



Quantification of debris flow events in the upper Kauner valley (Ötztal Alps) for the years of 1953-2012

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When it comes to transport capacity, debris flows are among the most efficient processes in high mountain areas. In addition, they constitute an important process for a coupling of slope and channel systems. If the contribution of episodic processes to the sediment budget of a catchment is to be quantified, the magnitude-frequency relationship of debris flows for the respective area needs to be determined.

The work shown here presents results of mass balancing of debris flow events in the upper Kauner valley, Ötztal Alps, Austria). The volume of debris flows can be quantified via the so-called morphological method from multi-temporal and highly resolved digital elevation models. To accomplish this, area-wide airborne LiDAR data from three different flight missions and georeferenced terrestrial LiDAR data are available. Volumes can be measured directly by differencing LiDAR data or by reconstruction of pre-event surfaces. Where no 3D data is available, volumes need to be estimated from proxy-data. Using multi-temporal orthophotos (for the project, aerial photos from eight different age volumes between 1953 and 2006 were rectified), the planimetric area of debris flow depositional areas can be measured. With the aid of an empirical area-volume-relationship, the debris flow volumes can be calculated.

We present results of debris flow balancing of all three named methods.