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Debris flow susceptibility assessment on medium scale using official and recently mapped inventories

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Landslide susceptibility assessment shows significant improvements in recent years by using indirect statistical methods on medium scale (1:25 000 – 1:50 000) implemented within GIS. This study is focused on the comparison of susceptibility models produced by using official and newly mapped inventories. The former is the official Italian Landslide Database GeoIFFI, while the latter was produced from photo interpretation and field surveys in the study area. Both inventories were produced at a same scale of 1:10 000.

The study was carried out in Central Italian Alps in Valtellina di Tirano. This area has long history of landslide and debris flow events which caused considerable damages. The assessment of the statistical relationships between the debris flows and the controlling geo-environmental factors has been carried out using quantitative data-driven model "Weights of Evidence". The outcomes from the analysis were validated and evaluated through the use of success-rate and prediction-rate curves.

Results from the analysis show improvements of the susceptibility models when using newly mapped inventory. Nevertheless the geo-environmental factors controlling the debris flow initiation seem to be different over the study area, thus no clear association between controlling factors and debris flow initiation areas is always visible. Another important result of the study is a completely different spatial pattern of the maps produced by various combinations of controlling factors and by using different inventories. This is an important outcome for the use of automatically calculated susceptibility maps.