



## **Quantification of feedbacks between small scale erosion and ecological succession on slopes in a high-mountain environment**

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Earth surface processes, vegetation succession and plant traits form a dynamic relationship that is driven by mutual feedbacks. High-mountain environments enjoy slowly strengthening recognition within this biogeomorphic research perspective, as they provide an expedient area for investigation. Recent studies focus on the qualitative description of relationships and feedbacks. However, in order to test the interdisciplinary concepts and to address multidirectional relationships, it is necessary to jointly quantify (i) geomorphic process rates as a function of vegetation and (ii) successional development as a function of geomorphic conditions.

The proglacial area of the Gepatschferner (Kaunertal) in the crystalline Central Eastern Alps represents a showcase environment to investigate these interactions as the retreating glacier and high rates of sediment reworking give rise to different stages of ecological succession.

In this particular study, we investigate small-scale biogeomorphic interactions at 57 plots of 2\*3m at 19 test sites. Experimental plots are established on slopes along a succession gradient to reflect interactions between ecologic and geomorphic activity at different stages of vegetation development. In order to quantify sediment transport, we use a combination of mechanical measurements (i.e. soil erosion plots) and digital surface observations (i.e. structure from motion analyses). A detailed vegetation survey is carried out to obtain information on the general distribution of species and individual plant traits (i.e. root volume, root length, leaf size).

This way, we have the possibility to generate a joint database of geomorphic and ecologic parameters for each experimental plot. By means of statistical analyses we are able to discuss reciprocal adjustment and to disentangle biogeomorphic feedback effects.