Time series analysis of the landscape changes in debris flows area, Val Mingèr

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Debris flow are a type of mass movements consisting of a viscous flow of sediments, wood and a variable amount of water, which usually propagates in torrential catchments and sometimes at very high speed. Debris flows are usually triggered by heavy rainfall events, and can cause substantial damage on people and their infrastructures (roads, houses, buildings).

The steep, undisturbed sedimentary bodies below the summit of Piz dals Cotschens in the Val Mingèr (Swiss National Park are susceptible to the initiation of debris flows. As process activity is undisturbed by human activities, the processes occurring at this site can be studied under natural conditions. In this study, we document and quantify two debris-flow events that occurred in summers 2015 and 2017, as a result of intense, localized precipitation events.

The main objective of this study is to have a better understanding about the process dynamics of debris flows, their behaviour, their trigger in factors, the impact they have on the landscape and their possible consequences. By using remote sensing and the analysis of drone imagery, LiDAR and aerial photos, we will aim to provide answers to whether the recent events are extreme in the longer-term perspective, and whether The apparent increase in activity can be linked to climate change.
This work will provide a time series analysis from 1970 to 2017 about the landscape evolution and the changes in the channel and depositional cone with aerial photos and changes in the elevation (erosion or accumulation) of the channel bed with topographic surveys. These analyses are made by GIS and they could be complemented with additional sources of information like rainfall data, debris-flow modelling, and dendrochronology (tree-ring analyses).