



## **Formation and shifting processes of calcareous and dolomitic debris and the influence upon bedload transport in torrential streams**

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Torrents are characterized by bed load transport processes triggered by flash floods and massive erosion that leads to debris flows with destructive effects of settlements and infrastructure. The most abundant and active sources of debris within torrent carbonate rock areas occur in regions of recent and sub-recent colluvial sediments and loose rock formations exposed to weathering. The extent of debris formation is substantially controlled by lithologic and tectonic factors: Primarily among these factors are the facies of the (marine) sedimentary environment, the early diagenetic processes, the allocation into the system of major tectonic units, the metamorphic influence of temperature and pressure, the position of the formation in relation to a fault zone. Tectonics lead to the cataclasis of rocks forming tectonic breccias. In general it is known that dolomite is more often subject to intensive debris formation according to the characteristic texture of fractures, but a fairly accurate quantitative assessment of debris potential of a catchment area for the purpose of hazard mapping or planning of mitigation measures has to be based on a detailed investigation which focuses on the individual geologic formation. Of major importance for the modelling of torrential bed load transport processes is the grain size of the clasts. Water surface runoff together with the non-sorted clasts produces mass flows with high viscosity. As a result areas with a high production of clasts show intensive fluvial erosion due to the high amount of bed load. The interplay of carbonate clast production, facies and tectonics are the controlling factors of these processes. Additionally the non-cohesive properties

of carbonate debris have major impact on the bed load regime.

Till now only little scientific research was done in this field, although carbonate debris plays an important role concerning torrent control in the Alps. The paper gives a comprehensive overview of the state of knowledge of the formation and shifting processes of carbonate debris and its influence upon bedload transport in torrential streams and summarizes the results of investigations, which were recently carried out in several Austrian torrent catchment areas (Großer Dürrenbach, Seebach, Holzäpfeltal).