

BOOK REVIEWS

THE SCIENCE AND POLITICS OF GLOBAL CLIMATE CHANGE: A GUIDE TO THE DEBATE BY Andrew E. Dessler and Edward A. Parson. Cambridge University Press. Paperback (ISBN-13: 9780521539418 | ISBN-10: 0521539412). There was also a hardback of this title but it is no longer available. Published 2006. 190 pages. \$AU 59.95

The library shelves of most universities are cluttered with books on global warming. The problem is identifying which ones are worth reading. "*The Science and Politics of Global Climate Change: A Guide to the Debate*" is one of these, not because it is definitive, or balanced, because it's not. It is because the coverage of the topic is broad, it's concise and it is well written in a style that suits an educated but non-specialist audience.

The professional backgrounds of the two authors are different but complementary, providing the expertise and experience in the areas of atmospheric science and environmental policy required to cover such a broad and complex subject. Andrew Dessler is an atmospheric scientist at Texas A&M University. Previously he worked as a Senior Policy Analyst in the White House Office of Science and Technology Policy. The other author, Edward Parson, has a PhD in Public Policy from Harvard and also holds a degree in physics from the University of Toronto. Dessler and Parson combine their expertise to help scientists, policy makers, and the

public sort through some of the often conflicting claims in the climate-change debate. The authors explain how scientific and policy debates work, summarise present scientific knowledge and uncertainty about climate change, and discuss the available policy options. They aim to explain why the debate is so confusing.

The book has five chapters: 1) Global climate change: a new type of environmental problem; 2) Science, politics, and science in politics; 3) Climate change: present scientific knowledge and uncertainties; 4) The climate change policy debate: impacts and potential responses; and 5) The present impasse and steps forward. There are also Appendices, a Glossary, Bibliography, and Index.

Assessments of global climate change have come a long way since the 1980s when scientists first shifted their attention from expectations of planetary cooling to prospects of global warming. Declarations by the IPCC in 1990 and 1992 on pending rises in air temperature and sea level by as much as 4.5 °C and 1.4 m, respectively, by the year 2030 have now been scaled down. And despite the momentum generated by the environmental movement that gave rise to the "climate change industry", a somewhat more moderate view is now held by a growing number of scientists. '*The Science and Politics of Global Climate Change*' reflects this more moderate approach. Notwithstanding this "settling of the dust", there is still heated debate. In fact, Dessler and Parson state climate change may well be the most

contentious environmental issue that we have yet seen.

Dessler and Parson state the aim of their book is to clarify the climate change debate, to sort through the conflicting claims made by scientists, economists, policy makers and the media and to look at how science is used and presented in policy debates. They “seek to help the concerned, non-expert citizen to understand what is known about climate change, and how confidently it is known, in order to develop an informed opinion of what should be done about the issue.” These are indeed ambitious aims, and a tall order for a small book. Perhaps this is the reason the aims are not fully achieved. What is missing is as follows.

The global warming debate has three parts: scientific assessment, impacts and policy. The highest priority is on the science of climate change and physical basis for change, in particular: How confidently is it known that humans climate have a role in causing significant climate change? Without a clear answer to this question, it is difficult to assess impacts and the need for mitigation policies. Dessler and Parson devote only one chapter to scientific knowledge, and only one point of view is presented.

The debate in climate science circles covers themes that are diverse and sundry, and it’s not about “belief” in global warming or “denial”. The debate centres on the extent to which human action will change climate, not about whether or not it will. The focus is on the evidence (or lack of it) that catastrophic or damaging climate change may occur and the extent to which the changes to the atmospheric environment that are brought about by mankind will show up in changed climate patterns, and whether these will increase or reduce

opportunities for agriculture, tourism, disease etc. There are three fundamental questions. 1) Is global warming occurring? 2) If so, why? 3) What should be done about it?

There is very little doubt that the twentieth century ended warmer than it began, but the rise was intermittent and not well correlated with the concentration of carbon dioxide in the atmosphere. The instrumental record shows that global climate began warming around 1850, long before the post World War II industrialisation that led to an increase in carbon dioxide emissions. Whatever the cause of the current warm phase, its occurrence is not unprecedented. Global warming happened from about 1900 to 1942, then cooling occurred until 1979. This was followed by another rise to 1998. Since 1998, mean global temperature has been relatively stable. This climatic variability is not unusual. During the Medieval Warm Period from 900 to 1200 AD, the Vikings sailed in arctic waters that are now permanent sea ice, and farmed in Greenland soil that is now frozen solid. This was followed by the Little Ice Age which ended around 1850.

Given that we accept that a) global climate has warmed about 0.7 °C in the past 100 years and b) a significant part of this warming occurred before the post World War II industrialisation that led to an increase in carbon dioxide emissions, the question arises: What confirms this small amount of warming (0.007 °C per year) is caused by carbon dioxide? Climate is always warming or cooling and climate variability is a normal feature of climate. The reason for debate is that it is so difficult to attribute observed warming to human activities, as opposed to the many natural causes of warming. There may be agreement that warming is occurring,

but assigning a cause is an entirely different matter. The Intergovernmental Panel on Climate Change (IPCC) makes this point:

"The fact that the global mean temperature has increased since the late 19th century and that other trends have been observed does not necessarily mean that an anthropogenic effect on the climate system has been identified. Climate has always varied on all time-scales, so the observed change may be natural. A more detailed analysis is required to provide evidence of a human impact."

(IPCC, *Climate Change 2001*, page 97)

Undoubtedly the recent warming could be due to man-made greenhouse gas emissions, but we understand so little about the causes of natural climate variability that it is not possible what part of the very small amount of observed warming is human-caused. To support the argument that carbon dioxide is causing it, the evidence would have to distinguish between human-caused and natural warming. This has not been done.

"Projections" of future climate come from computer climate models. But these models have not been verified, so their output is merely conjecture and not capable of being the mainstay of policy. It is an uncontroversial fact that the scientists who construct global climate models accept that they do not adequately handle key aspects of the climate system, such as the role of clouds and aspects of heat transfer in ocean circulation. Water vapour dominates the greenhouse effect, and global-warming

predictions are based heavily on how water vapour is likely to respond to increased carbon dioxide. But climate science is not yet capable of predicting this response. Predictions from climate models are of little value until they are reliable. A climate model is just a hypothesis until there is empirical evidence that proves it is correct.

In a good deal of the literature on global warming, claims about the future state of climate are based solely on model results. These are often treated as factual and quoted as justification for the mitigation measures. Model predictions reflect only the belief of the modellers. But when models are presented to the public as predictive tools or as "evidence" and a basis for public policy, the issues of social responsibility and ethical behaviour arise.

A central point in global warming debate is the absence of evidence that the observed increase of carbon dioxide in the atmosphere will cause dangerous climate change. Another is that warming does not confirm carbon dioxide is causing it. Another is that much of the so-called evidence is contradictory. For example, how do we explain the fact that the Arctic was just as warm in 1930s as it has been in recent times, or that the Antarctic ice mass is increasing, or that there has been no global warming since 1998? Is it wise to base future expectations on climate models given that their performance is so poor?

Underlying many social and economic assessments of climate change is the misleading notion of constant climate. Global climate is highly variable and constantly changing. Warming or cooling trends are a standard feature of climate and will occur with or without increased concentrations of carbon dioxide in the atmosphere. Moreover, climate

change occurs much more slowly than socioeconomic factors and patterns of crop improvement, farming techniques and the like. Superimposed on climate change is climate variability. Normal year-to-year variations in climate are one to two orders of magnitude greater than the gradual change predicted. In some cases, such as with agricultural food production for example, slow changes in climate are not important since response times at the farm level are not much more than one growing season. Technology and management are continually adjusting to changed circumstances.

A weakness of the book is that it promotes the view of global warming as a "crisis". According to the IPCC (1995) increases in greenhouse gases are likely to give rise to a slightly warmer and wetter climate in most places, in particular, warmer nights and warmer winters in mid latitudes. This is hardly a major threat. Plant growth is more often limited by temperatures and rainfall that are too low rather than too high. It seems that climate will not necessarily be worse, just different. The worst-case prognosis is for changed rather than reduced opportunities.

It is theoretically possible that Earth's climate could change due to human greenhouse gas emissions, but there is no evidence to suggest it will amount to much. One could reasonably argue that lack of evidence, one way or the other, is no reason for complacency.

Despite its weaknesses, the book is a useful resource as it identifies many of the key ingredients of the global warming debate, set out in a style that suits a non-specialist audience. Clearly, any future threat from climate, human-caused or natural, will not only depend on the amount

and rate of change, but also on the way in which society adjusts to it. Adaptation to ongoing change is a key factor in reducing adverse impacts or in preparing to take advantage of beneficial changes in climate. "*The Science and Politics of Global Climate Change*" serves to focus our attention on the facts underpinning the various aspects of the global warming debate. Anyone with an interest in how science is used in policy debates will find this book useful.

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31 October 2006

CLIMATE CHANGE: TURNING UP THE HEAT by A. Barrie Pittock. Earthscan, London, UK and CSIRO Publishing, Collingwood, Australia. Published 2005. xii+316 pages. ISBN 0 643 06934 3.

This book has a Foreword by R.K. Pachauri the chairman of the Intergovernmental Panel on Climate Change (IPCC) and this sets the scene for a book that is essentially based on *IPCC Third Assessment Report (2001)* with more recent research up to 2004 as well as 30 years of work in the field of climate change by the author. So it is essentially a book by a dedicated global warming guru and only a little space is devoted to global warming scepticism. This has to be explained at the outset so that the two sides of the global warming debate are clear as to where the book stands. That said it is a clear and detailed explanation of the global warming phenomenon as seen through the eyes of a believer.

It consists of an Introduction, twelve chapters, an up to date section of further information and an excellent index. In the Introduction Pittock mentions both the film *The Day After Tomorrow* and a paper in *Nature* (27 January 2005) by a team of UK scientists that update the range of possible warming during the current century. Chapter 1 sets the scene for the rest of the book by describing the changes in climate over the last 1000 years using the well-known IPCC 2001 hockey stick diagram, the recent (last 150 years) increases in temperature, its impacts, and the future. All of these features are expanded upon in the subsequent chapters. So in Chapter 2 past climates are discussed in terms of direct and proxy evidence. Unfortunately there is no explanation of how climate-related information is obtained from much of the proxy evidence. We are taken from 400,000 years before the present (the ice ages), through the Younger Dryad (but with no explanation of its causes), to the last 10,000 years with its sudden droughts and cold episodes. Chapter 3 looks at the future and provides a good description of the differences between predictions, scenarios and projections in both climate and socio-economic senses. Chapter 4 considers the role of global warming sceptics (or contrarians as he labels them) given the uncertainty of the future but it also brings in the importance of risk management in the light of such polarised views. The fact that sceptics emerged immediately after Kyoto (see Gerholm, 1999) is not mentioned. The next chapter describes likely changes in climate (and its ranges) – surface warming, regional differences, extreme events, sea level rise, abrupt changes – all based on IPCC 2001. This is followed by a gloomy chapter

on the impacts of these changes and the risks associated with them especially the awakening of the 'sleeping giants' of ocean circulation breakdown, rapid sea level rise and runaway carbon dynamics. Having decided on the inevitability of global warming Pittock uses Chapters 7 and 8 to consider how we can adapt to the changes or mitigate them. By this point climate change has become human-induced and we have to adapt because 'climate change is already happening' and eight strategies are offered and illustrated by an example of water supply adaptation in Western Australia. Mitigation, which is defined as reducing net greenhouse gas emissions, is covered in the longest chapter in the book. First the greenhouse gas emissions have to be stabilised and then reduced via such options as increased energy efficiency, substitute fuels, alternative energy sources (nuclear, hydro, solar, wind, biomass, tidal and wave, geothermal), and sequestration of carbon. This chapter is good on the needs but weaker on actual implementation, since cost is never considered. Perhaps this chapter should be read in conjunction with the Stern Report (2006). In a short Chapter 9 climate change is put into the context of all the other global change issues (land use change, water supply, economic development) that have to be considered by the world's decision makers. Chapters 10 and 11 consider the politics of global warming. The first question is whether politicians and decision makers can be convinced that human-induced global warming is real in view of the uncertainties involved in the scenarios and projections. The next question is how to make the mitigation fair to everyone. This brings in the problem of the differences between the developed and

developing countries, the importance of equity between political entities and between generations, as well as the role of governments, non-government organizations (NGOs) and businesses. The penultimate chapter looks very briefly at global warming from Arrhenius (1896) to the Kyoto Protocol (1997) before discussing the interests of Africa, Australia and New Zealand, China, the European Union, the Indian subcontinent, Latin America, Russian Federation, Small Island States, and USA. I found this order rather interesting! The book ends with a chapter on how to accept the challenge of global warming which by this time has morphed into 'human-induced dangerous climate change'. It reiterates the different problems facing developing and developed countries as well as the fact that Kyoto runs out in five years time (in 2012). Hence the surge of interest by Tony Blair and Helen Clark. It ends with a list of 13 key issues that need to be faced because 'We owe that, at least, to our children'. The book does not contain a complete list of references. Instead all the usual notes, caveats and references are made available at www.publish.csiro.au/pid/4992.htm. In the reading list of 79 items two-thirds are dated 2000 or later and several have updating web sites given. There is also an eight page list of websites divided into the following sections: business and economics, energy technology and climate policy, development, environmental and climate NGOs, government agencies, renewables, science. This is a very useful source for students and others to mine the internet for information on climate change. Overall the book is a useful addition to the growing literature on climate change provided that its stance is clearly understood. It is perhaps a

little light on the explanations of global change in the decade to century time span, offers no insight into the various computer models that model the climate (these are taken as read!) but it does expound at some length on the perceived economic and political consequences of a continuing increase in global temperatures over the next 100 years.

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20 November 2006.