



Bedload management concept for water withdrawals (small hydropower plants) to optimize integral risk management concepts for sensitive mountain river sections

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The operation of a small hydropower plant with a diverted reach influences, on the one hand, the natural mountain river/torrent regimen of the transverse structure. On the other hand, it also leads to a decrease of the runoff (annual and total) by the diversion of the process water along the entire diverted reach. Evidence in the form of an evaluation of bedload transport must be provided if the diverted reach is located in a sensitive mountain river or torrent section along which no degradation may take place. Degradation, in this context, refers to deposition or a deepening of the river bed downriver of the diverted reach that is caused by a lack of bedload over a longer period. This work proposes a practically orientated method – the advanced engineering based section-wise approach - for such an evaluation. This method is tested on a dataset of 89 single events based on direct and indirect measured rates of bedload transport (monitoring period: 2012 to 2017) at the bedload monitoring site Urslau. We analyzed the incipient motion and general mobilization of those events and defined the range of selective mobilization of bedload transport. Based on these findings, the event-based calculation of bedload transport of the authors has been modified to questions related to bedload transport in the context of diverted reaches.