



Seasonal differences in hillslope development derived from TLS data and their implementation in erosion models

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Steep slopes with sparse vegetation or free of vegetation are a major sediment source in alpine catchments. The monitored slope in the Bavarian Alps, Germany consists of glacial tills from several glacial advances in the Pleistocene and is almost free of vegetation. It has been subject to several TLS data acquisitions dating back to the year 2009. The alignment of the acquired data was done by using permanently fixed tie points. Therefore, long term changes, as well as event based surface changes can be analysed. In combination with the climatic settings, snow during the winter months and some heavy rain events during the summer, it is subject to several different geomorphic processes that are acting at the slope. Different patterns and volumes of surface change, especially erosion could be detected in the course of a year: Mainly rill erosion during the summer, whereas the early winter period is characterized by accumulation in the rills and erosion on the slope. Snow melt and precipitation trigger small scale slides and debris flows at the end of the winter.

The acquired DEMs were furthermore used to model erosion with two different kinds of erosion models: a physical-based and a statistical-based. The modelled values are in good agreement with the measured surface changes during the summer period, but they are inaccurate during the winter months and need some more improvements to model geomorphic winter processes.