SEMI-AUTOMATED LANDSLIDE MAPPING BASED ON MULTISPECTRAL SATELLITE IMAGERY: TWO AUSTRIAN CASE STUDIES FROM THE LAND@SLIDE PROJECT

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The vast availability of multispectral remote sensing data promotes research in the field of semi-automated landslide mapping. Decision makers and experts require tools that produce reliable landslide maps (1) regardless of input data resolution and area of interest, and (2) without the need for substantial user intervention. Such a tool would allow the creation/update of landslide databases which support susceptibility modelling and hazard zonation, as well as the digital documentation of landslide events.

Within the Austrian research project Land@Slide (FFG-ASAP), we develop robust landslide mapping routines based on various multi-temporal satellite images, ranging from high resolution (HR) Landsat data to very high resolution (VHR) WorldView-2/3 imagery. Development is conducted in line with previously acquired user requirements and specified mapping scenarios. The method of choice is object-based image analysis (OBIA) which has been recognized to be a new paradigm in remote sensing. This study will present results for two test areas:

(1) The first study in the Montafon, a region in the south of Vorarlberg, Austria, focuses on area-wide mapping of landslides. We use OBIA techniques to develop an effective mapping routine for post-event WorldView-2 and GeoEye-1 VHR images.

(2) The Fürwag landslide at Haunsberg (province of Salzburg) is one of the most famous landslides in Austria. The whole landslide body was reactivated in 1999. Until 2003, several parts of the landslide, particularly the southern part (Fürwag South), have been active, but large parts have been again covered by vegetation. The evolution of the landslide is mapped using Landsat time series HR data and object-based change analysis.

Based on these two case studies, the potential and limitations of semi-automated landslide mapping from multispectral satellite imagery are discussed. The semi-automated landslide maps are assessed with reference data; mapping routines are evaluated against user requirements. The improved mapping routines will feed into a landslide web service, the main output of the Land@Slide project.