INTERNATIONAL JOURNAL OF CLIMATOLOGY
Int. J. Climatol. **26**: 139–140 (2006)

BOOK REVIEW

CLIMATE CHANGE: CAUSES, EFFECTS AND SOLUTIONS, by John T. Hardy, Wiley, Chichester, 247 pages, 2003. £22.50 paperback. ISBN 047085191.

As the title indicates, John Hardy has attempted to provide a book with a comprehensive coverage of the subject of climate change, including its possible causes, potential impacts and possible mitigation and adaptation strategies. The structure of the book reflects this and it is subdivided logically into three sections: I, Climate Change – Past, Present and Future; II, Ecological Effects of Climate Change; and III, Human Dimensions of Climate Change.

Section I accepts that human-induced climate change is now generally recognised and explains clearly the enhanced greenhouse concept. Past climate changes are simplified into six periods. This perhaps can give an over-simplified impression of an ever dynamic system by citing just six examples of climate changes with widely divergent magnitudes and timescales. A more systematic overview of causes of climate change, both terrestrial and extraterrestrial, could be valuable for some readers. There follows a good summary of current evidence for recent and ongoing changes, including correlations between observed change and models for global temperature rises. Section I is completed with full discussion of the latest predictive models together with a review of the potential feedbacks and range of uncertainties associated with the complexities of the earth-ocean-atmosphere system. Appropriately, emphasis is placed on the greatest uncertainty, that of future human modification of the atmosphere. This Section is supported effectively by a series of colour plates illustrating projected future world distributions from recent climate models.

Section II provides a wide-ranging appraisal of likely impacts of global warming on freshwater ecosystems and on terrestrial ecosystems from major latitudinal and altitudinal shifts to probable phenological changes. Impacts on the atmosphere of ever expanding and increasingly intensified agriculture are examined in detail before discussion of research into the effects of projected climate changes on world agriculture and food supply, together with probable necessary adaptations. Another commendable feature is the prominence given to the marine environment, including the threat of sea level rise, possible adjustments to ocean currents and repercussions for marine biological productivity and ecological diversity. An interesting Section does contain one proof-reading error – on page l35, 'Model predictions suggest that greenhouse warming will be greater at lower latitudes, that is further north and south' should read 'at higher latitudes' so causing the reduced latitudinal temperature gradients.

Human Dimensions of Climate Change, the last Section, provides a thought-provoking overview of the potentially far-reaching impacts of global warming on many aspects of economy and society. The crucial energy question is investigated with argument for stabilising CO_2 emissions in spite of expanding world energy demands. Problems of enforced population migrations, infrastructure and transportation, industrial/commercial organisations and tourism are outlined. A chapter is devoted to effects on human health, including heat stress, spread of infectious diseases and increase in medical conditions directly related to atmospheric pollution.

The last two Chapters, 11 and 12, are concerned with solutions. Chapter 11 firmly places responsibility on our generation to progress mitigation measures for reducing emissions from fossil fuel usage, the prime cause of climate change. The final Chapter examines Policy, Politics and Economics of Climate Change. It forwards the case forcibly for greater international cooperation as being essential for effective mitigation and there is good critical analysis of progress, or lack of progress, achieved up to 2002. Further strong argument is made for mitigation policies with the benefits for human well-being and environment far outweighing costs. Adaptations are frequently costly and incapable of ensuring a sustainable global environment for future generations.

Excellent features are the hundred plus well selected illustrations with maps, diagrams and photographs integrated well into the text. There are two text boxes per chapter used informatively for more detailed scientific explanations or topic summaries without disrupting the flow of the text. Easily accessible chapter bibliographies give good coverage of important literature to 2002 and they are supported by a useful website appendix. The majority of research examples are North American, as might be anticipated, but this does not detract from their value as much putative research is North American based.

This book is a valuable contribution to the literature on climate change and does achieve its aim of providing a

comprehensive coverage of an enormous subject in one reasonably concise volume. It is therefore a very useful general reference for the practising climatologists and meteorologists, a good introductory reference for further specialist atmospheric research and a very readable text to be recommended for students studying climate change, its potential impacts and policy solutions.

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Published online in Wiley InterScience (www.interscience.wiley.com).
DOI: 10.1002/joc.1225