



Using High-Resolution Airborne LiDAR-Data for Landslide Mapping in the Eastern Alps

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Due to the increasing frequency of natural disasters like floods and landslides, the active remote sensing technique LiDAR (Light Detection and Ranging), has become a topic of great interest to the Federal State Government of Styria, Federal Republic of Austria. In a perennial project from 2008 to 2012 high-resolution 3D Airborne LiDAR Data of the Province of Styria, an area about 16.000km² in south-eastern Austria were collected. These data were processed to create Digital Terrain Models (DTM) and Digital Surface Models (DSM) at 1m resolution with a vertical accuracy of 15 [cm] and a positional accuracy of 40 [cm].

High resolution DTMs can be used in different geo-related applications like geomorphological mapping or natural hazard mapping. DTMs show because of its high accuracy various natural and anthropogenic terrain features such as erosion scarps, alluvial fans, landslides, old creeks, topographic edges and karstforms, as well as walking paths and roads and in addition to that LiDAR data allows the detection and outlining of these different geomorphological and anthropogenic features with the help of ArcGIS 10 geoprocessing and analysing techniques, mathematical, statistical and image processing methods and the open source scripting language Python. As a result complex workflows and new geoprocessing tools can be implemented in an ArcGIS 10 workspace and are provided as easy to use toolbox contents.

The landslide phenomena take in centre stage of the research work of the author. Thereby the main focus is targeted on sliding movements out of soils and bedrock. Factors like gravity take effect on slope stability directly and cause complex mass movements with a downslope directed, gliding movement of bed- and/or loose-rock as well as soil material.

In this paper the author presents the result of her master thesis, an automatic ArcGIS 10 landslide mapping tool using high-resolution LiDAR data in the rock masses of the Eastern Alps (Province of Styria, Austria). This tool based on analyzing and modeling different land surface parameters such as slope, variance of slope, curvature or roughness. The ArcGIS 10 Landslide Mapping Tool points out endangered regions in the Province of Styria and shows the quantity of landslides in a specific area.