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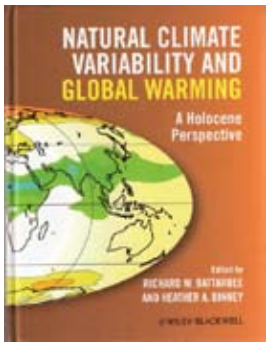

Natural Climate Variability and Global Warming—A Holocene Perspective, edited by Richard W. Battarbee and Heather A. Binney, 2008, Wiley-Blackwell, United Kingdom, i-x + 276 p., cloth, USD95.00, ISBN:978-1-4051-5905-0

The chapters of this book are based on keynote lectures presented at an Open Science Meeting at University College London in June 2006. The lecturers were from Western Europe and the United States, and the papers reflect their regional expertise. This is appropriate because Holocene history was first described in northwestern Europe, and the ideas developed then still dominate discussions.

The first chapter, Holocene Climate Variability and Global Warming, by R.W. Battarbee, presents a balanced account of the current perception of global warming forced by increasing levels of atmospheric carbon dioxide and the skeptical view that climate change is still within the range of natural variability, with major papers reflecting both views cited, along with a brief account of the following chapters.

The second chapter, by H. John B. Birks, Holocene Climate Research—Progress Paradigms, and Problems, is an excellent review of the historical development of Holocene studies. The studies go back to J. Heinrich C. Dau's studies of fossil pine tree stumps in peat bogs in Denmark in 1829. Birks traces the evolution of ideas concerning Holocene climate change from these early beginnings through the use of tree rings and pollen analysis. His discussion of the development of the Blytt-Sernander division of Holocene history (Sub-Atlantic, Sub-Boreal, Atlantic, Boreal, and Pre-Boreal, going back from the present) is a great help to the nonspecialist. He describes the development of the Co-operative Holocene Mapping Project (COHMAP) and the related climate modeling efforts, and gives an introduction to the more recent studies that form the basis for later chapters.

Next, Frank Oldfield, in The Role of People in the Holocene, gives an account of human impacts going back at least 4000 years. These include deforestation, use of fire, land being brought into cultivation, with the resulting erosion and soil-leaching effects. There is an account of Ruddiman's idea that human activities reversed the expected natural decline of atmospheric CO_2 some 8000 years ago and started an increase in supply of methane to the atmosphere 6000 years ago as cultivation of rice and other plants spread. There is a brief account of the effects of climate change on human societies as a possible cause of cultural collapse. He argues for a closer relationship between physical and social scientists in both data a gathering and modeling to understand better the human impact. The chapter includes an extensive bibliography as a guide for further study.

Michel Crucifix's chapter entitled Modeling the Climate of the Holocene is a masterful account of climate modeling, an excellent primer for those not versed in the topic. He discusses the different kinds of climate models, and describes in greater detail the Earth models of intermediate complexity (EMICs) that are the current workhorses of Holocene and older paleoclimate modeling efforts. He shows as an example the modeling of the so-called Holocene climatic optimum of 6000 years ago. The climatic optimum has been a major feature in discussions of climate change, and the combined modeling results he shows indicate that it is very much a high-latitude phenomenon, most pronounced around the North Atlantic. A second important topic is the question of how long the present interglacial will last. There, the modeling results indicate that even without human intervention, the present interglacial will be one of the longest of the Quaternary, lasting at least 50,000 years. He notes that rising atmospheric CO^2 levels have effectively precluded any possibility of an earlier return to glacial conditions.

In Chapter 5, The Early to Mid-Holocene Thermal Optimum in the North Atlantic, Eystein Jansen and colleagues describe in detail the climate records around the North Atlantic. They make clear that the thermal optimum is best represented at about 65°N and correlates well with the solar insolation maximum at that latitude. They also show that the solar insolation maximum is best reflected in the temperatures of the surface waters of the high-latitude ocean.

Juerg Beer and Bas van Geel, in Holocene Climate Change and the Evidence for Solar and Other Forcings, show the Milankovitch solar forcing from 12,000 years ago to 3000 years in the future, solar irradiance interpreted from ^{10}BE and ^{14}C over the past 9000 years, and the effects of volcanic forcing. They note the recent information that the changes in solar irradiance with sunspot and other cycles are strongly wavelength dependent and may be more likely to affect the ozone layer than Earth's surface. Changes in the stratospheric ozone concentrations, however, can affect tropospheric circulation. There is a very informative diagram comparing tree ring and ^{14}C ages with evidence from peat bogs for the Sub-Boreal to Sub-Atlantic transition. Possible

solar influence is a topic of active ongoing research and more has been written on the subject since the London conference, but this is an excellent introduction to the subject.

Hugues Gosse, Michael Mann, and Hans Rennsen present a brief overview of recent paleoclimate reconstructions in Climate of the Past Millennium: Combing Proxy Data and Model Simulations. This describes the methodologies of both techniques and shows how proxy reconstructions can be used to evaluate the roles of different climate forcing mechanisms. It is a useful supplement to the more extensive discussions of geologically recent past climate published by these authors elsewhere. Particularly valuable is a map showing the distribution of proxy data by type and age.

In Chapter 8, Latitudinal Linkages in Late Holocene Moisture-Balance Variation, Dirk Verschuren and Dan Charman report the relevant results of the PEPIII (Pole-Equator-Pole) transects that extend from Europe through Africa. There are extensive accounts of a number of paleohydrologic indicators and their interpretation. This is a complex topic, and appropriate space is given to it.

Martin Claussen's chapter, Holocene Rapid Land-Cover Changes—Evidence and Theory, concentrates on changes in the Sahara-Sahel region of North Africa and the boreal forest of Siberia. The observational data are compared with model simulations of different complexity. There is a useful discussion of the apparently inherent climatic instability of some regions. North Africa and northwestern Brazil have been identified as particularly sensitive, but the question remains whether other regions may show similar characteristics.

The last chapter, by Ray Bradley, Holocene Perspectives on Future Climate Change, provides a more global overview of Holocene climate change. Bradley emphasizes the role of El Nino and the Southern Oscillation, and the Asian Monsoon in influencing precipitation throughout the Holocene. He makes the important point that regional changes must not be interpreted as global change. As an example he notes that the so-called Medieval Warm Period described in Europe could just as well have been the Medieval Cold Period if studies had first been carried out in the equatorial Pacific.

Overall the book is an excellent compendium of the state of our present, unfortunately inadequate, knowledge of Holocene history. The typography is well done, and almost all of the illustrations are in color. The concentration on Europe is appropriate, because that is where the ideas about Holocene climate change developed, and it is the cradle of our knowledge. This book is not just a useful review for the specialist; it should be essential reading for anyone who deals with students or the general public. One can only hope that, in future years, more information from other areas will become available and that we will acquire a truly global perspective on this critically important period of Earth history.

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