



Rock glaciers in the alpine sediment cascade

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Rock glaciers are in the spotlight of current permafrost and climate change research. They represent climate sensitive landforms composed of debris and ice that can be found in many High Mountain and Arctic environments. Rock glaciers are closed coarse debris systems and form an important part of the alpine sediment cascade. Due to their long persistence in landscapes they play a vital role in sediment storage. Rock glaciers play a leading role in storing both rockfall-derived and glacier-derived debris and dominate the land surface of many hanging valleys. According to their evolution they contribute substantially to the paraglacial landform succession. The spatial distribution of relict and inactive glacier-derived debris rock glaciers indicates a multi-stage paraglacial landscape evolution. A current focus in rock glacier research lies on their kinematic behaviour and the climatic response of the movement. To assess the geomorphological significance of rock glacier movement, surface displacement values need to be combined with sediment volumes.

We analysed rock glaciers at various states of activity in the southern Swiss Alps using geophysical survey, digital photogrammetry and GIS modelling. Sediment volumes are compared to other landforms in the study area in order to assess the relative importance of rock glaciers as sediment stores. Volumes estimated from DHM analyses and surface displacement rates derived from digital photogrammetry are combined in order to calculate current geomorphic work for selected rock glaciers. Additionally, the current displacement rates are compared to long term erosion rates calculated for selected talus rock glaciers.

We discuss and analyse the geomorphological significance of rock glaciers within the sediment flux system of this high alpine catchment.