An integrated mass wasting susceptibility assesment by geographical information systems and remote sensing applications: Example from North Turkey

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The Northern part of Turkey have been suffering from both landslides and snow avalanches due to the steep topography and climatological characteristics triggering the processes. In order to manage these natural hazard phenomenons, regional hazards assessments are both crucial and essential for the region. In this context, an integrated hazard assesment including landslide and snow avalanche was carried out for a selected area at North Turkey. Caykara (Trabzon) district was one of the most suitable areas for such a purpose, because several landslide and snow avalanche cases occured in the area during the last two decades. To inspect the landslide and snow avalanche susceptibility of the area, geographical information systems and remote sensing based assessments were applied to the area. To produce a landslide susceptibility map, logistic regression model was used by using lithological, topographical and environmental data set. To obtain a snow avalanche susceptibility map, topograhical data such as slope gradient, slope aspect and slope curvature, environmental data such as normaliazed vegetation index (NDVI), snow accumlation areas and landcover were taken into account, and these data set were analyzed by a 2D modelling tool, called as CONEFALL. By obtaining the landslide and snow avalanche susceptibility maps, five susceptibility classes from very low to very high were differentiated in the area. The both susceptibility maps were also verified by the actual field data as well, and it was determined that the obtained maps were successful. Then, the both susceptibility maps were overlaid, and finally an integrated mass wasting susceptibility map was created. In this final map, total susceptible areas to both landslide and snow avalanche occurrence were determined. The final susceptibility map is believed and expected to be used by the govermental and local authorities as a decision makers to mitigate the landslide and snow avalanche based hazards in the area.