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Relating sediment supply to the morphological and hydro-meteorological characteristics of torrent catchments

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In mountain areas, the quantification of sediment yield is essential in the diagnosis of a torrential watershed. The objective of this study is to present a prediction method based on multivariate statistical models calibrated from an original data set covering nearly 130 torrential basins in the Northern French Alps. Data on sediment yield and occurrence of torrential events were collected on these catchments thanks to registries from sediment retention basins (average monitoring period of 20 years) and historical archives of the catchment basin managers. On these catchments, several morphological and hydro-meteorological characteristics were calculated (e.g. geological and sediment connectivity indices, the rate of connected eroding areas in the catchment, the Melton index, the slope of the fan, etc.) in order to relate them to sediment production and the frequency of occurrence of torrential events. These models allow the estimation of quantiles of the sediment yield in small torrent catchments. These models could be useful to evaluate sediment yield and the occurrence of torrential events on catchment not equipped with sedimentation structures.