

Book reviews

Hurricanes: Climate and Socioeconomic Impacts edited by Henry F. Diaz and Roger S. Pulwarty (Springer-Verlag, 1997). ISBN 3-540-62078-8. \$77.

Having become increasingly involved in the tropical cyclone community through my involvement with the Tropical Cyclone Coastal Impacts Program in Australia, I was rather pleased to get this book to review. The title certainly promises a review of a topic which is increasingly of interest and although the book generally delivers, it turns out that the promise (at least as far as that implied by the title) has been rather overstated.

The socio-economic impacts of climate phenomena have received so much attention in the last ten years or so. As the influence and details of climate features such as ENSO have been increasingly explored and the magnitude of long-term variability more clearly defined, the economic influence of climate phenomena has been increasingly the subject of discussion and debate. Quite apart from any potential climate changes resulting from enhanced greenhouse gas concentrations, the need to document and understand the socio-economic impacts of climate has grown immensely. The devastating impact of hurricane *Andrew* in 1992 is perhaps one of the more visible catalysts for renewed effort to understand vulnerability and improve response to the tropical cyclone threat.

This book is a product of a conference which was held at the US National Hurricane Centre in 1995. The workshop title 'Atlantic Hurricane Variability on Decadal Time Scales: Nature Causes and Socioeconomic Impacts' gives a much more honest (though less snappy) representation of the content of the book's content. The book is just about Atlantic hurricanes and none of the chapters venture away from the region which they affect.

The book is divided into four sections: Climatological Perspectives; Impacts of Hurricane Variability; Vulnerability and Policy Issues and Hurricane Risks and Property Loss Insurance. Each of these sections presents a comprehensive overview of their respective topics, and each chapter is accompanied by an extensive reference list.

The editors present an overview of the book in the first chapter and draw the reader's attention to the breadth of information which must be gathered and skills which must be drawn upon in order to fully assess the impacts of tropical cyclones. This chapter acts to

prime the reader for a suite of views from a range of authors. William Gray, John Sheaffer and Chris Landsea provide the climatological assessment of hurricane variability on decadal and multi-decadal scales along with a review of the prominent teleconnections associated with hurricane activity. The scientific background of this section is complemented by a theoretical treatment of hurricanes and by an example of modelling studies which have been undertaken. Rather than being some kind of summary of 'community opinion' many of the chapters as presented are likely to promote healthy debate. For example, the role of climate models in predicting likely variations of cyclone activity and intensity resulting from enhanced greenhouse gases has been the subject of particularly intense debate.

Section B deals with the impacts of hurricane variability in terms of the loss of life suffered by the affected population and in terms of the damage inflicted on ecosystems. A socio-economic study of the effects of hurricanes in Puerto Rico completes this section.

The weightiest portion of the book, Section C, deals with vulnerability and policy issues. These issues are perhaps the most important, and many of the principles which underlie these chapters can be applied directly to any cyclone-threatened community. As is the case for south Florida, tropical north Queensland has seen an enormous demographic change in the last 20 years. The population is now greater, younger and more mobile. The understanding of the cyclone threat is diluted as the population moves in and out of the area and the all-year tourist season, which has developed as the north Asian winter encourages a January/February break, means that a large number of the people who will be at risk in a cyclone are unfamiliar with the locality and emergency procedures.

The final component of the book deals very briefly with insurance issues. How will the insurance market react to an increase in hurricane numbers? The fact that hurricane *Andrew* caused such a large amount of damage in a period of relative inactivity for Atlantic hurricanes focussed many in the insurance industry on hurricane variability. A greater understanding of variability is clearly as important, if not more important, than pinning down the likely changes in intensity and frequency of storms which will result from enhanced greenhouse gas concentrations.

Books resulting from workshops have a tendency to lack the cohesion and quality of presentation of other scholarly works. In many cases it is as if the authors and editors are simply exhausted by the organisation and participation in the workshop and the 'book of the work-

shop' gets short shrift. This book is thankfully not simply a collection of papers prepared for the meeting; it is clear that considerable editorial effort has been expended. Overall the book is a healthy combination of general, what might be termed 'theoretical' studies of the issues, combined with a number of example 'applied' studies. It is well structured and the presentation style is uniform. The book has a useful index (all too often missing altogether from conference compilations) and the quality and quantity of illustrations is good.

The book provides an excellent summary of north Atlantic storms, but anyone looking for a broader perspective will have to look elsewhere. It will, however, provide a fine, authoritative starting point for researchers preparing to tackle the problem for other areas of the planet.

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A Climate Modelling Primer, 2nd edition by K. McGuffie and A. Henderson-Sellers (Wiley, 1997). ISBN 0-471-95558-2. \$89.95.

A primer is an introductory text book. As such, this is a first-rate introduction to the science of climate modelling, and a welcome update to the initial edition published in 1987, a very long time ago in climate modelling terms.

The pedagogical intent of the book is clear from its chosen topics. The first chapter opens with discussion of what climate signifies from a modelling perspective, and goes on to give a compact account of the important forcings and feedbacks. In the next section, some of the historical background of climate modelling is given – a theme which runs throughout the book, and which helps to give a good sense of the issues involved in the development of the science. Especially helpful in this context is the authors' use of older, simplified models of the atmosphere and ocean as a means of better understanding those concepts which are important in general circulation models. In this way, the reader gains an appreciation of some of the fundamental mechanisms driving the ocean-atmosphere system.

The advantage of discussing simple models is seen in chapter 3, as the concept of parametrisation is more easily understood when examined in an energy balance model than in a GCM. Some exercises are included to give the student a feel for the sensitivity of the energy balance model to changes in various parameters. Also mentioned is the well-known use of this type of model for studies of glaciation. Radiative-convective models are dealt with in the next section as a means of explaining the sensitivity of the atmosphere to radiation and clouds. Also included is a treatment of the use of two-dimensional statistical dynamical models, such as those used in baroclinic wave theory.

All of this is excellent preparation for the final chapters of the book, which deal with general circulation models. Most of the important topics are included and are discussed at an introductory level, although more could have been said about the details of the simulation of clouds and precipitation, given their crucial importance in climate sensitivity and prediction. The final chapter discusses the evaluation and use of climate models, and provides some cautionary words about their skill as assessed by model intercomparison studies. In particular, the authors make an important statement about the inadequate state of current model evaluation methods. They state that differences between model responses are not usually easily understood unless these models share crucial subroutines as part of a formal intercomparison process – something which has not yet been done, although the final stage of PILPS will do so. This reviewer is reminded of a similar comment by a senior European scientist at the final meeting of TOGA in Melbourne in 1995, who suggested that without such a comparison, the various modelling groups around the world were performing what he called 'irreproducible science'. While this is an exaggeration, the utility of such a comparison for model diagnosis and development would be great.

The last part of the book deals with the future of climate modelling. It is always dangerous to prophesy, and here the authors may be excused for generally not doing so. Still, some mention might have been made of the huge advances in computer power which are likely to be available in the near future, and what that might mean for climate modelling. Also, the authors' comments on the important issue of downscaling should have at least stated that high-resolution climate models, particularly variable-resolution models, have the potential, ultimately, to answer important questions about the effects of climate change at regional scales, despite the current inadequacies of such models.

The bibliography of the book is thorough, although it might have been made more useful to students if the authors had indicated the differing complexity of the references by dividing them into levels of difficulty. The

book comes with a CD-ROM, which contains an extensive collection of the BASIC routines which were supplied in the first edition of the book, including the famous DAISYWORLD. The disk also contains other software and animations of climate model results. The animations provide a good sense of the complexity of high-resolution climate models, particularly ocean models and their convoluted patterns of eddies. In my copy of the book, the plastic sleeve of the CD was attached to the inside back cover of the book, but backwards, with the opening glued shut against the book cover. Some surgery with a Swiss army knife was needed to extract the disk. The html interface of the CD is well thought out, but some important software is missing. For example, the animations are included in mpeg format, but no shareware mpeg player is provided on the CD. The disk interface gives a Web location for finding an mpeg player, but the ftp directories which this link leads to are not self-documenting and, moreover, are located on the other side of the Pacific, a long, slow bandwidth haul to this part of the world for any substantial piece of software like an mpeg player. I found one eventually on an Australian software archive, but only after an hour of searching and

installation. Additionally, perhaps the association between the graphics and the text of the book could have been made more explicit, with some further detailed discussion of what each of the animations are actually showing us, both physically and in a modelling context.

Nevertheless, I would strongly recommend this book as a first text in climate modelling. For students, it is easier to read and has a better development of its topic than other books on the subject. The authors also state in the preface that the book is not really meant for climate modellers. I disagree. If active researchers in this field want to find a pithy, concise account of a particular aspect of their field, this book is a good place to start.

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