

# ***Paleoclimatology***

by **Thomas J. Crowley and Gerald R. North**, published by the Oxford University Press, Oxford Monographs on Geology and Geophysics No. 18, ISBN 0-19-510533-8, 349 pages, 1996, \$35.00.

## Review by **Christopher G. Kendall**

This book aimed as graduate level text, summarizes present state of our knowledge with respect to paleoclimatology.

The book is divided into four parts. It begins with an introduction to climate models, the second part deals with Quaternary climates, the third with Pre-Quaternary climates, and the final section of the book deals with a summary of synthesis of information on past climates. The first part of this book focuses on present climatic regimes and elementary models of the climate system, including wind belts, temperature, variations across the globe, rain fall, ocean currents, etc.

In the chapter on Quaternary climates the authors show how analysis of pollen can be used to show how the globe's vegetation cover changed through the last 20 thousand years, particularly in North America, Europe, and South America, and can be tied to the CO<sub>2</sub> content of ice, the presence of wind blown sediments, phosphorous in the North Atlantic, and the oxygen isotope and carbon isotope records from deep ocean. The authors go on to show how models can be developed to predict the extent of ice sheets and the circulation patterns both in the oceans and in the atmosphere. There is a chapter on historical climate fluctuations as related to the advances and retreats of the ice in the last 20 thousand years, and then a chapter on temporal trends in Pleistocene climates. This chapter shows how, instead of four major glacial periods, it is thought that there were a number of smaller events stretched over the Pleistocene. This is followed by a chapter on time series analysis of the paleoclimate records of the Quaternary and the recognition the climatic effects of orbital disturbances in the earth's path around the solar system, namely the Milankovitch cycles and their recognition in the isotopic record of the oceans. The next section deals with Pre-Quaternary climates. There's a chapter on Mid-Cretaceous climate and its relationship to the position of the continents.

A discussion of the environmental consequences of an asteroid impact, a chapter on the last 100 million years of climate and various schemes for modeling these effects, including the relationship of climate to continental motion and expected changes in the carbon dioxide content. There is also a chapter on the development of glacial ice sheets of the Tertiary, and a chapter on the Paleozoic and early Mesozoic climates as related to sea level position, the presence and absence of aragonites, the recognition of glaciation. This section ends with a chapter on Precambrian climates and the book moves onto a summary and synthesis followed by a very complete and long bibliography.

This is definitely a text aimed at students but experts or specialists in the field of paleoclimatology will find this book useful to them. The text is clearly written, some of the diagrams could be sharper but all are readable and understandable. This text presents a nice summary of the state of the art of paleoclimatology. It's not all encompassing but deals with the current information derived from the oceans and icecaps. While the text might have more discussion of the geological section it does contain reference materials on this topic so that it can be the starting point for literature search in the topic or location that one is interested in. The text will be useful to my students who are doing stratigraphic studies through geological time. I say that 50% of the book is focused on the

Quaternary and 50% is focused on the Pre-quaternary. This text, clearly written, interesting and one can dip into it for information and enjoy reading it.