



Soil erosion in the Alps (spatial analysis of causes and risk assessment)

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Increasing numbers of tourists, changes in farming/cultivation techniques and global warming are expected to intensify soil erosion in the Alps. Therefore, the knowledge of the relations between triggering factors (e.g. hydrology and snow cover, stability of vegetation cover, landuse intensity etc.) and soil erosion in mountain regions will be of crucial importance in the near future.

The aim of this project is the identification of causes of soil erosion in alpine environments as well as the mapping of risk areas rather than an exact quantification of sediment rates.

The methods to determine erosion risk are developed within a subcatchment (30 km²) of the Furkareuss (Urseren valley, 1400-2500 m a.s.l.) in the Swiss Alps and are to be validated by upscaling to the whole catchment (80 km²).

Soil erosion is linked to runoff processes. In contrast to flat regions, subsurface flow has to be considered in addition to overland flow. The latter may initiate soil slips. The valley slopes of the investigated area are affected by both water surface erosion and soil slips. Preliminary soil surveys and erosion mapping were conducted. To delineate risk zones, the various soil types found were grouped into soilscares according to parameters with relevance for soil stability. It could be shown that soil slips occurred predominantly in the zone of hydromorphic soils, which also verified the linkage between subsurface flow and soil slips. However, a comparison between hillslopes most affected by erosion and undisturbed slopes indicated that they also differed in geology, vegetation and landuse. The weight of these triggering factors will be evaluated by spatial statistical analysis.

To assess whether erosion actually increased during the last decades or whether we observe a natural equilibrium-process of degradation and regeneration, sequences of aerial photographs for seven different years starting in 1959 and recent field mapping were analysed and compared. Special attention is directed to landuse, which differs greatly from typical practices in lowlands and has experienced significant changes during the last decades. To determine the relative importance of cultivation influence versus rainfall characteristics the progress of erosion is correlated to climate parameters as well as landuse change.