



Challenges for Mountain Regions—Tackling Complexity

Author: Luckman, Brian

Source: Mountain Research and Development, 31(3) : 272-273

Published By: International Mountain Society

URL: <https://doi.org/10.1659/mrd.mm089>

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Challenges for Mountain Regions—Tackling Complexity

Edited by Axel Borsdorf,
Georg Grabherr, Kati Heinrich,
Brigitte Scott and Johann Stötter.
Vienna, Austria: Böhlau, 2010.
223 pp. € 49.00.
ISBN 978-3-205-78652-8.

This is a glossy, attractive and well-illustrated book that highlights recent developments in collaborative interdisciplinary mountain research in Austria through a selection of short papers covering a wide range of topics. It is clearly designed to showcase 3 recently established mountain research programs in Austria and to inform both the scientific and general publics about their activities. The Austrian Academy of Sciences (ÖAW) has been involved in mountain research programs over a long period and, in 2006, established the Research Unit of Mountain Research: Man and Environment (IGF) in Innsbruck, which was upgraded to an Institute in 2009. One key initiative of IGF, in conjunction with the University of Vienna, is coordinating the research network GLORIA (Global Observation Research Initiative in Alpine Environments) led by Georg Grabherr. In 2009, the University of Innsbruck established a research focus on Alpine Space—Man and Environment. Shortly afterwards, the alpS: Centre for Climate Change Adaptation Technologies was also created in Innsbruck, funded by a national program that integrates scientific and business interests. This book presents 26 short papers by members of these 3 new organizations that outline their goals, demonstrate the scope and range of their activities, and present some of the research tools they have developed.

The book is divided into 6 thematic sections, each containing several short papers, generally 4–8 pages

long. The introductory section, “Mountain Research in Austria,” begins with examples from, and a summary of, ÖAW’s long involvement in major international science programs (the UN Educational, Scientific and Cultural Organization’s Man and the Biosphere Programme, the International Geosphere–Biosphere Programme, the International Human Dimensions Programme on Global Environmental Change, etc) followed by papers on the activities of the Alpine Space—Man and Environment research focus and the alpS Centre. These brief essays describe the history and organizational goals of each group and, in some cases, a summary of their projects and publications.

The main body of the book is the 4 sections devoted to essays grouped around broad themes that outline selected research activities undertaken by these groups. Section 2, “Global Change,” presents 6 studies that deal with physical and biological systems and approaches to their study. These studies address topics including: the problems of downscaling global climate models for studies in mountain regions and uncertainties in projected future climate scenarios; an application of laser imagery to a rock glacier and permafrost inventory in the Tyrol Mountains of Austria; and an overview of the concept, organization, and methods of the GLORIA project and a description and analysis of results from the pioneer GLORIA site at Mount Schrankogel in the Tyrol. The 2 final papers discuss soils as archives of environmental history and the processes and possible causes of shallow erosional landslides in the soils of alpine meadows.

Section 3, “Living in the Mountains—Living with Risks,” contains an overview by Johann Stötter and Matthias Monreal of risks related to natural hazards and to global climate change, particularly changes associated with glacier loss and hydrological changes. This section also includes a brief discussion of the

extreme summer of 2003, as an analog for future changes, and a discussion of conceptual frameworks and attitudes toward risk and risk research. This paper is followed by an analysis of economic resilience, vulnerability, and the costs of emergency management based on a case study of the 2005 floods in Tyrol and Voralberg. The paper notes that cleanup costs and protection are undervalued and underresourced, making an important distinction between the obvious direct costs of these extreme events and the indirect costs (eg on production, transportation links, disruption of services, and loss of business earnings) in assessing the economic impacts of these events. The final, totally different, essay briefly reviews the vulnerability of large urban centers in the Andes to extreme natural phenomena (earthquakes, floods, droughts, etc) and the “urban contamination” (through pollution, waste, urban sprawl, etc) of the environment. It discusses some differences between these cities in history and social conditions and points out the need for resource allocation to address and manage potential hazards and to reduce inequality and degradation.

Section 4, “Challenges for the Future,” is an eclectic collection of 4 studies on social and cultural topics. Manfred Perlik looks at the growth of a peri-urban area in the Alps—that is, the increasing penetration of lowland urban dwellers into adjacent rural or mountain environments through second homes, dormitory settlements, etc. These present a significant threat to previous rural lifestyles (and communities) and a “double use” of space by urbanites who occupy the most attractive areas as commuters or for holiday homes, decreasing previous economic activities in these landscapes. Oliver Bender discusses the possibilities and problems of preserving a viable, working cultural landscape by using local agricultural production to develop niche food markets that can attract tourists or day visitors from

nearby urban centers. His 2 case studies suggest some success with a wine- and fruit-based economy (Austria's Wachau Valley) but problems with a pastoral sheep-based economy in Franconian Switzerland (Bavaria). Mathilde Schmitt discusses the critical role of women as the "glue" in maintaining alpine agriculture, noting their critical multifunctional role as farm managers who diversify activities and income (eg by arranging farm tours, conducting direct marketing, or teaching farm classes). She also notes the problems of retaining educated younger women in these rural settings. The final paper is on transit (road) traffic in the European Alps and the Andes, contrasting different perceptions and responses to roads (eg traffic volumes and pollution in the Alps, compared with roads as development corridors in the Andes). However, the Gotthard and Paso de Jama are hardly the most comparable examples as the settings and historical context of these routes are very different.

Section 5, "Paths to Sustainability," contains papers on sustainability in different environments. Carla Marchant discusses the general problems of defining sustainability in Andean communities faced with (1) increased globalization (particularly mining conflicts in Chile and Argentina), (2) the accelerated effects of climate change (notably on water supply in the high Andes), and (3) the increased risk of natural disasters. Axel Borsdorf discusses the problems of balancing the economic benefits with the costs of developing hydropower in the Aysén area of southern Chile, compared with existing small-scale agricultural activities and ecological protection. Although the ecological concerns (and opposition) are discussed, the author clearly favors large-scale economic development. At the local scale, Falk Borsdorf discusses ways to "activate social capital" in facilitating and encouraging public participation in biosphere reserve management based on the

case of the Wienerwald in Austria. Finally, Lars Keller presents a methodology to measure and evaluate the "quality of life" (QOL) across the Alps based on 3 major dimensions—environmental, economic, and sociocultural—as defined by some 50 indicators. Keller suggests that QOL can be an important dimension in assessing sustainability.

The final section, "Products," presents information on the organization and characteristics of several initial outcomes of these research initiatives. These outcomes include the launch and early issues of the new scientific journal *eco.mont—Journal on Protected Mountain Areas Research and Management*; the development and structure of an interactive alpine information system (GALPIS); and the problems of harmonizing and accumulating data from 7 countries in developing the *Atlas of the Alps*, published in 5 languages in 2008. How, for example, does one develop indicators of sustainable development for such diverse regions? The final 2 papers examine collaboration, communications, and the delivery of research results. Astrid Björnsen Gurung reviews the activities of the Mountain Research Initiative in bringing together and facilitating communication between researchers and research networks in Europe and the initiative's role in facilitating "alpine knowledge gardening"—that is, making available knowledge easily accessible to researchers. And, taking communications full circle, Fides Braun briefly reviews the activity of the new, EU-funded, mountain.TRIP program, coordinated by IGF, which will provide research-based information for stakeholders, end-users, and practitioners, essentially providing researchers with a communication arm through which to deliver their research to the public and close the gap between theory and practice.

The volume concludes with an "Afterward" that reviews the growth of mountain research by its foremost protagonist, Bruno Messerli, who

acknowledges the early lead played by Hans Kinzl in Innsbruck and his influence in the development of Messerli's own approach to integrated, interdisciplinary mountain research. Messerli details the development of the mountain research agenda, from Humboldt and Carl Troll to some of the major points embedded in the UN Resolution on Sustainable Mountain Development (64/205, March 2010), and looks forward to further significant steps forward at Rio+20 in 2012. As ever, he ends with a call to the scientific mountain community to work together with politicians to continue to meet the political, economic, and scientific challenges faced by mountain communities and environments.

This book covers a wide range of physical, social, economic, and political topics relating to ongoing global change and the sustainability of mountain environments. Obviously, the overview cannot be comprehensive, but it presents a varied and interesting assortment of research by a mix of young scientists and more senior scholars that shows the diverse problems faced by mountain regions and the researchers who work in them. The studies range in scale from local to global and will be of interest to most mountain researchers, presenting something for everyone while raising mutual awareness of problems across more specialized disciplines. The editors are to be congratulated on bringing this interesting mix together and demonstrating the capacity and promise that these new networks will bring for future studies and collaboration within the mountain community.

AUTHOR

Brian Luckman

luckman@uwo.ca

Department of Geography, University of Western Ontario, London, Ontario N6A 5C2, Canada

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