

**Snow and Ice-Related Hazards, Risks, and Disasters.
2nd Edition. Edited by Wilfried Haeberli and Colin
Whiteman**

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Source: Mountain Research and Development, 42(2)

Published By: International Mountain Society

URL: <https://doi.org/10.1659/mrd.mm272.1>

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Amsterdam, the Netherlands: Elsevier, 2021. Hazards and Disasters Series. Series Editor J. F. Shroder Jr. 784 pp.
Softcover: US\$ 180.00, ISBN 978-0-128-17129-5. E-book:
US\$ 180.00, ISBN 978-0-128-17130-1.

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This is a comprehensive and informative volume with an excellent overview of most snow and ice-related hazards. The usual suspects are here—glacier lake outburst floods, snow avalanches, and permafrost degradation—but many other subjects where there are risks related to the cryosphere are covered, including some quite esoteric topics. There is a chapter on the different risks to the biosphere due to changes in snow, ice (including lake, river, and sea ice), and permafrost. This is perhaps also the chapter with the best illustrations. The possibility of future ice ages and the effect on radioactive waste stored in deep geological repositories are examined in detail for several different scenarios and geographical situations. Hazards related to ice masses on volcanoes, such as lahar generation, are also covered, with many examples from North and South America. A topic that may be new to many of the more run-of-the-mill glaciologists is the challenges posed by ice pressure to ships in the Arctic and on the Great Lakes of North America.

There is also a comprehensive chapter on the properties of snow, ice, and permafrost. At first, this may seem somewhat redundant, as most people interested in hazards posed by these variations of frozen water will be well acquainted with the basic theory. But for those coming from

a risk-assessment background without a wide knowledge of glaciology, it is useful to have the material in the same volume. The basic information given here is short but clear. However, having a separate chapter on a socio-cryospheric-systems approach to cryosphere hazards is less easy to understand. Most of the chapters consider the effects of these changes on people and livelihoods, and the material in the separate chapter would probably get more attention and be more useful if it were reallocated to the appropriate chapters.

There are a few topics that are missing (or well hidden) in such a comprehensive tome—glacier- and moraine-dammed lakes are described, but not supraglacial or subglacial lakes. Glacier surges have their own chapter (including several interesting case studies) but normal glacier advances do not. Admittedly, this is not a common situation at present, but a few snow-rich winters for maritime glaciers could change things. The increasing hazard to mountaineers or those doing glacier walks because of changing conditions, such as less snow cover on glaciers and snow melting earlier (or simply the fact that routes formerly considered safe may no longer be safe) is not covered, but is one that many people could come across. The increasing incidence of severe snowstorms is a frequent topic of conversation in mountain communities, and a summary of the latest knowledge on this would have been useful.

The geographic distribution of the authors is somewhat surprising, with the vast majority being from North America and western Europe (including over one fifth of the total from Switzerland), a few from South America and Oceania, and none from Asia. This bias is reflected in the text in some chapters. A truly comprehensive treatment of this subject that concerns so many places around the world requires a diverse team of authors.

But although such a large volume gives the opportunity to find many faults and omissions, this is a treasure of a book. Not only is it an essential compendium to have on the office bookshelf, it is also very readable, with concise text and many excellent diagrams and photos, and will help to while away time during fieldwork when stuck in the tent or cabin due to bad weather or even an impending hazard.