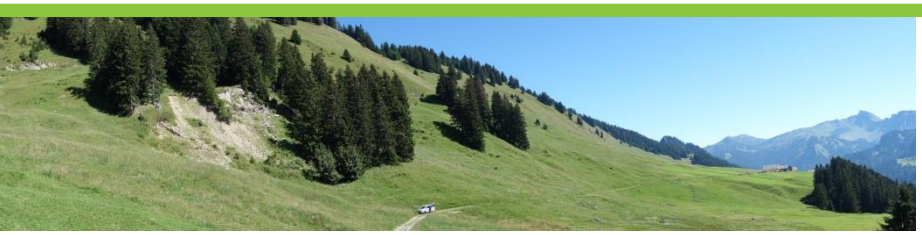
EO-BASED LANDSLIDE MAPPING

From methodological developments to automated web-based information delivery

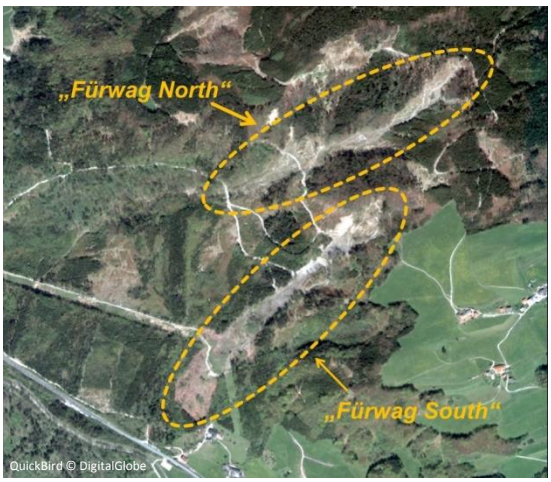


Need

In mountainous regions like the Alps, landslides frequently cause damage and pose a risk to the population and infrastructure, e.g. buildings, roads, railways and trails. Hence, infrastructure maintainers, regional authorities and emergency services require detailed and complete information on past and new occurrences of landslides in order to protect infrastructure at risk and to manage the damages.

Challenge

Usually, information on landslides is collected by a combination of ground surveying and image interpretation in the aftermath of landslide triggering events.
The high workload for field data acquisition and the subjectivity associated with labour- and time-intensive visual manual image interpretation has its limitations with respect to the completeness, consistency and objectivity of the provided landslide information.



Opportunity

The increased availability and quality of Earth Observation (EO) data in combination with new computational methods foster attempts to automate the preparation of landslide maps while reducing time and costs. The integration of multispectral EO data into a pre-operational web service for semi-automated landslide mapping allows improving the workflow for the collection of landslide information.

Land@Slide Objective

Land@Slide aims at the development of an EO-based web service that supports users in their landslide mapping and monitoring tasks by giving them access to satellite images, to landslide information extraction tools and to tools for landslide map comparison for detecting changes or identifying damaged infrastructures.

UNIVERSITÄT SALZBURG Z_GIS
GRID-IT
Geologische Bundesanstalt
FFG
bmvit Bundesministerium für Verkehr, Innovation und Technologie

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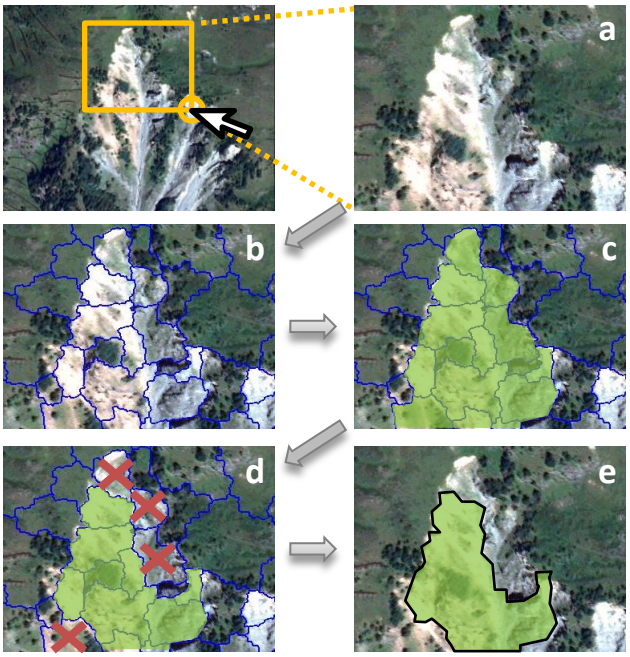
Web Service Tools

The developed *Land@Slide* web service lets the user apply tools for interactively producing landslide information. These tools address:

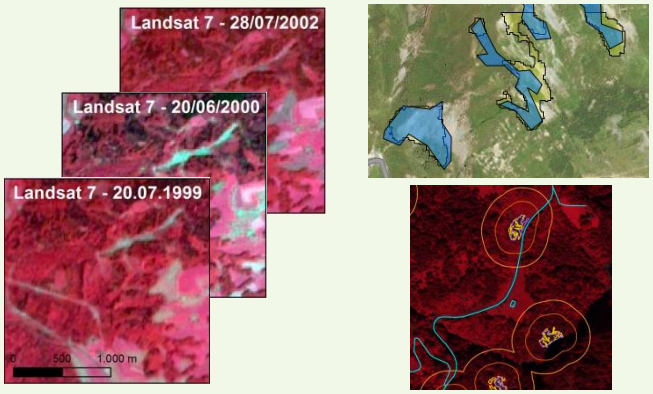
Landslide information extraction

- **Settings** – choosing a satellite image and defining an area of interest (AOI).
- **Segmentation** – generating homogeneous image segments resulting in candidate delineations for the landslides.
- **Classification** – selecting landslide segments as training samples and letting the tool find all other objects with similar properties for generating a landslide map covering the entire AOI.
- **Editing** – adding and removing segments to improve the landslide map's quality and unifying the segments into a final result.



Analysis components

- **Monitoring** – comparing several landslide maps of the same AOI from satellite images of different dates and calculating the amount of change between them.
- **Validation** – overlaying the landslide map with a reference map and thereby estimating the agreement between the two datasets.
- **Infrastructure** – overlaying a landslide map with street network datasets and other infrastructure layers for identifying the affected infrastructure.



Status of Work & Outlook

Within the *Land@Slide* project, we developed a pre-operational web service for landslide investigation. The service architecture provides the key functionalities and descriptions to guide the user through the entire workflow of landslide information extraction and subsequent analysis steps. The participants of our user/validation workshop tested the web service and provided valuable feedback for improvement. The feedback supports our ongoing efforts towards developing a customer-tailored and operational web service.

Project Details

Land@Slide was completed by the Department of Geoinformatics – Z_GIS, University of Salzburg, in partnership with GRID-IT - Gesellschaft für angewandte Geoinformatik mbH and Geologische Bundesanstalt (GBA).

Contact: Daniel Hölbling
+43 (0)662 8044 - 7581 | daniel.hoelbling@sbg.ac.at

Website: http://landslide.sbg.ac.at

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