Mountain Timberlines—Ecology, Patchiness, And Dynamics

Source: Arctic, Antarctic, and Alpine Research, 36(4) : 635

Published By: Institute of Arctic and Alpine Research (INSTAAR), University of Colorado

URL: https://doi.org/10.1657/1523-0430(2004)036[0635:BR]2.0.CO;2

Arctic, Antarctic, and Alpine Research, Vol. 36, No. 4, 2004, pp. 635–636

Book Reviews

MOUNTAIN TIMBERLINES—ECOLOGY, PATCHINESS, AND DYNAMICS. By Friedrich-Karl Holtmeier, Dordrecht, The Netherlands: Kluwer Academic Publishers, 2003. 369 pp. $133.00. ISBN 1-4020-1356-6.

This book is part of the series "Advances in Global Change Research" that covers the broad area of research on global climate change and its impact on the environment. The first version of the book was published in German (Holtmeier, 2000). This book gives a detailed overview of mountain timberline structure and its spatial and temporal dynamics in the context of global climate change. Timberline is examined as an ecological boundary, rather than as an organism or a line that may respond linearly to changes in temperature or other environmental factors (chapter 1). The author outlines a background of the historical and the current state of timberline research (chapter 2), and clarifies the ambiguous timberline terminology and definitions (chapter 3). The factors influencing the heterogeneity, complexity, physiognomy, and ecology of timberline are extensively and critically discussed (chapter 4). Finally, a comprehensive synthesis and summary of past and present changes in timberlines throughout the world are presented, in addition to a summary of the relevant aspects of timberline fluctuations (chapter 5).

Friedrich-Karl Holtmeier has been involved in mountain timberline research for over 40 years; he has conducted extensive field studies in alpine regions throughout the northern hemisphere, including the Alps, northern Scandinavia, northern Finland, and mountain ranges in the western United States and Canada. The author has compiled a comprehensive compendium from personal, college, and collaborators' research projects throughout the northern and southern hemisphere. Thus, the book presents an extensive summary and synthesis of timberline research and studies from around the world and an ample reference list of almost 1300 titles.

The core chapter of the book (chapter 4) refers to the physiognomic and ecological differentiation of upper timberline; within this chapter the author discusses topics such as tree species and the relationship of timberline elevation to macroclimate, climate character, and the mass-elevation effect. In addition, this chapter includes an extensive discussion of the ecological conditions and processes at timberline, considering 12 interrelated topics, some of which are heat deficiency, carbon balance, wind, snow cover, topography, regeneration, and the influence of trees and tree stands on site conditions. Within the various topics of this chapter, timberlines are compared globally across regions, and the important characteristics of each type of timberline (e.g., climatic, orographic) in the different continents are emphasized. This core chapter provides the basic knowledge for understanding the responses of timberlines to climatically driven changes, which are considered in the last chapter.

This book presents a multitude of scientific data and information while remaining orientated to the scientific community, in comparison to the book on timberlines by S. F. Arno and R. P. Hammerly (1984), which is comprehensive and descriptive, yet orientated to a more general audience. A glossary could have been of aid to novus students and scientists unfamiliar with this area of research in order to enhance and expedite their understanding of timberline terminology. A positive element of this book is the wealth of information compiled from literature in both German and English. In addition, the diagrams, pictures, and sketches are clear, informative, and precise and aid the reader in a concise understanding of the significant information contained within this book. I think this book will be a valuable addition to all students, scientists, and organizations involved in mountain timberline and global change research.

References Cited

Arno, S. F., Hammerly, R. P., 1984: *Timberline: Mountain and Arctic Forest Frontiers.* Seattle, The Mountaineers.

Holtmeier, F.-K., 2000: *Die Höhengrenze der Gebirgswälder.* Germany, Verlag Natur & Wissenschaft.

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1523-0430/04 $7.00