BOOK REVIEWS

NATURAL HAZARDS (SECOND EDITION) by Edward Bryant. Cambridge University Press. Paperback Published March 2005. 328 pages. £21.99, AU$ 69.95.

The field of natural hazards research never had the theoretical and methodological incisiveness of many other established research areas within geography and related disciplines. Despite this, over the years it has acquired a high level respectability. The 1991 edition of '*Natural Hazards'* is a measure of this. It dealt with the important aspects of natural hazards research and it showed how this work brought new insight and practical value in situations where people confront hazards of nature. The interest this book generated is reflected in the demand for a second edition of 'Natural Hazards'. However, the book and its contents are not merely a tweaked reissue of the first. Material contained in it has been extensively revised and updated making good use of very recent research findings and commentaries.

The first chapter provides an introduction to natural hazards and sets the scene for treatment of two major categories of hazards, namely, climatic and geologic. Chapter Two deals with mechanisms of climate variability and models of atmospheric circulation and change, which includes the role of mobile polar highs and a discussion of astronomical influences of solar and lunar cycles. It is rare to see mobile polar highs mentioned in an account of the fundamentals of atmospheric circulation. It is rarer still to find lunar tides included in a treatment of astronomical cycles and their possible effect on climate. Bryant appears undaunted by this and presents a useful discussion on their connection with the magnitude, frequency and location of mid-latitude storm systems and extreme climatic events.

Chapter Three deals with large-scale storms as a hazard, which includes tropical cyclones, extra-tropical cyclones, snowstorms, blizzards, freezing rain, dust storms and storm surges. This important chapter concludes with a lucid discussion of probability of occurrence. Chapter Four follows on from this with an account of localized storms as hazards, including thunderstorms, lightening, hail and tornadoes.

Chapter Five deals with drought as a hazard. It starts with a description of pre-colonial responses to drought, which is then compared to post-colonial responses. This is followed by an account of the ways in which drought conditions can be exacerbated by modern societies and what methods are currently available to reduce impact. Chapter Six deals with flooding as a hazard, specifically flash floods and high magnitude regional floods. Chapter Seven deals with fires in nature, including conditions favouring intense bushfires and presents an overview of bushfire disasters worldwide. Chapter Eight covers the oceanic hazards of waves, sea ice, sea level rise and beach erosion.

Part II of the book deals with geological hazards, beginning with Chapter Nine that covers causes and prediction of earthquakes and volcanoes. Chapter Ten gives an account of earthquakes and tsunami as hazards, which includes a discussion of types of shock waves, seismic risk maps and liquefaction or thixotrophy. Chapter Eleven deals with volcanoes as a hazard and includes types of volcanic eruptions and major volcanic disasters of the past. Chapter Twelve deals with land instability as a hazard, with a description of soil mechanics and shear strength and classification of land instability including subsidence. The final part of the book deals specifically with social impacts in terms of personal and group response to hazards. An Epilogue chapter concludes the book, which also contains a glossary of terms.

There are two underlying themes that are indirectly addressed throughout the text. The first is that natural hazards are pervasive in time and space. Natural hazards, and in some cases quite unexpected hazards, are simply more common and more widespread than perceived. The second is that impacts of natural hazards are a product of both nature and society and that these are strongly affected by feedback in the form of human adjustment. Overall, Bryant's book stands in contrast to the trend over the past two decades in which the once coherent field of natural hazards research has become diffused by the emergence of related but expanded fields of disaster studies dealing with biological and technological hazards in addition to geophysical, risk assessment, cumulative impacts, and global environmental change. Bryant's book hints at an emerging synthesis, but a unified theoretical basis for studying them has not yet emerged.

There is a large amount of material contained in this book and the purchaser will get good value for money. The majority of the text has been presented as undergraduate lecture material, so it will be particularly useful to university academics and their first and second year students.

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FUNDAMENTALS OF ATMOSPHERIC MODELING (SECOND EDITION) by Mark Z. Jacobson. Cambridge University Press. June 2005. 813 pages, 175 line diagrams and 60 tables. Paperback, ISBN 0-521-54865-9. Australian R.R.P. $160 (paperback). (Also available in hardback). First published 1999.

This is much more than just a book about modelling the atmosphere. It contains many chapters focused on atmospheric processes, including radiative energy transfer, boundary layer and surface processes, particle coagulation, deposition, air-sea exchange and many other aspects of chemical and physical processes in the atmosphere. In the 813 pages (an increase from 656 pages in the first edition) there is a clear description of numerical methods and computational techniques used to simulate such processes, however this does not occupy the majority of the book. In fact the first mention of 'computer programming practice' does not occur until page 60. From there on a programming practice or a modelling project appears at the end of each chapter. So it is a book about atmospheric processes and how to go about modelling them, rather than a book which tells you how to use your computer to model these processes. Programming experience and significant mathematical skills are assumed.

The 813 pages include (first edition equivalent in parenthesis)
Chapters 1-21: pages 1-708 (1-560)
Appendices; 43 pages (52)
References: 32 pages (22)
Index: 30 pages (22)

The appendices have been shortened by the exclusion of more than 10 pages of symbol definitions. The index is excellent, as are the references, with the earliest reference noted being 1918 and the latest 2003.

Numerous example calculations and problems are include and appear throughout the chapters with answers said to be available through; http://www.cambridge.org/0521548659

Information one might want to check before purchase such as the Table of Contents, the Index, the Preface, and even an excerpt from Chapter 1, can also be found at this site.

As stated in the introduction to the second edition, "*this new edition includes a wide range of new numerical techniques for solving problems in areas such as cloud microphysics, ocean-atmosphere exchange processes and atmospheric radiative properties. It also contains improved descriptions of atmospheric physics, dynamics, radiation, aerosol, and cloud processes*". However although the title of the book and this description emphasise modelling, there is a very strong emphasis on the many processes that take place in the atmosphere that are open to scientific investigation and study.

This is not an entry-level book by any means. Other reviews have placed it at the graduate level, and I would agree. Undergraduates would struggle not only with the modelling and the expectation of a student being able to program competently, but with the depth of the material in the book. For example in Chapter 11 there are over 22 pages of stratospheric chemistry alone. These include sections on chlorine and bromine photochemistry and polar stratospheric cloud formation and surface reactions on the clouds. On the physical side, Chapter 18 contains 46 pages on cloud thermodynamics and dynamics. Even lightening, with nearly 5 pages, receives significant attention. These examples give an indication of the coverage and depth given to atmospheric processes and are typical of the book as a whole. The comprehensive nature of this book cannot be over emphasised. For example Table B4 in the appendix contains the chemical equations and rate coefficients for 350 gas phase reactions. The appendix also contains information on solute activity coefficient data, surface resistance data and over 200 molecular names, formula and chemical structures. It is interesting to note that some of the activity data in Appendix B10 was derived from the Robinson and Stokes classic 1955 book 'Electrolyte Solutions'.

The author is to be congratulated on producing a book that not only describes how to go about atmospheric modelling and transform a process into a mathematical model, but also gives the necessary background in chemistry, physics, meteorology etc. Overall this is an excellent book in a subject area of importance and concern. For those amongst us who can translate processes into mathematical formulae this book can only enhance their performance and hopefully, as a result, our understanding.

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