

Climate Change: A Multidisciplinary Approach

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price of US\$247, this volume is unlikely to appeal to individual researchers, who are more likely to seek out papers of interest in a library copy. However, in these days of shrinking library budgets and rising journal subscription prices, it also questionable how many libraries will be willing to expand their collection of proceedings from this otherwise potentially valuable conference series.

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Climate Change: A Multidisciplinary Approach

by William James Burroughs
Cambridge University Press
40 West 20th Street, New York, NY
10011-4211
2001, 298 p. Paperback US\$29.95,
Hardback US\$85.00

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This small, readable, and useful volume on climatology and climatic change is aimed at the educated non-specialist. This is fortunate, for it is a comprehensive overview and we are all non-specialists for many of the topics discussed. The chapter headings are as follows:

1. Introduction
2. Radiation and the Earth's Energy Balance
3. The Elements of Climate (atmospheric and oceanic circulation)
4. Evidence of Climate Change (geological and historic climatic change)
5. Consequences of Climate Change (from sea levels to the spread of disease)
6. The Measurement of Climatic Change (a review of data sources from

- pollen analysis to satellites)
7. Statistics, Significance and Cycles (mathematical techniques for understanding the climatic evidence)
8. Causes of Climatic Change (from autovariance to human activities)
9. Modelling the Climate (The essential features of computer climate models and their ability to replicate climate)
10. Predicting Climate Change (natural fluctuations and human induced change)

Burroughs appears to have designed the Introduction as a filter to exclude the uncertain, rather than to attract the reader to topics in climatology and climatic change. An anecdotal and historical introduction to climate change could have provided a more enticing entrance to a fascinating subject. Instead, a battery of graphs establishes concepts in climatic variability and climatic change. However, this chapter serves as a warning; if you want a superficial treatment of the subject, or are allergic to analysis, do not read on.

The strength of the book is in Chapters 2 to 10, where the subject is developed from the essentials of the earth's radiation balance to a discussion of possible future climatic change. Burroughs is clearly most comfortable in the physics of climate and the volume maintains a rigorous, numeric approach to the topic. The diversity of topics considered is commendable.

Only a small portion of the volume, Chapter 4, dealing with the evidence of past climatic change, is of particular interest to geologists. His treatment touches on plate tectonics and "Snowball Earth" to "The Little Ice Age", including a figure illustrating sequence stratigraphy. Most of the discussion focuses on the Pleistocene and Holocene, with a critical dissection of the evidence. Anyone who has experienced the vast gulf in thinking between a modern climatologist, who considers a 30-year series a climatic average, and a paleoclimatologist, for whom decadal resolution would be very high resolution, will appreciate how well Burroughs writes in both areas.

Heartening to a geologist is his firm statement of the value of the geological record. He writes, "In terms of current concerns about future changes in the climate, these

[geological] changes seem immeasurably slow and hence of little relevance to contemporary issues. This view is short sighted. An understanding of longer term changes not only sets current events in context, but also identifies the importance of different components of the global climate....So the more we know about what has happened in the past...the easier it may be to appreciate the questions that need to be answered today" (p. 74).

Burroughs shows good scientific balance in the presentation of controversial topics, emphasizes uncertainties, and is commendably restrained in conclusions. For example, he does not press the (enticing) case for a climatic influence in human evolution, noting that the topic is "...an intellectual snakepit." (p. 121).

Considering the current Kyoto Accord controversy, Chapter 10, "Predicting Climate Change" is especially relevant. Burroughs comments: "The cozy notion that warming will simply produce a gradual displacement of climatic zones to higher latitudes, so England will eventually have a climate like southern France, is probably a gross oversimplification". What will matter, but is not known, is whether there will be a significant shift in the incidence of weather regimes. Regarding the much maligned general circulation models, he points out that, in spite of their limitations, there is no alternative to these tools to try to understand the climate and possible human impact.

Many figures are attributed to Intergovernmental Panel on Climate Change (IPCC) reports, which have brought together and synthesized work from diverse fields. Capable as he is, Burroughs would not likely have been able to bring this volume together without the use of IPCC reports. We have now had the 3rd IPCC report. Perhaps this volume will be updated to IPCC, 2001.

Several of the half-tone figures are of poor quality or are outright muddy (Fig 8.1, p. 209 showing the dust cloud distribution after the Pinatubo eruption). In spite of this flaw, this is a commendable book, and in soft cover, at a price that students deserve.