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Mountain Geomorphology

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Books

Landscapes of Diversity: Indigenous Knowledge, Sustainable Livelihoods and Resource Governance in Montane Mainland Southeast Asia

Edited by Xu Jianchu and Stephen Mikesell. Kunming, China: Yunnan Science and Technology Press, 2003. 608 pp. Yuan 180. ISBN 7-5416-1859-4/Q 85.

Mountain environments are unique in many ways, including varied slope gradients, cool climates, and high precipitation, often in the form of snow. The combination of these heterogeneous physical conditions has led to many mountain areas becoming refuges for biodiversity; it has also profoundly influenced the way in which humans have adapted to mountain environments and use them. In fact, it is the interactions between humans and physical processes that shape mountain environments.

Worldwide, human-induced processes such as deforestation, land degradation, and the conversion of traditional agricultural practices to permanent agriculture pose threats to the sustainability of resources. These threats become even more important and immediate in regions that support high biological and cultural diversity, such as Montane Mainland South East Asia (MMSEA). The global recognition of the value of this area has triggered long-term efforts by both scientific and local communities to reduce harmful processes. One fruit of these efforts has been a series of conferences on sustainability and indigenous knowledge in MMSEA. This book contains the proceedings of the third of these conferences, which took place in Lijiang, China, in 2002.

The MMSEA region is, by definition, situated between 300 and 3000 m asl, and overlaps with much of the area of the Southeast Asian mainland nation states and of Yunnan province in southwest China, encompassing a vast geographical area characterized by various political boundaries and socioeconomic settings, including the uplands of Myanmar, Thailand, Laos, Vietnam, a part of Cambodia, and Yunnan. These areas share common cultural and biophysical features, even though this is partly ignored or denied by political boundaries (p 3). The title of the book could thus not be more appropriate. Nevertheless, a little more geographical specificity would have benefited readers who are not familiar with the region. Moreover, from a reader's perspective, an overview of the history of the MMSEA initiative and its scope would have been useful in the introduction.

Following an introductory section with country profiles, the book covers 6 main thematic areas: 1) nature reserves, forests and nontimber forest products; 2) local governance in natural resource management and biodiversity conservation; 3) agro-biodiversity in MMSEA landscapes; 4) participatory watershed management; 5) rural knowledge and indigenous knowledge; 6) multifunctionality of mountain ecosystems.

The task of the book is overambitious, as it spans a diversity of disciplines and issues. However, this interdisciplinary, holistic view of mountain environments in Southeast Asia is also where its strength and interest lie. The multitude of experiences and narratives described raise important issues related to the appreciation of indigenous knowledge, the principle of inclusion in nature reserve management, and holistic approaches to landscape management. It may be important to note that the book refers to sources that are difficult to access and often not available in English, such as government policy and gray literature.

Some issues are only superficially addressed or not mentioned at all. Biodiversity is one of these. A recent publication by Conservation International on world biodiversity hotspots (Mittermeier et al 2005) includes the mountains of southwest China with a total number of 12,000 plants (3500 endemic) and Indo-Burma with a total number of 13,500 plants (7000 endemic), highlighting the global importance of these areas. Therefore, at least in the introduction, some more information should have been given on the region's biodiversity, in addition to the sketchy indications provided in Part I of the book.

The adoption and control of genetically modified organisms (GMOs) is one of today's important controversies in science and development policy. It is intrinsically linked with biodiversity and sustainability issues, including human health—especially in developing countries, where local farmers are often forced to make less informed choices. China, a key player in the MMSEA area, has been investing in GMO research for 20 years and is one of the world's largest importers of GMOs. It is a widely acknowledged fact that other developing countries bordering the MMSEA, even if they are willing to safeguard their natural heritage, lack the resources (trained personnel and money) necessary to exert detailed control over potentially imported or accidentally introduced GMOs (monitoring, labeling, segregation procedures). It is somewhat disappointing that the book fails to address this important issue and its implications for indigenous practices and sustainability.

Although mountain environments are subject to a wide variety of natural and human-induced changes, those related to climate change are a major topic of research at present. It is also widely accepted that ecosystems with steep temperature gradients, such as alpine mountain zones and eco-

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tones between sub-alpine and alpine zones, will be particularly affected by climate change. Since MMSEA is such an area, the book should have addressed implications for agriculture and biodiversity that may result from future climate change. This issue is all the more essential as most of the main crops cultivated in the area are climate-sensitive. Moreover, a rise in the sea level would cause coastal inundation, driving more people towards the montane areas. This, in turn, would intensify pressure on natural resources in these areas.

The correction of some inconsistencies and careless mistakes would have greatly improved this presentation. For example, the short CVs of the contributors are one line in length for some, while the CV for one of the editors is missing altogether. The index of authors is not correctly ordered in alphabetical order. The maps are not of very good quality, particularly those at the beginning. References in the text suggest that the maps were originally meant to be in color and were later replaced by black-and-white products, probably reflecting limitations related to publication costs. Moreover, some maps and figures have not been translated into English.

Nevertheless, this inexpensive book will be a good source of information for academics and students alike on mountain issues in general and the mountain environments of Southeast Asia in particular. There is a wealth of information that can also be useful to colleagues with research- and teaching-related interests in natural resource management in general. However, this is not a strictly academic book. With a diversity of contributors from academia, NGOs, charity, international organizations, and indigenous peoples, it is a book for both academics and a wider audience. The individual contributions to this book are also available as free PDF downloads from the web at http://www.cbik.org/cbik-en/cbik/resource/MMSEA_index.asp.

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Lesotho Atlas of Sustainable Development

By D.M. Bohra. Santa Clara, CA and Barmer, India: Trafford Publishing, 2003. 480 pp. US$120.00, €97.50, £67.57. ISBN 1-4120-3656-9.

In compiling the *Lesotho Atlas of Sustainable Development*, D.M. Bohra "attempt[ed] to map the state of sustainable human development" in Lesotho. To this end, "a range of indicators have been cartographically portrayed across districts, geographical zones, rural and urban areas and across gender base," resulting in a "profile of salient features of sustainable development in Lesotho [...] presented at national, district and regional levels in the sequel." The indicators were chosen to enable evaluation of "the sustainable development process in terms of its overall impact on the quality of life and standard of living of people," so that poverty alleviation could be addressed. A broad range of topics has been covered, including: population control measures; distribution and density of population; livestock and range management; food insecurity; energy; gender issues; radio listenership, television viewership, and newspaper magazine readership; migration; economic outlook; and various aspects of health and education. Each of the resulting 213 maps has an accompanying text, all of which are collected together, forming the second half of the book. The introduction provides a verbal summary of the statistics presented in map form.

Although diverse data are meant to be linked to Lesotho's geography, these are not GIS maps. Instead, bar graphs, pie charts and lists of text have been printed on top of an outline map of the country. In some instances, the actual map of Lesotho has been divided, with shading to distinguish properties of one region from another. The bar-graph-on-map approach to data presentation provides interpretive problems. For example, Map 127 "Evolution of pupil : teacher ratio : 1990; 1997" provides readers with the map of Lesotho divided into districts. A pair of bars with the two years' data protrudes from each district. While change within districts is obvious, comparison among districts is made difficult because the heights of the paired bars from district to district are unclear. The more traditional format of paired bars on the same baseline would have made all the bars' significance apparent.

Even if one understood the data being presented and wanted to use them, citation would be difficult because the source of the statistics is not indicated on any of the maps. The accompanying text for some maps alludes to reports or documents; one can only assume that this is where the data came from. Since the documents themselves are not fully cited, one is uncertain about how to find them in the references at the back—or whether the list of references is complete.

Due to the very unique mode of data presentation and the lack of source citation, the *Lesotho Atlas of Sustainable Development* cannot be recommended as the reference book it was clearly intended to be. Although the text celebrates this collection of data as a first for Lesotho because it combines statis-

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tics from several sources, it is difficult to see how this work could achieve another of the stated objectives: contributing to the construction of a baseline for use in assessing the effectiveness of the Government of Lesotho's anti-poverty agenda. For this purpose, a tabular format would have been more useful, statistics over a longer period of time would be needed, and the sources of data should not only be cited, but also analyzed critically for their accuracy.

The author clearly invested a great deal of effort in this project; it is unfortunate that the *Lesotho Atlas of Sustainable Development* cannot be recommended for any purpose.

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Mountain Geomorphology

Edited by Phil Owens and Olav Slaymaker. London, United Kingdom: Edward Arnold, 2004. v + 313 pp. £19.99. ISBN 0-340-76417-1.

In the introduction, the editors of this book point out that the worldwide total area covered by mountains is about 3.58 million km^2, representing around 24% of the global land area. Approximately 12% of the human population is believed to live in these environments. In the light of these figures it seems remarkable that the general topic of mountain geomorphology has been so thoroughly neglected in the past. The publication under review is unusually reasonably priced and approachable and well fills this key niche.

The book consists of 12 chapters, organized into 5 thematic sections. The first contains a single chapter by the editors that provides a general overview on mountain geomorphology. It seeks to summarize why mountain science is so important and attempts to review the range of approaches that can be used to classify mountain geomorphology. This chapter will prove to be of immense use to undergraduate and postgraduate students working in mountain areas, as it provides an insight into the important contexts within which upland research is situated.

The second section is entitled "Historical Mountain Geomorphology," a title that seems a little strange, given that the 3 chapters essentially examine the large-scale tectonic-geomorphic evolution of mountain chains. The approach is logical: the first chapter deals with global mountain systems (inevitably with an emphasis on tectonically active environments), the second reviews passive margins, and the third represents a more detailed analysis of one particular dynamic mountain chain (that of New Zealand). All 3 chapters provide a good synthesis, guided primarily by an approach that melds locationally-driven examples with a conceptual approach. It is perhaps disappointing to see that the chapter on global mountain systems makes relatively scant use of some of the exciting recent work on mountain evolution (for example in the Himalayas), tending to rely a little too much on texts dating back some 10 years. However, the chapter remains informative and interesting, and provides an excellent framework. Chapter 3 on passive continental margins has been written by Cliff Ollier, who is well-known for his controversial theories on the evolution of mountain chains. He provides an interesting review of theories and models of passive margin mountain belts, seeking not to promote a single, controversial hypothesis but instead to outline how much uncertainty remains. The comment in the conclusion that "at present our imagination and models seem to be running ahead of accepted basic information" is well-made and appropriate, and may indeed well apply far beyond passive margin mountain areas. The final chapter in this section focuses on the mountains of New Zealand, providing a nice counterpoint to the previous 2 chapters by examining in detail the synthesis between models and field data. This chapter emphasizes the role of erosion and deposition in driving uplift processes, which is welcome and timely.

The third section, entitled "Functional Mountain Geomorphology," includes 4 papers. The first 2 examine processes on a conceptual basis. Chapter 5 examines the nature of mountain belt erosion, including very recent ideas (many of which have been proposed in papers by the chapter's authors) that link sediment production to mountain evolution. In the conclusion of this insightful review, the authors give a useful outlook on where this science needs to focus in the future. Similarly, Chapter 6, which examines chemical denudation in mountain chains, also provides a fine overview of this important but neglected topic, and highlights the need to increase the number of studies quantifying chemical denudation. Usefully, the author specifies areas needing attention and the approaches that might be used to generate the necessary data. One hopes that this will inspire a range of work in this area. Unfortunately, the following 2 chapters fit the overall structure of the book less well. The first is a rather detailed study of hydrology and mass movements in the mountains of Japan. Compared with most other chapters in the book, the information seems rather too specific, with insufficient emphasis placed on the importance of our understanding these processes with regard to other locations. Chapter 8 examines glacial lake outburst floods (GLOFs). Whilst there is little doubt that this is an important and interesting topic, and that the

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chapter is well-written, a whole chapter on this topic does seem a little out of place when, for example, there is no chapter on mountain rivers.

The fourth section, consisting of 3 chapters, moves into the realm of "Applied Mountain Geomorphology." Again, the section title seems a little peculiar given that all 3 chapters actually focus upon geomorphic hazards in upland areas, with no coverage of other aspects of applied geomorphology. In Chapter 9, Ken Hewitt provides a welcome and well-structured review of the general topic of geomorphological hazards in mountain environments. This chapter should be required reading for students interested in upland areas. Extensive use is made of the author's experience in the Karakoram, yielding a section that highlights the general issues yet still manages to unpick some of the complexity of real world systems. Chapter 10 examines the mountain hazards of China. There is little doubt that China has some of the most geomorphologically dynamic mountains on Earth. A chapter illustrating the range of impacts associated with these phenomena and the approaches that are being used to mitigate them, is thus very useful. Chapter 11 rather ambitiously seeks to cover the range of hazards associated with volcanoes. The author provides a useful review, but given the large scope of the topic, coverage is inevitably quite light in detail at times. However, the chapter contains a great number of references, making it easy to get further detail if required.

Part 5 comprises a single chapter that deals with mountain geomorphology in the context of global environmental change. Again, the scope of material to be covered is huge. However, the authors put forward a cogent argument that studies of mountain geomorphology represent an important part of the analysis of global environmental change in terms of both the role that mountains play in determining the nature of change, and the sensitivity of mountains to the effects of natural and/or anthropogenic changes. Thus, the chapter provides both a useful overview of the previous sections and a key pointer to the future of the science.

Overall, the book is a good addition to the existing literature on mountains, and some of the less location-specific chapters will prove to be very useful to undergraduates and researchers. As with many edited books, it suffers a little from the broad range of approaches that the authors have used to compile the chapters. In addition, there are some notable gaps in coverage, especially on the fluvial and hydrological side. Thus, this book perhaps fails to completely fill the market gap in terms of a good, comprehensive mountain geomorphology textbook. However, in the preface the editors suggest that the aim of the book was to "encourage and inspire students and scientists:" there is little doubt that this aim has been achieved.

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In the Land of Orpheus: Rural Livelihoods and Nature Conservation in Postsocialist Bulgaria

By Barbara A. Cellarius. Madison, WI: University of Wisconsin Press, 2004. xi + 331 pp. US$45. ISBN 0-299-20150-3.

Between 1995 and 2002, anthropologist Barbara Cellarius spent two and a half years conducting ethnographic research into local environmental management in a small community in south central Bulgaria. More precisely, Cellarius was interested in learning how policies for nature conservation in Bulgaria, often emerging as a result of pressure from international nongovernmental organizations such as the IUCN, WWF, and others, were articulating (or not) with land management practices on the ground. As she put it in the subtitle of her PhD dissertation (University of Kentucky, 2000), she was keen to highlight the problematic and complex interrelations between "Global Priorities [for nature conservation] and Local Realities [for economic survival]." The capstone result of this research, conducted with financial support from an impressive list of prestigious funders, is the book under review, which, in her own words, seeks "to clarify the differing concerns and definitions of biodiversity held by 'local' people and [global] conservation advocates" (p 9).

Following a chapter that charts the recent history and geography of the Bulgarian environmental nongovernmental organization (ENGO) sector, Cellarius launches into detailed ethnographic studies of actual natural resource use in the central Rhodope Mountain community of Zaburdo. Her data are impressively detailed and extensive, covering spatial scales from the individual to the community to the national and international. She presents data about everyday practices such as firewood collection, farming of family agricultural plots, hunting, and the collection of berries and mushrooms—the latter providing a source of cash income as well as domestic comestibles. Though her data are rigorously social scientific, their presentation via family "case studies" makes her tales especially compelling. Overall, the reader is presented with a picture of families banding together to ride out the vicissitudes of postcommunist transition, during which the economy has contracted by more than 50% and wages are often insufficient even to pay the electricity bill.

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Chapter 5 is, in many ways, the linchpin of the book's theoretical ambitions, outlining the emergence of local and regional "intermediary" ENGOs whose function is to translate global nature conservation priorities into local realities. Obviously this involves striking a delicate balance between the needs of local communities who must rely particularly heavily on local resource hinterlands in this time of transition, and national and international demands for "nature conservation." Two case studies presented by Cellarius seem especially interesting here, involving two ENGOs: the Bulgarian Society for the Protection of the Rhodope Mountains and Green Balkans. In the former case, extensive relations were established early on with the WWF, but fell into abeyance by the late 1990s because of inadequate communications between the two ENGOs and the difficulties that the Bulgarian ENGO had in translating WWF's scientific research priorities into workable local programs, with many Bulgarians questioning the relevance of WWF activities for the Bulgarian context (p 229). In the latter case, Green Balkans, an ENGO with deep roots in the villages of the Rhodope, has been able to mobilize considerable local support through the promotion of ecotourism initiatives with support from other Bulgarian groups (Bulgarian Geographical Association) and European organizations (PHARE, EBRD, and others). These two case studies show both unsuccessful and successful intermediation processes.

Chapter 6 shifts gears quite significantly, presenting an interesting case study of the emergence of an ENGO in another part of the Rhodope out of grassroots concerns for cave conservation. According to Cellarius, this ENGO has survived from the communist era to the present because of its strongly localist and apparently apolitical concern with cave conservation. In the 1990s, it linked this primary concern with ecotourism promotion in the locality and thus articulated a work program that is independent of the sort of "project mentality" that characterizes so many other Bulgarian ENGOs (pp 258 ff).

The book ends with some reflective comments about nature conservation, ENGOs, and postcommunist transition in rural Bulgaria. Eschewing the temptations of grand theorizing, Cellarius restricts herself to the more practical issues related to the conditions under which ENGOs can succeed or fail, drawing on the many case studies presented earlier in the book. She suggests that "[i]n the Bulgarian context, NGOs can be more flexible, stable and issue-focused, particularly when compared to a poorly funded government distracted by the latest political crisis" (p 277).

This is a highly original book that will be of interest to scholars of nature conservation and mountain studies. It is part of a growing corpus of ethnographic studies of postcommunist societies, but also manages to engage issues of nature conservation and local development which heretofore have largely been explored through case studies in less developed nations.

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Climate and Hydrology in Mountain Areas

Edited by Carmen de Jong, David Collins, and Roberto Ranzi. Chichester, United Kingdom: John Wiley and Sons Ltd, 2005. xii + 315 pp. €149. ISBN 0-470-85814-1.

The characteristics of climate and hydrology in mountain areas remain poorly understood relative to lowland areas. High spatial and temporal variability in precipitation, runoff and subsurface flow processes, and stream flow, as well as sparse instrumentation networks and limited historical records of climate and hydrology, contribute to limited understanding of the distribution and movement of water in mountain environments. As the editors of this volume note, mountain regions play an extremely important role as "water towers" to the world, perturbing climatic circulation patterns and storing water for gradual release to adjacent lowlands. The papers collected in this book make an important contribution to advancing our understanding of climate and hydrology in mountain areas because they present pioneering work that, in many cases, represents the first application of existing measurement techniques to mountain regions. These applications demonstrate the utility and limitations of existing techniques in mountain areas, at the same time providing detailed information about the specific regions to which they are applied.

The volume is divided into 5 sections. Section 1, on snow and ice melt, includes "Use of positive degree-day methods for calculating snow and ice melting and discharge in glacierized basins in the Langtang Valley, central Nepal" by Rijan Kayastha and others; "Surface energy balance of high altitude glaciers in the central Andes: The effect of snow penitentes" by Javier Corripio and Ross Purves; "Using subgrid parameterization and a forest canopy climate model for improving forecasts of snowmelt runoff" by Ulrich Strasser and Pierre Etchevers; and "Assessment of snow-covered areas using air temperatures during melt in a mountainous basin" by Pratap Singh and Lars Bengtsson. Section 2, on soil water and permafrost, includes "Permafrost monitoring in high mountain areas using a coupled geophysical and meteorological approach" by Christian Hauck and others;

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"Effects of frozen soil on the groundwater recharge in alpine areas" by Daniel Bayard and Manfred Stähli; "Water balance in surface soil: Analytical solutions of flow equations and measurements in the Alpine Toce Valley" by Marilena Menziani and others; and "Saturated hydraulic conductivity and water retention relationships for alpine mountain soils" by Stefano Barontini and others. Section 3, on evapotranspiration and water balance, includes "Water balance modeling with fuzzy parameterizations: Application to an alpine catchment" by Gerald Eder and others; "Water relations of an old-growth Douglas fir stand" by Timothy Link and others; "Comparison of evapotranspiration and condensation measurements between the Giant Mountains and the Alps" by Carmen de Jong and others; and "Climatologic and hydrologic coupling in the ecology of Norwegian high mountain catchments" by Jörg Löffler and Ole Rössler. Section 4, on coupling meteorology and hydrology, includes "Runoff and floods in the Alps: An overview" by Baldassare Bacchi and Vigilio Villi; "The use of coupled meteorological and hydrological models for flash flood simulation" by Charles Lin and others; "Operational weather radar assessment of convective precipitation as an input to flood modeling in mountainous basins" by Stefan Uhlenbrook and Doerthe Tetzlaff; and "Geomorphological zoning: An improvement to coupling alpine hydrology and meteorology?" by Carmen de Jong and others. Section 5, on climate change impact and mountain hydrology, includes "The influence of glacier retreat on water yield from high mountain areas: Comparison of Alps and central Asia" by Wilfried Hagg and Ludwig Braun; "Snowmelt under different temperature increase scenarios in the Swiss Alps" by Franziska Keller and Stéphane Goyette; and "Climate variability, water resources, and hydrologic extremes—modeling the water and energy budgets" by Osman Yildiz and Ana Barros.

Except for very short review papers on alpine climate change and cryospheric responses by Roger Barry and the paper on runoff and floods in the Alps by Bacchi and Villi, the papers present detailed case studies. Although each contribution includes an introductory section that provides a brief overview of the topic it discusses, it would have been nice to include more state-of-the-science review papers in this collection. The different aspects of climate and hydrology are well covered. The papers deal primarily with physical processes, with relatively little attention given to chemical or ecological interactions. Discussions of climate change generally do not include changes in land use in mountain environments. Taken together, the collection of papers provides a useful guide to (i) areas of active research and the state of knowledge of climate and hydrology in mountains, and (ii) geographic (eg very low and high latitudes, very high altitudes) and topical (eg effects of land use, ecohydrology) gaps in existing knowledge.

The volume is well produced. Although the papers do not include abstracts, each has an introductory and concluding discussion. The text is easy to read and grammatically correct, even though many of the authors do not have English as their first language. The book contains a series of color plates, along with numerous black and white figures. Even the latter are easy to interpret, although a few do include indistinguishable shadings of gray. The volume is enhanced by a comprehensive index and a list of symbols and abbreviations. Although the content of this volume does have some overlap with various IAHS publications, the papers in this book tend to be longer and more consistently written and edited. This volume should provide a useful guide to those interested in learning more about climate and hydrology in mountains, and a reference for those already working in the field.

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