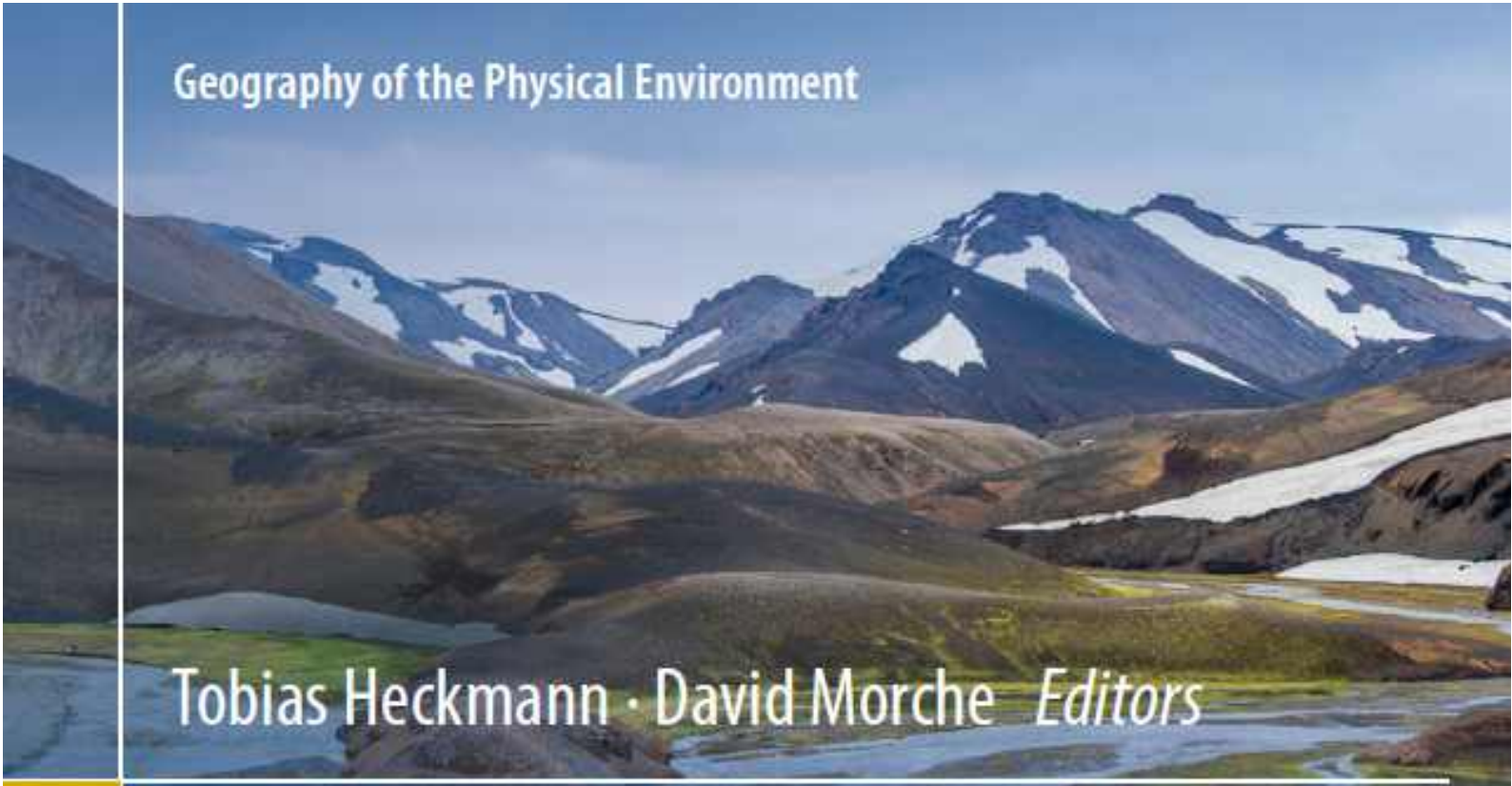
Geography of the Physical Environment



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Geomorphology of Proglacial Systems

Landform and Sediment Dynamics in Recently Deglaciated Alpine Landscapes

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Mountains are sensitive to and disproportionally affected by recent climate change. Among most important, most visible changes is glacier retreat. The latter entails the exposure of formerly glaciated terrain to subaerial conditions, with implications for hydrological, geomorphic and ecological processes. The geomorphic response to deglaciation has been conceptualised in paraglacial geomorphology, encompassing spatial and temporal changes in the activity of geomorphic processes, slope instability, and the build-up and depletion of sediment storage landforms. The transitional character of these adjustments to deglacial condition has been highlighted in recent research.

In this chapter, we propose and discuss the definition of proglacial areas as the area that has been deglaciated since the glacial highstands at the end of the Little Ice Age. We then summarise recent geomorphological research in proglacial areas and identify avenues of future research. These include (i) investigations extending further into the past based on historical imagery; (ii) the assessment of the relative importance of glacial vs. non-glacial processes; (iii) the role of direct, local climage change impacts vs. the transient response to deglaciation; and (iv) the potential propagation of local geomorphic changes (with connectivity being an important system property moderating this propagation) with potential downstream effects on hydropower generation, freshwater ecosystems and natural hazards. Observing and understanding past and present-day changes may provide templates for likely responses to future changes.

The **PROSA project** conducted from 2012-2017 in the proglacial area of the Gepatsch glacier, Central Austrian Alps, forms the framework of several case studies presented in the present volume; therefore, we briefly outline the joint project, its study area, research problems and methods.