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Surface erosion at disturbed alpine sites: effects of vegetation cover and plant diversity

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The relationship between plant diversity and soil stability in disturbed alpine terrain is poorly studied. In this paper, we investigated the influence of plant cover and diversity on water run-off and sediment yield on ski slopes. Rainfall simulations were conducted on a micro-scale (25 x 25 cm) to be able to replicate plots with different degrees of vegetation cover. We selected plots with 10%, 30% and 60% of vegetation cover containing different combinations of plant diversities: (i) grass, (ii) herb, (iii) moss/ lichen, and all combinations of these plant groups. Each combination was replicated five times with an applied rain intensity of 375 ml min^{-1} for about 5 minutes.

As could be expected, percent vegetation cover had a large effect on surface erosion: sediment yield decreased with increasing vegetation cover. However, within the plots with 60% cover, sediment yield was lower at higher plant diversity and functional group diversity.

The findings of this study support the view that beside the re-establishment of a closed vegetation cover, plant diversity is a relevant factor to reduce surface erosion at disturbed sites in alpine ecosystems.