

Trends of postglacial hillslope and relief development in selected mountain regions in eastern Iceland, northern Sweden and western Norway

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The various mountainous landscapes of Iceland, Sweden and Norway are characterized by Pleistocene glaciations and, connected to this, a dominance of glacially sculpted landforms like U-shaped valley systems and deposited mantles of glaciogenic materials. In consideration of such legacies, these formerly glaciated landscapes today can be considered at a unique stage of readjustment (recovery) with respect to spatial organization of currently active geomorphic process domains and the magnitude and patterns of sedimentary fluxes. Accordingly, the postglacial relief development in these landscapes has been controlled by a wide range of environmental drivers.

This study focuses on trends of postglacial hillslope and relief development in five selected valley systems in formerly glaciated mountain landscapes in eastern Iceland, northern Sweden and western Norway. The selected valley systems Austdalur and Hrafndalur in eastern Iceland, Latnjavagge in northern Sweden, and Erdalen and Bødalen in western Norway are considered to be representative valley systems for the respective mountain regions they are situated in. Our investigations include a quantitative compilation of contemporary mass transfers in the five valley systems, the analysis of Ho/Hi ratio values for the valley slope systems as well as a descriptive analysis of changes of valley cross and longitudinal profiles since deglaciation.

As a result, all U-shaped valley systems are characterized by a valley widening due to the continuing retreat of the existing rockwalls. However, the different valley systems show significant variations in the intensity of slope-channel coupling, in their storage behavior, in the development of their longitudinal valley profiles, and in the general intensity of postglacial relief modification. Accordingly, trends of postglacial relief development appear to be rather complex in the different mountain landscapes. It is found that the specific characteristics of the glacially sculpted valley morphometries are the most important control of the detected differences in slope-channel coupling, storage behavior and longitudinal valley profile development. Lithology and the given weathering resistance of the predominant bedrock is most important for the general intensity of postglacial relief modification. Apart from Hrafndalur which is characterized by rhyolites with very low mechanical weathering resistance, postglacial modification of the glacially sculpted valleys is altogether little and the landforms have not yet adjusted to the geomorphic surface processes operating under postglacial morphoclimates.