



## **Process analysis, quantification and modelling of erosion on steep unvegetated hillslopes:**

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Soil erosion is a problem in many parts of the world. While in agricultural environments the geomorphological drivers of soil erosion are well known, the process understanding in steep alpine environments is still lacking. Steep hillslopes in different climatic settings distributed in Germany and Italy were monitored for at least three years in order to gain better knowledge in the evolution of the unvegetated slopes. The monitoring setup was mainly based on terrestrial laserscanning (TLS) and was expanded with other monitoring methods, like aerial- and terrestrial-based structure from motion, aerial images and airborne laser scanning data. TLS data were mainly used to analyse processes on plot or hillslope scale. In order to regionalize these values, we used two different modelling approaches: a rule-based statistical and the physical-based model Erosion 3D. The latter one had to be adopted from flat agricultural areas to steep slopes. Parameters for modeling purposes were acquired by field work. Therefore an established rainfall simulator was customized for the application in alpine terrain.

The results showed clear differences in the seasonal behaviour of the acting geomorphological processes in nearly all study areas. Furthermore a quantification was possible for each process involved in hillslope development. Additionally, both models showed that an adaptation to the hillslopes was possible and provided satisfying results in all research areas. This presentation aims at summarizing the findings and key results of the three year study period.