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Flow process identification in torrent catchments by geomorphological parameters in the Austrian Alps

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Especially in mountainous regions, the geophysical complexity yields to different types of flow processes within the same catchment. However, for a hazard assessment the identification of the dominant flow process in a catchment plays an important factor. The emphasis of this study is therefore on the analysis of flow-affecting (surface) parameters such as geological conditions, slope, exposition, soil type, vegetation cover, basin ruggedness etc., to find a relation between the dominant flow processes and the related torrential catchments. Based on data of documented torrential events in Austria, fluvial sediment transport processes, debris floods and debris flows are examined.

First, the dominant process of a catchment is determined by analyzing all events ever recorded. Selection criterions are based on the percentage of the occurring process types. A refinement classification is done based on a mobility index and the catchment area. Hence, 17 catchments could be examined with fluvial sediment transport processes as the dominant transport process. Furthermore, 15 catchments related to debris floods and 21 catchments related to debris flows have been determined. Also 15 indifferent catchments with no dominant processes are considered.

Further analyses will be on the investigation of typical flow-affecting parameters based on a GIS approach. By using a factor analysis the main parameters will be estimated. Afterwards a discriminant analysis will be used to relate the flow parameters and the examined dominant flow processes.