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## Landslide susceptibility assessment at a local scale: logistic regression analysis for upper Tanaro catchments

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Landslide susceptibility is generally defined as the likelihood of a landslide occurring in a certain area on the basis of local terrain conditions. The aim of susceptibility assessment is to estimate the areas where landslides are likely to occur, based on the assumption that landslides will likely occur under the same conditions under which they occurred in the past.

The purpose of this study is assessing shallow landslide for Negrone and Tanarello catchments which are the upper basins of Tanaro river, a mountainous area within the Palaeo-European Continental Margin of the Alpine External Belt (External Briançonnais successions) and the Ligurian units of Maritime Alps of the Alpine Axial Belt (Penninic Domain). The lithology is composed of silicate and to a minor extent carbonate rocks.

In the last decades, the study area has repeatedly been affected by slope instability events, mainly related to debris flows, characterized by extremely rapid movements. By integrating a detailed (1:5.000) geological and geomorphological field survey with orthophoto interpretation and existing information provided by Arpa Piemonte, landslide inventories have been produced. Only focusing on source areas, susceptibility assessment to debris flow have been performed by using a logistic regression approach, considering as covariates lithology, land use and morphometric factors derived from a digital elevation model (DEM) with a 5 m resolution. Source area pixel have been split into training and validation subsets by adopting a random partition. A certain number of pixels equal to the training set has been randomly extracted among stable cells, to prepare the dataset for logistic regression. The best set of covariates in controlling the spatial distribution of debris flows have been identified by iteratively adding one variable at a time and comparing the results. Susceptibility model fitting and prediction skill have been assessed based on validation subsets. The role of the considered factors in predisposing debris flow failures has been evaluated, discussing differences in the outcomes.