



## **The geomorphological significance of avalanche sedimentation for landscape evolution**

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Snow avalanches, especially dirty snow and slush avalanches, are recognized as important geomorphological agents in periglacial landscapes. Especially where relief, climate and lithology are favourable. Therefore, the study of avalanche sedimentation adds to the understanding of classic concepts in periglacial geomorphology: rock weathering, erosion and transport, associated with periglacial landscape evolution. However, the importance of long-term, large-scale landscape evolution by periglacial processes is questioned. While major glaciations determine landscape evolution on large time and spatial scales, periglacial processes act normally on a much smaller time and spatial scales, bound to the supply of a water and/or snow source. In Svalbard, many rock walls, that underwent large retreat in the Holocene are presently covered in lichens and only undergo slow biogenic flacking. There is thus a discrepancy between small contemporary rockwall retreat and significantly higher Holocene rates. However, there are examples of long-term periglacial landscape evolution, induced for example by nivation processes. Nivation transformed the Saalian glacial landscape in southwestern Denmark, being especially effective in unconsolidated sediments, at perennial snow patches, but also at avalanche sites . The nivation concept therefore applies also for the process of cornice fall avalanche sedimentation in the Longyeardalen valley, central Svalbard. Here we show for the first time, that even after the early Holocene deglaciation of the hill slopes in Longyeardalen, the present-day rockwall retreat rates are higher than the Holocene ones. This contributes not only to the rock slope denudation, but also to the active development of a rock glacier and avalanches sedimentation fans.