



Periglacial and Paraglacial Processes and Environments, edited by J. Knight and S. Harrison, The Geological Society, London, Special Publication 320, ISBN 1-86239-281-1, £90.00 list price, £54.00 SEPM members, available from [www.geosoc.org.uk](http://www.geosoc.org.uk)

Don't judge this book by its cover (or title). *Periglacial and Paraglacial Processes and Environments* may appear to be written for a very small group of specialists, but the book is pleasantly surprising in its breadth. While the periglacial and paraglacial specialists may scrutinize every chapter in the volume, those interested in glaciology, geomorphology, hydrogeology, and polar regions will enjoy several individual articles.

The introductory chapter by editors Knight and Harrison ("Periglacial and paraglacial environments: A view from the past into the future") carefully lays out the rationale for the volume. They argue that para- and periglacial features—records of cold Earth processes—are valuable climate indicators. These features are sensitive to climate changes taking place from the past glacial-interglacial intervals and from current global warming. Our understanding of these transient landforms has evolved and improved in the past ~50 years, yet there is a need to understand them better so we can predict how these features formed by cold processes will change due to climate changes. The chapters that follow are intended to summarize our current understanding of cold-region landscape evolution and to evaluate processes driven by past and current climate change.

The volume is organized into three sections: periglacial processes and environments; paraglacial environments and processes in the British Isles; and paraglacial processes, climate change, and sediment supply.

#### Section 1: Periglacial processes and environments

While a bit scattered in its structure, this section focuses on geologic processes adjacent to (peri-) ice sheets. It starts out with a historical perspective of periglacial processes and our evolving understanding and interpretation of them (André, "From climatic to global change geomorphology: Contemporary shifts in periglacial geomorphology"), while subsequent chapters describe specific periglacial formations. Nicholson uses evidence from southern Norway to stress the greater importance of chemical (rather than mechanical) weathering ("Holocene microweathering rates and processes on ice-eroded bedrock, Røldal area, Hardangervidda, southern Norway"). In a short and interesting explanation, Seppälä and Kujala address palsa formation and the importance of buoyant and thermal processes ("The role of buoyancy in palsa formation"). Next,

Waller, Murton, and Knight bridge the gap between glaciology and permafrost research in a fascinating chapter, "Basal glacier ice and massive ground ice: Different scientists, same science?" The authors argue that glacier-permafrost interactions are critical in subglacial and periglacial processes and that collaboration needs to increase between these two fields. They pose several interesting questions and suggest areas for future research. The periglacial section ends with a chapter that perhaps should have come at the start of the section on the classification of pro-, peri-, and para-glacial systems (Slaymaker, "Proglacial, periglacial or paraglacial?").

#### Section 2: Paraglacial environments and processes in the British Isles

The next section starts with a chapter by Whalley that should be required reading for glacial geomorphologists, since he questions the interpretations of moraine formation ("On the interpretation of discrete debris accumulations associated with glaciers with special reference to the British Isles"). Whalley provides a thoughtful discussion of how paraglacial debris features (especially moraines) form, and the role that debris plays in glacial flow dynamics. The next chapter (Jarman, "Paraglacial rock slope failure as an agent of glacial trough widening") is about rock slope failure in the Scottish Highlands and Norway. He discusses landscape evolution and the erosion of young mountain chains, quantifying how trough widening from glaciations can increase erosion rates. Next, Wilson discusses talus slopes and features ("Rockfall talus slopes and associated talus-foot features in the glaciated uplands of Great Britain and Ireland: Periglacial, paraglacial or composite landforms?"). He stresses the importance, not of freeze-thaw cycles (periglacial processes), but of rock-slope failure due to paraglacial characteristics. This section ends with two chapters discussing sediment supply from periglacial processes. Passmore and Waddington discuss sediment supply and landscape changes from late Pleistocene pro-glacial lake drainage events ("Paraglacial adjustment of the fluvial system to Late Pleistocene deglaciation: the Milfield Basin, northern England"), and Knight discusses sediment supply in South Ireland and the limits of lithostratigraphic principles in interpreting Quaternary records ("The limitations of Quaternary lithostratigraphy: An example from southern Ireland").

Section 3: Paraglacial processes, climate change, and sediment supply

Curry, Sands, and Porter give an instructive introduction to paraglacial slope processes by investigating the seemingly stable and very steeply sloped moraines in southern Switzerland (“Geotechnical controls on a steep lateral moraine undergoing paraglacial slope adjustment”). In a well-described chapter that describes a variety of well-tested field and lab measurements, they argue that the current moraine slopes reflect the “angle of emplacement.” Wilkie and Clague continue this section with a chapter that describes changes in mountain rivers due to climate change (“Fluvial response to Holocene glacier fluctuations in the Nostetuko River valley, southern Coast Mountains, British Columbia”). These authors analyze field evidence from British Columbia and test the relationship between glacier constriction and fluvial incision rates. Friele and Clague’s chapter describes paraglacial sediments in an interesting and unique environment (“Paraglacial geomorphology of Quaternary volcanic landscapes in the southern Coast Mountains, British Columbia”). They look at three volcanoes that erupted against Pleistocene glaciers and compare sediment delivery using various scenarios. Hewitt analyzes rock-slope failure from paraglacial adjustments in Pakistan and Harrison ends the section and the book with an informative

chapter on climate and landscape evolution (“Glacially conditioned rock-slope failures and disturbance-regime landscapes, Upper Indus Basin, northern Pakistan”).

Overall, the editors do a nice job balancing the wide range of quite specific topics addressed by the individual authors. As with many conference proceedings (a joint meeting of the GSL and the Quaternary Research Association in 2007), there is little consistency among chapters in the amount of scientific detail (ranging from historical narrative to bona fide research papers), figure quality (some were very hard to read and interpret, others had a professional quality), chapter length, breadth of topic, or intended audience (some assumed a great deal of prior knowledge; others did not). At times I wished the chapters were more tightly aligned to the great introduction provided by the editors; however, the loose structure gave freedom to the authors and the variety makes the volume enjoyable to read.

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