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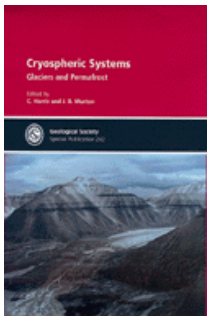

This book comprises a compilation of papers that were selected from a conference with the same title as the book, held at the Geological Society of London in 2003. Although glacial and periglacial processes are different in nature, they have in common that they occur under similar climatic conditions and thus often turn up near to each other. Their interaction in a joint periglacial/glacial environment may result in specific and significant geomorphological and hydrological responses. Understanding the complexity of this interaction, however, needs an interdisciplinary approach. Now that the evolution of cold environments may enjoy renewed attention, especially under changing climatic conditions, it was timely to bring together glaciological, geomorphological and geocryological knowledge.

The discussion of such a complex theme by a selection of case studies is a valuable approach to make a state-of-the-art of present-day insights, although the title of the book may mislead some readers who would expect an overall comprehensive treatment of the subject. As the processes that occur in both glacial and periglacial areas are quite different in nature, combining their effects in the zone of interaction is a considerable task and a huge challenge for future research. As a result, only part of the papers deal with processes at the permafrost–glacier interface, while the others concern solely either glacial or periglacial systems.

In an introductory paper, the editors review how different disciplines can provide a basis for improved understanding of key glacier–permafrost interaction at different temporal and spatial scales. They focus a.o. on glacitectonic processes, ground-ice development, rock glaciers and geomorphological and hydrological processes that occur in the proglacial realm. The individual papers are grouped in three sections: integrated glacier and permafrost environments, periglacial and ice-marginal processes, and permafrost and frozen ground.

In the first section, Etzelmüller & Hagen suggest that—in the mountain environments of southern Norway and Svalbard—permafrost may be a governing factor not only for glacier/permafrost interaction but also for glacial landform generation. Otherwise, the glacier ice affects the adjacent proglacial zone by, for instance, the formation of ice-cored moraines, periglacial folding and thrusting and sediment redistribution. Climate change has a crucial effect on sediment storage or mobilization by spatial shifting of this highly sensitive zone. In addition, Haeberli illustrates similar features in high-mountain areas where steep slopes may induce specific hazards (e.g. lake outbursts and ice/rock avalanches). Waller & Tuckwell discuss an ice-cored moraine complex in West Greenland by sedimentological characteristics. The sediment/ice units are glaciotectonized by, successively, periglacial compression and subglacial deformation. The contrast with proglacial deformations, which generally occur in Arctic push moraines, may reflect differences in thickness and spatial continuity of permafrost within the glacier foreland. The interaction of a surging glacier with a seasonally frozen foreland in Iceland is described by

Bennett et al. Sedimentological evidence is provided for subglacial sediment deformation under subfreezing conditions. This might be a common phenomenon around the margins of temperate glaciers during winter advances. In addition, different styles of tectonic deformation during the surge are explained by spatial variations of frozen ground in the glacial foreland. Moorman illustrates the interconnectivity of the glacial and permafrost hydrological systems, more particularly by subsurface water conduits. This result was obtained by a combination of ground-penetrating radar and dye tests. Dornbusch uses past and present-day moraines and rock glaciers to derive changes in precipitation gradients and patterns during the late Quaternary in the Western Cordillera of Peru.

The second section comprises three papers. Studying Arctic rivers, Irvine-Fynn et al. found, by principal-components and numerical analyses, that glaciofluvial sediment transfer is influenced by periglacial processes and conditions. Mercier & Laffly observed glacier retreat of more than 1 km since the Little Ice Age in western Svalbard. This has resulted in the formation of a new proglacial area with sandurs that provoked shoreline progradation at a rate of 3 m per year during the previous 30 years. Haresign & Warren investigated the relative contributions of ice calving and melting to mass loss at the outlet of the North Patagonian Icefield and the interplay between glacier and lake processes. It comes out that subaerial melt rates at the terminus are small compared with calving rates, except for the melting at the waterline of periglacial lakes.

Also the third section comprises three papers. Humlun reviews the knowledge on Holocene permafrost development in Svalbard and its relation with climate. Different kinds of ground ice are discussed. On the average, Svalbard is characterized by local-scale permafrost aggradation during the twentieth century, despite a warming climatic trend over that period. Several climatic factors and processes of deposition (e.g. by avalanches) control permafrost aggradation, illustrating the complex relationship between climate and permafrost dynamics. Harris & Murton report on one of their centrifuge experiments that are relevant for the preservation potential of thawed periglacial features, in this case ice-wedge casts. From the experimental results it follows that thaw consolidation, as well as the factors that influence it, play a key role in the amount and nature of deformation. A paper by Kirkbride et al. on late Holocene solifluction evolution in Iceland, using tephrochronology, concludes this series of papers. Two phases of solifluction activity occurred during periods of climate deterioration and vegetation reduction (around 2500 years BP and during the Little Ice Age), interrupted by a phase of stabilization during a milder period with re-vegetation (Medieval warming).

Concluding, a diversified series of papers is collected here that give an illustrative and well focused image of the present knowledge of the environmental and geomorphological conditions in ice-marginal regions. The book is well-edited and clearly presented.

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