



Long- and shortterm sediment yield by fluvial reworking of proglacial slopes in the upper Kaunertal

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Glacier retreat since the end of the Little Ice Age (LIA) has exposed, and is bound to expose, large quantities of glacial sediments to reworking by non-glacial processes such as slope wash, rill erosion, gully erosion and mass movements. According to the model of paraglacial response, proglacial areas experience a quick adaption with maximum rates of geomorphic activity and sediment flux shortly after deglaciation, followed by a period of slow stabilization.

Our case study is situated in the Upper Kaunertal, Central Austrian Alps (64 km²), and forms part of the interdisciplinary research project PROSA (High-resolution measurement of morphodynamics in rapidly changing proglacial systems of the Alps). Using high-resolution surveying techniques such as airborne and terrestrial LiDAR and digital photogrammetry, we monitor surface changes effected by different geomorphic processes on steep moraines and drift-mantled slopes that have been deglaciated since the end of the LIA. Specifically, we investigate the combined effect of topography, hillslope-channel coupling and changing hydrometeorological conditions on sediment flux.

Multitemporal airborne images dating back to 1953 are used to derive digital elevation models (DEMs) for long-term analysis of surface changes and the corresponding sediment transfer. Recent developments are measured by DEMs of Difference (DoD) based on multitemporal airborne (2006, July 2012, September 2012) and terrestrial (July 2010, September 2011, September 2012, September 2013, September 2014) LiDAR surveys. The analysis of more than 40 years of rainfall and runoff data suggests that significant changes in these parameters have had an additional effect on the reworking of glacial sediment stores.