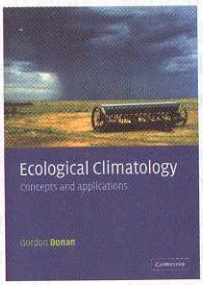
READINGS

BOOK REVIEWS

ECOLOGICAL CLIMATOLOGY: CONCEPTS AND APPLICATIONS

Gordon B. Bonan, 2002, 678 pp., $60.00, paperbound, Cambridge University Press, ISBN 0-521-80476-0

The idea that climate and weather influence vegetation is nothing new, and has been the topic of agronomists for centuries. The idea that vegetation can in turn influence climate and weather, however, is relatively new, and is the topic discussed in *Ecological Climatology*. The traditional view taken by both climatologists and ecologists is that the composition, structure, and functioning of terrestrial vegetated landscapes were determined largely by climate. Terrestrial ecosystems were viewed as responding to climate forcing, with little or no feedback to the climate system. This is often true; however, the concept that there is a significant and often underestimated response of the climate system's energy, water, and biogeochemical cycles to vegetation and land-use change at short and long timescales, across small and large spatial scales, is receiving increased attention. Some of this attention can be attributed to technological advances in the computational abilities of climate models, as well as satellite monitoring and detection of land-use change.



Ecological Climatology argues against the traditional view through well-researched chapters on several pertinent aspects of the role of vegetation and land-use change in the climate system. The first section of the text (chapters on global climatology, climate variability, and climate change) provide a brisk review of basic climatology. Those not familiar with processes governing climate variability, change, or extremes will quickly gain the basic knowledge required to understand how they influence terrestrial ecology through discussions on topics such as Earth–Sun geometry, the Coriolis effect, general circulation, and El Niño–Southern Oscillation. The next section covers the physical processes intermediate to climate–vegetation interactions—namely, hydrology, soils, and the surface energy balance and climate. In several places, examples from recent research projects are used to illustrate how changes in vegetation and/or land use can affect climate. For example, data from the recent Boreal Ecosystem–Atmosphere Study are used to illustrate the relationship between transpiration water loss and changes in soil moisture, and studies from the Hubbard Brook Experimental Forest are used to illustrate the importance of vegetation in regulating the water balance.

The author then really begins to examine the link between climate and vegetation in chapters that scale spatially from leaves to ecosystems. These chapters contain background information on key ecological concepts for those lacking or needing a review of relevant concepts such as life history patterns, competition, and succession. As is true throughout the text, there is a nice balance between field and modeling studies to support the ideas presented.

I liked best the final three chapters ("Climate–Ecosystem Dynamics," "Agroecosystems," and "Urban Ecosystems"). Here, Bonan assimilates our understanding of key climate and ecological concepts presented earlier in more of an "applied" sense. Gradients in temperature across the boreal forest and precipitation across western Africa are used to showcase the complex feedbacks and interactions between ecosystems and climate. The chapters on agro- and urban ecosystems highlight how human-controlled land-use change can alter climate. Examples include the effects of deforestation in Amazonia, Europe, the United States, and southeastern Australia, and the effects of urbanization in several North American cites.

Bonan's well-researched text successfully integrates fundamental concepts in climatology and ecology, and balances evidence from both model and field studies. The text is written in a straightforward narrative at a graduate student level. The use of "warm/cold" to describe temperature as opposed to "high/low" was distracting. There are numerous figures and tables, all relatively basic and clean. So why buy this

text over several other good texts on surface climatology (e.g., Gieger 1965; Oke 1987), or on the microclimates of plants and plant canopies (e.g., Jones 1992; Campbell and Norman 1998; Monteith and Unsworth 1990)? *Ecological Climatology* is a text where you can find up-to-date information integrating climate and vegetation topics in one place. I highly recommend the text for climatologists and meteorologists interested in better understanding the role of vegetation in the climate system, or ecologists and plant physiologists interested in better understanding the role of the climate system in vegetated ecosystems.

—Peter Blanken

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REFERENCES

Campbell, G. S., and J. M. Norman, 1998: *An Introduction to Environmental Biophysics.* 2d ed. Springer-Verlag, 286 pp.

Geiger, R., 1965: *The Climate near the Ground.* Harvard University Press, 611 pp.

Jones, H. G., 1992: *Plants and Microclimate: A Quantitative Approach to Environmental Plant Physiology.* 2d ed. Cambridge University Press, 428 pp.

Monteith, J. L., and M. H. Unsworth, 1990: *Principles of Environmental Physics.* 2d ed. Edward Arnold, 291 pp.

Oke, T. R., 1987: *Boundary Layer Climates.* 2d ed. Routledge, 435 pp.

KILLER 'CANE: THE DEADLY HURRICANE OF 1928

Robert Mykle, 2002, 235 pp., $26.95, hardbound, Cooper Square Press, ISBN 0-8154-1207-X

Lake Okeechobee, named after the Seminole Indian word for "big water," covers more than 700 square miles in South Florida. It is a shallow lake, averaging only 10 feet deep and no more than 20 feet at its deepest point. Before early twentieth-century newcomers to south Florida built canals and dikes to try to control the water, natural Lake Okeechobee rose and fell with the coming of each rainy and dry season, providing water through the pond apple forests and the "river of grass" Everglades regions to the south and east, ultimately draining into Florida Bay at the tip of the peninsula.

In September 1926 and again in September 1928, devastating category-4 (Saffir–Simpson hurricane scale) hurricanes swept across south Florida. The so-called Miami Hurricane of 1926 made landfall directly

NEW PUBLICATIONS

FLOODS, DROUGHTS, AND CLIMATE CHANGE

Michael Collier and Robert H. Webb, 2002, 153 pp., $17.95, paperbound, University of Arizona Press, ISBN 0-8165-2250-2

In this work, the authors offer insights into what we know about climate variability and its impact on people, in a straightforward text that assumes no previous understanding of climate processes. They emphasize natural, long-term mechanisms of climate change, and also show the human side of some of the most destructive weather disasters in history.

NOCTILUCENT CLOUDS

Wilfried Schröder, 2003, 183 pp., $20.00, paperbound, self-published, ISSN 1615-2824

This book, with selections in both English and German, reviews the life and work of Otto Jesse, a pioneer in the study of noctilucent clouds. It discusses the eruption of the Krakatoa volcano in 1883 that polluted the atmosphere, and the closer examination of the skies that followed, focusing on the research by Jesse and others at the Astronomical Observatory in Berlin. The book includes a reproduction of some of Jesse's scientific writings.

THE CEASELESS WIND: AN INTRODUCTION TO THE THEORY OF ATMOSPHERIC MOTION (NEW EDITION)

John A. Dutton, 2002, 617 pp., $60.00, hardbound, Dover Publications, ISBN 0-486-49503-5

Originally published in 1976, this popular text presents the significant concepts of the theory of atmospheric motion for undergraduate and graduate students. This edition includes new material on metamodeling, topological dynamics of spectral models, and approximate equations of motion for various scales of flow. There are hundreds of problems throughout the book for students to solve.