Catchment-scale patterns of biogeomorphic interaction in an alpine glacier foreland

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The interaction between abiotic and biotic development in glacier forelands depends on species traits and the frequency and magnitude of geomorphic events as shown on plot-scale studies. However, upscaling of biogeomorphic interactions is still scarce and it remains unclear how these interactions form and shape dynamic patches.

In this study, we combined traditional field based methods of geomorphology and ecology with remote sensing and soil erosion modelling. Geomorphic mapping allows the delineation of process domains for further methods specification. Field based plot sampling along a chronosequences provides insight into distribution of species composition. Catchment wide patterns of functional groups of vegetation (graminoids, forbs, woody) were analyzed with a random forest algorithm using UAV-based multispectral imagery recorded. Small scale geomorphic events are described through simulated annual sediment transport rates derived from the revised universal soil loss equation model (RUSLE).

The dataset will show temporal and spatial distribution of the stabilizing effect of plant functional types. Analyses of potential erosion rates will show the relationship of small scale sediment transport with species distribution. Results of this study will contribute to our understanding of processes that form biogeomorphic landscape patterns in glacier forelands at different scales.