



Detecting landslide location and volume for hazard assessments using DTM analysis in the Swabian Alb, Germany

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Landslides of varying magnitude have occurred in the cuesta landscape of the Swabian Alb (Germany). Geological predispositions of this landscape to landslides is related to Jurassic limestones overlaying marls and clays. Triggering factors are commonly rainfall events and, in particular, earthquakes.

This study presents the benefits of terrain analysis for detecting landslide location using DTM's of various resolutions (up to a 1m DTM). The method of Sloping Local Base Level (SLBL) is applied to define the potential volume erodible by landsliding within slopes. The SLBL is defined by calculating geometrically a sliding surface on a DTM. This surface is anchored by the streams, computed by standard GIS functions, and defines a volume in excess. In steep regions the procedure has proven its capacity but for smoothed topography the SLBL is more difficult to define because additional assumptions are needed.

The first additional assumption relates to the slope angle. Below a threshold ranging from 7° - 12° the slope is assumed to be stable. The second assumption is that the depth of the base level cannot occur below streams in the valley floors.

Preliminary results in the Swabian Alb show that especially the high resolution DTM has an enormous potential for detecting the location and spatial extend of landslides with different magnitudes. Most of the known landslides have been detected by SLBL analysis. Furthermore the SLBL is capable to determine the landslide volume sufficiently at local and regional scales. A verification of the calculated landslide volumes with determined landslide masses is currently in progress. However, the calculation of

the potential volume might be a very useful information to more accurately determine the landslide hazard at both scales.