

>> SYNTHESIZE MOUNTAINS OF KNOWLEDGE <<

Submitted Abstract

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Title	Slope-Type Debris Flow Record Since The End Of The Little Ice Age Using Aerial Photographs And Lichenometric Methods In The Grastal And Zwieselbachtal, Austria.
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Abstract

Debris flows play a big role in the morphodynamic systems of high mountain regions as well as in the interaction with other geosystems (e.g. biosphere). To get a better understanding of the future development of debris flow dynamic, it is crucial to gain a good understanding of the development of the dynamic in the past. However, it is difficult to obtain a sufficient debris flow record in high mountain areas, as for example historical text chronicles do often not provide detailed information for high altitude regions above settlement places and dendromorphological studies are only possible in forested areas.

Within this study, we establish a record of slope-type debris flows since the end of the Little Ice Age for the Grastal and the Zwieselbachtal, two side valleys of the Horalachtal, which is located within the Stubai Alps in Tyrol, Austria. Here, aerial and terrestrial photographs are limited to the period since 1947. Therefore, a detailed debris flow record for the timespan between 1947 and 2020 could be established based on a multitemporal analysis of available aerial photographs of twelve different time steps. For the timeframe between the end of the Little Ice Age and the first area-wide aerial photographs in 1947, we used lichenometric methods to date old debris flow deposits. Lichenometry is based on the even and consistent growth rate of the thalli of the lichen *Rhizocarpon geographicum*, which is a widespread species within the High Alps. During an extended field survey in summer 2021, we measured the diameter of lichen thalli at 105 different sites in the study areas. With the help of the collected data, we established a calibration curve using the thalli of 52 lichen sites from known historical glacier extents as well as debris flow deposits, which could be dated by the comparison of aerial photographs. Using this calibration curve, we were able to date 53 different debris flow deposits in the study area using the Five-Largest-Lichen approach and therefore extend the debris flow record to the period prior to 1947.