

Effect of discharge on sediment and wood transport processes in torrents

Torrents are characterized by steep catchments with intense sediment transport. In the summer of 2024, numerous floods occurred in Ticino and Valais with elevated sediment and wood transport, resulting in flooding and damages of infrastructures. These events highlight the urgency to improve the understanding of sediment and wood transport processes in torrents. The Gufelbach torrent is located in the Weisstannental catchment in the Canton of St. Gallen and is usually affected by water withdrawal to operate the Gigerwaldsee reservoir. This water withdrawal is currently shut off to facilitate maintenance works at the Gigerwald dam. Compared to the usual reservoir operation conditions, the Gufelbach discharge is higher, resulting in implications on sediment and wood transport processes.



Fig. 1: Gufelbach, Weisstannen (Canton St. Gallen)

The student will perform a series of field experiments at the Gufelbach (Fig. 1). Specifically, local measurements or large-scale image velocimetry will be performed to obtain the flow velocity. Line sampling analyses will be conducted to derive the grain size distribution and images will be used to detect river bed changes and to analyze wood transport processes. By relating the observed transport processes with existing discharge measurements, the aim is to 1) identify potential risks for adjacent settlements and 2) to derive solutions regarding discharge, sediment, and wood management. This thesis is a collaboration between WSL and VAW, where VAW will be responsible for organizational matters.

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Remarks: Field experiments;
Project language: English or German;
1 student for Master's thesis or up to 2 students for project work