction of each WG assessment report is coordinated and administered by a Technical Support Unit (TSU). As indicated above, the WG co-chairs are responsible for the production and approval of the WG's assessment of climate change and they would not be able to fulfil this role without considerable organisational, administrative and technical support, as housed within the TSUs. The TSUs play a significant role at every stage of the IPCC's practice of writing: preparing and administering the timeline for the report's construction; identifying and processing the selection of authors (chapter 7); managing the authors in writing the report; editing, harmonising and polishing submitted material (chapter 7); and compiling the finished product for panel approval and publication (chapter 8). Despite the fact that the technical support staff are the only unit within the organisation working full time on putting the assessment together, have the most contact with the report as it is assembled, and the TSU head is an authoritative figure in and over the IPCC's practice of writing, the TSUs are barely mentioned in the scholarly literature and have not been considered a noteworthy component for analysing and understanding this organisation and the meanings it generates.

The introduction of TSUs to the IPCC's assessment practice was an innovation of Sir John Houghton (the UK chair of WG I for the FAR, SAR and TAR), when it became apparent that working-group specific technical and administrative support would be

necessary in realising the finished product (Zillman 2007, 878). These units would subsequently become a central feature of all three WGs and one of the most significant institutional components of the IPCC’s practice of writing. The TSUs are set up once the decision to repeat the assessment has been taken and the new bureau elected (chapter 6). They are funded by the government of the developed country co-chair and are generally hosted within the chair’s institution, such as the university, the met office or the environment agency. To date there have been seven countries that have hosted the TSU, with the US having WG chairmanship for every assessment and the UK having chairmanship of four assessment reports, see table 5.1.

	FAR (1990)	SAR (1995)	TAR (2001)	AR4 (2007)	AR5 (2014)
WG I Science	UK	UK	UK	US	Switzerland
WG II Impacts	USSR	US	US	UK	US
WG III Mitigation	US	Canada	Netherlands	Netherlands	Germany

Table 5.1 Countries that have hosted TSUs by WG and assessment round.

The WG TSUs are not homogenous units, and although a newly elected chair and appointed staff seek input and advice from outgoing TSUs; the set up of this unit and the style of work it adopts develop over the course of the assessment as shaped by the WG chair, TSU head and the country in which it resides. These units have grown over time to keep pace with the increasing author numbers and volume of knowledge to be assessed, and today they have between five and fifteen members of staff.²² Nearly all staff will be

²² The exact number depends on the WG, the assessment round and the host country, with often greater administrative support required towards the end of the assessment process.

new hires, as only a few administrative and technical staff serve on multiple TSU teams and it seems that the demands of TSU head make it a difficult role to repeat (interview with TSU staff). Whilst the TSUs are set up to assist both the developed and developing country co-chairs, in reality this assistance is uneven. The TSU team regularly update and seek the input of the developing country co-chair, however, their main focus is on meeting the requirements of the chair with whom they work alongside, and it may be difficult for the developing country co-chair to mobilise the same degree of support (interviews with TSU staff and bureau members). The IPCC does provide the developing country co-chair with a small fund per calendar year, which they can choose to spend on support staff or equipment and in some instances the government may also provide additional support, but this is limited compared to the expertise housed within TSUs (ibid).²³

The majority of TSU staff provide administrative and technical support, but the head and one or two other members of the team are hired for their scientific credentials and experience of previous assessment exercises. The most important member of the unit in this regard is the head of the TSU, as this actor effectively implements and manages the production of the assessment as envisioned by the WG chair and approved by the panel (chapter 6). Selection of the TSU head is given careful consideration by the WG chair, whose scientific authority is at stake in the final product. The importance of the task is reflected in the credentials of those hired, many of whom are established within a field of science relevant to the WG and have usually contributed as an IPCC author, bureau member, or as part of a national delegation to the panel in previous assessments.²⁴ The

²³ For example, Dahe Xin has been co-chair of WG I since 2002, and is supported in this capacity by the Chinese government, who provide him with at least one full time assistant throughout the assessment. However, many developing country chairs do not have the same level of support as Dahe Xin (from interviews with bureau members).

²⁴ For instance, for the AR5 Pauline Midgley, is the head of WG I TSU based at the University of Bern in Switzerland. Pauline has a PhD in atmospheric chemistry, and before becoming involved in the climate change issue, contributed to the science of ozone depletion, publishing numerous articles and participating in international scientific assessments on the effects of CFCs on the environment. Prior to her appointment as TSU head, Pauline had provided scientific support to the German Federal Ministry of Research, and from 2006 she headed the German IPCC Coordination Office. Kristie Ebi is head of WG II TSU at the Carnegie Institute at Stanford. Kristie has a PhD in Public Health and has contributed to numerous North American and international assessment efforts, including as a contributing author in the IPCC's TAR and a lead author on the "Human Health" chapter of the AR4.

scientific authority and experience of the head of the TSU is critical for gaining the support of the authors, if the authors do not recognise the credentials of those leading the process and trust their capacity to produce an authoritative assessment, they are unlikely to fully invest in the demands of the process (interviews with TSU staff and authors). However, whilst the scientific capacity of the TSU has essential functions and distinguishes it from the secretariat, it is not the unit's main source of authority.

The WG TSUs make an IPCC assessment report possible, binding the assessment practice and the actors that constitute it together through day-to-day duties and tasks. The TSU's power then, lies in the IPCC's dependence on it for achieving assessments of climate change. This task gives the TSUs unrivalled access to the authors and the assessment of knowledge they produce. The TSU introduces authors to the IPCC and are their main point of contact for the duration of the assessment process (chapter 7). Through emails and author meetings the TSU instil in authors the appropriate procedures and values for the conduct of the assessment and have the editorial power to ensure these are adhered to in the compilation of chapters (chapter 7). The TSU's management of the report's construction also gives it unmatched technical knowledge of the process and progress of an assessment, which makes the TSU an important contact point for secretariat, panel and bureau members for informed position taking and decision-making prior to and during bureau and plenary proceedings. If actors seek to increase their access or influence over the direction and content of the assessment report, establishing and maintaining relations with TSU staff is vital.

5.5 The Secretariat

The Secretariat is the organisational centre of the IPCC and its only permanent body. Despite its permanence and symbolism as the focal point of the organisation, the secretariat is more of an enabler than a direct contributor to the IPCC's practice of writing. The secretariat plays an active role at the start of the assessment cycle,

particularly in assisting the chair and panel in formulating the work program and instilling IPCC values and procedures in the incoming bureau members and TSU staff. However, the secretariat's direct involvement in the assessment decreases with the formation of the new WG TSUs. The secretariat is an important actor in plenary and bureau meetings: presenting the agenda and reports of previous sessions, providing support for the chair, introducing budgetary matters, responding to government enquiries, and generally ensuring the orderliness of proceedings. Between these events the secretariat is regularly in contact with national focal points and bureau members and once the assessment is under way information flows daily between the secretariat and WG TSUs. Outside of the organization, the secretariat promotes the IPCC's work to other UN bodies in the climate field: presenting IPCC products at conferences and meetings of the UNFCCC and the SBSTA and seeking input from these parties to ensure the continued relevance of IPCC assessment reports.

Although the secretariat is situated within WMO headquarters in Geneva and its eleven staff are employees of the UN, the unit is answerable to member governments of the panel and it is governments that decide the size and remit of the secretariat (IPCC 2009c).²⁵ Organisationally, the secretariat adheres to WMO procedures, with many of the formal administrative and financial arrangements reflecting WMO requirements (IPCC 2009c, 9). The formal reporting arrangements also reflect the parent organisations, with the secretary seconded from WMO and reporting to the IPCC chair and executive councils of WMO and UNEP, and the deputy secretary seconded from and reporting to UNEP (*ibid*). The secretary is an important figurehead within the organisation and to date there has been two long-standing IPCC secretaries. The first, Dr Narasimhan Sundararaman, was appointed in advance of the first meeting of the panel in November 1988 and served in this capacity until his retirement in 2002 (Zillman 2007, 877). Dr Sundararaman was a US Federal Aviation Administration Scientist on deputation at WMO and is said to have been one of the “key actors in the decision making process that

²⁵ The secretariat was expanded in 2006 (from a staff of five – the same as when it was established), and again in 2009 after a panel review of its staffing and responsibilities. As a result of the IAC review and recommendations the remit and staffing of the secretariat are still under consideration by the panel, see IAC 2010a; IPCC 2010d, 8-9; IPCC 2011b.

led to the formation of the IPCC” and influential in the assessment style adopted by the organisation (Agrawala 1998b, 616). In 2004, Dr Sundararaman was replaced by the then deputy secretary, Dr Renate Christ. Prior to her appointment, Renate Christ had worked for UNEP, the European Commission and on the Austrian delegate for the development of the Kyoto Protocol, a career trajectory that is similar to others managing the IPCC process, including bureau members, panel members and TSU heads.²⁶

Both the secretariat and the current secretary appear to have lost authority in relation to other units of the IPCC and a number of factors and events account for this. The distance between the secretariat and the production of IPCC assessment reports has increased with the emergence and strengthening of TSUs. As studies of the bureaucratic authority of secretariats indicate, secretariat staff possess a wealth of experience and knowledge of treaty processes and procedures. This *intellectual capital* translates into authority in and between plenary and bureau proceedings when actors seek information and advice from the secretariat to inform decision-making (Bauer 2006; Depledge 2007; Jinnah 2010).²⁷ However, within the IPCC’s practice of writing the most valued form of intellectual capital is scientific knowledge and knowledge of the assessment process in practice, and the secretariat has no science staff and minimal direct involvement in the day-to-day construction of the assessment reports compared to the TSUs. Thus, whilst the secretariat is the principle point of contact for members of the IPCC and observer organisations (IPCC 2012c), the secretariat cannot provide participants with the same detailed knowledge of the assessment process and its progression as TSU staff.

The secretary has sought to stem the secretariat’s loss of authority by increasing the scientific capacity of the secretariat and its proximity to the IPCC’s practice of writing. However, this has brought the secretariat in conflict with TSU staff and led to further erosion of its intellectual capital. In 2008, the panel set up a task group to undertake a review of the secretariat’s staffing requirements as the unit was widely regarded as over-stretched (IPCC 2008a; IPCC 2009c, 2). The secretary proposed adding two science

²⁶ For a comparison to the career trajectories of the AR5 TSU heads, see footnote 23.

²⁷ Joanna Depledge (2007) coins the term intellectual capital in her study of the UNFCCC Secretariat and Chairpersons.

officers to the staff and indicated that she saw an expanded role for the secretariat in providing technical and administrative support to the IPCC chair and bureau members on issues and themes that cut across the three working groups and in assessing the grey literature used in reports (IPCC 2009c). The task group dismissed the secretary's request for additional science staff, indicating that:

...the working group and task force TSUs are primarily responsible for the preparation of the assessment reports and methodologies and provide the in-house scientific expertise of the IPCC. IPCC interviewees were strongly of the view that the Secretariat should continue to focus on corporate and administrative issues, concerned with the quality and efficiency of processes rather than with their substance. (ibid, 8)

Despite further attempts by the secretary to strengthen the scientific capacity of the secretariat during the plenary proceedings, including in the report of the session, the secretary's attempt to increase authority in and over the IPCC's practice of writing proved unsuccessful.²⁸ In fact, after the review, the post of Scientific Officer in the secretariat was amended to Programme Officer. The secretariat's position has been further undermined by the media attention surrounding errors in the AR4 and the resulting IAC review, which held the secretariat along with the chairman responsible for the IPCC's "sluggish response" to these events (IAC 2010, 47).

5.6 The Authors

IPCC authors are experts that have nominated themselves or been nominated by their government and selected by the WG bureaux and TSU staff to assess and review the material relevant to their expertise (chapter 7) and the government approved outline (chapters 6). As with panel and bureau members, producing the assessment is not a full time job for its authors and they are not paid by the IPCC for their time. The majority of

²⁸ The secretariat's report of the session notes that a "number of countries supported the shift towards more scientific technical expertise" (IPCC 2009a, 6),

experts nominated and selected as authors work as knowledge producers and reside within universities, research institutes, government agencies, and international governmental and non-governmental organisations. It is from these sites that they contribute to climate change knowledge production, and it is this contribution to a particular field or body of knowledge, such as the economics of climate change, its health impacts, or modelling the general circulation of the atmosphere, that constitutes them as climate experts and qualifies them to participate in the IPCC's practice of writing. For most authors, the IPCC's assessment practice is a series of author meetings, email exchanges, and intense periods of reviewing, compiling, assessing and writing to meet the deadlines of the drafting cycle.

The scientific habitus is an important determinant of relations between authors, although the extent to which it governs the conduct of the assessment is dependent on the WG. WG I is the most coherent in epistemic terms, which is evident from the journals referenced in the reports and the WG's reliance on peer-reviewed journal material. Charged with assessing the physical scientific aspects of the climate system and climate change, its remit has remained constant since the organisation's establishment. The WG is composed of natural scientists interested in documenting and modelling historic, present and future changes in the composition of the atmosphere, oceans and cryosphere and the relationship to global temperature. The dominance of the natural sciences is reflected in the journal articles referenced in the report, three-quarters of which belong to Earth science journals, including 'Geosciences', 'Oceanography' and 'Meteorology' (from Bjurstrom & Polk's (2011, 10) analysis of the TAR). 84% of WG I's references in the TAR are journal references, with a small number of journals frequently used (ibid, 4). This highlights that in WG I it is scientific conventions and the forms of authority that the scientific habitus acknowledge and recognise that governs relations within and between chapter teams and their conduct of the assessment. This epistemic coherence is not replicated in the other two WGs, whose mandates have been subject to change over the course of the IPCC's development.

In 1988 the IPCC was mandated to assess the science of climate change (WG I), its social and economic impacts (WG II) and policy response strategies (WG III).²⁹ By the completion of the FAR, climate change was firmly positioned on the international political agenda and negotiations towards a framework convention began through a newly established International Negotiating Committee (INC) (chapter 4.2). The establishment of the INC removed the formulation of response strategies from the IPCC's mandate, with the remits of WG II and III amended accordingly. The work programme for the Second Assessment Report (SAR) reflects the leadership's attempt to ascertain the IPCC's place within this increasingly politicised environment and assure its relation to the negotiating process (Bolin in IPCC 1992; Bolin 2007, 80-81). WG II was charged with assessing impacts and response options. Its continued focus on the impacts of climate change meant that relations within the WG and its assessment practice remained defined by its multi-disciplinary nature. The majority of WG II authors are natural scientists as reflected in the journal material referenced, the most important fields being the 'Earth sciences', 'Biology' and 'Environmental science' (as categorised and analysed by Bjurstron and Polk 2011, 10-13). However, WG II covers a broader range of topics and fields of knowledge than WG I, and 'Social sciences', 'Energy and resources' and 'Medicine' are also important subjects within the assessment (ibid). Furthermore, 59% of WG II references in the TAR are journal articles compared to WG I's 84%, and these references span three times the number of journal titles (ibid, 4). This highlights that WG II's assessment of climate change relies upon more varied reference material and sources than WG I, including the non-peer reviewed. Thus, whilst the scholarly habitus continues to govern relations within the WG and between chapter team members, the integration of the different fields of knowledge and the negotiation of scholarly conventions, epistemologies and terminologies is an important force in the conduct of the WG II assessment.

The authorship of WG III was notably different between the first and second assessment. In the FAR, WG III was effectively producing policy advice, as authored by low-level policymakers and negotiators alongside a few independent legal and environmental

²⁹ For details on this arrangement, see Agrawala 1998a, 616-7.

experts (Skodvin 2000a, 119). In authoring the assessment this group could not rely on a clearly identifiable body of knowledge for the content of the report or its scholarly conventions to structure working relations within the WG. As a result “the informal rules of politics” became “natural guides” (Skodvin 2000a, 120), with author meetings effectively acting as “policy-debating forum where governments could learn about the disputes that would be generated by specific policy options” (Boehmer-Christiansen 1994a, 149). After the publication of the FAR, the IPCC’s position in the climate field and relation to the negotiating process became uncertain. The leadership of the IPCC needed to ensure the relevancy of WG III’s assessment to the framework convention. There was also a desire to bring the assessment practices of both WG II and WG III closer to those of WG I and to recruit authors of “comparable stature” as those within WG I (Bolin in IPCC 1992, 4). In 1992, WG III was charged with assessing cross-cutting economic and other related issues, an assessment that would be structured by the scholarly habitus of the economist.

In the end, the bureau’s confidence in the credentials of the economists recruited for the SAR undermined the legitimacy of the final assessment product. Aspects of the economist’s construction of the climate change problematic proved difficult for developing countries to digest, as the statistical value of human life was calculated as one tenth of that in developed countries.³⁰ Scholarly belief in the theoretical assumptions underpinning these calculations made lead authors reluctant to accept reviewer’s criticisms and to amend the text accordingly. Thus, as a result of developing country objections, the final report did not make it through plenary approval and an additional session was scheduled (Agrawala 1991b, 626). Despite the controversy surrounding WG III’s construction of climate change in the SAR, economics continues to dominate the WG (Bjurston and Polk 2011, 11). WG III is distinct in character from WG’s I and II, as indicated by the reference sources and journal titles. Only 36% of WG III’s references in the TAR are journals and of these the ‘Social science’ dominate with economics strongly

³⁰ Chapter 6 of the Working Group III Second Assessment Report used controversial assumptions to calculate the ‘social costs’ of climate change, suggesting a cash value of \$1.5 million to a human life in the OECD against a mere \$150,000 in the developing countries (Pearce et al., 1995). As a result of developing country objections the final report did not make it through plenary approval and an additional session had to be scheduled (Agrawala 1998b, 626).

represented (Bjurstron and Polk 2011, 11). This highlights WG III's reliance on non-peer reviewed material and also indicates the more varied make-up of the WG, which includes a greater number of authors from government agencies, international governmental and non-governmental organisations and industry, with the reports and other materials these organisations generate important sources within the assessment.

The controversy surrounding WG III's construction of climate change highlights the impact that the disciplinary make-up of the WGs has, both on the conduct of the assessment and the representations of climate change this generates (Demeritt 2001).³¹ With the power to influence how climate change is written, the disciplinary makeup of the authorship of the assessments has become an object of struggle during author selection (interviews with bureau members), and an object of interest to the climate change scholarly community. IPCC assessments have the power to determine the social and political relevance of climate change knowledge, generating competition and struggle between climate change knowledge producers. Historically, General Circulation Models (GCMs) of the atmosphere have been regarded as the most important scientific and policy tool for knowing and defining the climate change problematic, which is reflected in the number of authors and space given within WG I reports to this form of knowledge (Demeritt 2001; Edwards 1999, 2001; Shackley 1999; Shackley et al., 1998). The dominance of one particular form of expertise means less space for another, and as the IPCC offers an important platform for legitimating climate expertise this becomes an object of criticism and means for demonstrating the relevance of alternative forms of knowledge (Hulme 2008; Hulme and Mahoney 2010; Nordlund 2008; Yearly 2009).

Although the scholarly habitus remains an important ordering force within the WG chapter teams; bureau, TSU and panel attempts to standardise authorship roles and assessment practices across the three WGs has meant that the IPCC's practice of writing has been subject to increasing levels of codification. In earlier assessments, as indicated

³¹ There has been much interest in the disciplinary compositions of the working groups and the representations of climate change this produces, much of which is critical of the dominance of the physical sciences, see: Cohen et al., 1998; Bjustorm & Polk 2010; Demeritt 2001; Hiramatsu et al., 2009; Hulme & Mahoney 2010; Shackley & Skodvin 1995; Yearley 2009.

above, the selection of authors and assessment practices were largely governed by the fields of knowledge and expertise of those that made up the WGs. However, as IPCC reports and scientific findings have been subject to criticism after publication, and as those managing the process have sought to respond and protect the IPCC and to maintain its authority and position within the climate field, the scientific habitus has been confronted and at times overruled by other organisational imperatives. In order to explore this interplay between scientific authority and the codification of the IPCC's practice of writing, chapter seven follows the pathway of the forming report from the nomination and selection of authors through to the government review. This pathway through the scientific assessment illuminates the relationship between scientific authority and other forms of capital, most notably economic capital, indicating how these structure participation and investment in the authorship of IPCC reports and the climate change knowledge these produce.

5.6 Summing up: From the people to the pathway

Previous studies into the IPCC have focused on the scientific and political dimensions of this organisation and its work, overlooking the influence of actors and activities that would not be classified as scientific or political. Thus, in order to re-examine those that make up the organisation, their role in the assessment process and authority over its conduct, the chapter explores the IPCC as five distinct units, describing the historical development and role of each in the construction of IPCC assessment reports. As in previous studies, the chapter identifies the power of the scientific habitus to order relations within and between all units of the organisation and indicates the challenge to scientific authority mounted by member governments through the panel. At the same time, whilst indicating the importance of scientific and political authority to order the organisation and its work, the chapter highlights that the IPCC is structured as much by the struggles in and over these forces as the forces themselves.

Those leading the establishment of the IPCC sought to instil the values of the scientific habitus in all aspects of the IPCC's work, from the conduct of plenary proceedings to the practice of compiling the WG assessment reports. However, as the political stakes in climate change have increased, IPCC member governments have attempted to distinguish the panel's role and increase its authority over the IPCC's practice of writing. The struggle between the bureau and the panel over the authority to decide how and by whom climate change is written has a marked impact on the organisation, the assessment practice and the products this produces. In this chapter this struggle was illustrated through the election of the IPCC chair, which highlights how geographical representation and the political interests of member governments structure the organisation and its work. Despite the increased autonomy of the panel, the panel's dependence on the bureau and particularly the WG co-chairs in realising IPCC assessments constrains the panel's conduct and ensures the continued authority of the scientific habitus in the IPCC's assessment practice. Over the coming chapters, we explore how the forces structuring this dynamic relationship between the panel and the bureau shape the pathway IPCC assessment reports travel and the extent to which it imprints on the writing of climate change.

In describing the previously overlooked role of the TSUs in the everyday construction of the IPCC assessment process, the chapter once more illuminates the force that scientific authority has to shape relations within and between the units that make up the organisation. The TSU's authority rests upon the scientific credentials of the TSU's head and the unit's proximity to the formation of the reports. This makes the TSU an important source of intellectual capital to other units of the organisation, which as the following chapter makes apparent, is a particularly important resource for the member governments funding these units and the developed country co-chairs leading the assessment process. At the same time that the TSU's scientific capacity and proximity to the IPCC's practice of writing cements this unit's significance, it highlights the secretariat's relative lack of administrative and intellectual influence in and over the IPCC's assessment process. The secretary has attempted to mobilise the units institutional resources to stem this loss of authority and increase the secretariat's scientific stake in the IPCC's practice of writing,

however, to date her efforts to convince those within the panel that have the power to decide have proven unsuccessful.

The symbolic power of the scientific habitus to determine relations within units and the conduct of the assessment is once more brought to the fore in the authorship of IPCC assessment reports. The structuring force of scientific conventions is most evident in WG I, the order of which the IPCC leadership has sought to emulate in the authorship and assessment practices of the other two WGs. Whilst today both WGs II and III rely upon the scholarly habitus to structure working relations within and between the chapter teams, their assessment practice is subject to and structured by the multidisciplinary nature of their work and the political implications of their content. Furthermore, the autonomy of authors and bureau members to rely upon scholarly conventions as a means to distinguish authority, order relations within chapter teams and structure the conduct of the assessment has – over time and through practice – increasingly been encroached upon by panel, bureau and TSU attempts to codify authorship roles, ensure geographical representation and standardise assessment practices across the three working groups. Chapter seven details the selection of authors and the pathway the forming assessment reports travel through author meetings and the IPCC's review process in order to further explore the interplay between these factors and their effect on how and by whom IPCC assessments of climate change are written.

This chapter has initiated the process of unpacking the relations, forms of authority and struggles between those that make up the organisation. The next step is to discern the structural force these have on the organisation and its assessment practice, for which it is necessary to follow the construction of IPCC assessment reports along their assembly pathway. It is in mapping the construction of IPCC documents and detailing the operations performed by each unit in realising the final product that it becomes possible to unpack the forms of capital necessary for governments, bureau members and authors to invest in the IPCC's practice of writing and to assert their interests over how climate change is written through the process. Over the coming chapters then, the report's assembly pathway is divided into three stages of its development: the construction of the

report outline, the scientific assessment and the government's acceptance and approval of the final products. The journey along the assessment's assembly pathway begins in the following chapter with the construction of the outline. Despite the outline's capacity to govern the direction and content of IPCC assessment reports and the involvement of member governments in its development, the outline's assembly pathway has not been subject to scholarly attention in previous studies. In providing a detailed account of the outline's journey through the panel, the panel's election of bureau members, scientific involvement in the scoping of the report and government acceptance of the final product, the chapter highlights how the relations between units, as detailed in this chapter, imprints on the IPCC's practice of writing climate change.

6. The outline

The previous chapter introduced the five units that make up the IPCC, indicating some of the forces structuring the organisation and its work. This chapter initiates the process of following these actors along the assessment report's construction pathway and detailing the activities through which the reports are assembled. A detailed account of the construction of IPCC reports is provided for three reasons: 1) to document how IPCC assessment reports are compiled; 2) to record who does what in putting them together; and 3) to identify the forces governing how and by whom climate change is written through the process. In order to provide this account the assessment pathway is sliced into three stages of the report's formation: 1) the outline; 2) the scientific assessment; and 3) the government approval of the final product. Whilst there are a number of detailed studies of the IPCC and its assessment process, as the previous chapter indicates, these focus on particular dimensions of the organisation and its work, and as a result overlook aspects of the IPCC and its assessment process that do not appear political or scientific in character. This has left one of the most significant units of the IPCC's work, the TSUs, unaccounted for. Likewise, this chapter documents an aspect of the IPCC's assessment process that has not been subject to serious scholarly attention previously, despite recognition that the report outline is "a major influence on the mandate and goals" of the next assessment (IAC 2010a 17). And even for the authors guided by this document, the process of its formation remains "somewhat opaque" (IAC 2010a, 17).

The outline is a list of chapter headings and bullet points formally approved by the panel, which indicates the topics to be covered by each of the three Working Groups (WG) in their contribution to the IPCC's next assessment of climate change (see figure 6.1). It is formed through a web of government and expert input mediated through the IPCC chair, secretariat, panel, bureau and the TSUs, each of which has a specific part to play and

operations to perform in the outline's production. This chapter is interested in untangling this web and following the process of putting the outline together from the formal decision to repeat the assessment process to the plenary session where the outline is approved by member governments. At times this account may appear mundane, but the details are important. As Bourdieu's stress on the practical nature of knowledge highlights, it is through the activities of life that the world is comprehended. The activities of the IPCC are some of the main ways in which climate change is being practiced and comprehended as an object of international political life by scientists, governments, international organisations and other actors contributing to its work. Thus, if we are to understand how the international order is making climate change and being re-made through climate change, we need to know the activities, actors and power relations putting it together.

As with all IPCC documentation the outline serves a purpose and embodies the relations and specific practices that put it together. There are four key stages to the outline's formation: the decision to repeat the process (section 6.1), the election of the bureau (section 6.2), the scoping meeting (section 6.3), and the panel's approval of the report outline (section 6.4). Mapping the outline's pathway through the organisation identifies the central role of member governments in the outline's formation, as the panel takes the official decision to repeat the process, elects the bureau to oversee the reports production and approves the outline of the IPCC's next assessment of climate change. Describing the panel's involvement in the production of the outline reveals the avenues through which member governments seek to influence the election of bureau members and direct the IPCC's next assessment of climate change. However, the power of member governments is channelled through IPCC processes and procedures, which through practice, exert their own constraining force on the interests and reach of member governments. It is the interplay between these forces and the influences they constrain and enable that this chapter's description aims to capture, which demonstrates that it is through the unfolding of the IPCC process in practice that these forms of authority imprint in and on the organisation's writing of climate change.

It is not only the government's purposes that the outline serves. Practically, the pathway of the outline's formation enables the elected bureau members and newly assembled TSU staff to review the treatment of issues in the previous report and to provide a roadmap for the authors undertaking the assessment. It also serves as a form of agreement between those that commission the report and those that are elected to oversee its production, enabling the construction of a shared vision of the assessment. The IPCC's practice of seeking comments and input from its main stakeholder, the UNFCCC and other international organisations ensures that the interests of these bodies are also intertwined with the assessment exercise, which guarantees the relevancy of the reports and their impact on the climate field. The scoping meeting, which brings together leading actors from across climate change knowledge and other expert communities, offers the newly elected WG co-chairs the opportunity to gain the recognition and support of those they are reliant upon for authoring the assessment and guaranteeing its scientific authority. Such purposes only become apparent from within the logic of the outline's construction. For this reason, the IPCC's practice of producing the outline for the next assessment of climate change is carefully detailed over the coming pages, which highlights how the IPCC's practice of writing serves to maintain the authority of IPCC assessment reports and their symbolic power to produce legitimate ways of knowing and responding to climate change.

<p>Chapter 1: Introduction</p> <p>Executive Summary</p> <ul style="list-style-type: none"> • Rationale and key concepts of the WG1 contribution • Treatment of uncertainty • Climate change projections since FAR <p>Frequently Asked Questions</p>
<p>Chapter 2: Observations: Atmosphere and Surface</p> <p>Executive Summary</p> <ul style="list-style-type: none"> • Changes in surface temperature and soil temperature • Changes in temperature, humidity and clouds • Changes in atmospheric composition • Changes in radiation fields and energy budget • Changes in hydrology, runoff, precipitation and drought • Changes in atmospheric circulation, including wind • Spatial and temporal patterns of climate variability • Changes in extreme events, including tropical and extratropical storms <p>Frequently Asked Questions</p>
<p>Chapter 3: Observations: Ocean</p> <p>Executive Summary</p> <ul style="list-style-type: none"> • Changes in ocean temperature and heat content • Ocean salinity change and freshwater fluxes • Sea level change, ocean waves and storm surges • Ocean biogeochemical changes including ocean acidification

Figure 6.1. Sample of Working Group I's outline for the Fifth Assessment Report (AR5).

6.1 The decision to repeat the process

As with the development of the organisation, the outline's construction pathway is one that has developed over time and through practice, both in order to achieve and through the process of meeting the document's objectives. Consequently, many of the features described below only became identifiable during the scoping and outlining of the Second Assessment Report (SAR), and then increasingly well marked and traversed by each assessment thereafter.¹ In the case of the FAR, the process was less formalised, terms of reference were established at the first session of the IPCC in November 1988, and these essentially delimited the core topics to be addressed by each WG (IPCC 1988). These

¹ On completion of the FAR Principles Governing IPCC Work were codified and have since been updated and refined (IPCC 1991, 8-9; IPCC 2006d). These principles laid down many of the key features of the IPCC's practice of writing assessment reports, as described in the coming chapters.

terms of reference requested the WG chairs to submit an outline to the bureau within 60-90 days of its establishment (ibid). In forming an outline, WG I held a scoping meeting that brought together about seventy experts from around the world to agree on chapter headings and outline the contents of the report, the outcome of which was then approved retroactively by the panel (Bolin 2007, 55; interviews with bureau members). With the completion of the FAR in 1990 and with international negotiations for a framework convention on climate change underway, the continuation of the IPCC, its structure and future work programme became a matter of concern to the institution and its parent bodies.

The IPCC's FAR proved influential in providing a common scientific understanding of the issue, and would serve as the basis for negotiations towards a framework convention on climate change (UNGA resolution 45/212 1990).² However, as chapter 4.2 indicates, the IPCC would not become the site for negotiating the framework convention, for which an International Negotiating Committee (INC) was created under the auspices of the UN General Assembly. The establishment of the INC transferred the responsibility for formulating policy response options from the IPCC to this newly formed body, with the IPCC tasked with providing the necessary scientific and technical advice to the negotiating process (UNGA res 45/212 1990). The IPCC's relationship to the climate convention was reflected in the WMO's reformulation of the organisation's terms of reference, which charged the IPCC to undertake "scientific and technical work in support of the negotiations of a framework convention on climate change", and to periodically update "the assessments of the available scientific information on climate change and the resulting environmental and socio-economic impacts" (Resolution 11 of the WMO congress 1991, see IPCC 2006b; IPCC 2007b). In light of these new terms of reference and to insulate the assessment process from this political environment, the IPCC's practice of writing was subject to codification and at the 5th session of the panel in 1991 the principles governing IPCC work were formulated (IPCC 1991). At this same session a pattern for devising the IPCC's future work programme emerged, laying the foundations of the pathway this chapter describes (ibid).

² See Bolin 2007, chapter 6.

The assessment pathway begins with the IPCC chair and a vision paper on the future of the organisation. As an assessment cycle nears completion, the future work programme becomes an issue on the panel's agenda and member governments must decide whether the assessment process is to be repeated. The chair composes a vision paper on the future work programme and organisational structure of the IPCC, and this leads discussions on whether the existing structure of the WGs and the timeframe and scale of preceding assessments remains appropriate for the next assessment cycle (Pachauri 2008; IPCC 2001a, 2001b). As with the outline, the construction of this vision paper has its own, more informal pathway. The product represents the chair's view on the future of the IPCC as informed by discussions with bureau members, panel members, authors, representatives of the UNFCCC and other international organisations as well as reflecting commentary taking place in the expert communities outside of the organisation (Moss 2000; Pachauri 2008; IPCC 2001a).³ Whilst the vision paper centres on the work programme, the appropriate structure of the WGs, and the timeline in which to achieve the next assessment of climate change, the content and themes of the next report are woven into these issues (Pachauri 2008; IPCC 2008c; IPCC 2008d; IPCC 2001a, 2001b). Thus, before the official decision to repeat the assessment process has been taken and before the new bureau and technical machinery is assembled, ideas and opinions on the direction of the next report are circulating. In the case of AR5, the chair's vision highlights the economic and sustainable development aspects of the climate change problematic and attention to these issues are mirrored in the comments it receives, even where not in agreement with the chair's representation (IPCC 2008c).

The formal decision to repeat the assessment process is taken by the panel at plenary session.⁴ The panel meets in plenary once or twice a year. This session of the IPCC, organised by the secretariat and chaired by the IPCC chair, is open to all member

³ Pachauri (2008, 4) references the discussions in the "scientific and professional community" on the scale, scope and timeliness of the IPCC assessment process and the suggestions put forward "which seem to favour a set of focused special reports rather than a comprehensive assessment of the type that has been produced in the past."

⁴ As highlighted above the exact details depend on the chair and the assessment round. For AR4 there were separate plenary meetings for the discussion of the vision paper and the decision to repeat the assessment process (IPCC 2001a, 2001b, 2001c, 2001d), for the AR5 the discussion and decision were held and taken at the same plenary (IPCC 2008a).

governments and is attended by the bureau, TSU staff, representatives of the parent organisations WMO and UNEP, the UNFCCC and other organisations with observer status. Plenary sessions are an important constituent of the IPCC's practice of writing, as through the process of coming together at one venue for a three to five day meeting a common identity or IPCC culture forms amongst the distinct units of the organisation. As chapter 8 details, it is in and through practicing the IPCC at plenary that the IPCC habitus forms, which constitutes (and is constituted by) a collective way of doing and thinking about the organisation, its assessment process and one's position relative to the IPCC's objective and other units invested in the process. Plenary sessions take place at different venues around the world by invitation of member governments and are generally hosted in large conference halls where participants are seated in long rows behind alphabetically arranged country flags, see figure 6.2. Each place is provided with a microphone, an earpiece for simultaneous translations, and a pile of the relevant paperwork. The meeting schedule is divided between morning, afternoon, and evening sessions, and as well as these formal sessions, there is a less formal culture of doing IPCC business in coffee breaks, over lunch and at dinner, which enables delegates, bureau members, secretariat and TSU staff to discuss panel matters and share and shape opinions on a more personal level.



Figure 6.2. The main hall of the 32nd Plenary of the IPCC held in Busan, South Korea in October 2010. Photo courtesy of ENB reporting services, available at: <http://www.iisd.ca/climate/ipcc32/> (last accessed 17.09.2012).

The plenary sessions are opened by the chair, who hands the floor over to the hosting government and heads (or representatives) of WMO, UNEP and the UNFCCC (IPCC 2008a). These speeches provide the IPCC's parent bodies and its main client (after the member governments) with the opportunity to shape plenary opinion on the future direction of the IPCC and its next assessment of climate change. As observed by Neumann (2007) in his analysis of speeches, the content of these speeches diverges little from the speech of the previous plenary, a practice that enables the speaker to reiterate the organisation's interests in and support for the IPCC and to instil a vision for the forthcoming report. Once the speeches have been given, the agenda is approved and the session gets underway (IPCC 2008a, 2008c; Pachauri 2008). The chair's vision paper and submitted commentary form the basis of discussions on the IPCC's future work programme, and governments raise their country flag to voice their views on the subject. Decisions are not usually reached in the full plenary in this manner, instead discussions are moved to contact groups, where a set of proposals are formulated and referred back to

the plenary for agreement and decision. Contact groups are chaired by members of the panel, as assigned by the chair, and are open to all member governments, although one party delegations will not be able to attend sessions running in parallel.⁵ Large contact groups dealing with issues of interest to the majority of participants are scheduled during the main plenary sessions, in which case translation into all UN languages is available, otherwise the contact groups proceed in English. For the AR5, decisions on the future of the IPCC were taken at the 28th Plenary Session in April 2008 (IPCC 2008a). Two contact groups were formed, one dealing with the structure of the WGs and the other dealing with the organisation and timing of the next assessment (Davenport, Gutiérrez, and Yamineva 2008; IPCC 2008a). On the basis of the contact group's proposals the panel agreed that the AR5 would be finalized in 2014 and that the WGs would retain the same focus and structure as the AR4 (ibid).

The panel's decision to repeat the assessment process opens the assessment pathway to the next stage in the assembly process: the election of the bureau. This step, the focus of the following section, introduces a new management team to the IPCC's practice of writing, putting in place the necessary professional personnel and administrative machinery required for the production of an IPCC assessment of climate change. The fact that the outline of the report is yet to formally appear on the panel's agenda should not be taken as an indication that its formation has not begun. When the chair produces a vision paper, and governments, past authors and relevant organisation submit comments, and when these comments are compiled and synthesised by the secretariat forming the basis of plenary discussion, the direction and content of the next report begins to take shape and is orientated by each of these operations and the issues they identify and the topics and themes they specify. Thus, by the time a new bureau is elected and the scoping of the next report formally begins, there are already signposts in place that demarcate preferred directions for the IPCC's next assessment of climate change and criteria identified for those best qualified to lead the process.

⁵ Wherever possible this effect is minimised and one party delegations wanting to be party to more than one contact group can request these groups be held separately, although ultimately this is determined by the practical demands of the agenda.

6.2 Electing the bureau

The election of the bureau is a significant event in the IPCC's practice of writing for its impact on the distribution of power between member governments in and over the assessment. Whilst the majority of bureau members are seen as independent from their national governments,⁶ bureau membership is an advantage to members of the panel as it enables them to attend bureau meetings. It is during these smaller and more collegial proceedings that panel decisions are rehearsed and narrowed, which enables governments in attendance to participate in the formation of bureau advice and recommendations to the panel.⁷ This not only enables governments to influence the presentation of issues to the panel, it also gives governments greater knowledge of the unfolding assessment process, which translates into authoritative interventions during plenary proceedings and the approval of IPCC documentation.⁸ Further expertise and insider knowledge of the IPCC's practice of writing is available to these governments in the plenary itself, as bureau members sit alongside and may even constitute the national delegation during these proceedings. As the leaders of the assessment and most respected position within the bureau, the election of the developed country WG co-chairs is particularly important. Developed country governments with an elected WG co-chair fund and host the technical support unit (TSU), which as the previous chapter highlights, has greater day-to-day contact with and knowledge of the assessment than any other unit of the IPCC. The office of the national focal point are in regular contact with TSU staff over budgetary and administrative issues, and delegates are likely to seek information, advice and the WG's position on plenary issues prior to and during bureau and plenary sessions (from interviews with TSU staff). To date only seven countries have hosted a TSU, endowing

⁶ Some bureau members are regarded as political appointees, with "political instructions from their respective governments" (Bolin 2007, 84).

⁷ Bureau meetings are attended by around 50 actors, compared to the 280 or more that attend plenary sessions.

⁸ For example of the twenty countries that intervened and spoke for the longest during the 32nd plenary session in Busan, only 3 do not have a bureau member in the AR5 (see appendix D). For more on this relationship see chapter 8.

these countries with considerable intellectual capital in and over the IPCC's practice of writing climate change.⁹

The bureau election not only impacts the distribution of power in the panel, it also has significant effects for the direction of the next report and for the actors elected, the institutions supporting them and the fields of knowledge and professional expertise that qualify them for the role. Each WG report is overseen by a WG bureau, and the expertise of the co-chairs and six vice-chairs that make up the three WG bureaux orientates the direction of the next assessment, delineating the forms of knowledge and expert networks accessed in scoping the outline, selecting authors and conducting the review (chapter 7). The power to influence is not evenly distributed amongst bureau members and is governed by bureau position, scientific credentials and actors' investment as enabled through economic and cultural capital. Once again, the most significant figure in this regard is the developed country co-chair, as they have the most access to and authority over the emerging assessment. Vice-chairs have less contact with the assessment pathway and the extent of their contact depends on the degree to which co-chairs and supporting TSU involve them in decision-making. Nevertheless, these actors also play a critical role in identifying and mobilising regional expertise and colleagues of epistemic networks (interviews with bureau members).¹⁰

Having the power to structure relations within the panel and govern the direction of the next assessment, bureau elections create considerable activity and excitement within the panel, as governments nominate bureau members and lobby for their election. Until recently there was little evidence of the behind the scenes manoeuvring that accompanied this element of the IPCC's practice of writing, although the controversy surrounding the election of Rajendra Pachauri in 2002 indicated its extent (chapter 5.3). However, wikileaks have provided clear indication of the importance some governments place on the election process. Panel and bureau members have attempted to contain the disorder

⁹ The countries that have hosted a TSU: US (x5); UK (x4); Netherlands (x2); Canada (x1); Germany (x1); Switzerland (x1); USSR (x1). For further details see chapter 5, table 5.1.

¹⁰ Some co-chair and TSU management teams actively seek the approval of the WG bureau for all major decisions, whereas others prefer to minimise bureau contact and decision-making (interviews with previous vice-chairs and TSU staff).

this engenders in the panel by codifying the election procedures (IPCC 2006c). These stipulate that once the session is open the proceedings pass to a nominations committee, whose task it is to compile and present the credentials of candidates to the panel (ibid). A long-standing aim of those leading this process has been to fill bureau positions by consensus rather than taking a formal vote. Starting with the IPCC chair, followed by the positions of WG co-chairs and vice-chairs, the relevant WMO regional groups meet and attempt to broker agreement on the candidates nominated (ibid).¹¹ Until 2002 this outcome was achieved through the leadership of the chair and the malleability of IPCC organisational structures, which enabled the political interests and geographical representation of the panel to be met through bureau expansion (Bolin 2007, 82-3;146). Since then, the elections have become increasingly reliant on the ballot, and whilst standing bureau members may want to maintain the spirit of accommodation, behind the scenes governments mobilise all available avenues to influence the election outcome.

In the case of the AR5, the release of wikileaks reveal US government lobbying in the run-up to the elections, to the extent that many delegations arrive at plenary with “guidance from their ministries of foreign affairs on what countries’ candidates to support” (Yamineva 2010, 85). Embassy cables document the avenues of influence sought by the US delegation prior to the election, through which they aimed to ensure the US candidate for WG II co-chair, Chris Field, was elected and the nominated Iranian candidate for the opposite position was not. Such a result was perceived as “problematic and potentially at odds with overall U.S. policy towards Iran,” which “would significantly complicate the U.S. commitment to funding the Working Group Two secretariat” (Guardian 2010a). The US did not consider withdrawing their nominee for the message it would send to Iran, and because “having a U.S. co-chair at the IPCC significantly bolsters U.S. interests on climate change, a key foreign policy issue” (ibid). As this cable indicates, in order to achieve the desired outcome, the US sought the support of the IPCC chair and other delegations prior to the election proceedings:

¹¹ The overall regional distribution in the bureau membership is as follows: Region I (Africa) - 5 positions; Region II (Asia) - 5 positions; Region III (South America) - 4 positions; Region IV (North America, Central America and the Caribbean) - 4 members; Region V (South-West Pacific) -3 positions and Region VI (Europe) - 8 positions (IPCC 2006, Rules of procedure for the election of the IPCC Bureau, annex B).

Prior to arrival in Geneva, *USDEL contacted IPCC Chairman Dr. [Rajendra Pachauri](#) (please protect), who agreed to work on this issue to avoid the potential for disruption to one the organization's three core working groups...*Next, USDEL contacted the Austrian delegate serving as EU representative on the nominating committee that manages the election process, who showed an understanding of U.S. equities. USDEL contacted the Malian and Argentinean delegations, who have nominated highly-qualified co-chair candidates (see below), and the German delegation, who have been interested in advancing the Malian for co-chair of Working Group Three, for which Germany has nominated an unopposed candidate as developed-country co-chair...Also prior to arrival in Geneva, USDEL contacted the UK and Netherlands delegations, both of which we have worked closely with in the past. (Guardian 2010a, italics in original)

In return the US delegation gave assurances to the countries contacted that it would give consideration to their election outcome preferences (Guardian 2010b; Guardian 2010c). This proved effective, with the US co-chair elected opposite the Argentinian, Vincente Barros (see figure 6.3).

Although political manoeuvring shaped the AR5 bureau election, political interests are not the only force dictating how the IPCC and its assessment process unfolds in practice; maintaining the order of proceedings and the malleability of the structural arrangements continue to act as strong determinants on eventual outcomes. For instance, in the election of the developed country co-chair for WG I, three candidates were nominated. As a precedence, pressure was applied to candidates and nominating countries to consider withdrawing in order to avoid a formal vote, as “it was speculated that a lack of strong consensus for one candidate could potentially be divisive to the work of the IPCC” (IAC 2010b, 245). Nominating delegations did not respond well to this pressure and in the end the candidates were permitted to present themselves to the panel and a formal vote followed, which saw Thomas Stocker of Switzerland elected (Barnett 2008). The malleability of the organisational structure and proceedings of the IPCC are also apparent in the election of the developing country co-chair for WG III. Here, rules did not stipulate how to resolve an election result that saw both candidates on the same ballot paper separated by a single vote, an outcome the panel managed by enabling both candidates to

take up the co-chair position (see figure 6.3). The resulting AR5 bureau embodies these contrasting forces and highlights that the election of the bureau, like all constituents of the IPCC's practice of writing, is a dynamic interplay between the interests of member governments and the habitus that panel activities and proceedings instil.

THE IPCC BUREAU			
Chairman			
Mr. Rajendra K. Pachauri			
IPCC Vice - Chairs			
Mr. Ogunlade Davidson (Sierra Leone)	Mr. Jean-Pascal van Ypersele (Belgium)	Mr. Hoesung Lee (Republic of Korea)	
Working Group I The physical science basis	Working Group II Impacts, adaptation, vulnerabilities	Working Group III Mitigation	Task Force Bureau National Greenhouse Gas Inventories
Co-chairs	Co-chairs	Co-chairs	Co-chairs
Mr. Dahe Qin (China)	Mr. Vicente Barros (Argentina)	Mr. Ramon Pichs Madruga (Cuba) ----- Mr. Youba Sokona (Mali)	Ms. Thelma Krug (Brazil)
Mr. Thomas Stocker (Switzerland)	Mr. Christopher Field (USA)	Mr. Ottmar Edenhofer (Germany)	Mr. Taka Hiraishi (Japan)
Vice-chairs	Vice-chairs	Vice-chairs	
Mr. Abdalah Mokssit (Morocco)	Ms. Nirivololona Raholijao (Madagascar)	Mr. Ismail A.R. Elgizouli (Sudan)	
Ms. Fatemeh Rahimzadeh (Islamic Republic of Iran)	Mr. Amjad Abdulla (Maldives)	Ms. Suzana Khan Ribeiro (Brazil)	
Mr. Francis Zwiers (Canada)	Mr. Eduardo Calvo Buendia (Peru)	Ms. Antonina I. Boncheva (Mexico)	
Mr. Fredolin T. Tangang (Malaysia)	Mr. Neville Smith (Australia)	Mr. Carlo Carraro (Italy)	
Mr. David Wratt (New Zealand)	Mr. Jose M. Moreno (Spain)	Mr. Jim Skea (UK)	
Mr. Jean Jouzel (France)	Mr. Serguei M. Semenov (Russian Federation)		

Figure 6.3 The AR5 Bureau. As Asia was not represented in WG III, an additional vice-chair position was subsequently filled by Saudi Arabia. Courtesy of: http://www.ipcc.ch/organization/organization_structure.shtml# (last accessed 09.12.2011).

6.3 Scoping the next assessment of climate change

With the newly elected bureau in place, momentum for the scoping and outlining of the next assessment report gathers pace, and the pathway widens to make way for the unit that will have greater day to day contact with the assessment report than any other unit of the IPCC: the technical support units (TSU). Up until now the pathway has concentrated on the activities and decisions taken by the panel at plenary session, and the necessary operations performed by the chair and secretariat to facilitate the decision to repeat the assessment and initiate the process. However, once the bureau has been elected and the TSU assembled, the purpose of each unit becomes more distinct and whilst their parallel pathways intersect at regular intervals, each unit is focused on its own operations. Below then, we continue to follow the assembly process through the activities of the IPCC panel at plenary session, we observe the assembly of the TSU, and we explore the combined operations of all units of the IPCC at two key events in the outline's production: the scoping meeting and the approval of the outline by the panel.

It takes about fourteen months from the election of the new bureau to finalise the outline of the IPCC's next assessment of climate change. In that time one of the key pieces of machinery required for the production of each WG report is put in place. As the previous chapter indicates, each WG has a TSU, which is funded by the developed country government of the elected WG co-chair and housed in or near their home institution. TSUs are made up of between 5-15 members of staff and it is these units that hold the assessment process together—its timeline, its authors and its contents—in order to produce an inter-governmentally approvable product. The TSUs sit above and incubate the WG reports from the moment they are assembled until publication, and even when placed into the hands of the authors, the unit maintains a watchful presence over the assessment, editing and polishing the final document. Once the WG co-chairs have been elected then, hiring the right staff and assembling this unit becomes the priority of the chairs and those that support them (interviews with TSU staff). The most important hire

will be the TSU head, in whom the chair of the WG must have considerable faith. Officially, only 50% of the chair's time belongs to the assessment process, which means the chair's capacity to fulfil this role resides with the TSU head's ability to manage and conduct the process. For this reason the WG co-chair seeks a head with complementary expertise and personal characteristics to broaden their professional range and guard the process.

The TSU's first major role in the assessment process is the scoping meeting. This meeting lasts up to a week and aims to produce a detailed outline of the next assessment report, including chapter headings and bullet points of the topics to be addressed in each chapter, see figure 6.1.¹² The meeting centres on identifying and scoping advances in climate change knowledge and in doing so opens the assessment pathway to the expertise that will author the report and whose fields of knowledge provide the scientific substance and authority necessary for the IPCC process. In this regard, the meeting also serves as a platform for the newly elected co-chairs to gain the respect and support of those they lead and rely upon in realising the next assessment of climate change. For the scoping of the AR5 participants were selected from nominations made by governments and observer organisations and from the expertise identified by the WG bureaux and TSU staff.¹³ Out of the 186 experts and government representatives participating, the majority had some prior experience and involvement with the IPCC and its assessment process. As with author selection (chapter 7.1), disagreement may arise within the WG bureau during this selection process, particularly over the disciplinary expertise and geographical balance of potential participants (interviews with bureau members). As the bureau election indicates, the professional expertise of the WG co-chairs, vice-chairs and the TSU science staff delineate the expert networks accessed and the disciplinary fields represented, and as the developed country co-chair and the TSU have greater contact with and responsibility for identifying expertise and compiling expert lists, the epistemic preferences and

¹² There were two scoping meetings for the AR4 and AR5. In the case of the AR5 the first of these focused on the outline of the main report and the second on the Synthesis Report, only the first it explored here as this thesis does not track the development of the Synthesis Report.

¹³ Although the InterAcademy review concluded that the scoping process and the selection of participants for the scoping meetings remained "opaque to those who have not participated" (IACa 2010, 17), the AR5 scoping process was the most formalised to date. In previous assessments, experts were largely identified and selected by the IPCC chair, the WG co-chairs and TSU staff (IPCC 2003a; interviews with TSU staff).

geographical range of these personnel are better represented if left unchallenged by the wider WG bureau.

The starting document for the scoping meeting is the chair's vision paper, which has evolved considerably since its first circulation and now reflects submitted comments, plenary discussions and the views of the newly elected bureau (IPCC 2009e). Attached to the chairman's vision paper is also a contribution from each of the WGs. These documents are prepared by the co-chairs and TSUs with input from the WG bureau, and summarise the main findings of the previous assessment, outline the issues and themes to be covered by the next report and usually include an initial draft outline, or straw man (ibid).¹⁴ Opened by the IPCC chair, most of the first day is taken up with informing and familiarising invited experts with the purpose of the meeting, IPCC rules and procedures, the main users and target audience of IPCC reports and the WG's initial vision for the next assessment (IPCC 2009f). The participants are then divided into WGs, or breakout groups, for the majority of the remaining meeting and in these groups of about 30 they are tasked with drafting an outline for the next assessment (IPCC 2009e). The WG chairs and the TSU staff are central in this process, guiding the expert discussions through workshops and presentations and updating the draft at the end of each day to reflect the views of those contributing (interviews with TSU staff). The aim is to get a sense of the state of the field by locating the advances in research since the last assessment, anticipating where further contributions are likely to occur before the next report is finalised, and finding the means to represent these in the outline of the next assessment of climate change. The ease at which discussion and debate is settled and reflected in the emerging outline depends on the homogeneity of the expert communities and management of the process (interview with bureau members). It is, for instance, easier for those contributing to the WG I process to identify and agree upon advances in the physical sciences of climate change, than it is for the diverse range of expertise constituting WG III to agree upon relevant economic, political and equity dimensions of mitigating climate change.

¹⁴ The WG TSUs tend to also conduct their own period of consultation with previous authors and relevant experts on the scope of the next assessment report, see for example WGI's background information on the outline (IPCC 2009j).

The outline generated by the scoping meeting is polished by the co-chairs and TSU staff and sent out to member governments and IPCC observer organisations for comments (IPCC 2009d). In order to respond to these comments and amend the outline accordingly, the bureau meets prior to the outline approval session. The full bureau meets on average twice a year for a one or two day session between and before the start of plenary sessions. These meetings are chaired by the IPCC chair and attended by the IPCC vice-chairs, representatives of the secretariat, WG co-chairs, WG vice-chairs, WG TSU staff, government representatives and representatives of WMO, UNEP and the UNFCCC. As with plenary sessions, these meetings have regular items on the agenda and although they are less formal than plenary sessions, they adhere to a similar order, with bureau members sat with the national representative in alphabetical order and translation available in all UN languages (interviews with bureau members). In many cases, the long-standing government representatives in attendance are more familiar and comfortable with these proceedings than the newly elected bureau members and confidently take more airtime than the elected officials (ibid).

When the draft outline is on the agenda the WG bureau have scheduled break-out sessions to review government comments and amend the draft accordingly. Government representatives are not permitted to attend these meetings, which are open to WG bureau members and TSU staff only. These proceedings are less formal than the full bureau meeting and tend to be more technical and focused on matters specifically related to the assessment process (interviews with bureau members and TSU staff). The majority of government comments relate to the structure of the report, the timeline for its completion and its policy relevance (IPCC 2009g). Some however, identify the use of politically sensitive language and framing of the climate change problematic, particularly if the topics covered are perceived to relate to or have some future bearing on the UNFCCC negotiating process (interviews with bureau members). Depending on the WG, these issues will range in their sensitivity and the ease with which they are resolved, and the comments received both facilitate a revising of the draft outline and signal the issues, topics and words that are likely to cause problems in the plenary approval session. For the

AR5 the WG bureaux took a day to revise the draft outlines, and once presented and approved by the full bureau they were sent out to member governments along with an information document prepared by each WG TSU on the context and detail of the outline's construction (IPCC 2009h; IPCC 2009i; IPCC 2009j; IPCC 2009k). Just over a month later the 31st session of the IPCC plenary convened in Bali to approve the outline of the IPCC's next assessment of climate change (IPCC 2009a).

6.4 Approving the Outline

The IPCC process for approving documents is one of the most fascinating facets of the IPCC's practice of writing. As the principles governing IPCC work stipulate, conclusions of the WG reports are not "official IPCC views until they have been accepted by the Panel in a plenary meeting" (IPCC 2006c). To achieve this official status, all IPCC reports and accompanying summary for policymakers are subject to acceptance and approval by IPCC member governments before publication. 'Acceptance' and 'approval' are IPCC terms identifying the extent of the panel's appraisal of submitted documents. WG reports are subject to government 'acceptance', a term signifying that member governments deem the reports comprehensive, objective and a balanced view of the subject matter (IPCC 2008b). The outline and final summary for policymakers (SPM) are subject to government 'approval', a term indicating that the documents have been approved line-by-line by the panel, which as becomes apparent in chapter eight, is a process that often breaks down to word-by-word negotiation.

The final section of this chapter attempts to identify some of the key features of this approval process as it maps the final stage of the outline's development, which sees the draft outline subject to approval by the IPCC panel. In depth analysis of the IPCC's process for accepting and approving IPCC documents is the subject of chapter eight. In this chapter, we follow the draft outline into the three WG sessions where it is often substantially revised through government interventions, objections, and suggestions for

rearranging the document and re-wording the bullet points. The outline that is eventually approved and adopted by the IPCC panel is a product of the pathway and operations described in this chapter, including the chair's vision paper, the bureau election, the scoping meeting and governments' comments. All of these operations constitute the IPCC's practice of producing an outline and provide a roadmap to the authors selected for generating the next assessment of climate change (chapter 7).

The plenary for the approval and adoption of the WG outlines adheres to the same opening routines as other plenary sessions, although the room is more crowded than usual, as larger delegations are required to cover the parallel WG sessions. Once the hosts have been thanked, speeches given and governments have had the opportunity to identify their major concerns with the outline as it stands, the plenary is suspended and the WG approval sessions begin (Carter, Schulz and Yamineva 2009). These sessions are chaired by the WG co-chairs and in general the developed country co-chair leads the proceedings with TSU staff seated next to him or her.¹⁵ The outline is projected on large screens at the front of the hall, and the co-chairs indicate the revisions made by the WG bureau in response to governments' comments and suggestions. The session then turns over to the floor as each chapter heading and bullet point is subject to the scrutiny of delegates, their interventions veering between concern for the political relevancy of the forthcoming assessment and wariness over the political implications of its content. Once it becomes apparent that no agreement can be reached over a given chapter or chapters by the panel in plenary or a particular issue begins to circle the room consuming plenary time, the WG co-chair may call for the formation of a contact group and appoint a member of the bureau or a government delegate as chair. These sessions take place in between the plenary session with the purpose of finding an agreeable chapter heading or bullet point, which is then taken back to the plenary for general approval.

In the case of the AR5, WG III's outline was subject to substantial revisions during the WG approval session. WG III is charged with assessing policy options and pathways for

¹⁵ There has only been one female WG co-chair: Susan Solomon from the US, who co-chaired WG I with Dahe Xin from China for the AR4.

mitigating greenhouse gases, and many of the issues arising during the approval session centred on the practical utility of the outlined topics and the academic language used to frame these in the draft (Carter, Schulz and Yamineva 2009, 6-8). Two contact groups were formed over the course of the approval session and these groups reordered and reformulated particular sections of the outline, at times breaking down into smaller groups in order to deal with particularly contentious areas (ibid; IPCC 2009l, 2009m). Much of the technical and scientific material assessed by WG III relates to and has implications for the international negotiations of the UNFCCC. Consequently many of the tensions that arose were the result of government delegations defending and contesting particular formulations that could potentially impact the international negotiating process. For example, in the draft outline, the chapter on National and Sub-National Policies separated the analysis of policy implementation and performance into *developed* and *developing* countries, see figure 6.5. (IPCC 2009l, emphasis added). Switzerland raised an objection to these two bullet points, noting that it was difficult to identify a threshold between developed and developing countries (Carter, Schulz and Yamineva 2009, 7). Other countries also intervened, including The Netherlands, the UK and Mexico, suggesting that development levels need to be subject to analysis (ibid, 8). Here, Saudi Arabia interjected, highlighting that the UNFCCC clearly differentiated between developed and developing countries, as reflected in the division between Annex 1 and non-Annex 1 parties (ibid). Such weighted categorisations as developed and developing and the assessed knowledge that they rest upon have implications for all countries and the responsibilities they must bear in the negotiating process and therefore do not pass through the outline approval process without contestation and struggle (ibid, 13).

The length of time it takes for the outlines to be approved depends on the WG and the discussion and debates that surface. For the AR5, the outlines of WG II and WG III were subject to substantial revisions, with approval sessions running into the night in order to be completed on time. WG I outlines however, which focus on assessing the physical scientific basis of climate change, are generally subject to the least change: a few words added to the end of an existing bullet point and perhaps a slight re-ordering to improve

clarity from the delegate's standpoint, but on the whole the AR4 and AR5 draft outlines remained largely intact (IPCC 2003b, 2003c, 2009n, 2009o). Although fewer revisions were made to the WG I outline than to the outlines of the other WGs, this does not mean points of tension do not arise over the direction of the next scientific assessment of climate change, particularly when it appears to point towards politically sensitive territory. For instance, during the AR5 approval process, China proposed the deletion of a specific reference to black carbon made under the chapter heading on clouds and aerosols (Carter, Schulz and Yamineva 2009, 4).¹⁶ This deletion was opposed by the US, UK, Austrian and Canadian delegations and in the end China agreed to keep the bullet point unaltered, "stating that they appreciate the need for an assessment of black carbon but noted that many aerosols also play an important role" (ibid).

Struggles over particular elements of the scientific conceptualisation of climate change are significant. They are struggles amongst the panel members over scientific objects that have the potential to become socially and politically weighted through the IPCC's practice of writing climate change. Once the threat of black carbon has been written into and accepted by the IPCC scientific assessment process, this substance and the industries that produce it are likely to become swept into the political struggle over the international community's response to climate change. Identifying the warming effect that particular gases or aerosols have on the atmosphere, such as carbon dioxide, methane or black carbon, weights these concepts and by doing so makes them constituents of the international contestation and struggle over emission reduction targets.¹⁷ Therefore, those country delegations aware of the political stakes of introducing or highlighting particular

¹⁶ The common name for black carbon is soot. These are small light-absorbing particles released into the atmosphere through the incomplete combustion of fossil fuels and biomass. These particles are thought to have both a local cooling effect by reducing the solar radiation that reaches the surface of the earth as well as a regional warming effect through the absorption of sunlight and by the darkening of ice and snow (Forster et al. 2007).

¹⁷ This contestation over the identification of particular elements of the science of climate change has been a feature of the panel's involvement in the IPCC's practice of writing climate change since the First Assessment Report. For example, in the negotiation over WG I's Summary for Policymakers in 1990, Saudi Arabia took issue each time that carbon dioxide was used in the proceedings, protesting that as carbon dioxide was not the only greenhouse gas it should not be referred to and the text should stick to the term of greenhouse gases (Leggett 1999, 17).

concepts in the outline come to the plenary approval session prepared and well armed to make and contest such references.¹⁸

16. National and Sub-national Policies

- Introduction
- Taxonomy of policy instruments
- Criteria for evaluating policy instruments
- Evidence on policy implementation and performance: Common experiences across countries
- Evidence on policy implementation and performance: Aspects specific to developed countries
- Evidence on policy implementation and performance: Aspects specific to developing countries
- Framework: role of institutions and governance
- National / state / local linkages
- Links to Adaptation
- Synergies and Conflicts among policies
- Assessing Policy Design Options

WG III draft outline presented at the 31st Plenary Session of the IPCC, Bali.

15. National and Sub-national Policies and Institutions

- Introduction
- Characteristics and classification of policy instruments and packages
- Approaches and tools used to evaluate policies and institutions
- Research and development policy
- Assessment of the performance of policies and measures in developed and developing countries taking into account development level and capacity
- Framework: Role of institutions and governance
- Capacity building
- National, state and local linkages
- Links to adaptation
- Synergies and tradeoffs among policies
- Assessing policy design options
- Investment and finance
- The role of public and private sectors and public-private partnership
- The role of stakeholders including NGOs
- Frequently asked questions

WG III outline as approved at the 31st Plenary Session of the IPCC, Bali.

¹⁸ How delegations prepare for these sessions is subject to further enquiry in chapter 8.

Figure 6.4 WG III outline as presented to the plenary in draft (top) and approved by the plenary (below) at the 31st IPCC Plenary Session in October 2009.

Once the WG outlines have been approved, the plenary is reconvened. The co-chairs of each WG report back to the plenary on the respective WG session, highlighting the revisions made to the approved outline and indicating their commitment to the next assessment of climate change (Carter, Schulz and Yamineva 2009, 8). The WG outlines are then accepted by the panel as the outline for the IPCC's next assessment of climate change with a timeline for their production agreed.¹⁹

6.5 Summing up: from outline to assessment

This chapter traced the outline's formation from the panel's decision to repeat the process to its acceptance of the final product. This pathway identifies the central role played by member governments at all stages of the outline's development. It is the IPCC's practice of seeking comments and the panel's role in electing the bureau and approving the outline, which enables governments to imprint at every stage of the outline's formation and shape the topics covered and knowledge surveyed by the IPCC's next assessment of climate change. This power to influence through the IPCC's practice of writing is not equally distributed amongst panel members and as an elected bureau member can significantly increase a delegate's access to and authority over the process, the bureau election is one of the most politically charged elements of the assessment's assembly pathway. By attending bureau meetings and by having the intellectual capital of bureau members close at hand during plenary sessions, governments with bureau membership expand their knowledge of the process and capacity for authoritative interventions. As we shall see in chapter eight, this access to the IPCC's practice of writing and knowledge of

¹⁹ There is an effort to stagger the publication of the three WG reports to enable the findings from WG I's assessment of the science of climate change to feed into WGs II and III. For the AR5 WG I's approval session is scheduled for September 2013, WG II – March 2014, and WG III – April 2014.

its proceedings translates into symbolic power during the approval of the final assessment report.

The outline that emerges from its pathway through the panel embodies the interests of its most powerful members. Those invested in the IPCC's practice of writing and working to insert their interests in its products, realise that the outline effectively serves as an agreement on the direction of the next assessment report between the member governments commissioning the report and those elected to oversee its production. The outline confines the scope and reach of the next assessment and thereby the authors of the report, whilst at the same time enabling them to insert their knowledge and expertise into the final assessment products. The assembly pathway mapped above facilitates the creation of a shared vision between all those involved in the assessment's production and serves to harmonise the expectations of the authors with those of the member governments, increasing the likelihood that the panel recognises the outcome and accepts the final product. Despite this power in and over the IPCC's practice of writing, the outline does not only serve the purposes of the panel, and the struggles between member governments are not the only forces embodied in the documents the panel approves; if the IPCC is to maintain its privileged position in the climate field and retain its symbolic power as provider of legitimate means to know and respond to climate change it must guarantee the authority and relevancy of its products.

Through its practice of seeking comments on the chair's vision paper, inviting representatives to the scoping meeting and the convention of speeches at plenary, the outline's construction pathway opens the forming document to the IPCC's parent bodies: WMO and UNEP, its main client, the UNFCCC, as well as other interested international organisations. These practices enable these parties to identify and insert their interests in the IPCC's next assessment of climate change, guaranteeing the relevancy and impact of the final product in and on the climate field. For this capacity to shape how climate change is known and practiced within the climate field, the IPCC is reliant on the knowledge communities that produce climate change knowledge and author its assessments. Here the scoping meeting serves a vital function, enabling the WG bureau

and TSU to identify the leading expertise and advances in climate change knowledge, as well as providing them with the opportunity to gain the respect and support of the expertise they are reliant on for realising the final product and guaranteeing its authority.

This pathway through the panel, the bureau, the TSU and other interested parties and the purposes the outlining activities serve, produces an outline that reflects the actors, activities and interests involved. Over the coming pages we follow this document as it passes to the authors and its bullet points and headings are transformed into bodies of texts and chapters on climate change. Like all aspects of the IPCC's practice of writing, this pathway through the scientific assessment indicates that whilst governments aim to structure the reality of climate change through the outline they approve, this reality is subject to re-writing in and through the interests of the authors and other actors that participate in reviewing and redrafting IPCC assessments.

7. The scientific assessment

This chapter explores the second slice into the IPCC's report assembly pathway, in which the government approved outline is written into an assessment of climate change. The previous chapter focused on the construction of the outline, and by mapping the development of this document and tracing its journey through the IPCC it illuminates how a roadmap of the next assessment is produced and the actors and activities influencing its construction. In this chapter we identify the actors and describe the process by which this outline is transformed into an assessment of climate change. Each WG produces an assessment report, a technical summary and a summary for policymakers. In this chapter we explore the construction of the main WG assessment reports. Each of these documents spans over a thousand pages and crosses disciplinary divides in its assessment of the scientific, technical and socio-economic aspects of the climate change problematic. Unlike the summary for policymakers (SPM), which is a widely read and quoted source of information for actors invested in the climate change problematic, the WG reports are not widely disseminated beyond the disciplinary and professional fields from which the expertise and knowledge is drawn. As revealed by interviews, the WG reports commonly serve as reference material or teaching aids for practitioners and their students, providing a survey of the field and identifying the gaps in knowledge for research agendas and proposals.

The fact that IPCC assessment reports do not serve the same IPCC-specific purposes as the outline and the summary for policymakers (SPM) distinguishes them from these documents: the assessment reports are not the product of or determined by the political forces governing the panel or the social relations between IPCC units as imprinted on the outline, rather they serve the purpose and embody the relations of the fields of knowledge they comprise. Although these reports may not be the most well used product of the

IPCC's practice of writing, they are critical to the transformation of climate change from an object of scholarly attention to an object of political struggle and social action. They also have a marked impact on the construction of climate change as an object of scholarly interest: distinguishing research and scholarly contribution to the field and identifying gaps in knowledge and future research directions. This makes authorship and inclusion in the IPCC's assessments of knowledge an important measure of one's position in the field and means for advancing it. As chapter 5.6 indicates, this interest in the authorship and content of the report is a structuring force within and between the fields producing knowledge of the climate change problematic. It is also an object of struggle between the bureau members and TSU staff charged within compiling author lists and selecting the chapter teams, as these actors seek to ensure the necessary expertise is in place to create and contest particular writings of climate change.

By documenting the construction of IPCC assessment reports we gain insight into the social-scientific forces structuring the construction of climate change. Most importantly, the chapter is able to tackle one of the central research questions directly, which is who gets to write climate change in IPCC assessment reports and what qualifies them to do so? The answer to this is sought in IPCC processes for nominating and selecting authors. Detailing author selection illuminates the role of governments, the WG bureau, the TSUs and the criteria employed to discriminate between nominations in compiling chapter teams. Documenting this process reveals the tension between the IPCC's objective of increasing geographical representation and the scientific criteria employed to identify and measure scientific authority in distinguishing between nominees and selecting those best qualified to author the assessment. At this juncture the chapter begins unpacking the relationship between economic capital and participation and investment in the IPCC's practice of writing. Each stage in the author nomination and selection process is revealing of the discrimination against developing country participation in the IPCC's assessment practice, the basis of which appears to lie in the scientific habitus. It is the capacity of scientific conventions to distinguish scientific authority that discriminates against those that do not possess the cultural properties particular to the social-scientific universe,

overlooking their historical particularity and relationship to and reliance upon economic capital.

In the second half of the chapter it becomes possible to begin addressing the next key element to the research question, namely how these relations imprint on the writing of climate change. The chapter follows selected authors into the lead author meetings, documenting how the relationship between authors and their interests, cultural capital and economic capital are imprinted on the construction of the assessment in and through the drafting and reviewing cycle. Here the chapter reveals some of its limitations. This is an attempt to map a living process, involving thousands of expert authors from around the world. The three working groups and the fields of knowledge contributing to the authorship and content of the reports are by no means homogenous. The features and properties identified in the chapter then, are an attempt to map the general topology of relations within and between the WGs in order to discern how these structure the assessment produced. In doing so, the chapter relies upon interviews and discussions with authors, bureau and TSU members (appendix a), and the questionnaire data collected through the IAC review process (IAC 2010b). Whilst the pathway the report travels in its formation is more deeply entrenched now than ever before, it remains open to adjustment and reconfiguration when events threaten the legitimacy of the IPCC's knowledge production processes and the organisation's privileged position in and to the climate field. Thus, whilst the chapter describes the AR4 and AR5 process, as a result of errors discovered in the AR4, the external reviews these initiated and the recommendations they gave rise to (IAC 2010a, 2010b; PBL 2010), the panel is already re-writing the procedures for producing reports (IPCC 2010a, 2011a, 2012a), meaning that by the end of the current assessment the pathway will not look quite as it did at the start.

7.1 Author selection

The assessment report's construction begins with a letter from the secretariat requesting author nominations from member governments and participating international and non-

governmental organisations, see figure 7.1.¹ Until this point, the IPCC's practice of writing has remained largely closed to the scientific communities that author the assessments. As chapter 6 indicates, whilst expert input is sought during the scoping process, this flows through a small representative sample: the WG bureau and experts invited to the scoping meeting, many of whom have participated in previous assessments. The secretariat's request for nominations and the roughly three month nomination period initiates a wider search for qualified authors, providing the opportunity for governments to identify experts and for experts aware of the IPCC process and interested in partaking to identify themselves and gain access to the IPCC's practice of writing.² Of course, not all qualified experts will be aware of this process, nor in practice is access equal to all experts and geographical regions. This section outlines the nomination and selection procedure and identifies some of its structural discriminations.

¹ For the Third Assessment (TAR) and earlier reports authors were selected prior to the finalisation of the outline, however, this procedure was altered partly because those managing the TAR discovered that in some cases they did not have the appropriate expertise to fulfil sections of the government approved outline (Yamineva 2010, 54-5). See also IPCC 1997.

² Although experts are encouraged to go through the national mechanism, for many countries "self-nomination is the norm" (IPCC 2010e, 7).

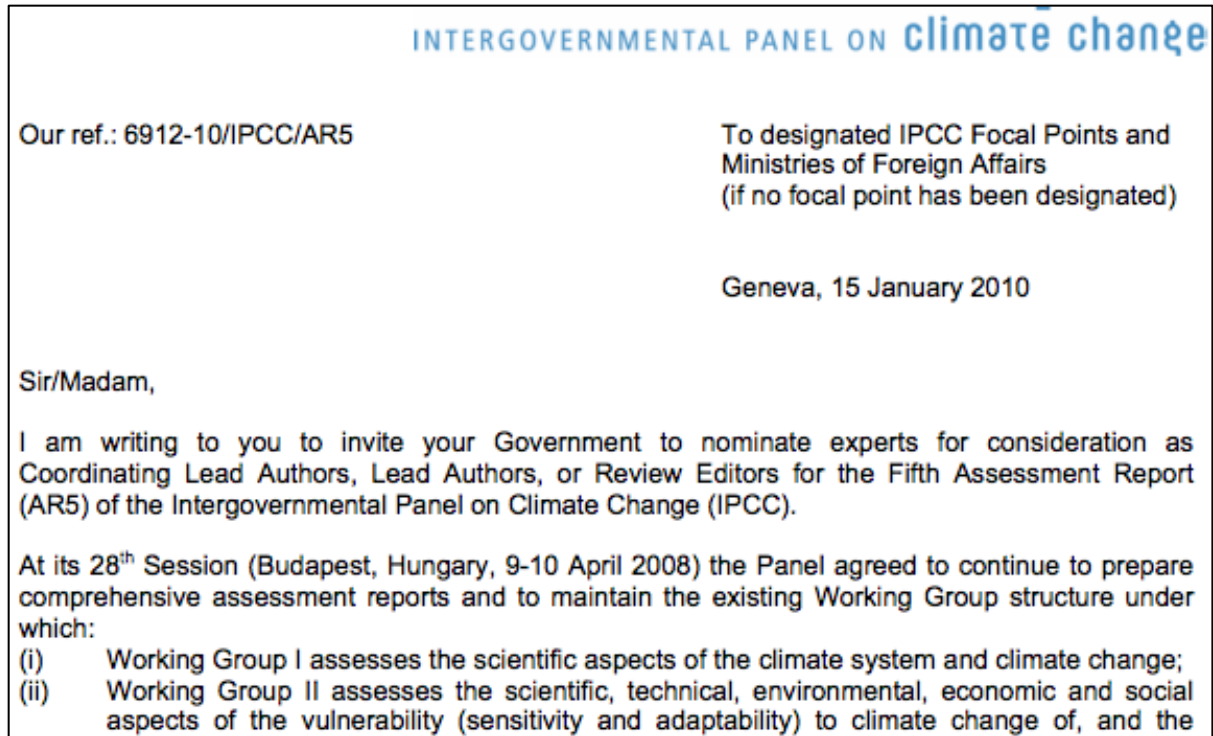


Figure 7.1. Letter from the IPCC secretariat to designated IPCC Focal Points and Ministries of Foreign Affairs requesting expert nominations for the AR5 assessment process.

The national focal point is regarded as the link between the government and the national scientific community, and is thus responsible for orchestrating the national process of identifying experts and submitting a government approved list of author nominations. The route taken by the focal points and any support staff to compose this list depends on the national context, the government department in which the focal point is housed and the national process institutionalised for this purpose (IPCC 2010e).³ Many developed country focal points have support staff and well-established mechanisms for sending out the call for nominations to government agencies and academic networks, which may include workshops to raise awareness of the IPCC assessment process (ibid, 6). These countries tend to also have a set of institutionalised procedures, such as government and community consultations or expert committees, which are convened to assist in the selection process (ibid, 7). This investment in the author selection process indicates the

³ The IPCC encourages all focal points to keep data bases of past authors and reviewers to contact at this time (IPCC 2010e).

recognition that some governments give to IPCC assessment reports as a platform for national climate change research.⁴ In contrast, scientists from developing countries complain that government focal points do not always nominate the best scientists from amongst those that volunteer, “either because they do not know who those scientists are or because political considerations are given more weight than scientific qualifications” (IAC 2010, 14). The lack of a coordinated effort for author nomination and selection in developing and EIT countries is supported by the IPCCs own study of the issue, which indicates that of those surveyed only half of developing and EIT country focal points submitted nominations for the AR4, compared to over ninety percent of developed country focal points (IPCC 2009p).⁵

Whilst the procedures followed by developed countries for nominating and selecting national experts are formally institutionalised, that does not make them without bias. The particulars of the process are specific to the country and without substantial research into each national case it is difficult to accurately illuminate the relationship between the IPCC focal point, government nomination practices and the national expert communities. However, from interviewing IPCC participants it is possible to highlight some case specific features. In the UK for example, particularly in the earlier days of the IPCC, many of the experts invited to participate by the government were known through government-contracted research for the Department of Environment, Food and Rural Affairs (DEFRA). These experts, drawn from or related to a limited number of research institutions, most notably the Hadley Centre of the Meteorological Office and the Climate Research Unit at the University of East Anglia, are connected to each other and the focal point through these locations, academic networks and participation on research projects

⁴ See for instance UKCDS report, which highlights that UK authorship to the AR5 is second only to the US (McLaren and Carter 2010, 18-19), also Shackley (1999). See also a memo released from Environment Canada's science and technology branch, which highlights the significance of Canada's contribution to the IPCC for maintaining the country's reputation as a leader in climate change research (de Souza 2010).

⁵ At the 30th session of the IPCC in Antalya (April, 2009a), the IPCC vice-chairs were charged with assessing the involvement of Developing/EIT country scientists in order to make recommendations for improving participation. As part of the analysis a survey was conducted, which of the 194 IPCC member countries only 38 responded, and of those respondents from Developing countries (18) and EIT (4), 50% indicated that no experts were nominated during author selection (IPCC 2009p). Thus, in actuality the figures are probably far lower as those that answered the questionnaire are likely to be those more invested in the process.

and assessments related to climate change (from interviews with UK participants).⁶ Although the call for nominations is now more widely distributed and anticipated, these traditional centres still remain better represented in the authorship of the reports.⁷

Once the nominations period closes it is the task of the TSUs and WG bureaux to select and compile the author teams. This selection process has become a significant undertaking in the IPCC's practice of writing, as those in charge respond to events and forces shaping the development of the IPCC and the communities of expertise its assessments depend upon. Since the IPCC's FAR there has been considerable growth in scholarly interest in climate change, which has led to a corresponding increase in the number of experts qualified to participate and in the volume of literature to be assessed.⁸ The three WG volumes of the IPCC's FAR, published in 1990, provided roughly 940-pages of climate change assessment. These three volumes were composed by a relatively small group of authors drawn from a few countries. The WG I report, for example, was compiled by 35 authors drawn from 12 countries, which reflected the fact that academic interest in climate change was still emerging and largely confined to a few research centres, most notably in the UK (Boehmer-Christiansen 1995a; 1995b; Shackley 1999) and North America (Edwards & Lahsen 1999).⁹ This in turn meant that the available literature on the subject was limited and could effectively be reviewed by one or two of

⁶ The UK has had an active role in the management and organization of the IPCC since its founding. The current focal point has been attending IPCC plenary's since 1990, and Sir John Houghton, the director-general and later chief executive of the UK Met Office, chaired WG I's contribution to the FAR, SAR, and TAR. It is therefore unsurprising that there are well-established routes between the UK focal point and the climate change research community, which are re-activated with each subsequent round of an IPCC assessment of climate change. For an account of the relationship between the then Department of the Environment and the Met Office, see Shackley 1999.

⁷ For the AR5, the government's call for nominations was answered by 154 applications which after review by a small panel of experts from DECC and elsewhere were all put forward for the IPCC selection process (see DECC, 2010). Of the 63 authors selected from this list 8 were from the Met Office Hadley Centre; 7 University of Exeter; 6 Oxford University; 5 Cambridge University and; 5 University of East Anglia (IPCC 2011c).

⁸ According to a survey by Boehmer-Christiansen & Skea (1994, 20-22) growth in knowledge was already observable between the FAR and the SAR, particularly in the fields of climate modeling, climatology, oceanography and the physical impacts of climate change. A recent UKCDS review indicates the scale of this increase over the past two decades: "between 1992-1996 the total global sample of publications was 2,467, over the period 2007-2011 this has now risen to 27,055" (McLaren and Carter 2010, 15).

⁹ Of the 12 countries that participated in WG I's contribution to the FAR there were no developing country authors, and only 3 EIT countries were represented with a single Lead Author from Brazil, China and India (these numbers are based on the provided author list in the WG I's contribution to the FAR, see Houghton et al. 1990).

the leading experts with requests for expert contributions where necessary (interviews with FAR participants).

In contrast, the three WG volumes of AR4 amounted to a 44-chapter assessment covering over 2,800 pages. This assessment, contributed to by more than 1,400 authors and review editors from 109 countries, referenced approximately 18,000 items of published literature.¹⁰ Thus, whilst it was possible for one or two chapter leaders to do a survey of the available literature for a given chapter in the FAR, a number of authors interviewed indicated that today this would be impossible. This growth in interest in both climate change and in the IPCC has continued into the AR5, for which over 3,000 author nominations were received across the three WGs, an increase of 50% from the previous assessment (IPCC 2010f). During the selection process, the WG TSUs must ensure the criteria they employ to discriminate between applicants and assess professional credentials identifies the leading authorities from amongst this expanding expertise and provides for the range of knowledge needed to address each heading or bullet point of the panel approved outline (interviews with TSU staff).

The selection process is further constrained by the IPCC's institutional concerns with improving geographical representation, incorporating a range of viewpoints (IPCC 2008b, 5), and introducing new and early-career scholars to the process. These preoccupations arise from the IPCC's attempt to ensure continued acceptance and support for the assessment process amongst its member governments and the communities of knowledge that evaluate the finished products. Geographical representation has been a central concern to IPCC leadership since its establishment and a number of institutional mechanisms are in place to enhance developing country membership to the panel and in the authorship of the reports.¹¹ These mechanisms, such as ensuring there is at least one

¹⁰ The figure of 18,000 items is taken from a statement given by the IPCC chairman, Rajendra Pachauri, at CoP 16 (Pachauri 2010). All other figures are based on author's own calculations from AR4 author lists.

¹¹ The first chairman of the IPCC, Bert Bolin is often quoted for his remark that 'right now, many countries, especially developing countries, simply do not trust assessments in which their scientists and policymakers have not participated. Don't you think global credibility demands global representation?' (Schneider 1991). In an attempt to ensure greater participation in the IPCC panel and authorship process the IPCC convened a Special Committee on the Participation of Developing Countries in 1989 that made a number of

coordinating lead author “and normally two or more from developing countries” on each chapter (IPCC 2008b), and establishing a trust fund to cover travel expenses, have contributed to an increase in the percentage of authors from developing and EIT countries. Despite this increase however, disparities remain in the level of involvement and contribution authors from developing countries are able to make to the assessment process, a topic explored further below.

Representing the range of views held by the expert communities that contribute to and contest the science of climate change became an issue after the publication of the FAR (Shackley 1996, 203-4), and the IPCC continues to be criticised for excluding expertise skeptical of the climate change issue and for not representing the range of disciplines contributing to climate change knowledge production.¹² To counter these criticism attempts are made to include a range of views and perspectives and where possible involve critics in the authorship of the assessments. Finally, efforts are taken to balance the retention of experienced authors, familiar with the IPCC’s practice of writing, with the introduction of fresh insight from new and younger participants. This criteria became even more important for the AR5, after the release of emails from the Climate Research Unit at the University of East Anglia reinforced perceptions that the IPCC assessment process is governed by a few long-standing members seeking to keep critical science out of the reports (de Costello 2009; Jowitt 2011; McIntyre 2009; Pearce 2010).

Once the author nominations are received, extracting the necessary data to facilitate the selection process becomes the concern of the co-chairs and the priority of TSU staff. The co-chairs are beholden to the expertise of the authors for producing an assessment of

recommendations, including offering financial support to developing country participants to attend plenary meetings and working group sessions (Lunde 1991, 77-8; Skodvin 2000a, 130-1).

¹² In this regard, the IPCC has been particularly sensitive to political opinion and opinion shapers within the US, where there is a long history of denying the existence and extent of climate change and attacking the credibility of IPCC scientists. This was particularly effective after the SAR, when as discussed below, criticisms about the scientific procedures followed in the assessment process circulated widely in the US media and threatened the credibility of the reports findings. For a sociological analysis of three critics that have had influenced this debate and public opinion of climate science and political attitudes towards the IPCC, see Lahsen 2008. For criticism from academic quarters on disciplinary representations and forms of knowledge included in IPCC assessments, see Demeritt 2001; Hulme & Mahoney 2010; Nordlund 2008; Shackley 1996; Yearley 2009.

climate change and want to ensure they identify the authors best qualified for the task, relying upon disciplinary conventions to evaluate nominees in achieving this. For instance, for the AR5, WG I TSU supplemented information provided in nominee’s CVs with data on the number of years since the applicant had finished their PhD and the number and impact factor of publications made since the AR4 (IPCC 2010g).¹³ WG II consulted respected scientists and researchers to evaluate chapter candidates, particularly in regard to young scientists that were new to the IPCC and not known to WG bureau members (IPCC 2010h). WG III aimed to select recognised individuals to increase the standing of its assessment of climate change mitigation, giving consideration to professional affiliations and applicant’s background in industry alongside more conventional criteria of publication output and impact (IPCC 2010i).¹⁴ TSU staff use these methods to assist the WG bureau in the selection process, drawing up shortlists and making recommendations to ensure that all IPCC criteria are considered and that each chapter team has the required expertise amongst its members to address the approved headings (interviews with TSU staff).

After a number of iterations conducted via email and teleconferencing between TSU staff, co-chairs and other bureau members—the particulars of which and the extent of wider bureau involvement depend on the WG—a shortlist of candidates is devised. This list also includes experts identified by members of this management team to fill gaps in expertise and improve regional representation (IPCC 2010i). Some potential authors are well known to bureau members and may be contacted personally either during or after the nominations period to identify whether they would be able fulfill a leadership role and encourage their participation and support in the authorship of the assessment (from interviews with authors). Making the final selection can be a contentious process, as when consulted the wider WG bureau may disagree with the criteria employed, the

¹³ WG I used the h-index to measure the impact of nominees’ publications (interview with TSU staff).

¹⁴ WGIII regarded the industry community as having a lot of up-to-date knowledge relevant to the AR5, but could not assess these individuals through their publications alone, as they are not necessarily engaged in producing scientific papers (IPCC 2010j, 2). The choice of criteria employed by WG III may well have been influenced by the IAC review, as some questionnaire comments noted the decline in “calibre” of economists participating from the SAR to the AR4, which is said to have impacted the “stature and credibility” of this part of the report (IAC 2010b, 71).

disciplinary representation and the regional balance reflected in the shortlist (from interviews with bureau members). Selection criteria, for instance, tend to be better satisfied by nominees of developed countries where epistemic conventions such as output and impact factor originate, and where they are the means for achieving epistemic authority. These are difficult criteria for developing country scientists to satisfy because of difficulties accessing meteorological data, journals and other educational materials, which are prerequisites for contributing to the literature and publishing in international journals (Gettelman 2003).

As chapter 5 indicates, scientific authority and the cultural capital it endows in the IPCC process is closely coupled to economic capital. Limited resources have practical implications for developing country scientists and their capacity to contribute to climate science. For instance, the cost of journal articles in foreign currency “may be a significant fraction of a researcher’s salary” (ibid, 6), which reduces developing country scientists access to international journals and the most up-to-date work. Statistics from journal editors and publishers indicate that there are few published articles from developing country authors in international journals, with a 25% acceptance rate for authors from these countries compared to 75% for papers with first authors from the US, Canada, Europe, Japan, Australia and New Zealand (ibid, iii).¹⁵ In interviews, journal editors cite the lack of awareness of current literature and the choice of outdated methodologies as holding back developing country submissions (ibid, 9). Older sources indicate editorial discrimination against authors for whom English is not a first language (Gibbs 1995, 96) and on the basis of institutional affiliation (Gibbs 1995, 97-8). Even when published in international journals, evidence suggests that developing scientists receive less citations than developed country scientists in the same journal (Gibbs 1995, 98). Then there is the cost of contributing to some forms of climate change knowledge production. This effectively excludes developing country participation in forms of modeling, such as Global Climate Model’s (GCM) and Integrative Assessment Models (IAMs), which

¹⁵ A 2002 study by UNESCO suggests that developing countries only have 17.5% of the world’s share of scientific publications (UNESCO 2005 in Yamineva 2010, 60). A survey of the journal science in 1995 indicates it only accepted 1.4 % submissions from 12 of the most prolific developing countries, which was the same figure as in 1991, despite a doubling in the rate of submissions (Gibbs 1995, 96).

require substantial investment in computer hardware, processing power, meteorological data, programs for producing and running models and high speed internet to share and download all of the above. This makes it virtually impossible for the majority of developing countries to contribute to research that has a significant impact on the conceptualisation of climate change in WG I and for scientists from these regions to compete with their Northern counterparts in terms of publications and impact factor (Kandlikar & Sagar, 1999; Lahsen 2004; Sagar & Kandlikar 1997; Karlsson, Srebotnjak and Gonzales 2007).

Evidence of the relationship between research expenditure, national publication output and authorship in IPCC assessment reports is provided by the growth in the number of Chinese, Indian and Brazilian authors contributing to the AR5. There has been rapid growth in Chinese authored publications in recent years and with around 5% of the author total, China is now the third highest contributor to the next assessment (McLaren and Carter 2010, 19). As McLaren and Carter suggest this is most likely due to increased research expenditure, with China's research investment standing at the third highest worldwide behind the US and Japan (Adams et al. 2009a in McLaren and Carter 2010, 19). Research and development expenditure has also grown in India and Brazil, with India's R&D standing at roughly 0.9% of GDP in 2009 (Adams et al. 2009b in *ibid*) and Brazil at nearly 1% of GDP in 2007 (roughly \$13 billion) (Adams and King 2009 in *ibid*). In the AR5, India is contributing to 4% of the total authorship and Brazil about 3% (McLaren and Carter 2010, 19). This expenditure still remains low compared to the UK, which spent 1.79 of GDP (roughly \$40 billion) on research and development in 2008 and contributes about 8% of the authors to the AR5, second only to the US, which contributes over 20% of IPCC authors (*ibid*). The author figures used by McLaren and Carter (2010) are misleading however, as they do not include contributing authors. As described below, contributing authors are identified and asked to contribute once the assessment process is underway and these contributions significantly increase developed country authorship of the reports. Furthermore, even when R&D expenditure is increased in emerging economies there still remain cultural barriers to increasing scientific capital in the IPCC process. Thus, whilst editors note the quality and quantity of manuscripts from India, they

also remark on the difficulties that senior scientists have with the peer review process and in accepting and responding to the criticisms they receive (Gettelman 2003, 9).

Bureau struggles over disciplinary and geographical representation of the authorship further reveal the constraints on developing country bureau members' capacity to contest this dominance, both in terms of not possessing the technical support necessary to produce comparative lists of regional expertise and not having the cultural capital required for manoeuvring and contesting bureau proceedings. For instance, when interviewed some bureau members suggested that their developing country counterparts were not forceful or articulate enough when it came to contesting items on the WG bureau agenda. This tended to be identified as part of a wider malaise in the bureau, characterised by a lack of interest and contribution from developing country bureau members, which was and assumed to result from the fact that these bureau members were political appointees.¹⁶ Comments like these and those critical of the overly formal style of developing country bureau members are indicative of the internal culture of the IPCC, the dominance of the scientific habitus and related cultural capital. These are particularly influential forces within the bureau and the authorship and have also been a powerful historical force shaping panel conduct (see chapter 5). This mode of operating is taken as a given and those not conducting themselves accordingly or presenting their grievances appropriately struggle to have their contestations and contributions recognised within and by the IPCC's practice of writing.

The final WG author lists are subject to wider bureau approval before being finalised. During these proceedings grievances over selection criteria and regional representation can again resurface, and if the bureau decides there is insufficient increase in the number of developing country authors from the previous assessment, WGs may be requested to

¹⁶ Such views are also prevalent in responses to the IAC questionnaire, for example one bureau member suggests that the bureau is "too geopolitical" and goes on to say: "I tried very hard to engage my WG2 bureau in author screening/selection, critical review of the zero order drafts, etc., and only one out of six were really helpful. Two others meant well, but didn't know the science well enough to be constructive, and the other three were simply unprepared to help in any meaningful way." (IAC 2010b, 587). Another IPCC participant with an insider view of the bureau suggests that "too much consideration of regional balance and balance between developed and developing countries spoils academic integrity, in some cases." (ibid, 261).

reconsider the geographical balance of authors and amend accordingly, as WG I were asked to do for their AR5 author selection (IPCC 2010j). At this point, those that have spent time compiling and amending these lists express frustration, highlighting the impossibility of such a task, and bringing attention to the number of developing country focal points that did not submit expert nominations (interview with TSU staff). Nevertheless, it is only once author lists have been revised and accepted by the bureau that the assessment report continues in its formation. With bureau approval, author lists are made public and appointment letters sent to successful candidates, see figure 7.2. Those that are unsuccessful are added to the IPCC database and requested to review the emerging report later in its assembly.

Working Group I						
Notes: CLA = Coordinating Lead Author, LA = Lead Author, RE = Review Editor, TS = Technical Summary ChNr = Chapter Number, WG = Working Group United Kingdom = United Kingdom of Great Britain and Northern Ireland ** Most entries are country of residence. However, for several experts working for International Organizations we have listed their "(country of citizenship) / (organization name)"						
	Surname	First Name	Institution	Country of residence ** / Organization	Ch Nr	Role
Chapter 1: Introduction						
1	Cubasch	Ulrich	Freie Universität Berlin	Germany	1	CLA
2	Wuebbles	Donald	University of Illinois	United States of America	1	CLA
3	Chen	Deliang	University of Gothenburg	Sweden	1	LA
4	Facchini	Maria Cristina	Institute of Atmospheric Sciences and Climate	Italy	1	LA
5	Frame	David	Victoria University of Wellington	New Zealand	1	LA
6	Mahowald	Natalie	Cornell University	United States of America	1	LA
7	Winther	Jan-Gunnar	Norwegian Polar Institute	Norway	1	LA
8	Ding	Yihui	China Meteorological Administration	China	1	RE
9	Mearns	Linda	National Center for Atmospheric Research (NCAR)	United States of America	1	RE
10	Wadhams	Peter	University of Cambridge	United Kingdom	1	RE

Figure 7.2. WG I AR5 chapter teams. Available at: http://www.ipcc.ch/pdf/ar5/ar5_authors_review_editors_updated.pdf (last accessed 31.08.2012).

7.2 The authorship

There is a hierarchical structure to the authorship of IPCC reports and the aim of the following section is to detail the historical development and breakdown of labour between chapter members, the responsibilities they entail and the power they enable in and over the content of the report. As indicated above, the number of actors wanting to participate in the IPCC process has increased with each round of assessments and this section identifies some of the benefits for authors' invested in the IPCC's practice of writing. The labour of each chapter is distributed between the coordinating lead authors (CLAs), lead authors (LAs), contributing authors (CAs), and review editors (REs). The articulation of these titles and the duties they entail have resulted from bureau and panel attempts to learn from the experience of previous assessments and in response to criticisms sustained after the report's publication. The IPCC's practice for producing climate change assessments has been subject to scrutiny by those seeking to undermine its conclusions. These criticisms were particularly vociferous after the publication of the SAR in 1995, and in 2009, when emails between IPCC authors were made public and errors were discovered in the regional chapters of WG II's contribution to the AR4. In order to respond to these events and prevent similar incidents undermining the next assessment, authorship roles and rules of procedure for fulfilling these have been periodically codified and updated.¹⁷

The FAR and SAR were put together and overseen by fewer participants and management of this process, such as that required for compiling the author teams, was largely the responsibility of the developed country chair and the TSU, with assistance and advice from key members of the then smaller bureau. Within the author teams, roles were not formally assigned, and leadership of the chapters was established more through scientific authority than formal decision-making. Furthermore, actors requested by

¹⁷ The tasks and responsibilities of authors were clarified after the FAR (IPCC 1993, Appendix G, Annex 2). Then after the SAR, IPCC procedures for the preparation, review, acceptance, adoption, approval and publication of IPCC reports were adopted at the Fifteenth Session (IPCC 1999), and amended at the twentieth session (February 2003a), twenty-first session (November 2003d), twenty-eighth session (September 2008a; 2008b) and thirty-third Session (2011a).

members of the chapter team to contribute material, who often times were colleagues within the same research institution, could become a formal member of the chapter team (interviews with authors). In the first two assessments then, scientific culture—as practiced by those managing and partaking in the process—governed the assessment effort. However, as climate change ascended the political agenda pressure on the IPCC process and its conclusions increased, and governments became more involved in the work and leadership of the panel. As a result the informal epistemic conventions governing the IPCC’s assessment practice became subject to scrutiny and codification by the panel.

The SAR’s conclusions were undermined by criticism surrounding IPCC procedures for revising the WG I report (Edwards and Schneider 2001; Houghton 2008; Lahsen 1998; Skodvin 2000b). The controversy was initiated by an op-ed piece in the *Wall Street Journal*, which followed a similar criticism made earlier by the Global Climate Coalition (*Nature* 13 June 1996, 539). In this piece, a well-regarded American physicist accused WG I lead authors of seriously corrupting the peer-review process by altering the text of the assessment after it had been formally ‘accepted’ by the panel. The chapter in question was the source of an influential and widely quoted sentence from WG I’s SPM, which stated that despite large remaining uncertainties, “the balance of evidence suggests that there is a discernible human influence on global climate” (Houghton et al. 1995, 5). The debate lasted several months, turning into a disagreement over the underlying scientific evidence for the statement. The exchanges between IPCC officials and their critics revealed ambiguity in the IPCC rules of procedure, which neither allowed nor prohibited changes to a report after its formal acceptance (Edwards & Schneider 2001, 227).

In another incident in the SAR, WG III’s report got stuck in plenary approval proceedings due to developing country objections to controversial economic assumptions used to calculate the ‘social costs’ of climate change (Agrawala 1998b, 626). In the chapter, a cash value of \$1.5 million was assigned to a human life in OECD countries against a mere \$150,000 in developing countries (Pearce et al., 1996). It seems that these

mistakes could have been avoided if there had been better oversight of the author's responses to review comments (Agrawala 199b, 626), and this incident appears to have been the motivation for introducing review editors to the author teams. In 1999 and in preparation for the TAR then, the IPCC tightened its rules of procedures surrounding the approval and amending of text and introduced review editors to the authorship of IPCC assessments (ibid 228-9; Skodvin 2000b).¹⁸ These procedures and the role of review editors were subject to further scrutiny after the publication of AR4 in 2009, when mistakes were discovered in WG II's contribution concerning the melting rate of Himalayan glaciers and the land area below sea level in the Netherlands (IAC Review 2010a; PBL 2010). The panel again responded to these events and the international media criticism they generated by tightening the rules and procedures of the assessment's construction (IPCC 2010a, 2011a).

Today then, and in part as a result of such events, the responsibilities and duties of IPCC authors are clearly demarcated and codified in IPCC rules and procedures (IPCC 2008b). These accord coordinating lead authors (CLA) with overall responsibility for the production of the chapter. There are usually two CLAs per chapter, and an attempt is made to divide this leadership role by assigning a developed country and a developing or EIT country author. The CLAs effectively manage the lead author (LA) teams of 6 to 16 experts per chapter, depending on the WG, and these actors have considerable editorial power over the content of the chapter.¹⁹ Lead authors (LAs) are charged with writing particular sections, as assigned during the first lead author meetings, and in preparing these they are encouraged to seek contributions from other experts in the field, and may also be requested to contribute to other chapters within or across WGs. Contributing authors (CA) are usually identified at the first and second lead author meetings and tend to be colleagues or members of the same academic networks as members of the chapter team. These authors do not attend author meetings; they are requested to submit technical

¹⁸ The role of review editor was previously undertaken by the WG vice-chairs and TSUs.

¹⁹ In the AR5 the number of lead authors per chapter averages 12 for WG I and III and 6 for WG II. WG II's average is lower because it has thirty chapters in the forthcoming assessment and in order to keep the total number of authors involved in the process to a manageable number those overseeing the process decided to have smaller chapter teams (interview with TSU staff).

information, such as text, graphs or data, which are then assimilated into the relevant section (IPCC 2008b). As suggested above, when the nationality of contributing authors is incorporated in the breakdown of authorship, developed country dominance becomes apparent. In the AR4, sixty five out of a total of 894 contributing authors were from non-OECD countries, which meant that developed countries made up over 92% of contributing authors.²⁰ Review editors complete the chapter reams. Tasked with overseeing the chapter's review process and ensuring that all substantive review comments are given due consideration and assimilated into the chapter (IPCC 2008b), these actors join the author teams from the third lead author meeting onwards.

The workloads of coordinating lead authors (CLA), lead authors (LA), contributing authors (CA) and review editors (RE) require different levels of commitment and command different levels of influence over the contents of the assessment. The IPCC indicates that the workload of the CLAs and LAs will be in the order of several months over the assessment cycle, with heavy periods towards the end of drafting cycles (IPCC 2010k). The role of the CLA is most demanding. Responsible for overseeing the production of the chapter, these actors must ensure the material submitted by the rest of the author team is arranged, harmonised and edited into a coherent chapter. This gives CLAs considerable editorial power over the content of the chapter, and although the CLA's vision for the chapter is negotiated within and between the chapter members, and the ensuing text passes under many pairs of expert eyes at each stage of its development, it returns to the hands of the CLAs for the final edit. Thus, just as the professional expertise of the WG co-chairs orientates the direction of the next assessment during the outline's assembly, the CLAs practice of the climate change problematic and epistemic connections shape their interpretation of the outline and the expert networks whose contribution and recognition they seek. Furthermore, as chapter eight details, CLAs are usually asked on to the drafting team of the summary for policymakers (SPM), thereby leading the process of extracting the chapter's key messages and conveying these in the most widely read constituent of the assessment.

²⁰ These figures are taken from Yamineva 2010, 57.

For all participants, authorship requires a substantial time commitment over the course of the assessment process. Authors are not remunerated by the IPCC and participation is likely to reduce actor's research and publication output. As outlined in the letter requesting author nominations, governments in the developed world are expected to support the travel of those they nominate (IPCC 2010k), whilst the IPCC Trust Fund supports those from developing and EIT countries.²¹ No other compensation is provided. In addition, through participation IPCC authors expose themselves to criticism and personal attacks from those seeking to undermine the organisation's credibility.²² This raises the question of why the number of experts interested in contributing to the IPCC's assessment of climate change continues to rise? If the rewards are not financial, why do actors want to invest their time and professional expertise in the IPCC process? All participants interviewed were asked about the personal and professional benefits of contributing to the IPCC, from which it became clear that there are field-specific and IPCC-constituted interests. Field-specific interests are identified here, whereas those constituted in and through authors' investment in the practice of writing are identified in the following section, which documents the authorship of the reports in practice.

The shared social interests of developed country authors are largely constituted by the physical, natural and social scientific fields that qualify them as climate experts and which are the main audience for the reports. Being an IPCC author enables actors to write the field and their contribution within it: locating the major influences and identifying the advances in climate change knowledge. This assessment is subject to review by the wider field and will be redrafted accordingly, but in conducting and producing these overviews, authors secure their place in the field. For climate scientists, atmospheric scientists and

²¹ The IPCC Trust Fund covers IPCC activities, in particular covering costs of developing country participants to attend Panel Sessions, Lead Author meetings and other expert meetings. The fund also covers the cost of publication and translation of IPCC reports. This fund is provided for by voluntary contributions from member countries as well as contributions from WMO, UNEP and the UNFCCC (IPCC 2012d).

²² For example, those criticising the peer-review procedure followed in the SAR identified and held responsible Ben Santor, the lead author of the section in question (Edwards and Schneider 2001; Houghton 2008; Lahsen 1998; Skodvin 2000a). Following the release of emails between IPCC authors at the Climate Research Unit at the University of East Anglia there were calls for the director, Phil Jones to resign (Monbiot 2010b). Both cases are said to have had personal consequences for the individuals involved (Brown 2010). There is also evidence of American and Australian authors being subject to aggressive emails, abuse and even death threats (Bagley 2012; Butler 2011).

oceanographers of WG I there is professional recognition in being appointed an IPCC author and considerable scientific authority attached to the CLA post. The awarding of the Nobel Peace Prize in 2007 further increased this scientific capital and extended it to the research institutes and universities that house IPCC participants, who incorporated the kudos of the Nobel Prize into their advertising and funding strategies. Authors of WG II noted that through participation they became aware of the limits and gaps in knowledge. Climate change impacts and adaptation are rapidly developing domains of study, and the IPCC has played a critical role in establishing the importance of this expertise to the UNFCCC negotiating process. As an IPCC author, actors have the opportunity to capitalise on the gaps they identify, either submitting publications before the end of the assessment cycle or creating grant proposals and new international research collaborations with the aim of generating knowledge for the next. Such collaborations are valuable for both developed and developing country scientists and research councils often respond positively to such applications because of the guaranteed platform for research outputs provided by the IPCC.

In WG III interests depend on professional and disciplinary fields of practice. Authors from industry and international organisations suggest they became more knowledgeable of the climate field through participation and as a result more valuable to their clients and stakeholders. Economists within WG III indicated that IPCC authorship is not recognised within a field that measures scholarly contribution by publication in one or two major journals. Although, for some applied branches of economics, the Stern Review raised the profile and interest in the economics of climate change. For developing and EIT country authors the interests are less well-defined and although older studies in India suggest that government funding agencies did not give as much value to lead authorship as North American and European governments (Biermann 1999, 8), research in Brazil indicates that participation in the IPCC confers prestige at the national level, which can result in lucrative consulting assignments with both national and international governmental and non-governmental entities (Lahsen 2004, 159). As well as field-specific and country specific forms of interest there appear to be universal benefits to participating in the process, from networking with renowned experts in the field to transferring and

expanding knowledge of climate change, to making new friends and travelling to new countries.

7.3 The order of authorship in practice

Whilst the above section makes clear the demands of IPCC lead authorship and identifies some of the reasons that actors may want to make this commitment, it is not until we follow authors into lead author meetings and through the drafting cycle that we get a better idea of how climate change is assessed in practice and the cultural properties governing this process. For the majority of actors IPCC authorship begins with the receipt of a formal letter of appointment. Some receiving this letter will have been authors before, and a small percentage of those appointed will have contributed to the formation of the outline by sending in written comments and attending the scoping meeting, but for many this letter signals their initiation into the IPCC's practice of writing.²³ Soon after, the newly appointed authors become acquainted with the unit they will have the most dealings with in the assessment cycle, the TSU. In preparation for the first lead author's meeting, the TSU requests CLAs to lead the chapter team through the development of a more detailed outline, and to assist authors in this process TSUs provide detailed guidance notes. These notes provide background on the outline's production and summarise the discussions and concerns of governments that arose during the scoping and approval process, providing authors with a road map for the content of the chapter and indicating the political dynamics and points of contention surrounding the topics they are set to assess (from interviews with TSU staff and authors).

The first lead author's meeting is the most critical in the development of the assessment. This five day meeting is when the chapter teams meet face-to-face for the first time, although in many instances, particularly in WG I, they may be familiar with each other's work and even well known to one another. At this meeting the chapter teams are charged

²³ For the AR5, 65% of those appointed as authors to WG I were new to the process, 54% of WG II, and 88% of WG III (IPCC 2010g, 2010h, 2010i).

with the task of finalising a detailed chapter outline, dividing the writing tasks between chapter members and devising an internal timeline for the preparation and compilation of the chapter (IPCC 2004). The schedule of the meeting is divided between plenary and chapter team sessions. The plenary sessions are the more formal of these, bringing the authors in front of the IPCC chair, WG co-chairs and TSU staff, who instil in the authors a sense of importance for the IPCC and the assessment task they have been selected to author, see figure 6.3. Over the coming days the plenary sessions are used by the co-chairs and TSU staff as a means for further inculcating authors with the IPCC's practice of writing, its processes and procedures, timelines and deadlines, and informing them of relevant concept notes from expert meetings and workshops.²⁴ Here we see the sensitivity and responsiveness of those leading the process to the political environment in which they are situated, which is notable in WG I's construction of the AR4.

WG I's report was chaired under an Administration hostile to the science of climate change and the international negotiating process, as apparent through its rejection of the Kyoto Protocol and its attitude towards the conclusions reached by the IPCC's TAR and its chairman, Robert Watson (McRight and Dunlap 2003, 2010; see chapter 5.3). In 2001 the Administration requested the National Academy of Science to undertake a review of the science of climate change, focusing particularly on "where there are the greatest certainties and uncertainties" and "whether there are any substantive differences between the IPCC reports and the IPCC summaries" (NRC 2001, appendix a). Those leading the process were aware that any conclusions reached in the report may be subject to a congressional hearing and were therefore particularly conscientious over the methods employed by authors to quantify certainty and in separating out fact from opinion (from interviews). The plenary of the author's meeting is a time for the co-chairs and head of

²⁴ Expert meetings bring together a small group of experts identified and selected by the WG bureau and TSU. Expert Workshops are larger events and have a formal government nomination and WG bureau selection process, similar to that detailed in chapter 7. There are a large number of expert meetings and workshops in the early stages of the assessment cycle and these are designed to feed into the scoping process by tackling gaps and emergent areas of research since the previous assessments and by identifying the existent expertise and knowledge for the forthcoming report. These events, which often aim to bring communities of experts from across the three WGs together, produce guidance papers and reports that are then provided to the authors of the assessment report. They also aim to initiate research collaborations and publications that will be available to assess in the forthcoming report (interview with TSU staff).

the TSU to share these concerns with authors and to make sure that the importance of guidance notes on methods for assessing uncertainties and assessing non-peer reviewed are appreciated and adhered to in the construction of the chapters.

Between the plenaries, the chapters break off into their groups and head for smaller rooms. The style and conduct of work within these teams is dependent on the WG and the communities of practice from which the authors are drawn. WG I is the most homogenous of the three WGs and therefore the style of work, order of proceedings and interactions—points of scientific contention and ways of contesting them—will be a familiar amalgamation of how things are done in the disciplinary fields that contribute to assessing the physical scientific basis of climate change. Less time spent establishing a means for conducting proceedings and negotiating a shared terminology enables WG I authors to immediately burrow down into the content of the chapter, recent developments in climate science and the key messages that the chapter is likely to generate.



Figure 7.3 The first lead author meeting of WG III for the AR5, held in Changwon, South Korea. Available at: <http://emanuele-massetti.blogspot.co.uk/2011/09/first-lead-author-meeting-of-ipcc-ar5.html> (last accessed 6.09.2012).

WG II, whilst still largely composed of those practicing or managing research, spans a wider array of disciplines than WG I, with the majority of chapter teams crossing the natural and social science divides. Thus, whilst authors can rely upon a common scholarly ethos for the conduct of their work; the substance requires negotiating disciplinary conventions, epistemologies and terminologies that on the surface are deceptively similar. This has become easier over subsequent assessments. During the compilation of the FAR, Dr. Tegart, a WG II vice-chair, reported to the plenary on “the complexity of the work” of WG II resulting from its multidisciplinary nature. He suggested that most of the experts involved in the WG’s work “had no previous interactions as they come from different disciplines” (IPCC 1990a, 20). The IPCC has been an important facilitator of multidisciplinary collaboration in this respect, developing a number of mechanisms to bridge epistemological divides and thereby deepen the level of engagement between disciplines: from holding expert meetings and workshops that bring members of different communities together to developing concept papers providing authors with instructions and guidance notes to standardise assessment practices. However, whilst guidance on the treatment of uncertainties and the use of non peer-reviewed literature offers authors the means to assess the relevancy and validity of research that crosses disciplinary divides and for these to be dealt with uniformly within and across the WGs, in practice, demands on the author’s time mean oftentimes these instructions are not fully integrated into the drafting process.²⁵

As with WG II, WG III brings together authors from a variety of disciplinary fields, it also houses more authors from non-governmental, governmental and international organisations than the other two WGs. Each of these fields of practice has its own style of work and ways of understanding and producing knowledge of the climate change problematic, bringing these practitioners together in a single chapter necessarily gives rise to different dynamics and collective styles than in the other WGs. Despite the eclectic arrangements of some chapter teams, order usually emerges. Unlike WG I and II,

²⁵ For instance, in the assessment of uncertainties authors are provided with guidance notes on the assessment of uncertainties and requested to produce a ‘traceable account’ of how they reached their expert judgments. However, as the Netherlands assessment indicates, “this part of the guidance has never been fully implemented in the assessment process.” (PBL 2010, 31).

this order will not necessarily be based upon scientific authority, although the hierarchy of disciplinary knowledges and institutional affiliations remain enduring guides. Once the author meeting has broken into chapter teams, chapter members are able to size one another up. There may be some apprehension at first as chapter members find their place, but once proceedings get going clashes of opinion surface and author's disagree over the chapter's direction, the material most relevant to the subheadings and the overall framing of the chapter (from interviews with authors). The scientific habitus pervades the relations that take shape in and through the practice of producing the assessment, determining the extent both an author and their knowledge is recognisable from the outset. However, as section 7.1 suggests, the extent to which authors can contest disciplinary representations and invest in the IPCC's practice of writing is oftentimes as deeply constrained by economic capital as it is scientific knowledge.

Despite the fact that there are two CLAs, usually one from a developed country and one from a developing or EIT country, all interview data indicates that the developed country CLA leads the process, and in the few instances where there are two developed country CLAs, one male and one female, it was noted that the male CLA sought to take the reins. Those actors that take the lead and whose voices are heard most in the decision-making process are often the most accomplished in their contributions to knowledge and thus it would seem only natural that they have the most to offer in and through the production of the chapter. However, the fact that the direction and content of the chapter is governed by one half (or less) of the author team is not only because other chapter team members are disinterested or less competent as appearances lead some authors to conclude; there are also practical determinants on the extent authors can invest themselves in the assessment process.²⁶ Initially it can be language and familiarity with terms of debates that limits the

²⁶ Comments alluding to the "tokenism" of developing country participation are commonplace amongst developed country authors as is apparent in the IAC (2010b) questionnaire response. For instance one CLA (2010b, 138) notes: "There are far too many politically correct appointments, so that developing country scientists are appointed who have insufficient scientific competence to do anything useful. This is reasonable if it is a learning experience, but in my chapter in the AR4 we had half of the LAs who were not competent. It put a huge burden on the CLAs."

In a similar vein another CLA suggests that "some of the lead authors (generally from developing countries) are clearly not qualified to be lead authors and are unable to contribute in a meaningful way to the writing of the chapter." (ibid, 16).

involvement of chapter members. When discussions become heated and the pace quickens, some members of the chapter team, for whom English is not their first language, have trouble following and are unlikely to interject in the proceedings (from interviews).

As authors begin the assessment of knowledge relevant to their assigned sub-heading, other practical barriers emerge. Once again the economic capital that may be taken for granted by developed country scientists is a necessity for a distinguished scientific career and defines the contribution individual authors are able to make to the process. Just as the acceptance rate for developing country scientists in international journals stands at 25% due to the lack of awareness of current literature and outdated methodologies (Gettelman 2003, iii), limited access to international journals and slow and costly internet access makes the practice of assessing tens of journal articles a difficult task for some developing country authors to perform.²⁷ Those leading the process have become aware of this practical impediment, and for the first time in the AR4 the WG I TSU reached an agreement with several publishing houses to provide free access to journals for its authors, and for the AR5 this is being extended to all WGs. However, this does not acknowledge the problem of internet access. In most developing countries it is only the most senior scientists that have personal internet access to their desktop and 25% of scientists surveyed by Gettelman (2003, 11) pay a marginal cost for access every time they use it. Even when internet access is available, either on a shared computer or in internet cafes, in locations across Africa it takes 2-3 minutes for each page to load and 5-10 minutes for an average sized article to download (if uninterrupted) (Gettelman 2003, 11). Further confounding this divide is the fact that whilst many developed country authors are supported in their authorship by their government or research institutions, which may extend to hiring a research assistant for compiling lists of relevant literature and producing endnote databases, these funds are not matched for developing country authors. Thus whilst a WG may be able to attract a number of developing and EIT country authors at the start of the process, numbers may reduce through the process as

²⁷ As one CLA notes, "I had to send often articles to colleagues, notably African professors" (IAC 2010b, 618)

authors have to drop out due to the time commitments of the process (Yamineva 2010, 58). It is for these reasons that developed country CLAs commonly perceive themselves as the most scientifically qualified and undertaking the lion's share of the assessing, editing and re-writing, supported in these efforts by one half of the chapter team.²⁸

Although the labour of those invested in the IPCC's practice of writing is not financially rewarded, authors are able to distinguish themselves through their commitment to the process. One means of achieving this is through the diagram. As well as reviewing, assessing and synthesising available knowledge through text, authors are keen to produce tables and figures. In a word restricted report, diagrams, graphs and tables allow authors to visually represent large volumes of data without taking up valuable space. Diagrams are also easily extracted for the SPM and from there, if they readily convey the extent and impacts of climate change, they may be taken into media and other forms of climate change reporting. In the past, a few diagrams have had a considerable impact on popular discussion, bringing attention and criticism to the IPCC process and putting its authors at the centre of the controversy. The two most infamous diagrams in this respect are the 'hockey stick graph' and the 'burning emblems diagram', illustrated in figures 7.4 and 7.5 respectively. Due to the advantages of diagrammatic representation and the attention it may bring to individual authors or chapter teams, the diagram has become a significant object of interest amongst team members. As a result chapter team members contest and compete with the depictions of other lead authors in an attempt to distinguish their contribution in the final product.

The IPCC also has its own rewards to offer those that demonstrate their proficiency through the conduct of the assessment and who distinguish the value of their knowledge and framing of climate change through their contribution to the IPCC's practice of writing. These authors may be offered the opportunity to become more deeply involved in the current and next assessment by being asked on to the drafting team for the SPM (chapter 8), being invited to the scoping meeting of the next assessment and rising up the ranks of authorship.

²⁸ See footnote 26 for CLA comments.

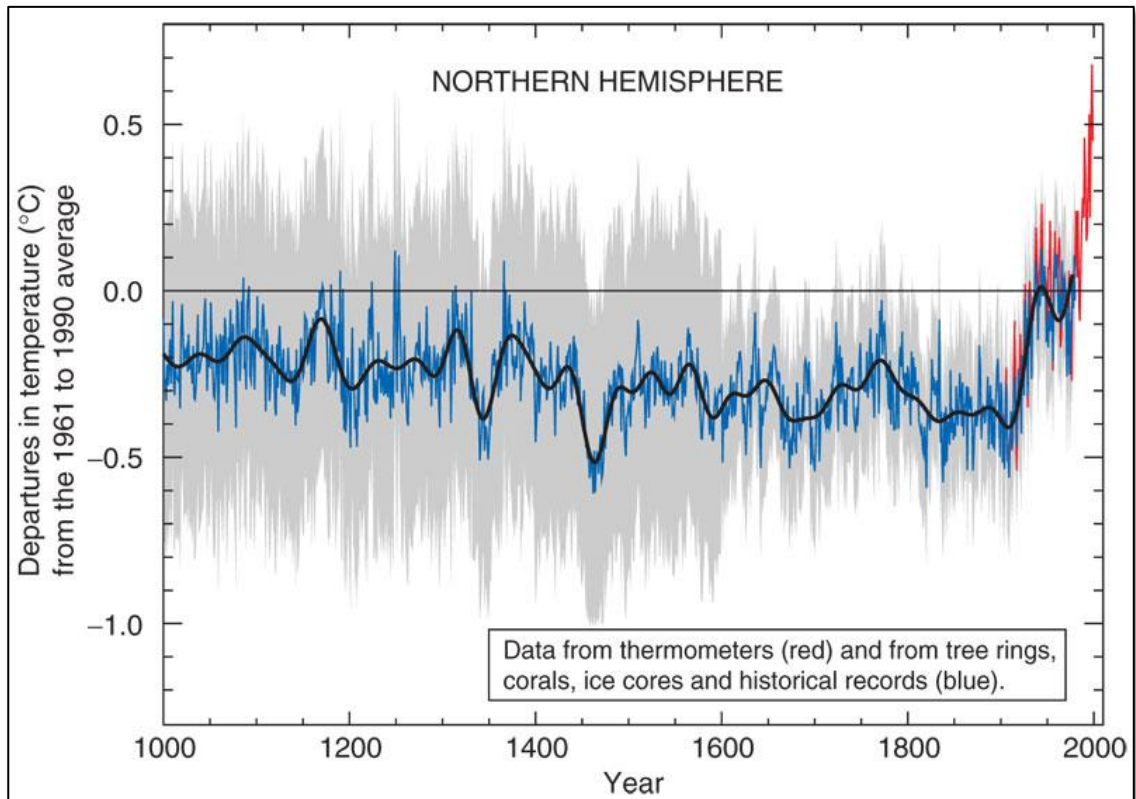


Figure 7.4. The "hockey stick" graph, as it is commonly known, shows the average global temperature over the past 1,000 years and featured in chapter two of WG I's contribution to the Third Assessment Report and in the accompanying Summary for Policymakers. The graph caused dissent amongst the chapter team members and since its publication the graph has become "a symbol of the conflict between mainstream climate scientists and their critics" (Pearce 2010).

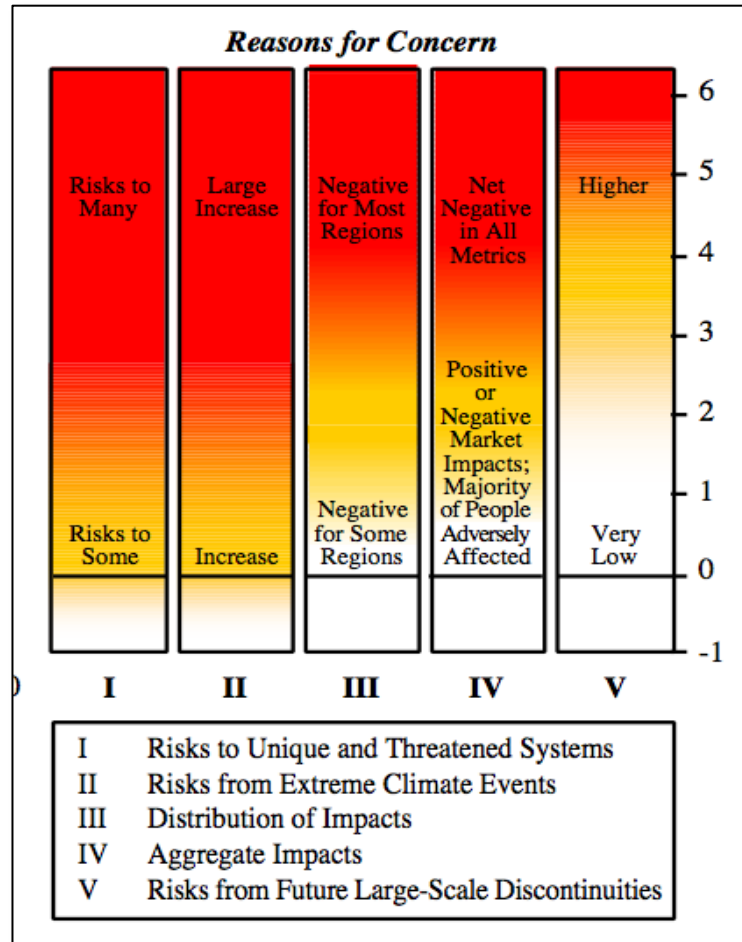


Figure 7.5. The ‘burning embers diagram’ figured in chapter 19 of WG II’s contribution to the TAR (Smith et al. 2001) and the SPM and identifies five reasons for concern, depicting the relationship between these impacts and rising global temperatures. Authors attempted to update the diagram for the AR4, however, it did not make it through the approval plenary (see chapter 8).

7.4 Reviewing

Although authors may seek to ensure their scholarly vision of the most relevant forms of climate change knowledge and their particular expertise are imprinted on the assessment, turning from the authorship to the formation of the text and the review process in particular, makes apparent the collective nature of the IPCC’s practice of writing and its products. Authors are not writing their view on the scientific, technical and socio-economic knowledge relevant to an assessment of climate change, although it may be

written and critiqued through their perspective; they are producing an overview of the field from a particular position in the field, which will be subject to evaluation by the field. This makes the field present in and through the drafting of the text. To ensure the resulting assessment is acceptable both to the communities of practice that generate this knowledge and the governments commissioning the reports and accepting the final products the IPCC has institutionalised an extensive review process within its practice of writing. Nearly all scholarly text is subject to the acceptance and approval of the field through some form of peer-review, which is “among the oldest certification practices in science” (Edwards and Schneider 2001, 229). When the IPCC was established in 1988 and on insistence of the US delegation (Zillman 2007, 873), it was agreed that a peer review process should be incorporated into the preparation of the reports (IPCC 1988a, annex IV), although the extended review procedures documented here were not formally established for all IPCC reports until 1993 (IPCC 1993, appendix c annex 1). The two-tier expert and government review institutionalised opens the forming assessment to hundreds of reviewers, which suggests it is “more comprehensive, *by many orders of magnitude*, than that in an average journal” (Agrawala 1998b, 623-4, italics authors own), typically leading “to hundreds or even thousands of changes” in the text (Edwards & Schneider 2001, 235).

The text is subject to three rounds of review in its formation, the first of these, when the draft is not much more than an indication of the topics the chapter will cover and the literatures it intends to survey, is reviewed internally or by a select number of external reviewers identified by the WG bureau, TSU staff and chapter authors (interviews with TSU staff; IPCC 2005c, 2011d). At this stage in the reports development, the reviewers are asked to give consideration to the chapter’s structure, gaps, balance, and cross-chapter issues, with the aim of providing chapter teams with an early indication of whether the draft reflects the available literature and provides a balanced coverage of the chapter’s scope (IPCC 2011d). These comments are discussed at the second lead authors meeting and incorporated into the construction of the first order draft. By now the chapter is beginning to take shape and is made ready for expert review. Expert reviewers include those that were nominated as authors but not selected, experts put forward by relevant

international and non-governmental organisations, representatives from the field as identified by the WG bureau and chapter review editors, as well as requests received by the TSU from experts interested in reviewing the report. For reviewers, the review process provides access to the IPCC's practice of writing and an avenue to influence how climate change is thought about and acted upon within the climate field. Special interest groups, such as environmental organisations and representatives of fossil-fuel industries, regard this as the main channel for transmitting their views into the assessment and for drawing authors' attention to literatures beyond their purview (Yamineva 2010, 80).²⁹

The three WG reports of the first order draft of the AR4 were commented on by a total of 1600 expert reviewers. The WG I report received 17,000 review comments from more than 540 reviewers (IPCC 2006e). WGII was reviewed by 770 experts, generating an average of 58 reviews per chapter (IPCC 2006f), and WG III received comments from 290 reviewers and also held a lead-author and industry expert meeting to discuss the draft as part of its reviewing process (WG III 2006g). Many of these comments identify editorial errors or remark on the choice of topics covered by the chapter, which as authors are working within the confines of a government approved outline they are largely powerless to change (interviews with authors).³⁰ The more substantial of these comments initiate chapter team discussions and debate and it is the role of the review editors to ensure these are adequately reflected in the redrafted text (IPCC 2008b). All review comments are attributed (see figure 7.3), thus even if the reviewer is not known by name to the chapter team, the epistemic authority of the individual can be ascertained through institutional affiliation, which necessarily impacts how comments are received and dealt with by chapter team members. The overall response of the chapter teams to the review process depends on the actors and the attitude towards work cultivated within the chapter teams, which is also a reflection of the values instilled in WG authors by those leading the process. From interviews with authors and reports on errors made in regional chapters

²⁹ Agrawala (1998b, 626) suggests that some industry lobby groups have taken advantage of this in the past by submitting identical reviews on behalf of individual experts, certain non-governmental organizations and as part of the official US government review.

³⁰ Chapter teams can make a request to the bureau to amend one or two of the words in the government approved outline, which they may allow, but overall the outline has to be accepted how it is (from interviews with authors).

of WG II's assessment, it is clear that some chapter teams are more conscientious than others (IAC 2010a; PBL 2010). Thus, whilst in some instances it is necessary for review editors to reassure authors that reviewer's comments are unfounded (from interviews with authors and bureau members), in other instances lack of consideration for reviewers and their comments has left mistakes uncorrected in the text.³¹

Comments	Considerations by the writing team
the future might be bright under the decreasing intensities, but that is fake and only due to the definition of these two intensity parameters. It creates confusion! My suggestion: skip these two parameters. (Robbert Misdorp, PUM)	
Suggest including a discussion of the recent increase in C/PE and projected (e.g. IEA) increasing trends in carbon per unit primary energy. The sign is opposite that mentioned in this section. (Haroon Kheshgi, ExxonMobil Research and Engineering Company)	Partly accepted, will be improved through better presentation of analysis
Mention part of decarbonization is illusionary, linked to leakage of heavy industries to non-OECD countries? (Frédéric Ghersi, CNRS)	Rejected, at global level it is no issue
Therefore the task at hand is formidable: global GHG emission reductions in absolute terms. This presupposes a reduction of energy and carbon intensities at a faster rate than income and population growth together. Bravo, yes that is a good statement by IPCC. I fully agree with this statement. Yes that is indeed one of the major tasks to be undertaken by a conscious UN agency! My question is what results of the proposed measures by which (UN) organization striving to reach population growth reduction, can be mentioned here? (Robbert Misdorp, PUM)	Rejected, this is not the issue (however, precise analysis will be presented)
It could be added, that the basic conclusions of IEA (2004) also hold in the more recent "World Energy Outlook 2005 - Middle East and North Africa Insights" (IEA 2005) (Joachim Schleich, Fraunhofer Institute Systems and Innovation Research)	Noted, will be dealt with
recognizing that population is a factor in future emissions, and therefore that promoting lower population scenarios can be part of a strategy to eventually stabilize climate, is not a question of "controlling" population development. Rather,	Agreed, will be considered in redrafting

Figure 7.3. A sample of the expert review comments with author's responses for WG III of the AR4, available on the WG III website: <http://www.ipcc-wg3.de/publications/assessment-reports/ar4/forth-assessment-review-comments/fod-comments/AR4-WG3-FOD-Review-Ch01.pdf> (last accessed 14.7.2011).

³¹ For instance, in the case of the erroneous statement in WG II's assessment, two reviewers commented on this statement during the government review, one of which provided references for articles that drew different conclusions to those stated in the chapter (IAC 2010a, 22).

The third and final review exposes the WG assessment to those that agreed its limits: IPCC member governments. Those experts that reviewed the first order draft are also able to review the text again at this stage. As with the expert review, the government review of the second order draft is designed to gather comments on the accuracy, completeness and balance of the scientific and technical content of the draft reports (IPCC 2008b). Importantly though, the process also provides the co-chairs with an opportunity to measure the government's reception to the product they sanctioned, with sufficient time before the panel approval session to address issues reviewers identify as underdeveloped, missing or inappropriately formulated (interviews with bureau members). As with the nomination of authors, the particularities of the government review process depends on the focal point's location and how the IPCC and climate change have been institutionalised within government. For example, since the FAR, Australia has held a national workshop to bring together experts from across different departments and outside of government to develop an agreed national view of the emerging assessment, which then becomes the main source document for the delegation during plenary approval proceedings (Zillman 2008, 33). In Brazil, lack of trust in scientists that participate in the authorship of IPCC assessments and overseas collaborations makes the Administration more selective of participants for the national processes (Lahsen 2004, 165).

The government review process again highlights the disparity between developed country and developing and EIT country involvement in the IPCC's practice of writing. For example, of the 194 IPCC member governments less than half participated (95 countries) in the expert and government review of WG II's contribution to the AR4, which was high compared to the numbers involved in the review of WG I (42 countries) and WG III (53 countries).³² Although WG II's report was reviewed by a total of 1,162 reviewers, 529 of those came from just five countries: the US (209); UK (128); Canada (76); Australia (65); and Finland (51). When we compare the numbers of reviewers with the number of

³² WG II has authors and reviewers from the highest number of countries participating as a result of its regional chapters: WG I (52 countries); WG II (109 countries); WG III (77 countries). All figures are based on author's own calculations from list of authors in Parry et al., 2007.

authors we see a direct correlation, with the top four countries providing 43.7% of the authors and 41.1% of reviewers, see table 7.1.

Country	Number of Authors ³³	Percentage of Total (%)	Overall Ranking	Number of Reviewers	Percentage of Total (%)	Overall Ranking
US	73	15.8	1	209	18	1
UK	60.5	13.1	2	128	11	2
Canada	38	8.2	3	76	6.5	3
Australia	31	6.7	4	65	5.6	4
Finland	3	0.6	17	51	4.4	5

Table 7.1 Number of authors and reviewers contributed by the top five countries for WG II's fourth assessment report (AR4).

6.7 Summing Up: from government review to government approval

The introduction indicates the importance of the scientific assessment to addressing questions central to the thesis, namely who gets to write climate change in IPCC assessments and what qualifies them to do so? And, how do the social relations and the properties constituting the order and conduct of the IPCC's assessment practice imprint on the writing of climate change? All of the empirical chapters documenting the report's pathway through the IPCC and the activities performed by different units in putting it together give an indication of by whom and through what processes climate change is being written in and through the IPCC's assessment practice. However, only the scientific assessment provides the opportunity to directly study the criteria used to discriminate

³³ Author count includes coordinating lead authors, lead authors, contributing authors and review editors. All figures are based on author's own calculations from list of authors in Parry et al., 2007.

between climate expertise and select the authorship of IPCC assessment reports. This chapter began with the author nomination period and although self-nomination remains the norm, through a description of the government nomination processes it became possible to identify the factors constraining the identification of climate expertise. This description reveals the disparity between highly organised processes in developed countries compared to over half of developing and EIT countries not submitting any nominations at all. Lack of developing country participation and investment in IPCC processes marks the work of every unit of the IPCC and frustrates those seeking to fulfil the IPCC's attempts to increase geographical representation and meet IPCC criteria. However, here the chapter illuminates the extent to which investment in the IPCC process and imprint on its products is dependent on possessing the necessary economic capital for achieving this.

Critically then, identifying and nominating the necessary expertise requires that there are actors within the environment ministry or meteorological office with the time and resources to host workshops and assemble committees to attract scientists and select nominees. During the author selection process it requires developing and EIT country bureau members to identify regional expertise and have the means to supplement and contest the developed country co-chairs and TSU's shortlisted candidates. Those nominated are judged by two criteria that define the IPCC's practice of writing: the scientific habitus and geographical representation. According to the scientific habitus, scientific excellence rests upon publications ratings and rankings, which distinguish an actor's contribution to the field. Developing and EIT scientists cannot match their developed country counterparts by these field-specific criteria, and it is on this basis that we see throughout the work of the IPCC that developing country and EIT participants and the knowledge and expertise they have to contribute is judged as "tokenism" and merely a necessity for political legitimacy. Similar attitudes are prevalent amongst bureau members, judging their counterparts as political appointees, disinterested in the IPCC process and not competent for the task.

Whilst it may be true that some national focal points attend IPCC meetings for the high speed internet, plush hotels and shopping sprees, and that some developing country and EIT bureau members and authors are less well qualified and not as interested in the process. It is also true that national governments, bureau members and authors are constrained by the same maldistribution of economic resources that limits the investment of developing and EIT country participants in all aspects of the IPCC's work. These bureau members do not have a staff of 5-15 in a dedicated unit at their disposal with the technical details necessary to support their interventions. Nor, in many instances are they perceived to possess the cultural properties that would distinguish them through the eyes of the scientific habitus as commanding the style of an authoritative leader capable of contesting the geographical and disciplinary representations of the author teams. The IPCC is only too familiar with the economic disparities limiting interest and investment in this time-consuming process, which has the power to write the meaning of climate change for all societies. Despite this knowledge and the studies undertaken by various task forces since the organisation's establishment, it seems that the scientific habitus and the cultural attitudes of worth it sustains remains a defining feature of the IPCC's practice of writing.

As the chapter turns to the authors and lead author meetings the importance of the scientific habitus in establishing the order and conduct of the assessment in and through the work of the chapter teams is once more apparent. However, it is not the only force shaping how and by whom climate change is written in and through IPCC assessment reports. Here we see how the IPCC's institutionalised assessment practice asserts its own habitus on authors' conduct. Those leading the process have the means to instil in authors a mode of conduct that upholds the values of the organisation and aims to retain its privileged position within the climate field through the assessment practice. The TSUs are critical to achieving this, preparing documentation that informs authors on the background of the outline's formation, producing concept papers aimed at standardising assessment procedures and inculcating the importance of author dedication to the onerous drafting and reviewing cycle. Following the emerging assessment into the hands of the reviewers brings into focus the shared nature of the process, revealing how the field

perspectives of individual authors and chapter teams are challenged and opened to the insertion and constitution of new forms of interest. Although here once more we are reminded that this process is only open to those with the means to invest.

8. The panel approval

As with many elements of the IPCC's practice of writing, this chapter documents a process—a means for approving IPCC documentation—that was created for the organisation's specific purposes, which in the case of the summary for policymakers (SPM) is the purpose of producing a 'policy document.' This chapter charts the emergence of this process and describes the development of the pathway that SPM documents travel today, identifying the forces governing the document's passage through the IPCC and how these structure the final product. As with the construction of the report outline and the scientific assessment, the IPCC's approval practice is a product of the conventions and authorities of the fields that constitute it, producing what may be identified as a hybrid form of activity, in which elements of scientific, diplomatic and bureaucratic activities are distinguishable (Miller 2001a). However, rather than perceiving of the IPCC's approval practice as an amalgamation of scientific and political activities (Shaw 2000, 2005), this chapter explores the development of the approval practice as a new form of activity, which is constituent of a new field of practice: the practice of climate change.

The preceding chapters explored the make up of the IPCC (chapter 5), the IPCC's practice of producing a report outline (chapter 6), and the authoring of the assessment (chapter 7). Each of these chapters provides insight into the involvement of the panel and the means available to member governments for structuring how and by whom IPCC assessments of climate change are written. Chapter six documents the involvement of member governments in the construction of the report's outline, from the panel's decision to repeat the assessment process to its approval of the topics to be covered in the next report. Chapters six and seven indicate the panel's influence over the authorship of the report, with member governments nominating authors and electing the bureau to oversee its production. Finally, chapter seven's description of the government review process

identifies the avenue available to member governments to influence the re-drafting of the assessments. At each stage of the report's formation then, the IPCC's practice of writing provides governments the opportunity to structure how and by whom climate change is written, including through the formulation of IPCC rules and procedures, which increasingly confine the authorship and conduct of the assessment. Nevertheless, it is not the panel that generates the draft outline, selects the authors or authors the assessment. Here, chapter seven's account of the formation of the assessment report makes apparent the symbolic power and material effects of the scientific habitus.

Documenting the author selection process and following the outline into author meetings indicates that it is scientific conventions that order relations within the WG and the conduct of the assessment. In the construction of the scientific assessment it is the struggles between bureau members over the make-up of the authorship and the struggles between author teams over the content of the chapter, which structure by whom and how climate change is assessed in the WG reports. Chapter seven's exploration of these relations makes apparent the force of economic capital in all aspects of the IPCC's work, determining a government's capacity to identify and nominate national expertise and undertake the government review, as well as underpinning scientific measures of competence in bureau and author participation. It is here, in chapter eight, through the IPCC's practice of approving IPCC documentation that the political force of member governments and the scientific authority of the co-chairs and lead authors is brought together for the purpose of approving the assessment's main message.

The SPM is a roughly twenty-page document that summarises in bullets, tables, boxes and figures the findings that are most relevant for social and political decision-making from the underlying report, see figure 8.1. Unlike the main WG report, this is a widely read and influential document beyond the scientific fields enabling its conclusions. Thus, sentences and figures from the SPM find their way into minister's speeches, media reporting of the climate change problematic and project proposals. The document is drafted by a core writing team, as selected by the WG co-chairs, and is subject to two rounds of government review before line-by-line approval by the panel. It is in the

drafting of the policy document and in its approval that we begin to discern the significance of bureau membership and the practice of government review, as these governments are best represented in the authorship of the SPM and as indicated by the data, intervene most frequently with the most to say during plenary proceedings. In the second half of the chapter, we follow the draft SPM into the WG approval session, which brings the co-chairs that have overseen the report's production in front of the member governments for the purpose of accepting and approving its main conclusions.

This chapter studies the approval session as a field of practice and as habitus. The chapter identifies the key features defining the order and conduct of the IPCC's practice of approving IPCC documentation. It begins by describing the routinised roles and interventions of member governments, identifying the properties distinguishing particular delegations and enabling some governments to have a greater impact on the text than others. Turning to the role of the WG chairs and wider bureau, the chapter explores the tactics and strategies employed by the co-chairs to curtail government's incursions into the text and to maintain order in the proceedings and over the policy document that results. Introducing the authors provides further evidence of the unique properties of this field of practice and the extent to which actions in the name of science, politics and climate change structure the roles and relations within the approval proceedings. It is here we see members of the panel staking their claim to knowledge and authors attempting to perform political authority as each struggles to distinguish and have recognised their particular forms of symbolic power to write the meaning of climate change.

This account is compiled from Earth Negotiation Bulletin (ENB) reports, responses to the IAC questionnaire (IAC 2010b), interviews with participants, published accounts by IPCC participants, the academic literature and personal observations of the 32nd IPCC plenary session. In previous chapters the report's assembly pathway has been reconstructed from IPCC reports and accompanying plenary documents, but these are not available for the plenary approval sessions. There are however, a number of published accounts of long-standing IPCC members and observers to the process, including: Bert Bolin (2007), chair of the IPCC from its establishment until 1996; John Houghton (2002;

2008), co-chair of WG I for the first, second and third assessment; Jeremy Leggett (1999), director of science at Greenpeace; Stephen Schneider (2009), a lead author in WG I and II since the SAR; and John Zillman (2007, 2008), who has acted both in the capacity of delegate for the Australian delegation and bureau member. The chapter draws on these personal accounts in reconstructing the final stage of the IPCC's practice of writing.

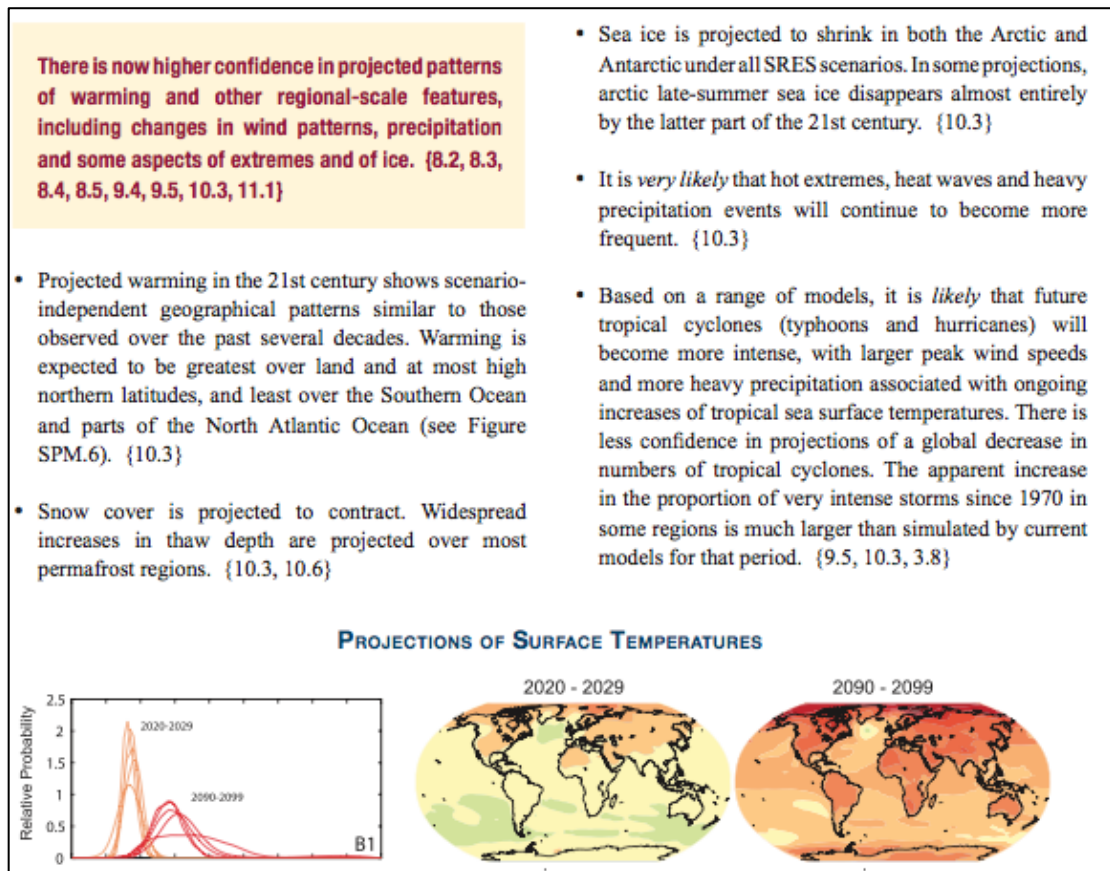


Figure 8.1 The format of the SPM, taken from WG I's contribution to the AR4 (IPCC 2007g, 15).

8.1 The origins of a policy document

The idea of producing a ‘policy document’ to summarise the scientific results of the full report is said to have been a WG I proposal accepted by the IPCC bureau at its first session in February 1989 (IPCC 1989 in Agrawala 1998b, 633). It had however, always been the intention for the IPCC assessment process to generate some form of policy document. And initially it was envisioned that the bureau would integrate the three WG reports of the FAR into “a single assessment statement which will include an executive summary, designed to facilitate the requirements of political analysts” (IPCC 1988, 6).

The first version of the WG’s SPM, produced by WG I as part of the FAR, appears to have followed a comparable construction pathway to that which is now embedded and described in section 8.2.¹ The text was subject to approval at a three-day meeting attended by the authors, other invited experts, delegates from 35 countries, environmental NGOs, and representatives from oil and coal industries (Leggett 1999). The meeting has been described as collegial and the criteria used for the document’s approval as scientific (Lunde 1991, 82; interviews with participants). WG II and WG III were also requested to produce a policy document, however, the production of these did not mirror the WG I experience. As chapter 5.6 indicates, at this stage in the IPCC’s development the assessment practice had not been codified and there had been little attempt to standardise the process across the three WGs. Thus, whereas WG I could rely on scientific conventions to structure the order and conduct of its assessment activities, the varied makeup of WGs II and III meant those involved could not rely upon the shared habitus of those leading the proceedings to order the conduct of the approval session. Consequently, producing an assessment and summary of the impacts of climate change (WG II) and response strategies (WG III) was a more troubled process (Bolin 2007, 63-6; Hecht & Tirpak 1995, 385-6; Skodvin 2000a, 119-123).

The IPCC’s first assessment was finalised at the fourth session of the IPCC plenary, held in Sundsvall in 1990, a meeting that gave a clear indication of the political forces that were to shape the WG approval sessions of subsequent assessment rounds. The first IPCC chairman, Bert Bolin, prepared a synthesis report for the meeting, a document that aimed

¹ See Houghton 2002, 3.

to highlight the most important findings from the three reports for acceptance and approval by member governments (Bolin 2007, 67; IPCC 1990). The chairman's document did not make it through the plenary, however, and it seems that it was only possible to reach closure "by cobbling together" lengthy extracts from the WG I SPM "and a few of the less contentious conclusions from the politically-sensitive WG II and WG III reports" (Zillman 2007, 879). The proceedings of this session, as described in the account below, were characterised by political posturing, which was to become a feature of all IPCC approval sessions and activities of the climate field more generally:

Having started in a very civilized fashion with songs about the future from children's choirs and an address from the prime minister of Sweden, the meeting finally came very close to breakdown. It finished at four o'clock in the morning, one day late, with most of the delegates having abandoned their chairs in the conference hall to gather on the front podium and shout at each other. (Brenton 1994, 183).

It is clear from this and other accounts that emerging national positions on the issue of climate change shaped government's interventions and attitudes towards the drafted text (Hecht & Tirpak 1995, 386-7). For instance, the American delegation wanted the uncertainty of the science emphasized (Leggett 1999; Lunde 1991, 82), the former USSR wanted caveats added and possible benefits to agriculture highlighted (Hecht & Tirpak 1995; Leggett 1999, 15-6; Lunde 1991 96), the Brazilian delegation arrived with a new study that contested the report's depiction of the contribution of tropical deforestation (Lunde 1991, 97), and some developing country delegations refused to join a consensus document (Brenton 1994, 182-3; Zillman 2007, 879).²

Observer status to IPCC meetings also gave access to lobbyists from fossil fuel industries and environmental NGOs. At this stage in the IPCC's development the role of such experts was "loosely defined", and they were permitted to intervene and make suggestions for the wording of the text (Leggett 1999, 3). As a result these actors also

² These political positions and the interests they indicate are not analysed here, as this requires examining each government's position within the domestic political field generative of its interests in the climate field, a study that is beyond the scope of the thesis.

became part of the struggle as they attempted to insert their interests into the policy document, a practice eventually curtailed during the approval of the SAR, when the co-chair of WG I requested observer organisations to leave the floor to governments (Leggett 1999, 229-30; Lunde 1991, 77-8). The tensions that arose during the approval and finalisation of the FAR between member governments, the authors and observer organisations were to become a permanent feature of the WG approval sessions. This is despite the fact that, as noted in previous chapters, on completion of the FAR policy prescription was removed from the IPCC's mandate and an International Negotiating Committee (INC) was established as the site for negotiating the Framework Convention, with the aim of separating knowledge production from the political response (Miller 2004).³

IPCC procedures for the preparation and approval of IPCC policy documents, or SPMs as they have become known, were formalised with the IPCC's re-structuring after the completion of the FAR (Bolin 2007, chapter 7).⁴ This institutionalised member government's line-by-line approval of the SPM document within the IPCC's practice of writing. The principles governing IPCC work indicate that approval sessions are to operate under the principle of consensus, meaning that "the IPCC Plenary and Working Groups shall use all best endeavours to reach consensus," and in cases where this is not possible "differing views shall be explained, and, upon request, recorded" (IPCC, 1991a, 8). Further codification of IPCC rules for the preparation of IPCC assessment reports introduced expert and government review for the SPM documents (IPCC 1993, appendix G). Thus by the Second Assessment Report (SAR) the formal pathway for constructing the SPM was in place, although it still had to be practiced.

The incremental development and learning involved in producing a practice for approving IPCC documentation is evident from the approval of WG I's contribution to the SAR when the co-chair, Sir John Houghton, arrived at the plenary in Madrid with a 40-page document. Despite protests from colleagues that an SPM of that size would

³ For more on the formation of the INC and the IPCC's relationship to the UNFCCC, see chapter 4.2.

⁴ As discussed in chapter 5.6, after the completion of the FAR and with the establishment of the INC the mandates of WG II and WG III were amended.

never make it through the approval session, the proceedings got underway and became mired in controversy, as delegates took to contesting every line and in some instances every word (interviews with bureau members). Eventually, these 40-pages became the first ever technical summary and the executive summary to the report was converted into the SPM (Leggett 1999, 227; Skodvin 2000a, 215). The history of the emergence of the SPM, the pathway for its construction and the codification of rules for conducting the plenary approval session indicate the scale of the task that the IPCC set itself in aiming to produce a policy document, which required establishing both a means for achieving this and a shared value in its realisation by all those participating.

8.2 Drafting and reviewing the SPM

Although there is a clear pathway for the construction of the SPM it is not fixed. As with the full reports there are IPCC operations and restrictions that have to be followed: a strict page limit, an institutionalised government review and an order and timeline for re-drafting. However, the particulars of the process—the selection of the drafting team and the message to be conveyed—are dependent on the assessment round as directed by the co-chairs, the TSU, the authors and the political environment in which it takes place. It is the WG co-chairs that have overall responsibility for preparing the SPM (IPCC 2008b), and in consultation with members of the TSU and the WG bureau, they direct the selection of the author team, guide the drafting, assume much of the re-working in response to government comments and chair the plenary approval session. The authors, selected on the basis of their expertise and IPCC-specific attributes, lead the chapter teams in identifying and crafting the chapter's key messages and in transforming these into bullet points and short sentences for the policymakers summary, and it is these findings, and their wording, which become the object of government struggle in the approval of the final product.

It is in the authorship, drafting and reviewing of the SPM that we begin to discern the advantage of bureau membership and the conversion of economic capital—as a determinant of member government’s investment in the IPCC’s practice of writing—into symbolic power over the WG’s conceptualisation of climate change. Chapter 6.2 documents the excitement that bureau elections prompt at the start of the assessment cycle and the lengths that some governments go to in ensuring the election of their candidates. This chapter identifies the advantage of chairing the WG and hosting the TSU, with these countries dominating the authorship of the SPM and the plenary proceedings. This section also begins to record how the relationship between economic capital, scientific capacity and investment in the IPCC converts into symbolic power over the practice of approving IPCC SPM documents, as governments with the economic capital to invest in an extensive review of IPCC materials prompt the most discussion amongst drafting teams and ensuing revisions in the re-worked SPM. It is these same governments that arrive at the plenary well prepared through the expertise enlisted for the review, which translates into authoritative interventions during the plenary approval session (8.3).

Formally, the process for selecting the core writing team is a decision of the WG bureau (IPCC 2005c, 2). In practice, whilst bureau approval is sought, the decision appears to rest more with the developed country co-chairs with input and guidance from the head of the TSU and those WG bureau members whose participation and investment is sought in the process (from interviews with TSU staff and bureau members). The convention is to have two representatives from each chapter, either the chapter coordinating lead authors (CLA) or a CLA and a lead author. For those selecting the SPM drafting team there are practical considerations beyond authors’ sharing the chair’s vision of the final product. The SPM authors will have an additional workload to the already pressing demands of the chapter. Thus anyone on the writing team needs to have demonstrated the ability to deliver and to have displayed those attribute, such as the capacity to summarise or ‘think clearly’, desired in SPM team members (interviews with TSU member). In making the final selection the co-chairs anticipate the approval session and its contentions. The SPM writing team attend the final approval session, presenting and explaining the scientific

findings that underpin the report's key messages, and therefore the WG co-chairs need to ensure they have the expertise to facilitate government approval of the text.

For the AR4, WG I had a core writing team of 33, including the two WG co-chairs, the head of the TSU, two vice-chairs and a mixture of CLAs, lead authors and review editors. A total of 18 countries were represented in the 33 drafting authors and 17 contributing authors, with the US and the UK combined providing 38% of the authorship and five countries over 60%: the USA (12); UK (7); Switzerland (4.5); Australia (3.5); and China (3) (see appendix b).⁵ China's presence in this list is explained by its co-chairmanship of WG I and growing presence in climate science (see chapter 7.1). Argentina, Mexico, South Africa and Thailand also each contributed an author to the drafting team. WG II had a total drafting team of 63, which included the two co-chairs, six vice-chairs, two TSU staff, the CLAs from all 20 chapters, plus a few extra lead authors. This writing team of 63 authors represented 34 countries (appendix B).⁶ However, over one quarter (26.2%) of the total authorship was drawn from two countries: the US (9) and the UK (7.5). WG III's core writing team was composed of the co-chairs, five TSU staff, and the chapter CLAs. These 33 authors represented 19 countries, with over a third (40.1%) of these authors from two countries: the Netherlands (7) and the US (6.5). It is in the authorship of the SPM that the significance of bureau membership and in particular developed country co-chairmanship of the WG becomes apparent, as the developed countries chairing the WG and hosting the TSU have the largest number of authors in the drafting of the SPM, see table 8.1.

⁵ These figures are from the lists of authors provided at the front of the SPM (IPCC 2007g; IPCC 2007h; IPCC 2007i). Authors associated with two countries are marked as half for each country, this is quite common and indicates nationality and country of work.

⁶ The wider geographical representation of WG II SPM authors is due to the regional chapters.

	WG I	WG II	WG III
Hosting government	U.S.	U.K.	The Netherlands
Countries represented	18	34	19
Total number of authors	50*	63	33
Hosting country	12 (24%)	7.5** (11.9%)	7 (21.2%)

Table 8.1 Hosting government of WG co-chair and TSU with number of countries represented in the drafting team and the percentage of authors of host country.

* Includes drafting authors and contributing authors, see appendix B.

** The UK did not have the highest number of drafting authors in the SPM, the US contributed 9 authors or 14.2% of the total.

Whether authorship of the SPM is automatic for all CLAs, volunteered or hand picked there is a prestige in being a member of the core writing team. The authors are aware that in most cases the only people reading their chapters in full are reviewers, peers and students in the field (interviews with authors). Being part of the SPM writing team on the other hand, provides authors with the opportunity to work on a widely read document that is influential in social and political constructions of the climate change problematic. Authors are rewarded for the extra demands this task requires by being prominently credited at the front of the document. More importantly, these authors will work closely with those managing the assessment process, will be invited to additional drafting meetings, and will participate in the approval session. This provides select authors with a deeper insight into the IPCC's practice of writing and offers them the opportunity to network with influential members of the international scientific and in some instances policymaking community. This reward for being seen to have the right attitude and attributes in the author meetings and drafting process by those overseeing them—the co-

chairs, the bureau and TSU staff—is an incentive for authors to further invest in the IPCC and its assessment practice.

The first draft of the SPM is submitted for government review at the same time as the second order draft of the full report, which opens the SPM's construction pathway to IPCC member governments and experts submitting comments as part of the expert review (see chapter 7.4). The government review is seen as an opportunity to improve the document, making sure that the content covers the most policy relevant issues—as perceived by the reviewing governments—and that the language used to communicate the report's key findings are appropriate to its audience and consistent throughout the report. Many of the comments submitted are about the general presentation and structure of the summary, the language employed and inconsistencies in the use of terms and parameters (IPCC 2006h; IPCC 2006i; IPCC 2006j). The reference point for these comments is the SPM of the previous assessment, with the current product checked against the clarity and conclusions of the previous SPM. The more specific comments may 'flag' government's attitudes towards the contents, signalling the words, sentences, phrases and topics that will excite the most debate during plenary. The following comments from the UK and China signal the concerns of the respective governments and the positions they are likely to take towards the text during the approval session:

The SPM as it stands could, in the UK's view, convey more about the need for action over the next decade. Estimates of costs of delaying mitigation action have not been given. Including some of key headings in both the SPM and the TS will help emphasise key findings including the message that recent work is confirming earlier impacts and revealing new important impacts. (Government of UK). (Comments on the WG III draft SPM, IPCC 2006j, 15. Errors in original text).

...China believes that the words "major emitters" are misleading. Unless it is clearly defined that "major emitters" means those countries with high per capita emissions, this phrase should not be used without any definition. China and other developing countries with low per capita emission can never be called "major emitters". (2) This statement is concerned about political issue, according to IPCC's principle, all the contents related to political issues (eg. mitigation responsibility) should not appear in the SPM, TS and all the chapters of WGIII AR4. Political

issues should be dealt with by UNFCCC negotiation, but not IPCC report. It is beyond the scope of IPCC responsibilities. For the above two reasons, we suggest to delete this sentence.

(Government of China Meteorological Administration). (Comments on the WG III draft SPM, IPCC 2006j, 310. Errors in original text).

These comments along with the hundreds of others and the issues they raise will be discussed amongst the core-writing team at the fourth lead author's meeting, which is usually extended for those working on this document (IPCC 2006f; interview with TSU staff). This practice and the thoughts and reflection it necessitates within the drafting team—as demanded by the IPCC's practice of responding to all review comments (refer to figure 7.3 of previous chapter)—enables governments to imprint their political interests on the formation of the SPM. As with the full reports, in most instances the governments and experts submitting the most detailed comments are the countries that make up the majority of the authorship of the reports and whom are intervening most frequently during the approval session. For example, for the AR4, the ten countries providing the most commentary on the first draft of WG I's SPM were the USA, Canada, UK, Germany, Australia, Norway, Austria, France, Japan and China.⁷ Nine of these countries (excluding Austria) account for 78% of the authorship to the SPM drafting team, and of the forty countries contributing to the full report these ten countries constitute 86% of the CLAs, 68% of the lead authors and 62% of the Review Editors, with the USA and the UK combined accounting for over one third of the authorship of the WG I assessment report and the writing team of the SPM, see table 8.2. At the 32nd IPCC plenary session in October 2010, these ten countries made 42.7% of the total interventions, taking up 40.8% of the total intervention time, see table 8.3 and appendix d.

⁷ These calculations are authors own, made from the record of government's comments on the first review of the SPM (IPCC 2006h).

	Coordinating Lead Author	Lead Author	Review Editor	SPM
USA	7	25	4	12
UK	3	12	3	7
WG I	22	106	24	33
% WG I	45%	35%	29%	38%

Table 8.2 The percentage of WG I authorship provided by the USA and UK in the AR4, according to authors listed in the report.

The government review process is not only significant for its impact on the drafting of the SPM, these comments and the expertise that governments seek in compiling them are an important constituent of a national delegation's preparations for the approval session (interview with focal points; Zillman 2008, 33). The plenary approval proceedings and interventions by governments bury deep into the text of the SPM, the knowledge that underpins it, and the IPCC rules by which it is compiled. Thus those that participate with an objective to strengthen, weaken or 'improve' the text must come prepared with arguments supported by material contained within the assessment or on the grounds of the rules of procedure for compiling the assessment. This is no small task, there are three WG reports totalling around 50 chapters and roughly three thousand pages, plus the three SPMs that aim to represent the key findings of the WG's assessment, all of which have some relevance and bearing on the work of numerous government departments. Those well resourced, organised and invested in the IPCC process ensure that the appropriate expertise has been canvassed from within and outside of government to review this material and inform the national position (interviews with delegates).

Country	Number of Interventions	Total Time (seconds)
1. US**	50	4240
2. Switzerland**	43	4849
3. Saudi Arabia*	33	3218
4. Australia*	28	2854
5. UK**	25	1960
6. Germany**	24	1222
6. Belgium*	24	737
7. Netherlands**	23	1288
8. Austria	14	1062
9. Russia*	12	1532
9. Canada*	12	464
9. Sweden	12	345
10. France*	10	635
10. Norway	10	511
10. Slovenia	10	444
11. Ireland	9	368
12. New Zealand*	8	768
12. Maldives*	8	796
12. China*	8	840
13. Brazil*	7	942
14. Denmark	5	186
14. Sudan*	5	199
15. Spain*	4	502
15. Mali*	4	334
15. Japan*	4	219
15. Iran*	4	241
15. Finland	4	205

Table 8.3 Top 15 delegations ranked by the number of interventions during 4 day plenary. Data collected at the 32nd Plenary session of IPCC, Busan, South Korea (11-14th October, 2011). For full listings of panel interventions and for countries ranked by total time of interventions made, refer to appendix D.

* Countries with bureau member, for bureau positions see figure 6.3.

** Countries with TSU in the AR4 and/or AR5. All countries with a TSU in previous assessments have a bureau member in the current.

Those delegations arriving at the approval session without the support of a national review process are less well armed for the ensuing struggle. Without technical expertise delegates cannot contribute or take up an informed position on a technical issue, which confines a government's interventions to general comments. When a country does step forward with a comment that reveals a lack of understanding for the topic at hand or sensitivity to prior proceedings a marked silence fills the room and there is a palpable sense of its irrelevance to the session at hand (from personal observation). It is therefore unsurprising that the participation of the majority of IPCC member governments in the approval session is limited (appendix d). In an IPCC survey of national focal points, 31.6% of the developing and EIT country respondents did not carry out a government review of any of the TAR or AR4 products, compared to 12.5% of the developed countries surveyed, although the actual figures are probably far lower (IPCC 2009q).⁸ In some cases this is a lack of awareness of the bearing that IPCC knowledge production has on the climate change negotiations (from interviews with bureau members). However, even this "lack of awareness" is the effect of limited resources channelled into more pressing national issues, which curtails a country's capacity to mobilise or divert the expertise necessary to review the reports and discern a national position on how this knowledge impacts the government's wider interests in the climate field (ibid).

There is one notable exception to the relationship between authorship of the reports, review comments and government participation in plenary approval session. Saudi Arabia has been a member of the IPCC panel since it was established in 1988 (IPCC 1988), and has been represented on the IPCC bureau for all but one assessment round.⁹ As the following section indicates, Saudi Arabia became one of the most active

⁸ Of the 19 developed countries and economies in transition that responded to the survey, six countries did not carry out a government review (IPCC 2009). However, due to the low number of respondents it is likely that the actual percentage of developing and EIT countries conducting a review of IPCC materials is much higher than the 30% suggested by the survey.

⁹ Dr Abdulbar A. Al-Gain was vice-chair of the IPCC for the FAR and re-elected for the SAR. Dr Taha Zatari was vice-chair WG III for the AR4 and was re-elected for the AR5. Saudi Arabia's candidate for vice-chair of WG III for the TAR lost out to India's candidate: Rajendra Pachauri (IPCC 1997, F.R 13).

participants of the WG plenary approval sessions during the SAR, a role it has maintained since, see table 8.3. Despite Saudi Arabia's active participation in the approval proceedings, it is poorly represented in the authorship of the reports and only once had an author on the SPM writing team.¹⁰ Furthermore, Saudi Arabia did not submit any comments to any of the WGs during the AR4 review process, and only in the SAR has a government reviewer ever been listed. This may be explained by the purpose of the review process as outlined, it not being in Saudi Arabia's interests to improve the communication of the IPCC's assessment of climate change in the SPM or forewarning the WG co-chairs of the components of the text it will be taking issue with during the approval session.¹¹

As well as government comments, the first and final draft of the SPM is commented on by observer organisations. WG II for instance received comments from UNESCO, the United Nations International Strategy for Disaster Reduction (UNISDR), Greenpeace and the International Petroleum Industry Environmental Conservation Association (IPIECA). Comments from these organisations are amongst the most transparent. As section 8.2 indicates, until the SAR, these actors were able to intervene in the approval of the text along with member governments. However, the ruling of WG I's co-chair during this approval session confined observer organisation to either making their appeals directly through the review process or by lobbying government delegations prior to or during the plenary. These organisations take commenting as an opportunity to insert their interests through the advice they offer to authors. In the majority of its comments, UNISDR stresses the importance of disaster risk reduction strategies, suggesting inclusions to the text that promote its achievements in this area and its potential for assisting adaptation to future increases in "climate variability and extremes" (IPCC 2007i, 7; 62; 115; 141). Submissions by Greenpeace stress the need to emphasise the negative consequences of climate change (IPCC 2007i 50; 63; 65; 69), and IPIECA's comments focus on the clarity

¹⁰ Saudi Arabia has always had a Lead Author in the production of WG III's assessment reports, but it has never contributed to the authorship of any WG I report, and only once had a role in the authorship of WG II.

¹¹ Although, Saudi Arabia did submit comments for the government review in the TAR, at least for WG III (Shaw 2000, 113).

of quantitative measures of certainty and the confidence statements of authors (IPCC 2007i 47-48; 106; 115).

The SPM drafting team have roughly two weeks to consider the comments received on the final version of the SPM and to respond and revise the text accordingly. The team arrive at the venue a few days before the opening session and the co-chairs use this as an opportunity to prepare those that have not attended an approval session previously. This section has concentrated on identifying the means available to member governments to structure the construction of the SPM. However, the process of selecting the chapter's key findings and conveying the overall message of the WG's assessment of climate change in a twenty page summary has its own tensions and divisions, and even at this stage disagreements between authors arise over the presentation of the issue and the message to policymakers that the document should provide (Schneider 2009, 166-8).

8.3 Approving the policy document

The WG approval session is the final destination for the SPM document, bringing together those that oversee the production of the report, those that author it and those that approve it. Chapters six and seven highlight the activities through which political forces and the scientific habitus structure the IPCC's practice of writing, and indicate how these are confronted by and channelled into and through IPCC processes and procedures. However, until the approval of the final product the political activities of member governments and the scientific conventions of the authors are largely channelled into and through distinct activities. The IPCC's practice of producing a policy document brings the political interests of member governments in contact with and subject to scientific practices for constructing knowledge of climate change, which has over time generated a new form of practice: the practice of producing a government approved assessment of climate change. This section explores the new forms of activity that have been realised in

the process and how they enable climate change to be practiced as an object of international political life.

It is in the approval plenary that the IPCC as a field of practice, constituting its own ways of acting, recognising and generating authority is most evident. Drawing from examples of past approval sessions, and the approval of the AR4 in particular, this section explores the influence and operation of an IPCC habitus. Realised through practice, this habitus is identifiable in and through delegates and delegations habituated styles of operating and the activities of the WG co-chairs and authors to curtail its impact on the text. From the outset of the IPCC approval process, as initiated for the FAR, political positions have become embedded in the proceedings, which in turn have become associated with routinised reasons for intervening and ways of acting out and arguing these interventions. These embedded roles give a degree of predictability to the proceedings and mean that when certain weighted terms or words surface in the text they prompt interventions that reignite discussion and debate of previous approval sessions, which in many instances relate to on-going issues within the UNFCCC.¹² Bureau members and authors combine their authority with the plenary circumstances to limit the governments' incursion into their construction of the climate change problematic and it is through the interplay of member governments, co-chairs and authors' ways of practicing their respective roles that the final document is written.

The WG approval sessions are organised by the IPCC secretariat and hosted in various cities around the world on invitation from member governments. The sessions are predominantly chaired by the WG co-chairs, although the IPCC chair may step in, and it is the convention for the developing country co-chair to open the session and for the developed country co-chair to assume the majority of the chairing of the line-by-line approval.¹³ In the approval of the AR4, roughly 300 participants attended each of the WG

¹² The notion of weighted concepts was introduced in chapter 6. 5, and refers to the way in which certain words and terms have become weighted through the IPCC's practice of writing and the international negotiating process so that each time these words reappear they initiate past political posturing and related debate.

¹³ From interviews, see also ENB accounts of the AR4 WG approval sessions: (Gutiérrez, Muñoz and Johnson 2007; Gutiérrez, Kulovesi and Muñoz 2007; Gutiérrez, M. et al. 2007).

four-day sessions, including delegations from roughly 100 countries of various size and composition, lead authors, bureau and secretariat members, and various international and non-governmental organisations with observer status (Gutiérrez, Muñoz and Johnson 2007; Gutiérrez, Kulovesi and Muñoz 2007; Gutiérrez, M. et al. 2007). The seating arrangements at these sessions are the same as for the regular plenary, with national delegations in alphabetical order followed by observer organisations and lead authors at the back of the hall, see figure 8.2.

The approval session opens with the WG co-chairs introducing the SPM and detailing amendments made to the final draft in response to government comments. The session then turns over to the lead authors, who are scheduled to make presentations throughout the plenary proceedings, providing short accounts of key components of the underlying report and advances in knowledge as captured in the text (IPCC 2007f). With the first paragraph of the SPM projected overhead and the presentations complete, attention shifts to the delegates waiting below. This first paragraph, a general introduction to the text, see figure 8.3, is greeted with a wave of country flags. In depth knowledge is not required to intervene in a discussion on the scope of the introduction, which means nearly all delegations may have an opinion on this constituent of the document. Consequently reaching a consensus on these three or four sentences can take up precious hours of the allotted time by running into a second morning or afternoon session. This highlights a number of important features of delegations, the properties of individual delegates and the tactics available to member governments to sculpt the SPM document and insert their interests into its text. At the same time, the account below reveals the means available to the co-chairs and authors to curtail these incursions into the WG's assessment of climate change.



Figure 8.2 Arrangement of the plenary approval session: the text projected overhead, co-chairs and TSU staff on the podium in front of the delegates with observer organisations and lead authors sat behind. Photo of WG II approval session in Brussels 2007, courtesy of ENB reporting services: <http://www.iisd.ca/climate/ipwg2/> (last accessed 17.09.2011)

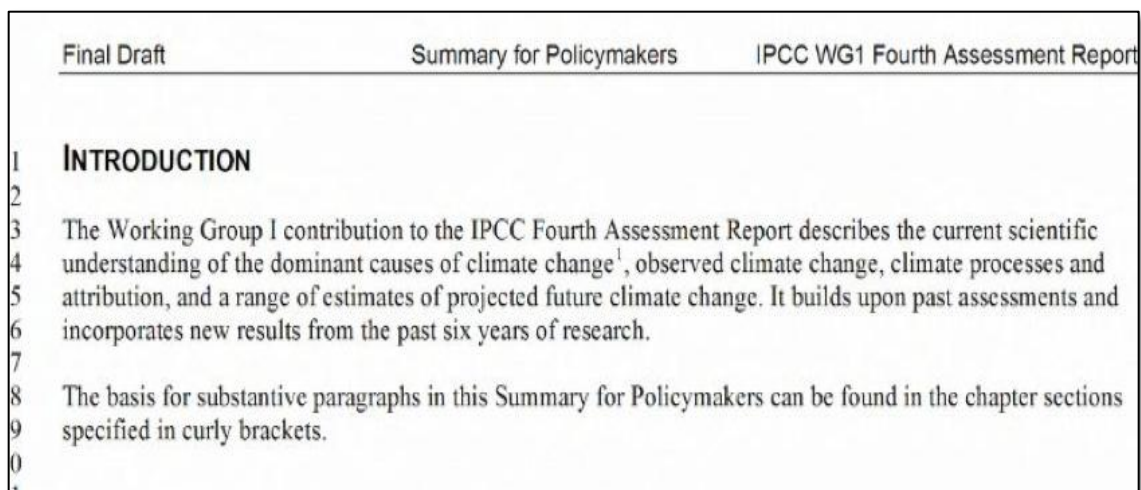


Figure 8.3 Introduction to the final draft version of the WG I's SPM for the AR4.

8.3.1. *The delegates*

The majority of national delegations consist of one civil servant from the environment ministry or national meteorological agency, see table 8.4 (and appendix C).¹⁴ However, those with well defined interests in the construction of climate change and the resources to support these, come with larger delegations, which include representatives from various government departments supported by the necessary academic expertise required for that WG approval session. China and the US consistently have the largest delegations. The Chinese delegation, which can consist upward of fifteen members, is headed by the Chinese Meteorological Administration and includes representatives from various ministries and governmental departments, including: the State Environmental Protection Agency, Ministry of Foreign Affairs, Ministry of Agriculture, Ministry of Science and Technology, Ministry of Water Resources, and the National Development and Reform Commission, as well as representatives of relevant national academies. The USA

¹⁴ In the WG III approval session for the SPM for the AR4 67% of delegations consisted of one delegate (see appendix C). In the WG III approval session of the SPM for the TAR 87.9% of delegations consisted of 1-2 delegates (Shaw 2000, 107).

delegation is headed by the State Department and depending on the approval session will include delegates from the Environmental Protection Agency, Department of Energy, and experts from relevant national laboratories.¹⁵ The size and composition of these delegations is an indication of national resources, the political significance given to the climate change issue, and in turn the departments interested in and affected by the knowledge contained within IPCC products.

Environment ministries (incl. specialized climate change departments)	Meteorological agencies	Other ministries	Foreign affairs (incl. local embassies)	Academia	Total
164	46	36	12	37	295

Table 8.4 Ministerial representation at the 9th session of WG III, 2007. Adapted from Yamineva 2007, 64.

The size of the delegation however, does not necessarily give countries greater influence over the proceedings. As we shall see below, having a large delegation has advantages, for instance these countries are able to attend all contact groups and are better placed to take up informed positions on the full range of discussions and disagreements that surface. However, there are other more important sources of authority in the plenary. In a few notable cases national delegates are long-standing participants to the IPCC process, as such they may have acted both in the capacity of bureau member and principal delegate, participated in bureau and plenary meetings, and been party to the compilation and formalisation of the IPCC's practice of writing over time. Knowledge of the process and the intellectual capital it endows enables these delegates to play a more active role in the proceedings, intervening more frequently and making longer interventions that are given greater consideration by the co-chairs and other plenary participants (personal

¹⁵ As listed in the list of participants attached to final reports of the IPCC plenary sessions, see IPCC 2005a; IPCC 2005b; IPCC 2007a (see appendix c), selected because these were plenary and WG sessions.

observations). In some cases the delegates' experience is constructive to the process, enabling these actors to detect the direction in which particular disagreements are heading and intervene with suggestions that have successfully resolved similar issues in the past. At the same time, these delegates are also better able to wrap political interventions in knowledge of the process to assert their interests, which may extend to disrupting or delaying the proceedings.

Delegates and delegations have become recognised and associated with particular roles in the process. The head of the British delegation, David Warrilow, see figure 8.4, is well known amongst the panel, the secretariat, bureau and TSU members. The British focal point to the IPCC, now residing in the Department of Climate Change (DECC), he has attended plenary and bureau sessions since 1995 and has also been a member of the British Delegation to the SBSTA and UNFCCC since they were established. David is perceived by bureau members as a delegate that knows the science and has distinguished himself within the panel as a constructive member of the IPCC's practice of writing, regularly intervening in approval proceedings to offer advice on improving the wording, order and flow of the section under discussion. Recognised as such, his opinion is sought on all matters of IPCC business inside and outside of plenary sessions. He often heads task groups to gather background and opinion to inform panel decision-making, is commonly requested to chair contact groups during WG plenaries and is often at the front of efforts to broker deals between dissenting parties (from interviews with participants and personal observations).¹⁶

The Saudi delegation is comprised of a highly skilled team of delegates, which for approval sessions is generally headed by Mohammad Al Sabban. Mohammad Al Sabban, see figure 8.5, has been chief negotiator to the UNFCCC process since 1991 and senior economic advisor to the Minister of Petroleum and Mineral Resources in Saudi Arabia since 1997. He has also distinguished himself as a member of the panel, although he is attributed with a different set of capabilities that are commonly viewed as hindering the

¹⁶ Recently he chaired the task group on governance and management in response to the IAC recommendations (IPCC 2011e), and prior to the task group on reinforcement of the IPCC secretariat (IPCC 2009c).

approval proceedings. Regarded in the UNFCCC negotiating process as one of the key players and usually cast in the role of villain (Depledge 2008; Harris 2009), he gained notoriety within the IPCC for his performance during the approval session of WG I's contribution to the SAR in Madrid, in 1995 (Houghton 2008). At this approval session, notes were past between the Saudi Delegation and the head of the Global Climate Coalition (GCC), Don Pearlman, with repeated objections that delayed the approval of the text (Leggett 1999, 224-30; Schneider 2009). Events such as these distinguish delegates and make their appearance at the approval session a talking point within and between the other plenary participants, which is often taken as an indication of the importance of the material being approved and the shape of the proceedings to come (personal observation).¹⁷

The solidification of roles within the IPCC gives a degree of regularity and even predictability to the approval proceedings. This extends beyond the routines and conventions of doing an IPCC approval plenary into the timing and content of delegates' interventions. Again the Saudi Arabian delegation provides the clearest illustration of this, but it is not alone in this role. From the approval of the FAR in 1990, Saudi Arabia's interventions have focused on the confidence levels assigned to the scientific findings presented in the text and with preventing carbon dioxide being distinguished from other greenhouse gases (Leggett 1991, 17). The content of Saudi interventions continue to question the certainty of scientific claims today, for example, in the case of the AR4 the ENB reporting of the WG I and II approval session details four occasions of Saudi Arabia objecting to the certainty language employed (Gutiérrez, Muñoz and Johnson 2007; Gutiérrez, Kulovesi and Muñoz 2007). In one case China and Saudi Arabia proposed reducing or qualifying the probability that anthropogenic greenhouse gas increase has *very likely* caused most of the observed increase in global temperature by removing the adverb "*very*" or adding the term "increasingly" *very likely* (Gutiérrez, Muñoz and Johnson 2007, 5).

¹⁷ A character of similar notoriety is the US climate change negotiator, Jonathan Pershing. Appointed US Special Envoy for climate change in March 2009, in the 1990s (1990-8) Jonathan Pershing was a US negotiator for the UNFCCC and its Kyoto Protocol. His appearance at the IPCC 32nd Plenary Session, at which the InterAcademy Review and reform of IPCC procedures were on the agenda, was acknowledged and discussed by other delegations.

Different issues have a similar effect on other countries. For example, Brazil intervenes whenever forestry and land-use change are mentioned; Brazil, China and India are sensitive to references regarding growth, recent emissions and mitigation potential of developing countries; and a number of European countries, most notably Germany, intervene to stress the importance of scientific knowledge on sea level rise and melting of the Greenland and Antarctic ice sheets (Gutiérrez, Muñoz and Johnson 2007; Gutiérrez, Kulovesi and Muñoz 2007; Gutiérrez, M. et al. 2007). Even the appearance of a single word can re-ignite past discussions and disagreements that can become particularly long-winded if they are on a subject that all parties may have something to contribute. This regularly occurs over the meaning of words as translated from a scientific report to a policy document and from English into other UN languages, as delegates disagree over the emphasis or strength assigned to them in different contexts and languages. Discussions like these have broken out over the usage of “preliminary” (Leggett 1999, 228); “substantial” (Petersen 2006, 176), “significant” (interview with participants), “evidence” and “agreement” (Gutiérrez, et al. 2007, 3).

Whilst the content of governments’ interventions appears to remain relatively stable, changes in domestic political circumstances can impact the level of involvement and role played by national delegations in the proceedings. As an international agreement curtailing GHG emissions is likely to significantly impact oil producing nations, Saudi Arabia’s stakes in the scientific certainty of climate change is high and unlikely to change in the near future. The content of US interventions, on the other hand, has varied with the ideology of the Administration, although perhaps not to the extent one might expect. In approving the FAR, the US sided with Saudi Arabia and the Soviet Union in emphasising the uncertainties, highlighting possible benefits of warming, stressing the cost of action, and even trying to get the words “climate change” replaced with “global warming at the surface of the Earth” (Leggett 1999, 16). By the approval of the SAR the Democratic Administration of Bill Clinton had replaced the Republican Administration of Bush Senior. The effect of this appears to have been a reversal in the role played by the US in the approval proceedings, with interventions from the delegation that counter-balanced

those of Saudi Arabia (Skodvin 2000a, 116). Despite the return of a Republican Administration for the approval of the TAR in 2001, there was not an observable change in the government's attitude towards the IPCC or the text until the approval of the AR4 in 2007.¹⁸

During the approval of the AR4, the US delegation was constructive to the approval of the WG I SPM (Gutiérrez, Muñoz and Johnson 2007), which is likely to relate to the fact that the government hosted the co-chair and the TSU. In the approval of the WG II SPM, however, the US often supported Saudi and Chinese interventions and insisted that the section on North America document the benefits of moderate climate change to agriculture (Gutiérrez, Kulovesi and Muñoz 2007, 8; Schneider 2009, chapter 6). Other delegations have also changed their behaviour over time. The Chinese delegation has become more active in the proceedings. In the written accounts of the FAR and SAR there are few references to interventions by China, whereas by the AR4 China plays a lead role in the approval proceedings (Gutiérrez, Muñoz and Johnson 2007; Gutiérrez, Kulovesi and Muñoz 2007; Schneider 2009, 180-97). The increasingly assertive interventions of the Chinese delegation demonstrates growing confidence in the process, as perhaps necessitated by the increasing stakes for the Chinese government in the international convention process as the world's largest emitter of greenhouse gases. Other delegations have also increased their participation in the proceedings, although in some instances this is as much a consequence of the increased confidence and ease of individual delegates as any change in national political circumstances. Thus, bureau members note that some developing country delegates have become more proactive and constructive to the process. Identifying two delegates in particular, one interviewee suggested that a delegate who used to be "a real nuisance", had become more supportive of the proceedings and could now be charged with chairing contact groups. Another delegate had apparently distinguished himself in the panel through sheer hard work and persistence, despite the fact that the process had not come to him naturally.

¹⁸ Schneider suggests "the delegation was so low on the Bush team's list of priorities that we didn't have to face the political ideologues we feared might attend" (Schneider 2009, 165).

The entrenchment of national ways of operating in the plenary approval is not solely the product of national interests in the climate change issue, other factors clearly constrain and enable the role of delegations in the process, such as cultural values and even the personality of delegates. Thus whilst the UK often intervenes as an authority on the language and grammar of the document and with word substitutes to placate dissenting parties, the US and Canada perceive themselves as the guardians of the scientific conventions of the IPCC process and the scientific content of the text. This is reflected both in the government's review comments and interventions, and in their response to recent events that called the IPCC's scientific credibility into question.¹⁹ The head of the Russia delegation on the other hand, Yuri Izrael, is well known for his protests against continuing the approval session without official translation. It is often the case that the approval sessions run into the night and over schedule and as a result continues in English without translation into other UN languages. In the approval of the TAR and the AR4, Yuri Izrael led the refusal to continue without translation, a protest that a number of other countries joined, although the approval sessions were eventually resumed (interview with participants; Schneider 2009, 172). Such characteristics point to particular cultural and even personal values and stances that are operating in and through government interventions, and in some instances these values may act to curtail the assertion of political interests. This may explain why US interjections to the IPCC's practice of writing have been relatively stable despite shifting from antagonist to ally in the plenary approval, as the national delegation attempts to maintain and balance its role as conserver of science with particular political interests in the climate change problematic.²⁰

¹⁹ This was stated by some delegates interviewed, but was also clear from the response of these countries to the IAC review at the 32nd plenary, a process that was initiated to safeguard the scientific integrity of the organisation after criticism sustained from mistakes discovered in the AR4.

²⁰ For example, Schneider (2009, 195) suggests that some US delegates were "persuaded by mainstream science" and were constructive to the AR4 process, but were constrained in this capacity by "their marching orders from delegation head Harlan Watson and the Bush Administration."

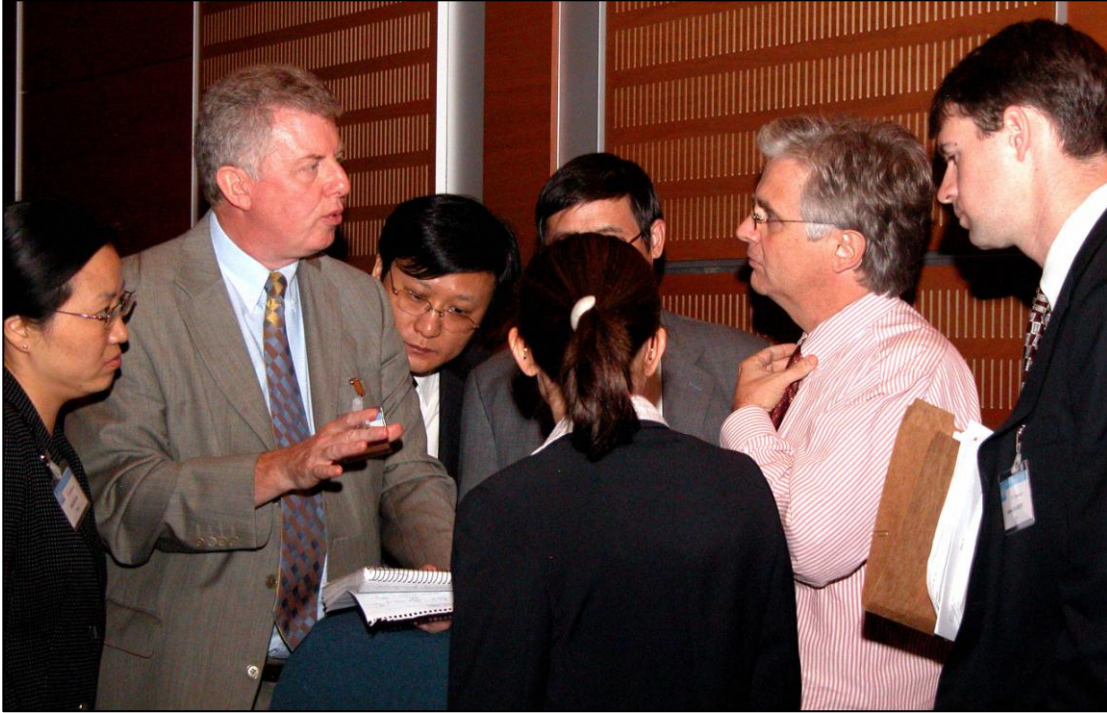


Figure 8.4 David Warrilow co-chairing a contact group at the 24th plenary session of the IPCC in Montreal, 2005. Photo courtesy of ENB reporting services: <http://www.iisd.ca/climate/ipcc24/> (last accessed 17.09.2011).



Figure 8.5 The Saudi delegation at the climate change talks in Bonn 2010, courtesy of the ENB reporting services. In the centre Mohammad Al Saban, to his right Aysar Tayeb and to his left Abdullah Khalid Tawlah. All three delegates are advisors in the Ministry of Petroleum and Mineral Resources. Aysar Tayeb regularly heads the Saudi delegation at IPCC plenary and SBSTA meetings accompanied by Abdullan Khalid Tawlah.

8.3.2. The WG Co-chairs

Whilst member governments have the power to approve or not to approve, political authority is not the only force in the proceedings; bureau members, particularly the WG co-chairs and authors have the scientific authority, through their knowledge of the subject matter, to constrain the behaviour of delegates and strategies for curtailing their imprint on the final product. Chairing is one of the most important elements of the plenary in this regard. The chairing of WG approval sessions is viewed as an art form and a skill widely admired by those privy to this stage of the IPCC's practice of writing. Long-standing delegates and bureau members—who are best able to judge this particular talent—are

quick to identify flaws in chairs' methods for conducting the proceedings and recall anecdotes of well executed chairing strategies that out manoeuvred difficult delegates (from interviews; Houghton 2008).²¹ Long-standing participants to the IPCC process like to see things done a certain way and prefer a chair that gives them the opportunity to do what they came to the plenary to do: to participate in the proceedings and to get involved in contesting sentences and contributing to its re-wording and thereby improving the document as they see it (from interviews with delegates and bureau members). This is after all the delegate's turn in the IPCC's practice of writing. Those chairs that do not allow the plenary process to proceed in the accustomed fashion, or who are not quick enough to assign paragraphs to breakout groups—the place where delegates can really get their hands on the text—are criticised.²²

The chair's perspective of the proceedings may not align with that of the delegates, particularly chairs that are new to the process and unfamiliar with the purpose of the approval session as perceived by delegates. The WG co-chairs have spent months crafting each sentence of the document now projected above their heads, and it is therefore unsurprising that they would view success as getting the text past governments with as few a changes as possible. However, becoming possessive of the text and the proceedings can alienate the plenary participants, including other WG bureau members. Bureau members and delegates of some countries are regarded as friends on the floor, and as mobile members of the proceedings can act as mediators between the chair, the authors and government delegates (interviews with bureau members).²³ A good chair

²¹ This regard given to chairing is apparent from responses to the IAC survey, as respondents indicate: "...much depends on the capacity of the chair person" (author and government advisor in plenary, IAC 2010b 47); "Skillful, experienced chair persons are required to protect CLAs and ensure scientific integrity of the text" (author and Bureau member, 2010b 118); "Requires skilled chairing" (author, IAC 2010b 293).

²² It should be noted that this observation is in contradiction to Shaw (2000, 114), whose data suggests that contact groups were not perceived as desirable "due to the time and effort required to reach agreement." Suggesting that the chairman of WG III in the approval of the TAR used contact groups as a threat to reach agreement in proceedings: "Please accept this wording or it will be sent into a contact group." Although as Shaw notes, they still took place frequently (ibid). I suspect this depends on who you speak to, but certainly long-standing members see contact groups as the place to get things done when a sentence of phrase has got stuck in the main proceedings.

²³ As discussed in chapter 5, in the former years of the IPCC the role of bureau member was not as distinct from government delegate as it is now, thus some of the long-standing members of the IPCC, such as Sir John Houghton (UK), Martin Manning (New Zealand), Bert Metz (Netherlands), John Stone (Canada), Robert Watson (US), and John Zillman (Australia) have acted both in the capacity of principle delegate and

knows to use these ‘friends’ by assigning them to lead formal and informal discussions on portions of text that have become mired in controversy.

Another tactic that the chair has at his or her disposal is the use of time to set the pace of the session. An experienced chair knows that delegates want the chance to say their piece and enjoy a sense of urgency in the proceedings, and thus the chair can play on time accordingly (from interviews with bureau members). Experienced chairs speak about taking it slowly in the beginning and earning the trust of the delegates by listening and responding to their concerns, then cashing in on this trust later once everyone is invested in the process and sensitised to the time constraints and joint endeavour of getting words, sentences and paragraphs approved (*ibid*).²⁴ Having only four days to approve the text, urgency is easily created, and it is not uncommon for discussions to stay circling the first paragraphs of the report at the end of the second day or for difficult portions of the text to be pushed back until later in the proceedings. However, delaying the approval of contentious issues until later in the week when the pressure of time can be exerted may backfire. This appears to have happened in the case of the WG II plenary approval of the AR4, see figure 8.6, where the all night session that most approval plenaries experience ran over into an extra day and was generally regarded as ill managed and “laborious” (Gutiérrez, Kulovesi and Muñoz 2007, 1), with some participants claiming it was “one of the worst meetings they had ever attended” (Gutiérrez et al. 2007,14).²⁵

As this indicates, time is not only available to the chair, it is also a strategy that delegates may play. In particular, delegations can attempt to slow and delay proceedings by continually intervening and raising issues with the text and by re-opening for discussion previously approved sections (Skodvin 2000a, 162-5). This is a tactic that the Saudi

bureau member. Such individuals, many of whom have long-standing careers of working the line between science and policy, are able to use the authority of these roles to instill shared values in the task and encourage an attitude of cooperation between government delegations and lead authors of the report (interviews with bureau members).

²⁴ See Peterson’s notes on a contact group he observed at the WG I approval of the Third Assessment Report in 2001 in Shanghai (Peterson 2006, 175-82) and Skodvin’s observations and conclusions from the WG II approval session of a 1994 Special Report (Skodvin 2000a, 161-8).

²⁵ This was also highlighted by a WG II bureau member in his response to the IAC questionnaire, writing that “the chairing of the entire WG2 plenary for the Fourth Assessment by just one individual - including a final mammoth 24-hour plus session - was not very effective” (IAC 2010b, 228).

delegation has become associated with both in IPCC and UNFCCC proceedings (Depledge 2008). One particularly well-documented incident, referred to above, is the approval session of WG I's contribution to the SAR, when the Saudi Arabian delegation made life difficult for the chair by repeatedly objecting to text (Houghton 2008; Leggett 1999; Schneider 2009). The content of many of these interventions appear to have been provided by the head of the Global Climate Coalition (GCCC), Don Pearlman, with written notes ferried between the two (Leggett 1999, 230; Schneider 2009, 138; interview with participants).

Whilst in most instances these tactics result in the substitution of words or re-ordering of sentences; continuous objections by delegations—particularly once the pressure of time is bearing down on the proceedings—may succeed in getting sentences, boxes, figures and in some instances entire sections dropped from the document. A number of such instances occurred in the approval of the AR4, particularly in the approval of WG II's contribution. For example, the US supported by Saudi Arabia suggested removing a section on “Systems, sections and regions especially affected by climate change.” The US stated that it did not object to the substance of the section per se, but its contents were captured elsewhere and there lacked time for discussion. Despite strong objections from other delegations, including an intervention from France expressing concern with the proceedings, this text was dropped (Gutiérrez, Kulovesi and Muñoz 2007, 8-9).²⁶ A number of similar incidents occurred, with China, Saudi Arabia and the US particularly successful at removing or diluting references to the UNFCCC, mitigation, stabilization scenarios and regional impacts (*ibid*).

²⁶ Similar instances also occurred in WG I and III, see Gutiérrez, Muñoz and Johnson 2007, 4; Gutiérrez et al. 2007.



Figure 8.6 The state of progress on day three of the WG II approval session of the AR4. Picture courtesy of ENB reporting services: <http://www.iisd.ca/climate/ipwg2/> (last accessed 29.9.2011).

8.3.3. *The Authors*

For authors, observing the proceedings from the back of the hall, this plenary specific way of approving the text is alien and described as slow, awkward, time-consuming, and even excruciatingly boring (IAC 2010b, 38, 84, 112). Government interventions are often regarded as political, time wasting, and delegates merely enjoying the sound of their own voice (from interviews). However, the authors themselves are also susceptible to being swept up in the unfolding theatre, with dramatic accounts of scientists storming out, or more mundane anecdotes of keeping themselves amused by taking bets on the length of

time between Saudi interventions (Schneider 2009, 138).²⁷ To some extent this reflects the role of authors in the proceedings and the intrusion of the plenary and the actions of delegates into the authors' sphere of influence over the content of the document, which leads some to resort to symbolic gestures.

Lead authors are present to ensure that any suggested revisions to the text are consistent with the content of the underlying chapter and the literature from which this is compiled. Thus, when a new paragraph of the SPM is opened for approval, the authors responsible for that section take their place on the podium alongside the co-chairs to give a short presentation of the material, answer questions from the floor and indicate whether suggested changes fit with or distort the meaning of the chapter's conclusions and the literature that underpins it. The majority of the ensuing discussions centre on clarifying the terms and concepts employed by the authors and translating them into a language that is comprehensible to the SPM's audience (interview with participants). The author's authority in these proceedings rests upon their knowledge of the subject area and their capacity to rule whether changes suggested by governments are consistent with the factual material contained in the full report (IPCC 2008b). However, this authority does not operate unchallenged. The right of authors to rule over the text becomes a constituent of the struggle within and between delegates as they seek to uphold their interests through the practice of plenary proceedings.

In cases where disagreements break out that appear unresolvable in plenary, a contact group is formed. Contact groups move polarised discussions out of the plenary to a smaller group of interested parties and take place before, after, and in the lunch breaks of

²⁷ In the approval of WG II's contribution to the AR4, the lead author of a particularly contentious issue walked out of the meeting hall after the scientific certainty of a statement in the SPM was lowered as a result of Chinese and Saudi objections. Although, Schneider (2009, chapter 6) suggests that it was not a storm out, the press reported it as such, see news coverage: Eilperin 2007; Mason (2007); Vergano and O'Driscoll (2007).

the main plenary.²⁸ This practice, which outside of plenary time proceeds in English, enables governments objecting to a particular word, sentence or section to work alongside the authors in a more intimate setting and broker text that can then be taken back to the plenary for approval, a process that can be completed in a matter of minutes or run into days (interviews with participants). During these sessions delegates push the authors on precisely what is meant by particular terms and phrases, which necessitates authors translate their scientific and technical understanding into a form that can be digested by those present and then reworded in a manner that is consistent with the underlying chapter and is understandable and politically acceptable to the delegates present (interview with delegates, authors and bureau members; see Petersen 2006, appendix; Shaw 2000, 113-117).²⁹ To do this the authors may step outside of the room to discuss between themselves, refer back to the underlying literature or even contact members of the wider chapter team before they agree on a particular government suggestion or translation (interviews with participants).

There is no guarantee that the text agreed in the contact group however, will be accepted by the panel, and whilst in some cases a few minor adjustments are all that is required to please the wider panel, on some occasions authors have found themselves embroiled in the same disagreements that initiated the contact group in the first place. In cases like these and particularly when an issue sits close to national interests, delegations may use the fact that they did not participate in the contact group as a reason to reject the revisions.³⁰ In the face of such tactics authors have little at their disposal to constrain government behavior and must contain their frustration, as author outbursts are not well received by the panel. One such instance happened in the approval of WG I's SPM in the SAR when Mohammad Al-Saban raised a series of objections to text that had been agreed in a contact group. Here the lead author lost his temper and in his response to the

²⁸ When the issue affects the majority of the panel the contact group will take place in the main hall and where possible is scheduled so as not to clash with the timetable of other contact groups and plenary proceedings, which gives smaller delegations the opportunity to participate.

²⁹ If necessary the authors may seek the approval of the wider chapter team before accepting delegates suggestions.

³⁰ For smaller delegations this is a genuine problem, as oftentimes there are several contact groups running simultaneously throughout the four-day approval session.

Saudi delegate indicated that these issues could have been discussed at the contact group, had a member of the delegation been present. This outburst was not tolerated by Al-Saban, who considered it necessary to remind the author that he was “a representative of a sovereign nation” and the author was “just a scientist” (Schneider 2009, 140).

Both in the plenary and the contact group the authors can iterate and re-iterate the science and the evidence to support the claims made in the SPM, but if government delegations refuse to accept the statement as it appears authors have limited means to prevent it from being revised or even rejected for the sake of consensus and completing the approval of the SPM. For some authors this is an acceptable price to pay to keep government interest and involvement in the IPCC and the climate change issue, for others however, this represents a battle between the authority of science and the selectivity of politics that has to be contested.³¹ Authors’ attempts to constrain government revisions are able to draw on the rules of procedures as a means to counter government intervention, or refer to the mandate of the WG and the government approved outline. However, whilst governments also draw on these materials in the support of their own interventions there is no guarantee they will be persuaded by the same restraints when their interests are at stake. For example, when the US, supported by Saudi Arabia, objected to a reference to Article 2 of the UNFCCC in WG II’s SPM, a lead author quoted the mandate of WGII “to specifically address UNFCCC Article 2” (Gutiérrez, Kulovesi and Muñoz 2007, 8).

³¹ One can see both of these points of views on the approval process in authors’ response to the IAC questionnaire. A commonly held view on the approval proceedings is that:

Governments clearly have their own agendas as is clear from the adoption process. Nevertheless, the buy-in from governments at the adoption stage makes the document yet more powerful. It is then endorsed by the parties / governments and becomes theirs - this is what makes the assessment reports strong - not just a collection of scientists but the collected best knowledge acknowledged by governments (even if they do not particularly like some aspects of the content). (IAC 2010b, 39).

Others disagree, perceiving of the approval session as an impingement on the authority of scientists:

Each country in the IPCC plenary is there to defend your [sic] own interest, not the collective interest or the science behind it. This is a pure political process that must be avoided. I was at the meeting were the IPCC AR4 report was accepted. The process was really terrible for all points of view. Negotiations driven by purely political issues is the main issue here. This must be changed. (IAC 2010b, 373).

Despite this reference to WG II's mandate and the support of other delegations, the author was not successful in his attempt to prevent the sentence being revised, and eventually the reference to the UNFCCC was omitted.

Even scientific values and conventions are not the sole preserve of authors. The WG co-chairs appeal to these values to constrain the proceedings, which arguably encourages governments to play upon the language of scientific objectivity to support their interventions. For example, in opening the plenary approval session the co-chair of WG I made the following statement to governments:

The IPCC provides a scientific assessment; therefore all proposals for changes in the SPM must be related to scientific accuracy, scientific balance, clarity of message, understandability to policy makers and relevance to policy. (co-chair WG I TAR in Petersen 2006, 150).

By making statements such as these, which indicate that scientific values will be the principle measure of worth during the session, the chairs effectively initiate a process whereby government's comments and interventions are wrapped up in and deployed alongside the language of 'balance,' by which governments claim the right to know what is 'objective' and dismiss that which they identify as 'policy prescriptive.'³²

A further impingement on the authority of the authors is the presence of experts in national delegations. Although the authors themselves may dismiss the expertise and objectivity of such experts, their presence adds weight to government interventions. For instance, in WG II's SPM to the AR4, China objected to the confidence level assigned to the statement that "many natural systems in all continents and some oceans, are being affected by regional climate changes...", insisting that the scientist in his delegation disagreed with the assessment on scientific grounds (Gutiérrez, Kulovesi and Muñoz 2007, 4; Schneider 2009, 183-5). Although the authors rejected the challenge to their

³² In his observations of WG I's approval session for the TAR, Petersen (2006, 150) indicates that the term 'balance' was a word often used in the proceedings. The use of such terms is also observable in government review comments, with sentences rejected for being 'policy prescriptive', see IPCC WG III 2007; Fogel 2005.

scientific practice by what they regarded as “eleventh-hour, national side science,” the confidence level was eventually lowered and the authors were reduced to symbolic protests, such as requesting to have their dissent recorded in a footnote, and theatrical outbursts about “scientific vandalism” (ibid).

8.4 Summing up: the practice of writing climate change

As chapter four indicates, all IPCC documentation serves a purpose and embodies the activities and order of relations that construct it. For those establishing the organisation and devising a means to achieve an intergovernmental assessment process, the policy document served and continues to serve the purpose of producing government approved knowledge of climate change. In realising the government approval practice these actors led the process of rendering climate change an object of international political life and institutionalising the activities through which it could be practiced within and by the IPCC. This and the preceding chapters identify the IPCC’s institutionalised process for producing assessments—and rendering climate change practicable—as a practice of writing. Each chapter documents a segment of the report’s journey along its construction pathway, recording the activities and power relations through which IPCC assessment reports are put together. Through this documentation of the IPCC’s assessment pathway, the thesis offers a study of climate change as an object of action. This indicates the role that the IPCC has and continues to play in providing a means to write climate change into something that can be done in and through the economic, political, social, scientific and bureaucratic activities that constitute international political life.

This chapter has provided an account of the historical development of the plenary approval practice. It describes the activities that put the SPM together and documents the uneven distribution of authorship and review comments, which serve to highlight the extent to which the SPM text is drafted and re-drafted through the social forces and political interests of the dominant. It is only once the SPM reaches the plenary approval

however, that it is possible to take a closer look at the order putting this document together. Here we see that the economic resources—a condition for meaningful participation in the IPCC's practice of writing—translate into authoritative interventions. Thus, it the governments with the economic resources to have a delegation greater than one or two and to institutionalise an extensive government review that arrive at the approval proceedings well armed with interventions for re-wording the drafted text. Whilst economic resources are a condition for meaningful participation within the IPCC's practice of writing, a delegation of more than two members does not guarantee authority or the ear of the chair. There are other more important means for distinguishing a government's imprint on the text.

The history of the IPCC's development is an important source of authority for those that have been party to it. Long-standing bureau and panel members know the history of the IPCC's practice of writing, have taken decisions that have shaped the course of its development and ensured the assessment's continued relevancy in and to the climate field. Delegates participation in the dramas of past approval sessions distinguish them in the panel: proposing a word that brokered agreement or raising an objection every time the term carbon dioxide is written into the text, gives certain delegates a place in the history of the organisation that is re-told in anecdotes and written into accounts in the scholarly literature. This gives the head of the British and Saudi Arabian delegations, as well as others, symbolic power: a role that can be played and a degree of room to manoeuvre that is more likely to be accepted by other panel members and those chairing the session.

However, such symbolic forces cannot be relied upon. Here we see the shifting positions of delegations. Thus, whilst there are clear patterns of behaviour triggered by the appearance of words, statements of certainty and new assessment findings with implications for the UNFCCC negotiating process, skilled delegates and delegations are careful not to overuse the objection, which risks disillusioning other members of the panel and those they rely upon for chairing and overseeing the process. The US is notable in this regard, seemingly walking a thin line between protecting the organisation and its

work and protecting its political activities from the knowledge the organisation writes. This highlights that no single force governs the IPCC's practice of writing. Through member government's interest and investment in realising intergovernmental assessment's of climate change, the practice of writing has the power to shape the activities and attitudes of those participating: channelling political interests through its habitus and distinguishing members of the panel previously unnoticed. It is these forces in combination then, which generate and are generated by the international political practice of climate change.

Having witnessed these dynamics in bureau and plenary meetings and read between the lines of the review comments, the co-chairs arrive at the approval session prepared for its characters, political positions and the forces that govern the conduct of the panel. At this stage of the IPCC's practice of writing it is perceived best if the chair lets go of the text and takes over the proceedings. The value the chair instils at the start of the process shapes the unfolding event and the order that delegates call upon in making their interventions for re-working the text. It is through practice that chairs have developed the symbolic means to curtail the interventions and ensuing chaos of earlier approval sessions. By playing on time and using break out sessions, a skilful chair prevents the text slipping out of his or her hands and into the interests and forces governing panel conduct below. In this endeavour they are supported by the authors. In place to ensure that any changes to the text remain true to the underlying report, author perceptions of this event are distinct from the chairs and panel members, who have—through the practice of plenary—internalised the steps of this dance. The familiar boundaries between the fields of science and politics are challenged in and through the approval session. When scientific findings encroach on political interests, delegates stake a claim to scientific authority as they aim to re-word the implications of the scientists' findings. And when the scientific authority of the author is not accepted by the panel, authors too resort to playing on the political theatre that the practice of approval has institutionalised.

It is the shifting roles that the IPCC's approval practice enable that distinguishes the IPCC's practice of writing from the scientific and political fields that constitute it.

Scientists acting out the theatre of politics and delegates staking a claim to scientific knowledge are not the normal order of business within the fields that qualify these actors to participate within the IPCC's assessment practice. These are evidence of a new domain and field of practice, where a new order in the name of climate change is being established. This is an order in the making—in which roles have not been solidified and forms of authority assigned—as is apparent from the fact that delegate's claim to scientific knowledge and the scientist's stake to the politics of the proceedings are received with some discomfort, a degree of shuffling and even outbursts that serve to put actors back in their place. This is also an indication that this field in the making remains reliant on the conventions (and the authorities they recognise) of the political order founding it.

9. Conclusion

The world is written by a few. Those few have particular properties, or forms of capital as Bourdieu termed and studied it, distinguishing these actors and authorising them to write the world for others. This thesis offers a study of these properties, the authorities they constitute and the actors they empower to label the world. It explores how the activities through which those with the authority to write the world are writing climate change, and how in and through this writing of climate change the order of international political life is reproduced.

In order to study how the world is written, the thesis begins by identifying the work of four scholars and outlining their contribution to the theorisation of knowledge and power in the construction of international environmental politics. Peter Haas's epistemic community model was the first comprehensive attempt to account for and codify the role that scientific communities and scientific knowledge have in shaping the international political response to environmental issues. The model facilitated detailed historical accounts of the emergence and politicisation of climate change and the role that science and scientists played in bringing the phenomenon to the international communities attention and in conceptualising it for political action. However, the concept of epistemic community belies the social nature and inherent interests of any claim to know and define the meaning of environmental degradation for social action. Methodologically, the concept of epistemic community prioritises scientific actors and activities prior to study, obscuring the power of other actors and actions in the conceptualisation of international environmental politics.

The discursive approach of Karen Litfin highlights that knowledge does not only empower the producer in the realm of international environmental politics, as once

produced scientific knowledge is available to all those that know to incorporate and mould it to their discursive constructions. The work of Maarten Hajer on the construction of the acid rain problematic further demonstrates the range of actors and competing discursive frames through which environmental issues come to be known and acted upon. It is in his work that we begin to discern the extent of struggle and diffusion of power within and across the range of actors and institutions invested in framing the social and political meaning of environmental problems. Here, both Hajer's discourse analytical approach and Steven Bernstein's normative framework highlight the extent to which the conceptualisation of environmental degradation is structured by prevailing ways of knowing and acting in the world. Thus, in the construction of acid rain, Hajer's conclusions indicate that despite a discursive shift towards ecological modernization in the framing of acid rain, the eventual institutional response was more consistent with end-of-pipe abatement strategies than the internalisation of environmental care assumed within eco-modernist thinking.

Bernstein's work further illuminates this situation. Tracing the development of international environmental governance, Bernstein's normative approach suggests that new ideas concerning the governance of international environmental problems only became widely accepted once they found some fitness with norms of liberal economic growth and development. Bernstein's theorisation of social structure demonstrates that far from the political response following scientific discovery, prevailing social structures limit the extent to which environmental degradation can be known and acted upon. Thus, whilst scientific knowledge and new ideas have the power to challenge social and political order – as 1970s environmentalism and the discourse of ecological modernization did – in both instances the institutional response highlights the power of the world as it is currently governed to constrain political action. Further light is shed on the power of prevailing structures with Bernstein and Adler's use of Foucault's notion of episteme, a concept the authors employ to analyse the role of background knowledge in the construction of global governance. Their analysis of the liberal episteme indicates the productive force of collective understanding. It is the capacity of collective ways of

knowing to identify and judge authoritative actors and legitimate actions that reproduces the liberal episteme through the political problematisations and responses it generates.

In outlining these approaches chapter two explores some of the comprehensive frameworks available for thinking about and analysing the role of knowledge and power in the construction of international environmental problems, identifying the means they offer for addressing by whom and through what processes climate change is being written. The epistemic community model attempts to simplify the construction process to a linear transfer of knowledge from science to politics. However, historical accounts of the politicisation of climate change reveal that the actors and activities through which climate change became an object of political action are not so neatly delineated along epistemic lines. The discursive and normative frameworks of Litfin, Hajer and Bernstein facilitate analysis of a more complex and competitive international social realm, in which actors struggle for discursive and ideational hegemony in defining the meaning of environmental degradation. Alongside the power of actors and scientific knowledge then, these approaches consider the power of discourse, institutions, norms and background knowledge to structure the construction of international environmental action. These approaches provide space for theorising a more intricate social fabric and indicate the power of the prevailing order to structure how we know and respond to environmental problems. Despite these insights, there remains work to be done in developing the theoretical tools necessary for deepening our understanding of the relationship between knowledge and power in the construction of international environmental politics.

The thesis makes its contribution by enabling: 1) an unpacking of the relationship between power and knowledge, 2) identification of the properties and distribution of the power to name, and 3) an exploration of how prevailing international order is re-made in and through the naming of climate change. The Intergovernmental Panel on Climate Change (IPCC) is the site of this study. As the leading international body for the assessment of climate change knowledge, the IPCC is at the centre of international political efforts to render climate change meaningful for political life. Furthermore, its intergovernmental nature makes the organisation ideal for exploring the properties and

distribution of power across different social universes invested in the international politics of climate change, from those authorised to produce knowledge of the problem to those with the power to take political action. It is in this study of the IPCC that the thesis explores the relationship between power and knowledge and addresses its central research question, namely: how and by whom is climate change being made an object of international political life?

The symbolic power of knowledge

In order to study how and by whom climate change is being made, the thesis introduces the sociological approach of Pierre Bourdieu. Chapter three outlines how Bourdieu's approach to the study of social order can be deployed for rethinking the international politics of climate change as one of the most important realms of order making in politics today. The aspects of Bourdieu's work critical to this study are his interrogation of symbolic power and the practical nature of knowledge. Bourdieu understood the social realm as a site of continual struggles to determine the meaning and thus the order of social reality. In order to map the distribution of power to determine meaning, Bourdieu developed a set of thinking tools that rest upon the practical nature of being. Through his philosophy of action Bourdieu challenged the common dichotomy in social study that either attempts to represent objective reality or re-create subjective interpretation. Bourdieu's stress on the practical nature of knowledge indicates that it is through shared social practice that the objective world is subjectively known. In order to explore the construction of reality in practice, Bourdieu incorporated into analysis both the objective structures of the social world and the perceptions of these and from these, as internalised within habitus.

Bourdieu's stress on the practical nature of knowledge indicates that social reality effectively exists twice: in the objective structures of a social field—the distribution of political, economic and social capital—and in the internalisation of its order in schemes

of perception. It is in and through the practice of a given social realm that the world is simultaneously comprehended in habitus and re-produced through practice. This indicates that there are two sides to the productive force of knowledge. The first is conservative, reproducing through practice and through what practice builds the order of which it is the product. But knowledge also offers the potential to transform. By challenging perceptions of social reality, knowledge has the power to alter how the world is acted upon and the world these action make. In truth, just as the social world cannot be understood solely on the basis of its objective reality or subjective experience, nor is knowledge purely one form or another. Bourdieu highlights this through a study of the social field constituting his own schemes of perception. His analysis of French academia identifies the symbolic power of the scholar and scholarly systems of knowledge in world making. It is on the authority of disciplinary knowledge and through its scholarly practices that scholar's claim to know, categorise and name reality, which has the power to alter perceptions of the world and thus how the world is acted upon. As with all social actors however, the scholar is invested in the social field authorising her expertise, and thus the knowledge she creates is subject to and distorted by the forces of her social location and its struggles. There is then, no such thing as disinterested knowledge.

The thesis takes up Bourdieu's notions of habitus, field and capital for the purpose of studying the IPCC and its practice of climate change. Studying the IPCC as a social field requires locating the organisation and its assessment products within the broader international political struggle over climate change and the actions it warrants. The international politics of climate change is commonly conceived in relation to the climate regime. In regime thinking the collective response to climate change is made (or not) through the international negotiations of the United Nations Framework Convention on Climate Change (UNFCCC). This focuses scholarly attention on the events, decision-making and agreements of this arena—where the action takes place—and positions the IPCC in relation to the regime as scientific knowledge provider and enabler of the political response. This is misleading. As the thesis documents, all activities within the field of climate change are the practice of climate change, through which climate change is made an object of international political life. And all of these activities, even those

labeled scientific, embody the political order and power relations structuring the climate field.

The regime concept is also worrying for the lack of reflexivity it promotes. As with the epistemic community model's belief in the disinterested nature of scientific knowledge, the routine deployment of regime conceals its stake in the struggle over international order and the symbolic power of regimes to contribute to its making. The success of the regime is reflected in the fact that the notion is employed both by those studying the international politics of climate change and by those practicing it, leaving unconsidered in whose interests this construction of reality is made and continues to serve. The thinking tools deployed within this study are not an attempt to model reality and therefore cannot purposefully build a reality; they are designed for pulling apart the productive forces of knowledge and the social order these generate. Nevertheless, the dividing line between the theory and practice of climate change remains thin. All scholars with an interest in studying climate change have a stake in its making. Characterising the international politics of climate change as a social field of forces and struggles acknowledges this, positioning the scholar and the research firmly within the climate field.

Chapter four initiates the process of re-problematising the international politics of climate change as a struggle over the meaning of climate change for international political life and locating the IPCC and the purpose of its assessment products within this struggle. The IPCC and those establishing it were critical to the transformation of climate change as an object of science to an object of political activity, and subsequently the IPCC and its assessment reports have become a central means for legitimating ways of knowing and acting within the climate field. Thus, for those that seek to legitimate their political stakes in the climate field and the social and political relevancy of particular forms of expertise the IPCC and its assessment process is an object of attraction. For actors contesting the science of climate change and political action, the IPCC, its assessment practice and its products are a target for attack. The forces exerted by those seeking to legitimate their stake or undermine the authority of the IPCC structures the organisation and its

assessment practice as those leading the process work tirelessly to maintain the organisation's symbolic power to assign meaning.

It is within the context of these forces that the IPCC's practice of writing has emerged as a means to practice an intergovernmental assessment exercise that generates internationally recognised and government approved knowledge of the climate change problematic. It is through the practice of writing that the IPCC transforms climate change into an object of political action and attempts to preserve the organisation's authority to do so. This project tells the story of the development of the IPCC and its practice for producing assessments of climate change. It describes the five units of work that are clearly distinguishable within the organisation today and identifies the distinct role and forms of authority that each has in and through its contribution to the IPCC's practice of writing. Chapters six, seven and eight follow the formation of IPCC assessment reports, detailing the construction of the report outline, the scientific assessment and the government approval session of the final product. Through this map of the assessment pathway and the chapter's descriptions of actors and activities putting it together the thesis illuminates the scientific, political, economic and organisational forces structuring how and by whom climate change is written. The following section outlines each of these forces, discussing the extent to which they determine the IPCC's practice of writing.

The forces governing the IPCC and its practice of writing

Chapter five identifies the IPCC as five units of work: the panel, the bureau, the TSUs, the secretariat and the authors. Each of these units performs particular tasks in maintaining the IPCC and in realising assessments of climate change. Previous studies have focused on discreet aspects of the organisation and its assessment activities, studying the IPCC as a site for interrogating the relationship between science and politics in knowledge production practices and the disparity between North and South in these exercises. Whilst this research has identified the dominant forces structuring the IPCC

and its assessment activities, the narrowness of focus has overlooked powerful actors and actions within the IPCC's practice of writing. Thus the role of the TSU, the unit that has greater day-to-day contact with the assessment than any other IPCC actor, has been left unconsidered. Also under-theorised is the internal struggles within the organisation, which are most evident in relations between the bureau and the panel, and the secretariat and the TSUs. These struggles over relative positions within the IPCC and authority over its assessment practice structure the internal order of the organisation and determine a unit's symbolic power in the IPCC's writing of reality.

In order to shed light on the relations within the organisation and the impact they have on the conduct of the assessment, chapters six to eight follow the construction of IPCC assessment reports and detail the activities that put them together. The account serves two purposes: firstly, it provides documentation of the IPCC's assessment process, from the panel's decision to repeat the assessment to governmental approval of the final product. Secondly, through the documentation process, it identifies the properties and distribution of power determining how and by whom climate change is written. The chapters descriptions of the formation of the outline, the scientific assessment and the plenary approval reveal the central forces structuring the IPCC's practice of writing as: the scientific habitus, political order, economic capital and the IPCC's practice of writing. As the following section indicates, these forces are deeply intertwined and it is thus the relationship between scientific, political, economic and organisational forms of authority that structure the IPCC's construction of climate change.

The scientific habitus

The power of the scientific habitus to order relations within the IPCC and the conduct of its assessment is unsurprising. The IPCC was established to produce scientific assessments of climate change and many of those leading the process gained their authority through notable contributions to the field of climate science. The first chairman

of the IPCC, Bert Bolin, was a carbon cycle scientist and a central actor in earlier climate change assessment activities (Rodhe 1991). As chapter five documents, in chairing the early sessions of the IPCC he sought to instil in plenary proceedings the order and conduct of international scientific processes like those of its parent bodies, particularly the WMO, which he and other bureau members were familiar with as either representatives to the WMO or participants within WMO-supported international scientific processes. The symbolic power of IPCC assessments of climate change has rested upon the scientific authority of those leading the process and authoring the reports and the scientific conventions adhered to in their construction. For these reasons knowledge of climate change, international scientific processes and scientific practice are important sources of authority within all units of the IPCC and all aspects of the organisation's work. As a means for increasing authority in and over the IPCC's practice of writing, scientific authority has become an object of struggle within and between IPCC units. This is most notable in chapter five's description of the secretariat's recent attempt to stem and recover the loss of authority through a request to increase the scientific capacity of the unit and by attempting to obtain a more direct expert role for the secretariat in the production of IPCC assessment reports.

The power of the scientific habitus to order relations and the conduct of the assessment is most evident in chapter seven's documentation of the selection process and the drafting and reviewing of IPCC assessment reports. Although there are other factors to consider, such as geographical representation and including the range of views, scientific credentials remain the most important criteria in author selection and in ordering relations within IPCC assessment activities. Thus, chapter seven indicates that both within the chapter teams and the WG bureau, the competency of actors is judged according to scientific capital and knowledge of scientific processes. The capacity of the scientific habitus to recognise those qualified and capable of contributing to the IPCC's practice of writing automatically limits the contribution of those actors not possessing these particular forms of cultural capital. The symbolic power of the habitus to operate as such is apparent from the level of acceptance, as one developing country author writes in responding to the IAC questionnaire:

The team members from the developing countries (including myself) were made to feel welcome and accepted as part of the team. In reality we were out of our intellectual depth as meaningful contributors to the process... from a point of view of strengthening scientific community, the learning experience of participating in high level science, and from the point of view of political legitimacy, the process of inclusiveness has great value to the IPCC. (Comment made by a lead author, IAC 2010b, 330).

Unrecognised in and by this order, and actors acceptance of it, is the geographically and historically particular ways of knowing generated through scientific practice, the arbitrariness of relations built on publication output, and the fact that the scientific habitus excludes forms of cultural capital that may have something to teach its practices for comprehending the world, which are themselves imbued with the cultural values and activities of life that generate the climate problem.

The power of the scientific habitus to order relations within the IPCC and the conduct of its work has not gone uncontested. Cultural contestation of the working mode and values of the scientific habitus is most evident in relations between the bureau and the panel, as discussed further below. However, at the same time as member governments contest the dominance of the scientific habitus, scientific capabilities retain the power to distinguish delegates within the panel deemed to know their science. These members of the panel, regarded as friends on the floor, are called upon by bureau members for advice and to chair difficult contact groups, and are relied upon to broker agreement or to find the word acceptable to dissenting parties in the approval of IPCC documents. Governments also appeal to the sentiments of the scientific habitus in plenary approval sessions as they seek to challenge the author's construction of climate change in the SPM text. As a result, scientific authority itself becomes part of the plenary struggle as the chair calls upon scientific values to order proceedings and member governments and lead authors stake a

claim to scientific conventions and scientific knowledge as they attempt to re-write or limit the re-writing of the policy document.

Political order

The political force of IPCC member governments lies in the panel's decision-making power over all aspects of the organisation's work, most significantly the capacity to codify the IPCC's assessment practice and to approve the outline of the assessment and its final products. The extent of government involvement has increased over time. Chapter eight indicates that in the first assessment report, the effect of political interests was most marked at the end of the assessment process, when the panel approved the key messages of the assessment's findings. The establishment of the UNFCCC, and the symbolic power of the IPCC's FAR in its creation and over its form, increased governments' interest in climate change knowledge production and the IPCC's assessment activities. The deepening investment of member governments has re-ordered the relationship between the panel and the bureau, with the panel seeking greater autonomy from the working mode of the scientific habitus and freedom from its judgments. The effect of this increasing interest and the autonomy governments have sought for the panel have impacted the organisational structure of the IPCC and its assessment activities, as epitomised in the altered conduct of bureau elections.

As chapters five and six document, until the start of the AR4 assessment cycle, bureau elections were governed by the working mode and ethos that key bureau members sought to instil in all plenary proceedings. This was particularly true of the first chairman, Bert Bolin, who played a central role in bringing the panel to consensus over the make-up of the bureau. He was assisted in this endeavor by the malleability of the IPCC's organisational structures, which enabled him to increase geographical representation through bureau expansion. However, the nature of bureau elections changed in 2002. The significance of this election cannot be understood without reference to wider events in the climate field. By the start of the AR4 assessment cycle, the Kyoto Protocol was heading towards ratification—despite US rejections—and adaptation was emerging as a major

constituent of international climate practice.¹ Both of these developments demonstrated the IPCC's symbolic power to shape international action. It is therefore unsurprising that political interest increased in the IPCC and its assessment activities between the second and third assessment. Whilst these events are significant, they are not the only reason for the panel's increasing involvement in the IPCC's work.

The increasing involvement of governments within the IPCC and the cultural contestation it has engendered is also the inevitable product of practice. As governments have become more familiar with the work of the IPCC so their interest and investment in its activities have deepened. This was a new kind of game for governments and their delegates in 1988 and so naturally they followed the lead of those that could institutionalise such a process. However, once delegates became more comfortable with the proceedings and confident in its assessment practice, panel members increasingly manoeuvred through and subject the IPCC's practice of writing to political practices and the interests these intend to realise. This is reflected in the altered operating style of the panel, the drama of the bureau elections and the changed attitude of some panel members to the current chair and other actors within the bureau. At the same time, whilst governments have introduced forces and activities more customary of the political habitus, governments' investment in the IPCC and its practice of writing has—over time and through practice—structured government interest and channeled these forces.

Thus, we see the panel increasingly consumed with maintaining the integrity of the IPCC and its symbolic power in the climate field. This is unsurprising. The IPCC is a significant site for struggling over and controlling the means by which the reality of climate change is written. Member governments naturally seek to maintain both the IPCC's symbolic power to write reality and their control in and over the activities through which it is written. However, as IPCC panel members and through panel activities, governments also serve the interests of the IPCC. This is most evident in the panel's response to mistakes discovered in the AR4 and the media attacks on the IPCC's

¹ This is reference to the Marrakech accords, which established the National Adaptation Programmes of Action and adaptation funds for the Least Developed Countries, see Dessai & Schipper 2003; Hardee & Matunga 2009.

chairman. In response the panel: 1) tightened IPCC procedures (IPCC 2011b), 2) formalised governance and management arrangements (IPCC 2011f), 3) produced a conflict of interest policy (IPCC 2011g), and 4) generated a communications strategy (IPCC 2011h). Many of these measures were symbolic, codifying the IPCC's assessment process as it is already practiced. Nevertheless, the panel's response served to preserve the integrity of the IPCC, and in doing so, it solidified the authority of the WG co-chairs, the TSUs and the secretariat in and over the IPCC's practice of writing.

Economic capital

What is not always evident from within the scientific habitus or through its practical conventions for ordering relations within the IPCC's assessment exercise is the dependence of scientific capacity on economic capital. Economic capital is the most important determinant of participation within the IPCC's practice of writing. Interest in the IPCC's practice of writing as an author, bureau and panel member is conditional on economic capital and economic capital conditions level of investment. This relationship means that economic capital ultimately determines by whom and according to whose cultural values climate change is written. The significance of economic capital to participation and to the legitimacy of the process was apparent to those that established the IPCC, and funds were made available to cover the cost of travel for developing country participants, as institutionalised within the IPCC's trust fund. However, as many developed country bureau members and authors observe and as is evident from plenary session proceedings: attending IPCC bureau, author and plenary meetings does not guarantee meaningful participation.

Chapter seven indicates how economic capital affects the symbolic recognition of developing and EIT country authors and the scientific contribution these authors are able to make. Meaningful participation in the IPCC's practice of writing is reliant on being recognised as a meaningful participant within and by its order. The scientific habitus distinguishes authority on the basis of contribution to the field, one of the most important

measures of which is publication output. Here chapter seven documents the barriers faced by developing and EIT country scientists. The acceptance rate for journal articles submitted by developing country authors stands at 25%, compared to 75% for papers with first authors from the US, Canada, Europe, Japan, Australia and New Zealand (Gettelman 2003, iii). In citing the lack of awareness of recent literature and the use of outdated methodologies, international journal editors identify the practical impediment to developing and EIT country scientists publishing in recognised journals and building a distinguished career in an international field of science. Not having the economic capital necessary for purchasing and publishing in international journals has a direct effect on perceptions surrounding the knowledgeability of developing and EIT country authors. The IPCC has acknowledged the impact of journal access, which is available for all authors in the AR5 process. However, as chapter seven highlights, there still remains the question of internet and internet speed, an indication of the disparity in working conditions between developed and developing country authors that has practical implications for how and by whom climate change is written.

The same relationship between economic capital, investment in the IPCC's practice of writing and recognition of contribution is evident in the work of the bureau and the panel. As within the authorship of the reports, chapter seven documents the tendency amongst developed country bureau members to suggest that only half of the bureau are any use, with the other half judged as either incompetent or political appointees. Once more these comments do not acknowledge the resources necessary for investing in the IPCC's practice of writing or equally, the re-distribution of economic capital that would be necessary to achieve participation by all. The disparity is evident in the co-chairmanship of the WGs. The developed country co-chair has a unit of 5-15 highly skilled staff to support them in their decision-making and in realising their leadership of a WG assessment report. Developed and EIT country co-chairs may be provided with a small fund from the IPCC and a few receive assistance from the national government, but they do not have the comparative administrative and technical support that would be necessary for realising a shared vision of the WG's assessment of climate change.

It is not only practical involvement that is impeded by economic capital, interest itself is conditioned by and conditional on having the economic resources to invest. The lack of interest reported in developing country participants by bureau members and authors is evident during plenary sessions, with some delegates apparently oblivious to the proceedings, surfing the web and wandering in and out of the main hall. It is here that Bourdieu's conceptualisation of interest comes to the fore (chapter 3.3.2). Interest in the IPCC's practice of writing is conditional on being able to participate meaningfully, which requires possessing the economic capital to undertake IPCC activities. As chapters six to eight document, without the time and resources to invest in commenting on draft outlines, initiating a search for national expertise and undertaking a government review of draft reports, member governments are effectively excluded from meaningful participation within IPCC proceedings. This is evident in chapter eight, which highlights that informed position taking on the technical framing of climate change—as struggled over during the approval session—requires the expert knowledge generated through the review process or housed within the national delegation. As the majority of developing country delegations consist of one delegate and do not carry out an extensive review of IPCC reports it is unsurprising that the data indicates that less than half of those present intervene during plenary proceedings (appendix d). Without economic capital and the intellectual and symbolic forms it converts to through the IPCC's practice of writing, the majority of developing country delegates, bureau members and authors are reduced to the role of spectator.

The IPCC's practice of writing provides an important means for increasing symbolic and economic capital, which highlights the intertwined and re-inforcing nature of the political, scientific and economic order as embodied within the IPCC and its assessment reports. For countries with large climate science communities invested in and supported by the national government there are rewards for investing in the IPCC's practice of writing. These rewards are largely symbolic, such as the prestige of co-chairing the WG assessment report, supporting the TSU or having the largest number of authors in the assessment. However, these symbolic forms of capital readily convert into intellectual capital during plenary proceedings, as greater knowledge of the process provides

delegations with practical reasons and the knowledge to intervene. As chapter seven indicates, similar forms of symbolic capital are available to authors. This is most readily illustrated in WG I, where IPCC authorship is perceived as a measure of a scientist's contribution to the field. This form of symbolic capital was further enhanced through the awarding of the Nobel Peace Prize in 2007, which extended the prestige to the universities and institutions housing these authors. For authors too, these forms of symbolic capital readily convert into economic capital through career advancement.

These forms of symbolic capital are not universal, and only function where they are recognised. Thus, for governments that cannot compete in terms of national climate expertise and authors for whom their contribution is neither recognised by the author team, the national government or the home institution there is no evident reason to be interested or to invest limited time and resources in the IPCC's practice of writing. This can change over time. Even if starting from a position of disadvantage, where governments have had the resources to invest in climate science and the IPCC's practice of writing they have rapidly improved their position within the organisation and influence over its products. This is evident from China's increased presence and involvement in all aspects of the IPCC's work. China had a single lead author in WG I's first assessment report. This changed from the SAR onwards, when China joined the WG I bureau as a vice-chair and in the TAR became co-chair of the WG, a position it has held since.² In both the TAR and the AR4, China contributed three authors to the SPM drafting team and in the AR4 China had the fourth highest number of lead authors in the report: 6.5, behind the US (25), the UK (12.5) and France (10.5). In the AR5, China's presence is stronger again, with at least one author on all chapters of the WG I report.³ China's increased interest in the climate field and investment in both climate science and the IPCC's practice of writing is also reflected in the plenary approval proceedings. As noted in chapter eight, in the written accounts of the FAR and SAR there are few references to

² China provides administrative and technical support for its co-chair and one Chinese scientist has been hosted in the TSU of the developed country chairmanship from the TAR onwards.

³ Calculations authors own from list of authors provided in WG I reports. See, Houghton et al., 1990; 1995; 2001; Solomon et al., 2007.

interventions by China, whereas by the AR4 China plays a lead role in the approval proceedings.⁴

The IPCC's practice of writing

Exploring the dominant forces structuring the IPCC and its assessment activities identifies: 1) the symbolic power of the scientific habitus to order the authorship of the assessment, 2) the influence of member government's over the assessment practice and its products, and 3) economic capital's capacity to determine scientific and governmental participation. This reveals that those with the greatest responsibility for generating climate change and those that have benefitted most through fossil fuel-powered development are in the strongest position to write the meaning of climate change in and through the production of IPCC assessment reports. However, although the descriptions of the scientific habitus, political order and economic capital indicate that these forces reinforce one another in practice, they are not remaking climate change an object of international political life unrestrained. The IPCC's practice of writing constrains and channels these forces.

The power of the IPCC's practice of writing to restrain the reproduction of international economic, political and cultural order in the construction of climate change resides in the organisation's objective. The IPCC was established to generate a process for producing internationally recognised and government approved assessments of climate change. Its authority and legitimacy within the climate field, and thus its ability to realise this purpose, depend upon developing country participation in the bureau, panel and authorship of IPCC reports. The fact that the IPCC's purpose and symbolic power depends on geographical representation places practical constraints on the extent to which the dominant are able to write the reality of climate change through the IPCC's assessment practice. The three most important constraints on the political order's capacity

⁴ This is again reflected in the increasing number of reviewers listed over subsequent assessments. In the FAR, no Chinese reviewers were listed for the WG I, in the SAR however, 8 reviewers were listed, in the TAR 9 and in the AR4 17. See, Houghton et al., 1990; 1995; 2001; Solomon et al., 2007.

to re-write itself through the IPCC's assessment activities, are: 1) the organisation's attempts to increase geographical representation in the panel, bureau and authorship of the reports, 2) the codification of the IPCC's assessment practice, and 3) the construction pathway itself.

Increasing geographical representation became a central objective in and to the IPCC's work during the production of its first assessment report and remains a regular item on the panel agenda. Institutionalising a trust fund to cover the cost of developing and EIT country participation has ensured that delegates, bureau members and authors are able to attend the relevant meetings, even whilst participation remains restricted by economic capital. Institutional attempts to increase geographical representation in the bureau and authorship of the reports have also been important. From the SAR onwards the chairmanship of the WGs has been split between developed country and developing/EIT country expertise, and efforts intensified to share the coordinating of chapters as well as to increase the geographical representation of the author teams. Whilst it appears universally accepted that the developed country participants assume leadership, its division nevertheless alters the order and conduct that would otherwise be established. Thus, whilst chapter seven makes apparent the importance of scientific credentials in the author selection process, these are not the only criteria used in compiling author teams. The WG bureau and TSU staff must ensure author lists have adequate geographical representation to be accepted by the wider IPCC bureau and ultimately the panel.

The IPCC's decision to follow the lead of WG I in the AR4 and make journal access freely available to all IPCC authors for the AR5 acknowledges the disparity in working conditions that result in the judgment of developing country author's expertise and competency. This may have a more significant effect than immediately apparent. As the previous section indicates, the relationship between economic capital, scientific capacity, interest and participation are reinforcing and perpetuated through perceptions within chapter teams and the actual material contributions authors are able to make. Providing developing country authors with free journal access not only enables them to increase their contribution to the assessment process it also puts them at an advantage to

colleagues and experts within their national fields of study, and thereby serves to increase the symbolic capital of IPCC authorship and interest in the process.

The standardisation of IPCC authorship and assessment practices challenges the authority of the scientific habitus to order relations within chapter teams and the conduct of the assessment. As chapter's five and seven make apparent, in the authorship of the FAR, it was largely the cultures and conventions of the WG authors that governed how and by whom IPCC assessments were written. In the case of WG I, this meant that the field of climate science effectively determined the limits of the authorship and the knowledge assessed. Consequently, the report was dominated by those countries that dominated knowledge production, most notably the US and the UK. However, even within WG I, maintaining legitimacy within the climate field has meant opening up IPCC authorship to greater geographical representation and subjecting its scholarly conventions to codification. Thus, today author selection and the division of roles and responsibilities are guided by IPCC objectives and the codification of its assessment procedures, and whilst the identification of contributing authors continues to rely on epistemic connections, these are no longer the sole mechanism for identifying by whom IPCC assessments of climate change are written.

The standardisation of the IPCC's assessment practice across the three WGs has had a similar effect, limiting the capacity of the authors' habitus to order how climate change is written. Standardisation is largely occurring through the creation of guidance notes, most significantly on the use of non-peer reviewed literature and on the evaluation of evidence and treatment of uncertainties. Although these practices are based upon scientific conventions they are being re-written for and codified through the IPCC's purposes. The guidance notes themselves have arisen as a response to criticism received after the publication of the assessment reports and are the product of expert workshops and draft papers prepared by members of the WG TSUs. Their production and enforcement increases the TSU's authority over the scientific habitus and ultimately the authors, as it is members of these units that instil the worth of standardised assessment activities in

authors and have the editorial power to ensure they are adhered to in the production of the final report.

One of the most important restraints on the reproduction of order is the pathway that IPCC assessment reports travel in their formation. As chapter four makes apparent, IPCC documents serve the purpose and embody the relations that put them together. The pathway that has developed for the report's formation and the assessment activities institutionalised within the IPCC's practice of writing ensure that the final products are not solely the outcome of the government, bureau and author interests overseeing, writing and accepting the reports, but rather are representative of wider interests and subject to approval by the climate field. The IPCC's practice of seeking comments on the chair's vision paper and the draft outline, and the plenary practice of opening speeches by representatives of the IPCC's parent bodies and the UNFCCC, ensure that its main stakeholders have the opportunity to insert their interests in the next assessment of climate change. The IPCC's expert and government review process serves a similar purpose, enabling those interested and invested in the climate field and impacted by its products to scrutinise the authors' constructions of climate change and insert their stake into the final product.

It is important not to be misled by these institutional restraints. As this thesis makes clear, the IPCC is more than its assessment activities; it is a field of practice. The rules and procedures are an important mechanism for channeling the scientific habitus and political interests into the IPCC's objective and in the process the disparities in economic capital sustaining these social, scientific and political forces are illuminated. Nevertheless, all IPCC documentation is the product and embodies the forces structuring the IPCC's practice of writing, including the documents codifying this practice. Thus, the IPCC's institutional mechanisms for realising intergovernmental assessments, to increase geographical representation and provide input from its main stakeholders are themselves the product of the forces governing this field of practice, and as such, mask and reproduce some of its greatest contradictions. This is illustrated by two of the most

important innovations of the IPCC and its intergovernmental assessment process: 1) the government approval session, and 2) the technical support units (TSUs).

Chapter eight provides the clearest evidence of the IPCC as a field of practice. In its documentation of the approval session it highlights how the IPCC's practice of writing and actors' investment in realising its objective has the power to shape the activities and attitudes of those participating: channelling political interests through its practice and taking the scientific habitus beyond its limits as it draws co-chairs and authors into activities that would normally undermine expert authority. This is given in evidence of the activities and authorities being created in the name of climate change, through which climate change is being rendered practicable for international political life. At the same time, apparent within this practice of climate change is the fact that the political forces and cultural conventions structuring its development are not only remnant of the fields of practice that founded the IPCC, but are based in and on its order. Thus, it is member governments with the economic resources to invest in both scientific knowledge production and the panel's activities that have the symbolic power to write the meaning of climate change in and through the IPCC's practice of writing. The reproduction of international political order is assured by the fact that as dominant panel members these governments have the greatest influence over the report outline, have the most authors in the assessment, generate the most review comments and ensuing revisions, and arrive at the plenary approval session best equipped to re-write the policy implications of climate change.

These same power arrangements are embedded in the institutional arrangements of the IPCC as is most apparent from the TSUs. These units practically enable the IPCC to realise its objective, undertaking the administrative and technical activities that are required to bind hundreds of authors together and instilling through the process the assessment procedures and values the final product is to embody. These units ensure that the IPCC's concern with geographical representation and its procedures for producing IPCC assessments are reflected in the authorship of the report and adhered to in the final product. At the same time, only seven countries have ever hosted the TSUs, with the US

hosting one for every assessment round and the UK for four (table 5.1). Chapters six and eight document the advantage these units provide member governments in the form of intellectual capital during plenary and approval proceedings, as is apparent from the fact that the delegations intervening the most and making the longest interventions are those that presently or in the past hosted a TSU (table 8.2; appendix d).

Thus, when the dominant governments, as panel members, step forward to dictate the terms by which the IPCC's practice of writing are to be codified—as has been done after the publication of each report in response to criticism generated from within these countries—they enable and assure the reproduction of international political order. The codification of the IPCC's practice of writing is done on the basis of particular cultural measures and social practices of integrity, as embodied in and by these panel members, the bureau members they have elected, the authors they nominate and the staff within the TSUs they host. This empowers particular properties of knowing and acting in the world as lived in North America and Europe. And yet, it is these cultural ways of living, the values they embody and the ways of comprehending the world they internalise, which are degrading the planet, which begs the question: do these cultures offer the means for comprehending the meaning of climate change? Or, are they simply serving to preserve the political order and activities of life that enable the dominant to determine meaning?

Appendix A: List of interviewees

Interviews conducted between July 2010 and May 2012.

Authors

Mike Hulme (WG I, CLA TAR)
Corrine Le Querre (WG I, LA, AR5; AR4; TAR)
Lynne Talley (WG I, LA AR5; AR4)
Richard Somerville (WG I, CLA AR4)
David Adger (WG II CLA AR5; CLA AR4; LA TAR; CA SAR)
Nigel Arnell (WG II LA AR5; LA AR4; CLA TAR; CLA SAR)
Mike Brklacich (WG II RVED AR5; LA AR4)
Saleemul Huq (WG II CLA AR5; CLA AR4; LA TAR)
Linda Mortsch (WG II, CLA AR4; CA)
Robert Nicholls (WG II RVED AR5; CLA AR4; LA TAR; LA SAR)
Terry Root (WG II AR5 RVED; AR4 LA; TAR LA)
David Vaughan (WG II, CLA AR5; AR4)
Poh Poh Wong (WG II CLA AR5; CLA AR4; LA TAR)
Terry Barker (WG III CLA AR4, CLA TAR)
Lenny Bernstein (WG III LA AR4; LA TAR)
Philippe Crabbé (WG III LA AR4, LA TAR)
Michael Grubb (WG III LA AR4; LA TAR)
Matthew Paterson (WG III LA)
Jayant Sathaye (WG III AR5 RVED; AR4 LA; TAR CLA)

Bureau members

James Bruce (WG III co-chair SAR; RVED AR4)
Sir John Houghton (WG I chair FAR; co-chair SAR, TAR)
Bert Metz (WG III co-chair TAR, AR4)
Martin Parry (WG II co-chair AR4)
John Stone (WG I vice-chair TAR; WG II vice-chair AR4; WG II LA AR5)
Jim Skea (WG III, vice-chair AR5)
Youba Sokona (WG III co-chair AR5; LA AR4)
Pier Vellinga (WG III vice chair FAR; WG II LA SAR; WG III LA TAR)
John Zillman (delegate FAR; bureau member SAR; WG I vice-chair TAR; WG II vice-chair AR4)

TSU

Martin Manning (WG I, AR4)

Melinda Tignor (WG I, AR5; AR4)
Chris Ebi (WG II, AR5; LA AR4)
Michael Mastrandrea (WG II AR5; CA AR4)
David Dokken (WG II, AR5; TAR; SAR)
David Griggs (WG I, TAR)
Maria Nogueur (WG I, TAR)

Panel

Brian Gray (Head delegate, Environment Canada)
David Warrilow (Head delegate, DECC UK)
Lucy Hayes (DECC, UK)

Secretariat

Preferred not to be named and largely email correspondence.

Appendix B: Tables of drafting team authors for the WG SPMs of the AR4, as listed.

Country	Drafting authors	Contributing authors
USA	7	5
UK	4	3
Switzerland	3.5	1
Australia	3	0.5*
China	3	
Argentina	1.5	
France	1.5	1
New Zealand	1.5	
Canada	1	2
Japan	1	
Mexico	1	
Norway	1	1
Russia	1	
South Africa	1	
Thailand	1	
Belgium	0.5	
Germany	0.5	2.5
Denmark		1
Totals	33	17

Table 1. Drafting team of the WG I SPM for the AR4 by nationality (IPCC 2007g).

* 0.5 denotes where two countries listed.

Country	Drafting authors
USA	9
UK	7.5
Australia	4.5
India	3
Mexico	2.5
Canada	2.5
Argentina	2
China	2
Germany	2
Japan	2
Philippines	2
Russia & Fed	2
South Africa	2
France	1.5
Morocco	1
Belguim	1
Brazil	1
Finland	1
Barbados	1
Chile	1
Hungary	1
Bangladesh	1
New Zealand	1
Poland	1
Senegal	1
Singapore	1
Slovenia	1
Spain	1
Switzerland	1
Venezuela	1
Kenya	0.5
Benin	0.5
Netherlands	0.5
Nigeria	0.5
Sweden	0.5
Totals	63

Table 2. Drafting team of the WG II SPM for the AR4 by nationality (IPCC 2007h)

Country	Drafting authors
Netherlands	7
USA	6.5
India	3
UK	3
Australia	1
Brazil	1
China	1
Denmark	1
Germany	1
Hungary	1
Japan	1
New Zealand	1
Russia & Fed	1
Sierra Leon	1
Uruguay	1
Argentina	0.5
Austria	0.5
Mexico	0.5
Montenegro	0.5
Pakistan	0.5
Totals	33

Table 3. Drafting team of the WG III SPM for the AR4 by nationality (IPCC 2007i).

Appendix C: Table of delegates and ministries at the 9th session of the IPCC WG III (Bali, Indonesia, 26-29 October 2009), approval of WG III's contribution to the AR4 (IPCC 2007a).

Country	Number of delegates	Department of head
Afghanistan	1	Foreign Affairs
Albania	1	Environment
Antigua & Barbuda	1	Meteorological
Argentina	2	Foreign Affairs
Australia	3 + BM	Environment
Austria	1	Environment
Azerbaijan	1	Environment
Belarus	1	Environment
Bahamas	2	Meteorological
Bangladesh	1	Embassy
Belgium	2 + BM	Federal Planning
Benin	1	Meteorological
Bhutan	1	Agriculture
Botswana	1	Meteorological
Brazil	2 + BM	Science & Technology
Bulgaria	1	Environment
Burundi	1	Geography Institute
Cambodia	1	Environment
Cameroon	1	Environment
Canada	5	Environment
Central African Rep.	1	Meteorological
Chile	1	Conama
China	19	? Meteorological
Colombia	1	Environment
Costa Rica	1	Meteorological
Cote d'Ivoire	1	Environment
Cuba	1 + BM	Meteorological
Czech Republic	1	Hydro
D. R. of Congo	1	Environment
Denmark	2	Environment
Djibouti	1	Environment
Dominica	1	Environment

Dominican Republic	1	Environment
Ecuador	1	Tourism
Egypt	1	Environment
Finland	5	? Meteorological
France	1 + BM	CGTI
Gambia	1	Water
Georgia	1	Environment
Germany	10	? Environment
Guinea Bissau	1	Meteorological
India	3	? Environment
Indonesia	2	Environment
Iran	1	Meteorological
Italy	3	Environment
Jamaica	1	Meteorological
Japan	8 + BM	Environment
Jordan	1	Environment
Kazakhstan	1	Climate change centre
Kenya	BM	Academia
Kiribati	1	Environment
Lesotho	1	Meteorological
Liberia	1	Meteorological
Libya	1	Meteorological
Malaysia	2	Meteorological
Maldives	1	Meteorological
Mali	1	Meteorological
Mauritius	1	Meteorological
Mexico	2	Environment
Mongolia	1	Environment
Morocco	1 + BM	Meteorological
Myanmar	1	Meteorological
Namibia	1	Environment
Nepal	1	Meteorological
Netherlands	2	Environment
New Zealand	1 + BM	Environment
Norway	4	Environment
Pakistan	1	Meteorological
Paraguay	1	Environment
Peru	BM	
Philippines	2	Meteorological
South Korea	5	Environment

Moldova	2	Meteorological
Romania	1	Environment
Russia	1	Envt Institute
Rwanda	1	Meteorological
Saint Lucia	1	Economic affairs
Sao Tome & Principe	1	Natural resources
Saudi Arabia	1	Embassy
Senegal	1	Meteorological
Serbia	1	Meteorological
Seychelles	1	Environment
Singapore	1	Environment
Slovenia	1	Environment
South Africa	2	Environment
Spain	3	Environment
Sri Lanka	1 + BM	Meteorological
Sudan	1 + BM	Environment
Suriname	1	Environment
Swaziland	1	Meteorological
Sweden	3	Environment
Switzerland	1	Environment
Syria	1	Environment
Tajikstan	1	Environment
Thailand	11 + BM	Environment
Former Yugoslav	1	Research
Togo	1	Environment
Tunisia	2	Environment
Turkey	1	Environment
Turkmenistan	1	Environment
Tuvalu	1	Environment
Uganda	1	Meteorological
Ukraine	1	Meteorological
UK	4	Environment
USA	8 + BM	State
Uruguay	1	Environment
Uzbekistan	1	Meteorological
Zambia	1	Environment
Zimbabwe	1	Meteorological

? Not clear whether this department is the head of the delegation.
BM Bureau member

Appendix D: Member governments listed by number and length of interventions at the 32nd Plenary session of IPCC, Busan, South Korea (11-14th October, 2011).

As recorded by the author at the 32nd plenary session. This session was attended by a total of 103 IPCC member governments. Presentations by chairs of contact groups or bureau members were not included.

Table a) Countries listed by total number of interventions

Country	Number of Interventions	Total Time (seconds)
US**	50	4240
Switzerland**	43	4849
Saudi Arabia*	33	3218
Australia*	28	2854
UK**	25	1960
Belgium*	24	737
Germany**	24	1222
Netherlands**	23	1288
Austria	14	1062
Sweden	12	345
Canada*	12	464
Russia*	12	1532
Slovenia	10	444
Norway	10	511
France*	10	635
Ireland	9	368
New Zealand*	8	768
Maldives*	8	796
China*	8	840
Brazil*	7	942
Denmark	5	186
Sudan*	5	199
Finland	4	205
Japan*	4	219
Iran*	4	241

Mali*	4	334
Spain*	4	502
Bangladesh	3	140
South Africa	3	147
R. of Congo	3	204
Argentina*	3	214
India*	3	223
Lesotho	2	39
Niger	2	107
Benin	2	110
Peru*	2	428
Cote d'Ivoire	1	3
Gambia	1	20
Philippines	1	29
Pakistan	1	36
Ecuador	1	38
Costa Rica	1	110
Cuba*	1	115
Malaysia*	1	128
Mexico*	1	129
46. Madagascar*	1	250
Totals	433	33431

Table b) Countries listed by total number of seconds

Country	Number of Interventions	Total Time (seconds)
Switzerland**	43	4849
US**	50	4240
Saudi Arabia*	33	3218
Australia*	28	2854
UK**	25	1960
Russia*	12	1532
Netherlands**	23	1288
Germany**	24	1222
Austria	14	1062
Brazil*	7	942
China*	8	840
Maldives*	8	796
New Zealand*	8	768

Belgium*	24	737
France*	10	635
Norway	10	511
Spain*	4	502
Canada*	12	464
Slovenia	10	444
Peru*	2	428
Ireland	9	368
Sweden	12	345
Mali	4	334
Madagascar	1	250
Iran	4	241
India	3	223
Japan	4	219
Argentina	3	214
Finland	4	205
R. of Congo	3	204
Sudan	5	199
Denmark	5	186
South Africa	3	147
Bangladesh	3	140
Mexico	1	129
Malaysia	1	128
Cuba	1	115
Benin	2	110
Costa Rica	1	110
Niger	2	107
Lesotho	2	39
Ecuador	1	38
Pakistan	1	36
Philippines	1	29
Gambia	1	20
46. Cote d'Ivoire	1	3
Total	433	33431

*Countries with a bureau member.

** Countries hosting the WG co-chair and TSU in the AR4 and AR5.

IPCC documents

1988

IPCC (1988) 'Report of the first session of the WMO/UNEP Intergovernmental Panel on Climate Change (IPCC).' Geneva, 9-11 November 1988. Available at: <http://www.ipcc.ch/meetings/session01/first-final-report.pdf> (Last accessed 28.09.2012).

1989

IPCC (1989a) 'Report of the second session of the WMO/UNEP Intergovernmental Panel on Climate Change (IPCC).' Nairobi, 28-30 June 1989. Available at: <http://www.ipcc.ch/meetings/session02/second-session-report.pdf> (Last accessed 28.09.2012).

1990

IPCC (1990a) 'Report of the third session of the WMO/UNEP Intergovernmental Panel on Climate Change (IPCC).' Washington DC, 5-7 February 1990. Available at: <http://www.ipcc.ch/meetings/session03/third-session-report.pdf> (last accessed 28.09.2012).

IPCC (1990b) 'Policymakers summary: prepared by working group I.' In Houghton et al. (eds) *Climate change: The IPCC scientific assessment*. Cambridge University Press, Cambridge, United Kingdom.

1991

IPCC (1991a) 'Report of the fifth session of the WMO/UNEP Intergovernmental Panel on Climate Change (IPCC).' Geneva 13-15 March. Available at: <http://www.ipcc.ch/meetings/session05/fifth-session-report.pdf> (Last accessed 28.09.2012).

1992

IPCC (1992) 'Report of the eighth session of the Intergovernmental Panel on Climate Change.' Harare, Zimbabwe, 11-13 November 1992. Available at: <http://www.ipcc.ch/meetings/session08/eighth-session-report.pdf> (Last accessed 28.09.2012).

1993

IPCC (1993) 'Report of the ninth session of the Intergovernmental Panel on Climate Change.' Geneva, 29-30 June. Available at: <http://www.ipcc.ch/meetings/session09/ninth-session-report.pdf> (Last accessed 28.09.2012).

1995

IPCC (1995) 'Summary for policymakers: the science of climate change.' In Houghton et al. *Climate change 1995: the science of climate change*. Cambridge University Press, Cambridge, United Kingdom.

1997

IPCC (1997) 'Report of the thirteenth session of the Intergovernmental Panel on Climate change.' Maldives, 22 and 25-28 September. Available at: <http://www.ipcc.ch/meetings/session13/thirteenth-session-report.pdf> (Last accessed 28.09.2012).

1999

IPCC (1999) 'Report of the fifteenth session of the Intergovernmental Panel on Climate Change.' San Jose, Costa Rica, 15-18 April 1999. Available at: <http://www.ipcc.ch/meetings/session15/fifteenth-session-report.pdf> (Last accessed 28.09.2012).

2001

IPCC (2001a) 'Future work programme of the IPCC.' IPCC-XVII/Doc. 4. Available at: <http://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=5&cad=rja&ved=0CEMQFjAE&url=http%3A%2F%2Fwww.ipcc.ch%2Fmeetings%2Fsession17%2Fdoc4.pdf&ei=RBBmUPUPqNLRBaHtgcgP&usq=AFQjCNEPp1t3m4t6AO4GaqsF7jf4ZqH61A> (Last accessed 28.09.2012).

IPCC (2001b) 'Future of the Intergovernmental Panel on Climate Change.' IPCC-XVIII/Doc. 4 (a). Available at: <http://www.ipcc.ch/meetings/session18/doc4a.pdf> (Last accessed 28.09.2012).

IPCC (2001c) 'Report of the 17th session of the Intergovernmental Panel on Climate Change.' Nairobi, 4-6 April 2001. Available at: <http://www.ipcc.ch/meetings/session17/final-report.pdf> (Last accessed 28.09.2012).

IPCC (2001d) 'Report of the 18th session of the Intergovernmental Panel on Climate Change.' Wembley, UK, 23-29 September 2001. Available at: <http://www.ipcc.ch/meetings/session18/doc4d.pdf> (Last accessed 28.09.2012).

2003

IPCC (2003a) 'Report of the 20th session of the Intergovernmental Panel on Climate Change.' Paris, 19-21 February 2003. Available at: <http://www.ipcc.ch/meetings/session20/final-report.pdf> (Last accessed 28.09.2012).

IPCC (2003b) 'Proposed chapter outline of the WG I contribution to the IPCC fourth assessment report (AR4).' WG-I: 9th/Doc. 3. Available at: <http://www.ipcc.ch/meetings/session21/wg1doc3.pdf> (Last accessed 28.09.2012).

IPCC (2003c) ‘Chapter outline of the WG I contribution to the IPCC fourth assessment report (AR4).’ IPCC-XXI/Doc. 21. Available at: <http://www.ipcc.ch/meetings/session21/doc21.pdf> (Last accessed 28.09.2012).

IPCC (2003d) ‘Report of the 21st session of the Intergovernmental Panel on Climate Change.’ Vienna, Austria, 3 and 6-7 November 2003. Available at: <http://www.ipcc.ch/meetings/session21/final-report.pdf> (Last accessed 28.09.2012).

2004

IPCC (2004) ‘Progress of the working group I towards the IPCC fourth assessment report (AR4).’ IPCC-XXII/Doc. 9. Available at: <http://www.ipcc.ch/meetings/session22/doc9.pdf> (Last accessed 28.09.2012).

2005

IPCC (2005a) ‘Report of the 23rd session of the IPCC.’ Addis Ababa, 6-8 April, 2005. Available at: <http://www.ipcc.ch/meetings/session23/final-report.pdf> (Last accessed 28.09.2012).

IPCC (2005b) ‘Report of the 24th session of the IPCC.’ Montreal 26-28 April, 2005. Available at: <http://www.ipcc.ch/meetings/session24/final-report.pdf> (Last accessed 28.09.2012).

IPCC (2005c) ‘Progress report by working group I.’ IPCC-XXIV/Doc. 8. Available at: <http://www.ipcc.ch/pdf/session24/doc8.pdf> (Last accessed 28.09.2012).

2006

IPCC (2006a) ‘Report of the 25th session of the IPCC.’ Mauritius, 26-28 April 2006. Available at: <http://www.ipcc.ch/meetings/session25/final-report.pdf> (Last accessed 28.09.2012).

IPCC (2006b) ‘Review of IPCC terms of reference.’ IPCC-XXV/Doc. 8. Available at: <http://www.ipcc.ch/meetings/session25/doc8.pdf> (last accessed 13.08.2012).

IPCC (2006c) ‘Rules of procedures for the election of the IPCC bureau and any task force bureau.’ Adopted by the panel at its 25th session, 26-28th April 2006. Available at: <http://www.ipcc.ch/pdf/ipcc-principles/ipcc-principles-elections-rules.pdf> (Last accessed 28.09.2012).

IPCC (2006d) ‘Principles governing IPCC work.’ Approved at the 25th session (Mauritius, 26-28 April 2006). (Last accessed 28.09.2012).

IPCC (2006e) ‘Progress of working group I towards the IPCC fourth assessment report (AR4).’ IPCC-XXV/Doc. 13. Available at: <http://www.ipcc.ch/meetings/session25/doc13.pdf> (Last accessed 28.09.2012).

IPCC (2006f) ‘Progress of working group II towards the IPCC fourth assessment report (AR4).’ IPCC-XXV/Doc. 15. Available at: <http://www.ipcc.ch/meetings/session25/doc15.pdf> (Last accessed 28.09.2012).

IPCC (2006g) ‘Progress of working group III towards the IPCC fourth assessment report (AR4).’ IPCC-XXV/Doc. 18. Available at: <http://www.ipcc.ch/meetings/session25/doc18.pdf> (Last accessed 28.09.2012).

IPCC (2006h) ‘IPCC working group I fourth assessment report: expert and government comments on the second order draft – summary for policymakers.’ 26 August 2006. Available at: <http://pds.lib.harvard.edu/pds/view/7818866> (last accessed 12.09.2012).

IPCC (2006i) ‘IPCC working group II fourth assessment report: government review comments on the summary for policymakers with author responses.’ December 2006. Available at: http://www.ipcc-wg2.gov/AR4/SPM_REVIEWS/SPM_SOD_Govt.pdf (last accessed 12.09.2012).

IPCC (2006j) ‘IPCC WGIII second order draft comments.’ Available at: <http://www.ipcc-wg3.de/publications/assessment-reports/ar4/forth-assessment-review-comments/sod-comments/AR4-WG3-SOD-SPM-Review.pdf> (last accessed 13.09.2012).

2007

IPCC (2007a) ‘Report of the 26th session of the IPCC.’ 30th April – 4th May, 2007. Available at: http://www.ipcc.ch/meetings/session26/final_report_26.pdf (last accessed 12.09.2012).

IPCC (2007b) ‘Review of IPCC terms of reference.’ IPCC-XXVI/INF. 2. Available at: <http://www.ipcc.ch/meetings/session26/inf2.pdf> (Last accessed 28.09.2012).

IPCC (2007c) ‘IPCC working group I fourth assessment report: government comments on the final draft of the summary for policymakers.’ 10 January 2007. Available at: <http://pds.lib.harvard.edu/pds/view/7819661> (last accessed 12.09.2012).

IPCC (2007d) ‘IPCC working group II fourth assessment report: government comments on the final draft of the summary for policymakers.’ February 2007. Available at: http://www.ipcc-wg2.gov/AR4/SPM_REVIEWS/SPM_FGR_comments.pdf (last accessed 12/09/2012).

IPCC (2007e) ‘IPCC working group III fourth assessment report: government review of the final draft summary for policymakers. April 26 2007. Available at: <http://www.ipcc-wg3.de/publications/assessment-reports/ar4/forth-assessment-review-comments/fd/AR4-WG3-FD-SPM-Review.pdf> (last accessed 12/09/2012).

IPCC (2007f) ‘IPCC working group II eighth session, Brussels, 2-5 April 2—7: Provisional agenda.’ WG-II: 8th/Doc. 1. Available at: <http://www.ipcc.ch/meetings/session08/doc1.pdf> (last accessed 12.09.2012).

IPCC (2007g) ‘Summary for policymakers.’ In Solomon et al. (eds) *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

IPCC (2007h) ‘Summary for policymakers.’ In Parry et al. (eds) *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, UK, 7-22.

IPCC (2007i) ‘Summary for policymakers.’ In B. Metz, et al. (eds) *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

2008

IPCC (2008a) ‘Report of the 28th session of the IPCC, Budapest 9-10 April 2008.’ Available at: <http://www.ipcc.ch/meetings/session28/final-report.pdf> (last accessed 21.08.2012).

IPCC (2008b) ‘Procedures for the preparation, review, acceptance, adoption, approval and publication of IPCC reports.’ Adopted at the 29th Session (Geneva, 31 August – 4 September 2008).

IPCC (2008c) ‘Future of the IPCC: Compiled comments from governments, authors, organizations and bureau members.’ IPCC-XXVIII/INF.1. Available at: http://www.ipcc.ch/scoping_meeting_ar5/inf1.pdf (last accessed 24.08.2012).

IPCC (2008d) ‘Future of the IPCC: Synthesis of comments.’ IPCC-XXVIII/Doc. 7. Available at: http://www.ipcc.ch/scoping_meeting_ar5/doc7.pdf (last accessed 24.08.2012).

2009

IPCC (2009a) ‘Report of the 29th session of the IPCC, Antalya, Turkey, 21-23rd April 2009.’ Available at: http://www.ipcc.ch/meetings/session29/FINAL_REPT_P_29.pdf (last accessed 22.08.3012).

IPCC (2009b) ‘Implementation of decisions taken by IPCC-30: Involving developing country/EIT scientists (decision 7).’ IPCC-XXXI/INF. 1. Available at: <http://www.ipcc.ch/meetings/session31/inf1.pdf> (last accessed 15.08.2012).

IPCC (2009c) ‘Future IPCC activities: Reinforcement of the IPCC secretariat – report from the task group.’ IPCC-XXX/Doc.19. Available at: <http://www.ipcc.ch/meetings/session30/doc19.pdf> (last accessed 21.08.2012).

IPCC (2009d) ‘Scoping of the IPCC 5th assessment report: Background, Cross cutting issues and AR5 Synthesis Report.’ IPCC-XXXI/Doc. 4. Available at: <http://www.ipcc.ch/meetings/session31/doc4.pdf> (Last accessed 28.09.2012).

IPCC (2009e) ‘Chairman’s vision paper.’ AR5-SCOP/Doc. 2. Available at: http://www.ipcc.ch/scoping_meeting_ar5/documents/doc02.pdf (Last accessed 28.09.2012).

IPCC (2009f) ‘Draft agenda and indicative schedule of meetings.’ AR5-SCOP/Doc. 1. Available at: http://www.ipcc.ch/scoping_meeting_ar5/documents/doc01.pdf (Last accessed 28.09.2012).

IPCC (2009g) ‘Scoping of the IPCC 5th assessment report: summary of comments on the draft scoping document.’ IPCC-XXXI/INF. 5. Available at: <http://www.ipcc.ch/meetings/session31/inf5.pdf> (Last accessed 28.09.2012).

IPCC (2009h) ‘Report of the 40th session of the IPCC bureau.’ Geneva, 17-18th September 2009. Available at: <http://www.ipcc.ch/meetings/bureau-sessions/bureau40rep.pdf> (last accessed 30.08.2012).

IPCC (2009i) ‘Working Group I contribution to the fifth assessment report (AR5): background information.’ WG-I :11th /INF.1. Available at: http://www.ipcc.ch/scripts/session_template.php?page=26ipcc.htm#.UGYWbvIERbo (Last accessed 28.09.2012).

IPCC (2009j) ‘Working Group II contribution to the fifth assessment report (AR5): background information.’ WG-II :9th /INF.1. Available at: http://www.ipcc.ch/scripts/session_template.php?page=26ipcc.htm#.UGYWbvIERbo (Last accessed 28.09.2012).

IPCC (2009k) ‘Working Group III contribution to the fifth assessment report (AR5): background information.’ WG-III :10th /INF. 1. Available at: http://www.ipcc.ch/scripts/session_template.php?page=26ipcc.htm#.UGYWbvIERbo (Last accessed 28.09.2012).

IPCC (2009l) ‘Proposed chapter outlines for the WG III contribution to the fifth assessment report (AR5).’ WG-III :10th /Doc.2. Available at: http://www.ipcc.ch/scripts/session_template.php?page=26ipcc.htm#.UGYWbvIERbo (Last accessed 28.09.2012).

IPCC (2009m) ‘Agreed reference material for the IPCC fifth assessment report.’ Available at: <http://www.ipcc.ch/pdf/ar5/ar5-outline-compilation.pdf> (last accessed 30.08.2012).

IPCC (2009n) ‘Proposed chapter outlines for the WG I contribution to the fifth assessment report (AR5).’ WG-I :11th /Doc.2. Available at: http://www.ipcc.ch/scripts/session_template.php?page=26ipcc.htm#.UGYWbvIERbo (Last accessed 28.09.2012).

IPCC (2009o) ‘Chapter outlines for the WG I contribution to the fifth assessment report (AR5): Revised version of WG-I: 11th /Doc.2 adopted by the Eleventh Session of Working Group I.’ IPCC-XXXI/Doc. 19. Available at: <https://www.ipcc-wg1.unibe.ch/docs/Doc.19-WGI-Outline.pdf> (Last accessed 28.09.2012).

IPCC (2009p) ‘Improving participation of developing/EIT countries in the IPCC: Summary and recommendations.’ IPCC-XXXI/Doc.11. Available at: <http://www.ipcc.ch/meetings/session31/doc11.pdf> (Last accessed 28.09.2012).

IPCC (2009q) ‘Implementation of decisions taken at IPCC 30: Involving developing/EIT country scientists (Decision 7) Questionnaire results and analysis on number of experts in the past assessment reports.’ IPCC-XXXI/INF. 1. Available at: <http://www.ipcc.ch/meetings/session31/inf1.pdf> (Last accessed 28.09.2012).

2010

IPCC (2010a) ‘Report of the 32nd session of the IPCC, Busan, Republic of South Korea, 11-14 October 2010.’ Available at: http://www.ipcc.ch/meetings/session32/final_report_32.pdf (last accessed 21.08.2012).

IPCC (2010b) ‘IPCC trust fund programme and budget.’ IPCC-XXXII/Doc.3. Available at: http://www.ipcc.ch/meetings/session32/doc03_p32_prog_and_budget.pdf (last accessed 15.08.2012).

IPCC (2010c) ‘The IPCC fifth assessment report: progress report of working group I.’ IPCC-XXXII/Doc. 9. Available at: http://www.ipcc.ch/meetings/session32/doc09_p32_wg_I_progress_report.pdf (last accessed 21.08.2012).

IPCC (2010d) ‘Review of IPCC processes and procedures: Comments on the Report on Climate Change Assessments prepared by the InterAcademy Council and released on 30 August 2010.’ IPCC-XXXII/INF. 6. Available at: http://www.ipcc.ch/meetings/session32/inf06_review_of_IPCC_Processes_Procedures_IAC_Report_team.pdf (last accessed 21.08.2012).

IPCC (2010e) ‘Guidance document for IPCC government focal points on the nomination of potential Lead Authors, Coordinating Lead Authors and Review Editors.’ Available at: <http://www.ipcc.ch/pdf/ar5/ar5-fp-guidance.pdf> (Last accessed 28.09.2012).

IPCC (2010f) ‘831 Experts selected for the fifth assessment report.’ IPCC press release, 23 June 2010. Available at: <http://www.ipcc.ch/pdf/press-releases/pr-23june2010.pdf> (Last accessed 28.09.2012).

IPCC (2010g) ‘The IPCC fifth assessment report: Progress report of Working Group I.’ IPCC-XXXII/Doc. 9. Available at: http://www.ipcc.ch/meetings/session32/doc09_p32_wg_I_progress_report.pdf (Last accessed 28.09.2012).

IPCC (2010h) ‘The IPCC fifth assessment report: Progress report of Working Group II.’ IPCC-XXXII/Doc. 11. Available at: http://www.ipcc.ch/meetings/session32/doc11_p32_wg_II_progress_report.pdf (Last accessed 28.09.2012).

IPCC (2010i) 'The IPCC fifth assessment report: Progress report of Working Group III.' IPCC-XXXII/Doc. 12. Available at: http://www.ipcc.ch/meetings/session32/doc12_p32_wg_III_progress_report.pdf (Last accessed 28.09.2012).

IPCC (2010j) 'Report of the 41st session of the IPCC bureau.' Geneva, 19-20 May 2010.' Available at: <http://www.ipcc.ch/meetings/bureau-sessions/bureau41rep.pdf> (last accessed 31.08.2012).

IPCC (2010k) 'Letter inviting governments to nominate experts for the AR5.' Sent to designated IPCC Focal Points and Ministries of Foreign Affairs (if no focal point has been designated). Geneva, 15 January 2010. Available at: <http://www.ipcc.ch/pdf/ar5/Web%20version%20-%20FPs-MFAs%20Nomination%20of%20Authors%20for%20the%20AR5.pdf> (Last accessed 28.09.2012).

2011

IPCC (2011a) 'Report of the 33rd session of the IPCC, Abu Dhabi, United Arab Emirates, 10-13 May 2011.' Available at: http://www.ipcc.ch/meetings/session33/final_report_33.pdf (last accessed 22.08.2012).

IPCC (2011b) 'Decisions taken with respect to the review of IPCC processes and procedures: procedures.' Available at: http://www.ipcc.ch/meetings/session33/ipcc_p33_decisions_taken_procedures.pdf (last accessed 21.08.2012)

IPCC (2011c) 'IPCC Fifth Assessment Report (AR5) authors and review editors.' Available at: http://www.ipcc.ch/pdf/ar5/ar5_authors_review_editors_updated.pdf (last accessed 31.08.2012).

IPCC (2011d) 'Progress report: Working group I contribution to the fifth assessment report.' IPCC-XXXIII/Doc. 16. Available at: http://www.ipcc.ch/meetings/session33/doc16_p33_progress_report_wg1.pdf (Last accessed 28.09.2012).

IPCC (2011e) 'Review of the IPCC processes and procedures: task force on governance and management.' IPCC-XXXIII/Doc. 10. Available at: http://www.ipcc.ch/meetings/session33/doc10_p33_review_tg_proposal_governance_management.pdf (last accessed 15.08.2012).

IPCC (2011f) 'Decisions taken with respect to the review of IPCC processes and procedures: governance and management.' Available at: http://www.ipcc.ch/meetings/session33/ipcc_p33_decisions_taken_governance_management.pdf (last accessed 26.09.2012).

IPCC (2011g) 'Decisions taken with respect to the review of IPCC processes and procedures: conflict of interest policy.' Available at:

http://www.ipcc.ch/meetings/session33/ipcc_p33_decisions_taken_conflict_of_interest.pdf
(last accessed 26.09.2012).

IPCC (2011h) 'Decisions taken with respect to the review of IPCC processes and procedures: communications strategy.' Available at:

http://www.ipcc.ch/meetings/session33/ipcc_p33_decisions_taken_comm_strategy.pdf. (last accessed 26.09.2012).

2012

IPCC (2012b) 'IPCC focal points (as of 10 February 2012).' Available at:

<http://www.ipcc.ch/pdf/ipcc-principles/ipcc-focal-points.pdf> (last accessed 15.08.2012).

IPCC (2012c) 'Decisions taken with respect to the review of IPCC processes and procedures: governance and management.' Available at:

http://www.ipcc.ch/meetings/session35/IAC_Secretariat_TSU.pdf (last accessed 21.08.2012).

IPCC (2012d) Intergovernmental Panel on Climate Change website. Available at:

<http://www.ipcc.ch/> (last accessed 28.09.2012).

Bibliography

- Abrahamsen, R. and M. C. Williams. (2011) *Security Beyond the State: Private Security in International Politics*. Cambridge: Cambridge University Press.
- Adler, E. (1992) The Emergence of Cooperation: National Epistemic Communities and the International Evolution of the Idea of Nuclear Arms Control. *International Organization* 46:101-45.
- Adler, E, and P. M. Haas. (1992) Epistemic Communities, World-Order, and the Creation of a Reflective Research-Program - Conclusion. *International Organization* 46:367-90.
- Adler, Emanuel and Steven Bernstein (2005) 'Knowledge in Power: The Epistemic Construction of Global Governance', in Michael Barnett and Raymond Duvall (eds) *Power and Global Governance*. Cambridge: Cambridge University Press
- Adler-Nissen, R. (2008) The Diplomacy of Opting Out: A Bourdieudian Approach to National Integration Strategies. *Jcms-Journal of Common Market Studies*:663-84.
- Agrawala, S. (1998a) Context and Early Origins of the Intergovernmental Panel on Climate Change. *Climatic Change* 39:605-20.
- . (1998b) Structural and Process History of the Intergovernmental Panel on Climate Change. *Climatic Change* 39:621-42.
- . (1999) Early Science-Policy Interactions in Climate Change: Lessons from the Advisory Group on Greenhouse Gases. *Global Environmental Change and Policy Dimensions* 9:157-69.
- Ashley, R. (1986) The Poverty of Neorealism. In *Neorealism and Its Critics*, edited by R. Keohane, pp. 255-300. Colombia: Colombia University Press.
- Axelrod, M. (2011) Climate Change and Global Fisheries Management: Linking Issues to Protect Ecosystems or to Save Political Interests? *Global Environmental Politics* 11:64-+.
- Bäckstrand, K. & E. Lövbrand (2006). Planting trees to mitigate climate change. Contested discourses of ecological modernization, green governmentality and civic environmentalism. *Global Environmental Politics* 6(1): 50-75.
- . (2007) Climate governance beyond 2012: competing discourses of green governmentality, ecological modernization and civic environmentalism. In M. E. Pettenger (ed) *The social construction of climate change*. Hampshire; Ashgate Publishing Ltd.
- Bagley, K. (2012) Climate scientists face organized harassment in US. *Bloomberg*, 10.09.2012. <http://www.bloomberg.com/news/2012-09-10/climate-scientists-face-organized-harassment-in-u-s-.html> (last accessed 10.09.2012).

- Bailey, I., A. Gouldson and P. Newell (2010) Ecological modernization and the governance of carbon: a critical analysis Centre for Climate Change Economics and Policy, Working Paper No. 26 and The Governance of Clean Development, Working Paper No. 09
- Barnett, A. (2008) IPCC elections: close contests. *Nature Reports Climate Change*, 24.08.2010. Available at: <http://www.nature.com/climate/2008/0810/full/climate.2008.95.html> (last accessed 28/04/2010).
- Barnett, M. N, and M. Finnemore. (1999) The Politics, Power, and Pathologies of International Organizations. *International Organization* 53:699-732.
- Bauer, S. (2006) Does Bureaucracy Really Matter? The Authority of Intergovernmental Treaty Secretariats in Global Environmental Politics. *Global Environmental Politics* 6:23-49.
- Bernstein, S. (2000) Ideas, Social Structure and the Compromise of Liberal Environmentalism. *European Journal of International Relations* 6:464-512.
- . (2001) *The Compromise of Liberal Environmentalism*. New York ; Chichester: Columbia University Press.
- Bernstein, S, M Betsill, M Hoffmann, and M Paterson. (2010) A Tale of Two Copenhagens: Carbon Markets and Climate Governance. *Millennium-Journal of International Studies* 39:161-73.
- Biermann, Frank (1999) Big Science, Small Impacts-In the South? The Influence of International Environmental Information Institutions on Policy-Making in India. ENRP Discussion Paper E-99-12, Kennedy School of Government, Harvard University. Available at <http://www.hks.harvard.edu/gea/pubs/e-99-12.htm> (last accessed 22.08.2012).
- . (2000) Science as Power in International Environmental Negotiations: Global Environmental Assessments Between North and South. Belfer Center for Science and International Affairs (BCSIA) Discussion Paper 2000-17, Environment and Natural Resources Program, Kennedy School of Government Harvard University 2000. <http://www.hks.harvard.edu/gea/pubs/2000-17.htm> (last accessed 22.08.2012).
- . (2002) Institutions for Scientific Advice: Global Environmental Assessments and Their Influence in Developing Countries. *Global Governance* 8:195-219.
- Bigo, D. The Mo'bius ribbon of internal and external security(ies). In M. Albert, D. Jacobson, & Y. Lapid (Eds.), *Identities, borders, orders: Rethinking international relations theory*. Minneapolis: University of Minnesota Press.
- . (2006) Global (in)Security: The Field of the Professionals of Unease Management

- and the Ban-Opticon. In *Traces: A Multilingual Series of Cultural Theory*, edited by Jon Solomon and Naoki Sakai, pp. 109-57. Hong Kong: Hong Kong University.
- . (2011) Pierre Bourdieu and International Relations: Power of Practices, Practices of Power. *International Political Sociology* 5:225-58.
- Bigo, D, and MR Madsen. (2011) Introduction to Symposium "A Different Reading of the International": Pierre Bourdieu and International Studies. *International Political Sociology* 5:219-24.
- Bjurstrom, A, and M Polk. (2011) Physical and Economic Bias in Climate Change Research: A Scientometric Study of IPCC Third Assessment Report. *Climatic Change* 108:1-22.
- Bodansky, D. M. (1993) The United Nations framework convention on climate change: a commentary. *Yale Journal of International Law* 18: 451–558.
- .The Emerging Climate-Change Regime. *Annual Review of Energy and the Environment* 20:425-61.
- . (2001) The history of the global climate change regime. In U. Luterbacher and D. F Sprinz. (eds) *International Relations and Global Climate Change*. Cambridge, Mass. ; London: MIT Press.
- Boehmer-Chirsitansen, and S. (1994a) Global Climate Protection Policy: The Limits of Scientific Advice Part 1. *Global Environmental Change* 4:140-59.
- . (1994b) Global Climate Protection Policy: The Limits of Scientific Advice Part 2. *Global Environmental Change* 4:185-200.
- . (1995a) Britain and the International Panel on Climate Change: The Impacts of Scientific Advice on Global Warming Part 1: Integrated Policy Analysis and the Global Dimension. *Environmental politics* 4:1-18.
- . (1995b) Britain and the International Panel on Climate Change: The Impacts of Scientific Advice on Global Warming Part ii: The Domestic Story of the British Response to Climate Change. *Environmental Politics* 4:175-96.
- Bolin, B.(2007) *A History of the Science and Politics of Climate Change : The Role of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press.
- Booker, C. (2009) The questions Dr Pachauri still has to answer. *Telegraph*, 26.12.2009. Available at: <http://www.telegraph.co.uk/comment/columnists/christopherbooker/6890839/The-questions-Dr-Pachauri-still-has-to-answer.html> (last accessed 4.01.2010).
- Bourdieu, P. (1986) *Distinction: A Social Critique of the Judgement of Taste*. London : Routledge & Kegan Paul, 1984 (1986 [printing]).

- . (1988) *Homo Academicus*. Cambridge: Polity Press in association with Basil Blackwell.
- . (1989) 'Social space and symbolic power.' *Sociological Theory*, 7 (1). pp.14-25.
- . (1990a) *The Logic of Practice*. Cambridge: Polity.
- . (1990b) *In Other Words : Essays Towards a Reflexive Sociology*. Cambridge: Polity.
- . (1998) *Practical Reason : On the Theory of Action*. Cambridge: Polity Press.
- . (2003) Participant Objectivation. *Journal of the Royal Anthropological Institute* 9:281-94.
- . (2004) *Science of Science and Reflexivity*. Cambridge: Polity.
- . (2007) *Sketch for a Self-Analysis*. Cambridge: Polity.
- . (2008) *The Bachelor's Ball : The Crisis of Peasant Society in Bearn*. Cambridge: Polity.
- Bourdieu, P., J. C. Chamboredon, J. C. Passeron, and B. Krais. (1991) *The Craft of Sociology : Epistemological Preliminaries*. English ed. / by Beate Krais. ed. Berlin ; New York: Walter de Gruyter.
- Bourdieu, P., and J.B. Thompson. (1991) *Language and Symbolic Power*. Cambridge: Polity.
- Bourdieu, P., and L. J. D. Wacquant. (1992) *Invitation to Reflexive Sociology*. Polity P.
- Bowen, K. J., S. Friel, K. Ebi, C. D. Butler, F. Miller, and A. J. McMichael. (2012) Governing for a Healthy Population: Towards an Understanding of How Decision-Making Will Determine Our Global Health in a Changing Climate. *International Journal of Environmental Research and Public Health* 9:55-72.
- Boyle, S., and J. Ardill. (1989) *The Greenhouse Effect: A Practical Guide to Our Changing Climate*. New English Library.
- Brenton, T. (1994) *The Greening of Machiavelli : The Evolution of International Environmental Politics*. London: Royal Institute of International Affairs, Energy and Environmental Programme: Earthscan.
- Brown, D. (2010) Climate scientist Phil Jones contemplated suicide over data claims. *Times*, 8.02.2010. Available at: <http://www.timesonline.co.uk/tol/news/environment/article7018484.ece> (last accessed 8.2.2010)

- Bruce, J. P. (1991) The World Climate Programme's Achievements and Challenges. Proceedings of the Second World Climate Conference. Cambridge University Press, 149-155.
- Bruce, J. P., H. Yi, and E. F. Haites. (1996) *Climate Change 1995 : Economic and Social Dimensions of Climate Change : Contribution of Working Group Iii to the Second Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press.
- Bueger, C. and T. Villumsen. (2007) Beyond the Gap: Relevance, Fields Of practice and the Securitizing Consequences of (Democratic Peace) research. *Journal of International Relations and Development* 10:417-48.
- Butler, S. (2010) Climate scientists face rising abuse, threats. 11.06.2011. Available at: <http://www.greenleft.org.au/node/47873> (last accessed 13.6.2011).
- Buttel, F. H. (2000) Ecological Modernization as Social Theory. *Geoforum* 31:57-65.
- Calhoun, C. J., E. LiPuma, and M. Postone. (1993) *Bourdieu : Critical Perspectives*. Cambridge: Polity.
- Carrington, D. (2010) IPCC officials admit mistake over melting Himalayan Glaciers. *Guardian*, (20.01.2010). Available at: <http://www.guardian.co.uk/environment/2010/jan/20/ipcc-himalayan-glaciers-mistake> (last accessed 11.5.2011)
- Carter, S., A. Schulz and Y. Yamineva (2009) Summary of the 31st session of the Intergovernmental Panel on Climate Change (IPCC), 26-29 October 2009. *Earth Negotiations Bulletin*, 12, 441.
- Cohen, S., D. Demeritt, J. Robinson and D. Rothman (1998) Climate change and sustainable development: towards dialogue *Global Environmental Change* , 8(4), 341-371
- Confalonieri, U. B. et al. (2007) Human Health. Climate change 2007: Impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M. L. Parry et al. (eds). Cambridge University Press, Cambridge, UK, 391-431.
- Conliffe, A. (2011) Combating Ineffectiveness: Climate Change Bandwagoning and the UN Convention to Combat Desertification. *Global Environmental Politics* 11:44-+.
- Davenport, D., M. Gutiérrez, and Y. Yamineva (2008) Summary of the 28th session of the Intergovernmental Panel on Climate Change (IPCC), 9-10 April 2008. *Earth Negotiations Bulletin*, 12, 363.

- DECC (2010) 'List of applicants to the IPCC 5th Assessment Report submitted by the UK for consideration by the IPCC.' Available at: http://www.decc.gov.uk/assets/decc/what%20we%20do/global%20climate%20change%20and%20energy/tackling%20climate%20change/intl_strategy/ipccreports/1_20100324114204_e_@@_listapplicantsuktoipcc.pdf (last accessed 31.08.2012).
- Demeritt, D. (2001) The Construction of Global Warming and the Politics of Science. *Annals of the Association of American Geographers* 91:307-37.
- Depledge, J. (2007) A Special Relationship: Chairpersons and the Secretariat in the Climate Change Negotiations. *Global Environmental Politics* 7:45-68.
- . (2008) Striving for No: Saudi Arabia in the Climate Change Regime. *Global Environmental Politics* 8:9-35.
- . (2006) The Opposite of Learning: Ossification in the Climate Change Regime. *Global Environmental Politics* 6:1-22.
- . (2005) Against the Grain: The United States and the Global Climate Change Regime. *Global Change, Peace and Security* 17:11-27.
- Derluigan, G. M. (2005) *Bourdieu's Secret Admirer in the Caucasus : A World-System Biography*. Chicago, IL ; London: University of Chicago Press.
- Dessai, S, and EL Schipper. (2003) The Marrakech Accords to the Kyoto Protocol: Analysis and Future Prospects. *Global Environmental Change-Human and Policy Dimensions* 13:149-53.
- Dimitrov, R. S. (2010) Inside Copenhagen: The State of Climate Governance. *Global Environmental Politics* 10:18-24.
- Edwards, P. N. (1999) Global climate science, uncertainty and politics: data-laden models, model-filtered data. *Science as culture*, 8 (4) p. 437-472.
- Edwards, P. N. (2001) Representing the Global Atmosphere: Computer Models, Data, and Knowledge about Climate Change. In C. Miller, and P. Edwards, (eds.) *Changing the Atmosphere: Expert Knowledge and Global Environmental Governance*. Cambridge, MIT Press. 219-246.
- Edwards, P. N. and M. Lahsen (1999) Climate science and politics in the US. Available at: <http://pne.people.si.umich.edu/PDF/PMNPC/USA.pdf> (last accessed 23. 09.2012).
- Edwards, P.N. and S.H. Schneider (2001) Self-Governance and Peer Review in Science-for-Policy: The Case of the IPCC Second Assessment Report. In C. Miller, and P. Edwards, (eds.) *Changing the Atmosphere: Expert Knowledge and Global Environmental Governance*. Cambridge, MIT Press. 219-246.
- Epstein, Charlotte. (2008) *The Power of Words in International Relations: Birth of an Anti-*

Whaling Discourse. Cambridge, Mass.; London: MIT.

- Fidler, D. (2010) The challenges of global health governance. Working Paper for Council of Foreign Relations. Available at: http://ec.europa.eu/health/eu_world/docs/ev_20111111_rd01_en.pdf (last accessed 30.04.2012).
- Field, C. B. et al. (2012) *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, UK, and New York, NY, USA, pp. 3-21.
- Fisher, D. R., and W. R. Freudenburg. (2001) Ecological Modernization and Its Critics: Assessing the Past and Looking toward the Future. *Society & Natural Resources* 14:701-09.
- Fogel, C. (2005) Biotic Carbon Sequestration and the Kyoto Protocol: The Construction of Global Knowledge by the Intergovernmental Panel on Climate Change. *International Environmental Agreements* 5:191-210.
- Forster, P. et al. (2007) Changes in Atmospheric Constituents and in Radiative Forcing. In S. Solomon et al. (eds) *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- de Costello, T. (2009) Smear scientists must still mend their ways. *Financial Times*, 16.12.2009. Available at: http://www.ft.com/cms/s/0/0a36733e-ea7a-11de-a9f5-00144feab49a.html?nclick_check=1 (last accessed 26.12.2009).
- de Souza, M. (2010) Climate role helps national image: memo. *Postmedia News*, 17.12.2010. Available at: <http://www.montrealgazette.com/technology/Climate+role+helps+national+image+memo/3990564/story.html> (last accessed 19.12.2010).
- Foucault, Michel, and Colin Gordon. (1980) *Power/Knowledge: Selected Interviews and Other Writings, 1972/1977*. Brighton: Harvester Press.
- Franz, Wendy E. The Development of an International Agenda for Climate Change: Connecting Science to Policy. Discussion Paper E-97-07, Kennedy School of Government, Harvard University, August 1997.
- Gettelman, A. (2003) The information divide in the climate sciences. Report of a 2002 survey, Environmental and Societal Impacts Group, National Center for Atmospheric Research, Boulder, CO, 52 pp. Available at: www.esig.ucar.edu/infodivide (last accessed 22.09.2012).
- Gheciu, A. (2005) Security Institutions as Agents of Socialization? Nato and the 'New

- Europe'. *International Organization*: 973-1012.
- Gibbs, W. W. (1995) Lost Science in the 3rd-World. *Scientific American* 273:92-99.
- Gupta, Joyeeta. (1997) *The Climate Change Convention and Developing Countries: From Conflict to Consensus?* Dordrecht; London: Kluwer Academic.
- Guston, D. H. (1999) Stabilizing the Boundary between US Politics and Science: The Role of the Office of Technology Transfer as a Boundary Organization. *Social Studies of Science* 29:87-111.
- . (2001) Boundary Organizations in Environmental Policy and Science: An Introduction. *Science Technology & Human Values* 26:399-408.
- Guardian (2010a) US Embassy cables: US lobbied Rajendra Pachauri to help them block appointment of Iranian scientist. *Guardian*, 6.12.2010. Available at: <http://www.guardian.co.uk/world/us-embassy-cables-documents/168194> (last accessed 8.12.2010).
- Guardian (2010b) US Embassy cables: Norway supports US plan to block election of Iranian climate scientist. *Guardian*, 6.12.2010. Available at: <http://www.guardian.co.uk/world/us-embassy-cables-documents/166258> (last accessed 8.12.2010).
- Guardian (2010c) US Embassy cables: Brazil considers US plan to block election of Iranian climate scientist. *Guardian*, 6.12.2010. Available at: <http://www.guardian.co.uk/world/us-embassy-cables-documents/166298> (last accessed 8.12.2010).
- Gutiérrez, M., M. Muñoz and S. S. Johnson (2007) 'Tenth session of working group I of the Intergovernmental Panel on Climate Change: 29 January – 1 February 2007.' *Earth Negotiations Bulletin*, 12 (319).
- Gutiérrez, M. K. Kulovesi and M. Muñoz (2007) 'Eighth session of working group II of the Intergovernmental Panel on Climate Change: 2-6 April 2007.' *Earth Negotiations Bulletin*, 12 (320).
- Gutiérrez, M. et al. (2007) 'Ninth session of working group III of the Intergovernmental Panel on Climate Change: 30 April – 4 May 2007.' *Earth Negotiations Bulletin*, 12 (321).
- Gutiérrez, M., L. Mead and A. Schulz (2010) 'Summary of the 32nd session of the Intergovernmental Panel on Climate Change: 11-14 October 2010.' *Earth Negotiations Bulletin*, 12 (486).
- Gutiérrez, M., J. van Alstine and M. Yamineva (2011) Summary of the 34th session of the Intergovernmental Panel on Climate Change: 18-19 December 2012. *Earth Negotiations Bulletin*, 15 (522).

- Eilperin, J. (2007) U.S., China Got Climate Warnings Toned Down. *Washington Post*, 7.4.2007. Available at: <http://www.washingtonpost.com/wp-dyn/content/article/2007/04/06/AR2007040600291.html> (last accessed 16.09.2012).
- Guzzini, S. (2000) A Reconstruction of Constructivism in International Relations. *European Journal of International Relations*:147-82.
- Haas, E. B., M. P. Williams, and D. Babai. (1977) *Scientists and World Order: The Uses of Technical Knowledge in International Organizations*. Berkeley ; London: University of California Press.
- Haas, P. M. (1989) Do Regimes Matter - Epistemic Communities and Mediterranean Pollution-Control. *International Organization* 43:377-403.
- . (1990) Obtaining International Environmental-Protection through Epistemic Consensus. *Millennium-Journal of International Studies* 19:347-63.
- . (1992a) Epistemic Communities and International-Policy Coordination - Introduction. *International Organization* 46:1-35.
- . (1992b) Climate Change Negotiations. *Environment* 34:1-2.
- . (2000) International Institutions and Social Learning in the Management of Global Environmental Risks. *Policy Studies Journal* 28:558-75.
- . (2004) When Does Power Listen to Truth? A Constructivist Approach to the Policy Process. *Journal of European Public Policy* 11:569-92.
- . (2005) Science and International Environmental Governance. In P. Dauverge (ed) *Handbook of Global Environmental Politics*. UK: Edward Elgar Publishing Limited.
- . (2008) Climate Change Governance after Bali. *Global Environmental Politics* 8:1-7.
- Haas, P. M. and D. McCabe (2001) Amplifiers or Dampeners: International Institutions and Social Learning in the Management of Global Environmental Risks. In *Learning to Manage Global Environmental Risks*, volume 1, edited by the Social Learning Group, 323–348. Cambridge MA: MIT Press.
- Haines, A. (2008) Climate Change and Health Strengthening the Evidence Base for Policy. *American Journal of Preventive Medicine* 35:411-13.
- Haines, A. et al. (2007) Energy and Health 6 - Policies for Accelerating Access to Clean Energy, Improving Health, Advancing Development, and Mitigating Climate Change. *Lancet* 370:1264-81.
- Haines, A. et al. (2009) Health and Climate Change 6 Public Health Benefits of Strategies to Reduce Greenhouse-Gas Emissions: Overview and Implications for Policy Makers. *Lancet* 374:2104-14.

- Hajer, M. A. (1995) *The Politics of Environmental Discourse: Ecological Modernization and the Policy Process*. Oxford: Clarendon Press.
- Hand, M, E. Shove, and D. Southerton. (2005) Explaining Showering: A Discussion of the Material, Conventional, and Temporal Dimensions of Practice. *Sociological Research Online* 10.
- Hardee, K and C. Matunga (2009) Strengthening the link between climate change adaptation and national development plans: lessons from the case of population in National Adaptation Programmes of Action (NAPAs). *Mitigation Adaptation Strategies Global Change*. Vol. 15/2. 113-26.
- Harris, J. (2009) 'Copenhagen climate conference: the key players.' *Guardian*, 30.11.2009). Available at: <http://www.guardian.co.uk/environment/2009/nov/30/copenhagen-key-players> (last accessed 17.08.2011).
- Harris, P. G. (2007) Collective Action on Climate Change: The Logic of Regime Failure. *Natural Resources Journal* 47:195-224.
- Hart, D.M. and D. G. Victor (1993) Scientific Elites and the Making of United-States-Policy for Climate-Change Research, 1957-74. *Social Studies of Science*:643-80.
- Hashimoto et al. (1991) Human Settlement; the energy, transport, and industrial sectors; human health; air quality; and changes in ultraviolet-B radiation. In W. J. Tegart, G. W. Sheldon and D. C. Griffiths (EDS). *Climate Change: The IPCC Impacts Assessment*. Australia; Department of the Arts, Sport, the Environment, Tourism and Territories by the Australian Government Publishing Service.
- Hecht, A.D. and D. Tirpak (1995) Framework Agreement on Climate-Change - a Scientific and Policy History. *Climatic Change* 29:371-402.
- Hiramatsu,A., Mimura,N. and Sumi,A. (2008) A mapping of global warming research based on IPCC AR4. *Sustainability Science* 3(2), 201-213
- Houghton, J. (2002) 'An overview of the Intergovernmental Panel on Climate Change (IPCC) and its process of science assessment.' *Issues in environmental science and technology*, 17, 1-20.
- . (2008) Madrid 1995: Diagnosing Climate Change. *Nature* 455:737-8.
- Houghton, J. T., G. J. Jenkins, and J. J. Ephraums (1990) *Climate Change: The IPCC Scientific Assessment*. Published for the Intergovernmental Panel on Climate Change[by]Cambridge University Press, 1990 (1991).
- Houghton, J. T. et al. (1996) *Climate Change 1995 : The Science of Climate Change : Contribution of Wg1 to the Second Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: CUP.

- . (2001) *Climate Change 2001 : The Scientific Basis : Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press.
- Hulme, M. (2008) Geographical Work at the Boundaries of Climate Change. *Transactions of the Institute of British Geographers*: 5-11.
- Hulme, M. and M. Mahony. (2010) Climate Change: What Do We Know About the Ipcc? *Progress in Physical Geography* 34:705-18.
- Huysmans, J. (2002) Shape-Shifting Nato: Humanitarian Action and the Kosovo Refugee Crisis. *Review of International Studies*: 599-618.
- IAC (2010a) Review of IPCC processes and procedures. Report by the InterAcademy Council. IPCC-XXXII/Doc. 7. Available at: http://www.ipcc.ch/meetings/session32/doc07_p32_report_IAC.pdf (last accessed 24.08.2012).
- IAC (2010b) Responses to the IAC questionnaire. Available at: <http://reviewipcc.interacademycouncil.net/Comments.pdf> (last accessed 24.08.2012).
- Jackson, P. (2008) Pierre Bourdieu, the 'Cultural Turn' and the Practice of International History (Vol 34, Pg 1, 2008). *Review of International Studies*:379-79.
- . (2009) Pierre Bourdieu. In *Critical Theorists and International Relations*, edited by Jenny Edkins and Nick Vaughan-Williams. London: Routledge.
- . (1990) *The Fifth Branch: Science Advisors as Policymakers*. London ; Cambridge, MA: Harvard University Press.
- Jaeger, J. and T. O'Riordan (1996) The History Of Climate Change Science And Politics'. In Jaeger, J. and T. O'Riordan, eds. *Politics Of Climate Change: A European Perspective*. London: Routledge.
- Jasanoff, S. (1996) Science and Norms in Global Environmental Regimes. In F. O. Hampson and J. Reppy. (eds) *Earthly Goods: Environmental Change and Social Justice*. Ithaca, N.Y. ; London: Cornell University Press.
- Jenkins, Richard. (1992) *Pierre Bourdieu*. London: Routledge.
- Jinnah, S. (2010) Overlap Management in the World Trade Organization: Secretariat Influence on Trade-Environment Politics. *Global Environmental Politics* 10:54-79.
- . (2011a) Climate Change Bandwagoning: The Impacts of Strategic Linkages on Regime Design, Maintenance, and Death Introduction. *Global Environmental Politics* 11:1-9.
- . (2011b) Marketing Linkages: Secretariat Governance of the Climate-Biodiversity Interface. *Global Environmental Politics* 11:23-+.

- Jowitt, J. (2011) The leaked climate science emails – and what they mean. *Guardian*, 24.11.2011. Available at: <http://www.guardian.co.uk/environment/2011/nov/24/leaked-climate-science-emails> (last accessed 5.09.2012).
- Kandlikar, M, and A Sagar. (1999) Climate Change Research and Analysis in India: An Integrated Assessment of a South-North Divide. *Global Environmental Change-Human and Policy Dimensions*:119-38.
- Karlsson, S, T Srebotnjak, and P Gonzales. (2007) Understanding the North-South Knowledge Divide and Its Implications for Policy: A Quantitative Analysis of the Generation of Scientific Knowledge in the Environmental Sciences. *Environmental Science & Policy*:668-84.
- Kauppi, N. (2003) Bourdieu's Political Sociology and the Politics of European Integration. *Theory and Society*:775-89.
- . (2010) The Political Ontology of European Integration. *Comparative European Politics* 8:19-36.
- Kellogg, WW. (1987) Mankinds Impact on Climate - the Evolution of an Awareness. *Climatic Change*:113-36.
- Keohane, R. O. (2012) Twenty Years of Institutionalism Liberalism. *International Relations*: 26: 125; 125-38.
- Keohane, R. O, and D. G Victor. (2011) The Regime Complex for Climate Change. *Perspectives on Politics* 9:7-23.
- Keohane, R. O and J. S. Nye (1989) Power and interdependence. Harper & Queens Publishers.
- Keohane, R. O and J. S. Nye (1985) Two cheers for multilateralism. *Foreign Policy*, 60 (Autumn). pp. 148-67.
- Kirch, PV. (2005) Archaeology and Global Change: The Holocene Record. *Annual Review of Environment and Resources* 30:409-40.
- Klein, N. (2009) Copenhagen's failures belong to Obama. *Guardian*, 21.11.2009. Available at: <http://www.guardian.co.uk/commentisfree/cif-green/2009/dec/21/copenhagen-failure-obama-climate-change> (last accessed 27.09.2012).
- Krasner, S. D. (1982) Structural Causes and Regime Consequences - Regimes as Intervening Variables. *International Organization* 36:185-205.
- . (1983) *International Regimes*. Ithaca: Cornell U.P.
- Lahsen, M. (1998) The detection and attribution of conspiracies: the controversy over chapter

8. In G. E. Marcus (ed) *Paranoia Within Reason: A Casebook on Conspiracy as Explanation. Late Editions 6, Cultural Studies for the End of the Century*. University of Chicago Press, Chicago, IL.
- . (2004) Transnational locals: Brazilian experiences of the climate regime. In S. Jasanoff and M. L. Martello (eds) *Earthly politics: local and global in environmental governance*. MIT Press, Cambridge MA.
- . (2008) Experiences of Modernity in the Greenhouse: A Cultural Analysis of a Physicist "Trio" Supporting the Backlash against Global Warming. *Global Environmental Change-Human and Policy Dimensions*:204-19.
- Langhelle, O. (2000) Why ecological modernisation and sustainable development should not be conflated. *Journal of Environmental Policy and Planning* 2: 303–22
- Lawler, A. (2002) Pachauri defeats Watson in new chapter for global panel. *Science*, 296 (5568) p. 632.
- Leander, A. (2002) Do We Really Need Reflexivity in Ipe? Bourdieu's Two Reasons for Answering Affirmatively. *Review of International Political Economy*:601-09.
- . (2005) The Power to Construct International Security: On the Significance of Private Military Companies. *Millennium-Journal of International Studies*:803-25.
- . 2006. The 'Realpolitik of Reason': Thinking International Relations through Fields, Habitus and Practice. *Copenhagen Business School Working paper* (83).
- . (2009) Thinking Tools. In *Qualitative Methods in International Relations: A Pluralist Guide*, edited by A. Klotz and D. Prakash, p. 272: Palgrave Macmillan.
- . (2011) The Promises, Problems, and Potentials of a Bourdieu-Inspired Staging of International Relations. *International Political Sociology* 5:294-313.
- Leggett, Jeremy K. (1999) *The Carbon War : Dispatches from the End of the Oil Century*. London: Allen Lane.
- Levy, D. L. and D. Egan (2003) A Neo-Gramscian Approach to Corporate Political Strategy: Conflict and Accommodation in the Climate Change Negotiations. *Journal of Management Studies* 40:803-29.
- Litfin, K. (1994) *Ozone Discourse : Science and Politics in Global Environmental Cooperation*. New York ; Chichester: Columbia University Press.
- Lövbrand, E. (2007) Pure Science or Policy Involvement? Ambiguous Boundary-Work for Swedish Carbon Cycle Science. *Environmental Science and Policy*:39-47.
- Lunde, L. (1991) *Science or Politics in the Global Greenhouse? : The Development Towards Scientific Consensus on Climate Change*. Lysaker: Fridtjof Nansen Institute.

- Mason, J. (2007) 'Scientists, governments clash over warming report' *Reuters*, 6.4.2007) at: <http://www.reuters.com/article/2007/04/06/us-globalwarming-scientists-idUSL0649942120070406> (last accessed 29/9.2011)
- McCright, A. M. and R. E. Dunlap (2003) Defeating Kyoto: The Conservative Movement's Impact on U.S. Climate Change Policy. *Social Problems* 50:348-73. (2010)
- . Anti-Reflexivity the American Conservative Movement's Success in Undermining Climate Science and Policy. *Theory Culture & Society* 27:100-33.
- McIntyre, S. (2009) Climategatekeeping: Michaels and McKittrick 2004. *Climate audit*, 17.12.2009. Available at: <http://climateaudit.org/2009/12/17/climategatekeeping-2/> (last accessed 3.09.2012).
- McLaren, C and A. Carter (2010) UKCDS workstream review: Review of funding and outputs of UK research on climate change and development. UK collaborations on development sciences final report.
- McMichael, A. J. et al (1996) Human population health. in R. Watson et al. (eds) *Climate change 1995: Impacts, adaptations and mitigation of climate change: scientific-technical analyses*. Cambridge; Cambridge University Press.
- McMichael, A. J. et al (2001) Human Health. in McCarthy et al. (eds) *Climate Change 2001: Impacts, adaptation and vulnerability*. Cambridge; Cambridge University Press.
- Meadows, D. H. (1972) *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind*. New York: Universe Books.
- Merand, F, and V Pouliot. (2008) The World of Pierre Bourdieu: Elements for a Social Theory of International Relations. *Canadian Journal of Political Science-Revue Canadienne De Science Politique* 41:603-25.
- Miller, C. (2001a) Hybrid Management: Boundary Organizations, Science Policy, and Environmental Governance in the Climate Regime. *Science Technology and Human Values*:478-500.
- . (2001b) Challenges in the application of science to global affairs: Contingency, trust and moral order. In C. Miller and P. N. Edwards. (2001) *Changing the Atmosphere: Expert Knowledge and Environmental Governance*. Cambridge, Mass. ; London: MIT.
- . (2001c) Scientific Internationalism in American Foreign Policy: The Case of Meteorology, 1947-1958. In C. Miller, and P. N. Edwards. (eds) *Changing the Atmosphere: Expert Knowledge and Environmental Governance*. Cambridge, Mass. ; London: MIT.
- . (2004) Climate science and the making of a global political order. In S. Jasanoff (ed) *States of knowledge: the co-production of science and social order.* International

- Library of Sociology. London: Routledge.
- Mitchell, Ronald B. (2006) *Global Environmental Assessments: Information and Influence*. Cambridge, Mass. ; London: MIT.
- Monbiot, G. (2010a) 'Climate change email scandal shames the university and requires resignations.' *Guardian*, 2.02.2010. Available at: <http://www.guardian.co.uk/environment/georgemonbiot/2010/feb/02/climate-change-hacked-emails> (last accessed 5.09.2012).
- Monbiot, G. (2010b) 'Rajendra Pachauri innocent of financial misdealings but smears will continue.' *Guardian* (26.08.2010). Available at: <http://www.guardian.co.uk/environment/georgemonbiot/2010/aug/26/rajendra-pachauri-financial-relationships> (last accessed 17.08.2012).
- Mol, Arthur P. J. and G. Spaargaren (2000) Ecological Modernization Theory in Debate: A Review. *Environmental Politics* 9:17-49.
- Moss, R. H. (2000) Ready for Ipcc-2001: Innovation and Change in Plans for the Ipcc Third Assessment Report - an Editorial Comment. *Climatic Change* 45:459-68.
- Nature (1996) Climate Debate Must Not Overheat. *Nature* 381, 6583.
- Neumann, IB. (2002) Returning Practice to the Linguistic Turn: The Case of Diplomacy. *Millennium-Journal of International Studies*:627-51.
- . (2007) "A Speech That the Entire Ministry May Stand for," Or: Why Diplomats Never Produce Anything New. *International Political Sociology* 1:183-200.
- Newell, P. (2000) *Climate for Change : Non-State Actors and the Global Politics of the Greenhouse*. Cambridge: Cambridge University Press.
- NOAA (2012) Trends in Atmospheric Carbon Dioxide. Available at: <http://www.esrl.noaa.gov/gmd/ccgg/trends/> (last accessed 9.08.2012).
- Nordlund, G. (2008) Futures Research and the Ipcc Assessment Study on the Effects of Climate Change. *Futures*:873-76.
- NRC (2001) *Climate change science: an analysis of some key questions*. Committee on the science of climate change, National Research Council.
- Oels, A. (2005) Rendering Climate Change Governable: From Biopower to Advanced Liberal Government? *Environment policy and planning* 7:185-207.
- Okereke, C., H. Bulkeley, and H. Schroeder. (2009) Conceptualizing Climate Governance Beyond the International Regime. *Global Environmental Politics* 9:58-+.
- Osborn, F. (1948) *Our Plundered Planet*. [S.l.]: Faber and Faber Ltd.

- Parry, M. L. et al. (2007) *Climate Change 2007: Impacts, adaptation and vulnerability.* Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- Parson et al. (1997) Explaining the forms of assessment: Why do we get the forms of assessment we do? Workshop on Global Environmental Assessments: A Critical Evaluation of Global Environmental Assessments: The Climate Experience, College of the Atlantic in Bar Harbor, Maine (June 22-26, 1997).
- Paterson, Matthew. (1996) *Global Warming and Global Politics*. London: Routledge.
- . (2009) Post-Hegemonic Climate Politics? *British Journal of Politics & International Relations* 11:140-58.
- Pachauri, R. (2008) 'Some issues related to the future of the IPCC.' Available at: http://www.ipcc.ch/scoping_meeting_ar5/future-ipcc-4-january-2008-2.pdf (last accessed 30.08.2012).
- Pachauri, R. (2010) 'Statement by the Chair of the Intergovernmental Panel on Climate Change (IPCC) at the opening session of the 16th Conference of the Parties, Cancun, Mexico, November 29, 2010.' Available at:
- PBL (2010) Assessing an IPCC assessment. An analysis of statements on projected regional impacts in the 2007 report. *Netherlands Environmental Assessment Agency (PBL)*. The Hague/Bilthoven.
- Pearce, D. W. et al., (1996) The social costs of climate change: Greenhouse damage and the benefits of control. In Bruce, J. P., H. Yi, and E. F. Haites. (1996) *Climate Change 1995 : Economic and Social Dimensions of Climate Change : Contribution of Working Group Iii to the Second Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press.
- Pearce, F. (2010) Climate wars: the story of the hacked emails. *Guardian special investigation*, 9.02.2010. Available at: <http://www.guardian.co.uk/environment/series/climate-wars-hacked-emails> (last accessed 13.08.2012).
- Petersen, A. C. (2006) *Simulating nature: a philosophical study of computer-simulation uncertainties and their role in climate science and policy*. Het Spinhuis Publishers, The Netherlands.
- Pettenger, M. E. (2007) *The Social Construction of Climate Change : Power, Knowledge, Norms, Discourses*. Global Environmental Governance. Aldershot: Ashgate.
- Pop, L. (2007) Time and Crisis: Framing Success and Failure in Romania's Post-Communist Transformations. *Review of International Studies* 33:395-413.

- Pouliot, V. (2007) "Subjectivism": Toward a Constructivist Methodology. *International Studies Quarterly* 51:359-84.
- . (2008) The Logic of Practicality: A Theory of Practice of Security Communities. *International Organization* 62:257-88.
- . (2010) *International Security in Practice : The Politics of Nato-Russia Diplomacy*. Cambridge: Cambridge University Press.
- Rodhe, H. (1991) Bolin, Bert and His Scientific Career. *Tellus Series a-Dynamic Meteorology and Oceanography* 43:3-7.
- Rowlands, Ian H. (1995) *The Politics of Global Atmospheric Change*. Manchester: Manchester University Press.
- Ruggie, JG. (1975) International Responses to Technology - Concepts and Trends. *International Organization* 29:557-83.
- . (1982) International Regimes, Transactions, and Change - Embedded Liberalism in the Post-War Economic Order. *International Organization* 36:379-415.
- Sagar, A, and M. Kandlikar. (1997) Knowledge, Rhetoric and Power - International Politics of Climate Change. *Economic and Political Weekly*:3139-48.
- Schneider, S. H. 1991. Three Reports of the Intergovernmental Panel on Climate Change. *Environment*, 33. pp 25-30.
- . (2009) *Science as a Contact Sport : Inside the Battle to Save Earth's Climate*. Washington, D.C.: National Geographic.
- Schumacher, E. F. (1974) *Small Is Beautiful : A Study of Economics as If People Mattered*. [S.I.]: Sphere Books.
- SCOPE (1986) *The Greenhouse Effect, Climatic Change, And Ecosystems* SCOPE 29. Bolin, B., B. R. Doos, et al., eds. Chichester: John Wiley & Sons.
- Shackley, S. (1996) Global Climate Change and Modes of International Science and Policy. in A.Elzinga & C.Langstrom (eds), *Internationalism and Science*. Taylor Graham, London. pp 199-222.
- . (1999) Climate change science and policy in the UK: an over-identified scientific problem in a context of political intransigence. Available at: <http://pne.people.si.umich.edu/PDF/PMNPC/uk.pdf> (last accessed 23.09.2012).
- Shackley, S. and T. Skodvin. (1995) Ipcc Gazing and the Interpretative Social Sciences: A Comment on Sonja Boehmer- Christiansen's: 'Global Climate Protection Policy: The Limits of Scientific Advice'. *Global Environmental Change* 5:175-80.

- Shackley, S, and B Wynne. (1996) Representing Uncertainty in Global Climate Change Science and Policy: Boundary-Ordering Devices and Authority. *Science Technology and Human Values* 21:275-302.
- Shackley, S., P. Young, S. Parkinson, and B. Wynne. (1998) Uncertainty, Complexity and Concepts of Good Science in Climate Change Modelling: Are Gcms the Best Tools? *Climatic Change*:159-205.
- Shaw, A. (2000) Imbued meaning: science-policy interactions in the Intergovernmental panel on climate change. Honours B.A., The University of British Columbia.
- . (2005) Policy relevant scientific information: the co-production of objectivity and relevance in the IPCC. Breslauer Symposium, University of California International and Area Studies, UC Berkeley.
- Sheirmeier, Q. (2010) IPCC signs up for reform: panel agrees new guidelines and management restructure with Pachauri still at the helm. *Nature*, 467. pp 891-2.
- Shove, Elizabeth (2003) Converging conventions of comfort, cleanliness and convenience. *Journal of Consumer Policy*, 26 (4). pp. 395-418.
- Shove, E. A. and M. Pantzar (2005) Consumers, Producers and Practices Understanding the invention and reinvention of Nordic walking. *Journal of Consumer Culture*, 5 (1). pp. 43-64.
- Shove, E., F. Trentmann, and R. R. Wilk. (2009) *Time, Consumption and Everyday Life : Practice, Materiality and Culture*. Oxford: Berg.
- Siebenhuner, and B. (2002) How Do Scientific Assessments Learn? Part 1. Conceptual Framework and Case Study of the Ipcc. *Environmental Science & Policy* 5:411–20.
- Siebenhuner, B. (2003) The Changing Role of Nation States in International Environmental Assessments - the Case of the Ipcc. *Global Environmental Change-Human and Policy Dimensions* 13:113-23.
- Skodvin, T. (2000a) *Structure and Agent in the Scientific Diplomacy of Climate Change : An Empirical Case Study of Science-Policy Interaction in the Intergovernmental Panel on Climate Change*. Advances in Global Change Research. Dordrecht ; London: Kluwer Academic.
- . (2000b) Revised rules of procedures for the IPCC process. *Climatic change*, 46. 409-415.
- SMIC (1971) *Inadvertent Climate Modification: Report of the Study of Man's Impact on Climate (Smic)*. Cambridge (Mass.) ; London: M.I.T. Press.
- Solomon, S. (2007) *Climate Change 2007 : The Physical Science Basis : Contribution of*

- Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press.
- Spaargaren, G. (2011) Theories of Practices: Agency, Technology, and Culture Exploring the Relevance of Practice Theories for the Governance of Sustainable Consumption Practices in the New World-Order. *Global Environmental Change-Human and Policy Dimensions* 21:813-22.
- Stavins, R. (2010a) Will we know success when we see it? *National Journal*, 6.12.2010. Available at: <http://climate.nationaljournal.com/2010/12/will-we-know-success-when-we-s.php> (last accessed 13.08.2012).
- Stavis, D. (2006) Historical Trajectory of International Environmental Politics and Its Study. In *International Environmental Politics*, edited by K. Hochstetler and D. Stevis M. Betsill: Palgrave Macmillan.
- Stones, Rob. (1998) *Key Sociological Thinkers*. Basingstoke: Macmillan.
- Stuvoy, K. (2010) Human Security Research Practices: Conceptualizing Security for Women's Crisis Centres in Russia. *Security Dialogue* 41:279-99.
- Swartz, D. (1997) *Culture & Power : The Sociology of Pierre Bourdieu*. Chicago ; London: University of Chicago Press.
- Tol, R., R. Pielke and H. van Storch (2010) Save the panel on climate change. *Spiegelonline*. Available at: <http://www.spiegel.de/international/world/opinion-save-the-panel-on-climate-change-a-673944.html> (last accessed 23.09.2012).
- UNGA RES/45/53 (1988) 'Protection of global climate for present and future generations of mankind.' Available at: <http://www.un.org/documents/ga/res/43/a43r053.htm> (last accessed 13.08.2012).
- UNGA RES/45/212 (1990) 'Protection of global climate for present and future generations of mankind.' Available at: <http://www.un.org/documents/ga/res/45/a45r212.htm> (last accessed 13.08.2012).
- Vergano, D. and P. O'Driscoll. (2007) 'Scientists, governments clash over climate report.' *USA Today*, 4.08.2007. Available at: http://www.usatoday.com/weather/climate/globalwarming/2007-04-06-global-warming-report_N.htm# (last accessed 14.8.2011).
- Vidal, J., A. Stratton and S. Goldenberg (2009) Low targets, goals dropped: Copenhagen ends in failure. *Guardian*, 19.12.2009. Available at: <http://www.guardian.co.uk/environment/2009/dec/18/copenhagen-deal> (last accessed 27.09.2012).
- Vogler, John. (1995) *The Global Commons: A Regime Analysis*. Chichester: Wiley.

- Wacquant, L. (1998) Pierre Bourdieu' in R. Stones (ed) *Key Sociological Thinkers*. London: Macmillan Press
- . (1989) Towards a reflexive sociology: a workshop with Pierre Bourdieu. *Sociological Theory*, 7 (1): 26-63.
- . (2002) The Sociological Life of Pierre Bourdieu. *International Sociology* 17:549-56.
- Wacquant, L. (2004) 'Following Pierre Bourdieu into the field'. *Ethnography*, 5 (4): 387-414.
- Weart, Spencer R. (2008) *The Discovery of Global Warming*. Rev. and expanded ed. ed. Cambridge, Mass. ; London: Harvard University Press.
- Webb, Jen, Tony Schirato, and Geoff Danaher. (2002) *Understanding Bourdieu*. London: SAGE.
- Wilk R. (2009) The edge of agency: routines, habits and volition in E. Shove, F. Trentmann and R. Wilk (eds) *Time, consumption and everyday life: practice, materiality and culture*. Oxford: Berg Publishers. 143-156.
- Williams, Michael C. (2007) *Culture and Security: Symbolic Power and the Politics of International Security*. London: Routledge.
- Williams, M. C., and I. B. Neumann. (2000) From Alliance to Security Community: Nato, Russia, and the Power of Identity. *Millennium-Journal of International Studies* 29:357-+.
- WMO (1979) Declaration of the World Climate Conference. In *Proceedings of the World Climate Conference – A Conference of Experts in Climate and Mankind, 12-23 February 1979*, WMO Publication no. 537, Geneva: World Meteorological Organization
- WMO (1986) *Report Of The International Conference On The Assessment Of The Role Of Carbon Dioxide And Of Other Greenhouse Gases In Climate Variations And Associated Impacts*. Villach, Austria, 1985, WMO/UNEP/ICSU.
- World Commission on Environment and Development. (1987) *Our Common Future*. Oxford: Oxford University Press.
- Yamin, F., and J. Depledge. (2004) *The International Climate Change Regime : A Guide to Rules, Institutions and Procedures*. Cambridge: Cambridge University Press.
- Yamineva, Y. (2010) The assessment process of the Intergovernmental Panel on Climate Change (IPCC). Submitted as PhD thesis. Newnham College, Cambridge.
- Yearley, S. (2009) Sociology and Climate Change after Kyoto What Roles for Social Science in Understanding Climate Change? *Current Sociology*:389-405.

Young, O. R. and M, A. Levy (1999) 'Chapter 1: The effectiveness of international environmental regimes', in O. R. Young (ed.) *The Effectiveness of International Environmental Regimes: The Causal Connections and Behavioral Mechanisms*. Cambridge, MA: The MIT Press, 1-32.

Zillman, J. W. (2008) Australian Participation in the Intergovernmental Panel on Climate Change. *Energy & Environment* 19:21-42.

Zillman, John. (2007) Some Observations on the IPCC Assessment Process 1988-2007. *Energy and Environment* 18:869-92.