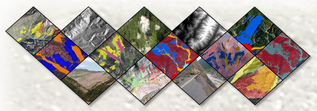
iSLIDE - INTEGRATED SEMI-AUTOMATED LANDSLIDE DELINEATION, CLASSIFICATION AND EVALUATION



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1. Introduction

Landslides are a major natural hazard in almost all mountainous regions of the world. Today, the wide range of available **Earth observation (EO)** data implies the need for reliable and efficient methods for detecting, analysing and monitoring landslides to assist hazard and risk analysis.

Object-based image analysis (OBIA) is a valuable approach for semi-automated landslide detection. It produces more accurate and realistic results than pixel-based classification methods (e.g. Martin and Franklin, 2005).

2. Objectives

The main objective of the **iSLIDE** project is to develop a methodological framework for **landslide delineation**, **classification** and **evaluation** through the integration of optical remote sensing data, digital elevation information and terrain unit layers using innovative **OBIA methods**.
Additionally, the potential of **Synthetic Aperture Radar (SAR)** data will be investigated for object-based landslide mapping.

Background

Object-based image analysis for landslide mapping

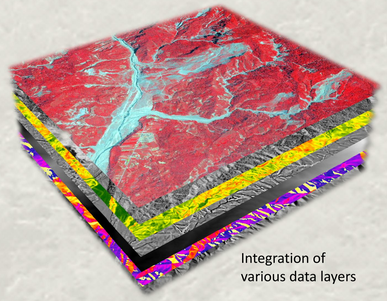
Object-based image analysis *interlinks image* ***segmentation*** *and image* ***classification****. OBIA is making considerable progress towards a spatially explicit information extraction workflow (Blaschke, 2010), as it offers a methodological framework for addressing complex classes, defined by spectral, spatial, structural, as well as hierarchical properties (Lang, 2008).*

OBIA provides a high potential for ***semi-automated landslide mapping*** *as multiple data sets can be integrated - in comparison to pixel-based approaches - and thus, landslides can be examined in a more efficient way making use of the most suitable properties of the information layers (Hölbling et al., 2012).*
Advanced ***class modelling****, a cyclic process of segmentation and classification, allows addressing objects individually in a region-specific manner at any stage (Tiede et al., 2008). This approach enables the creation of transferable, flexible and yet robust rule sets.*

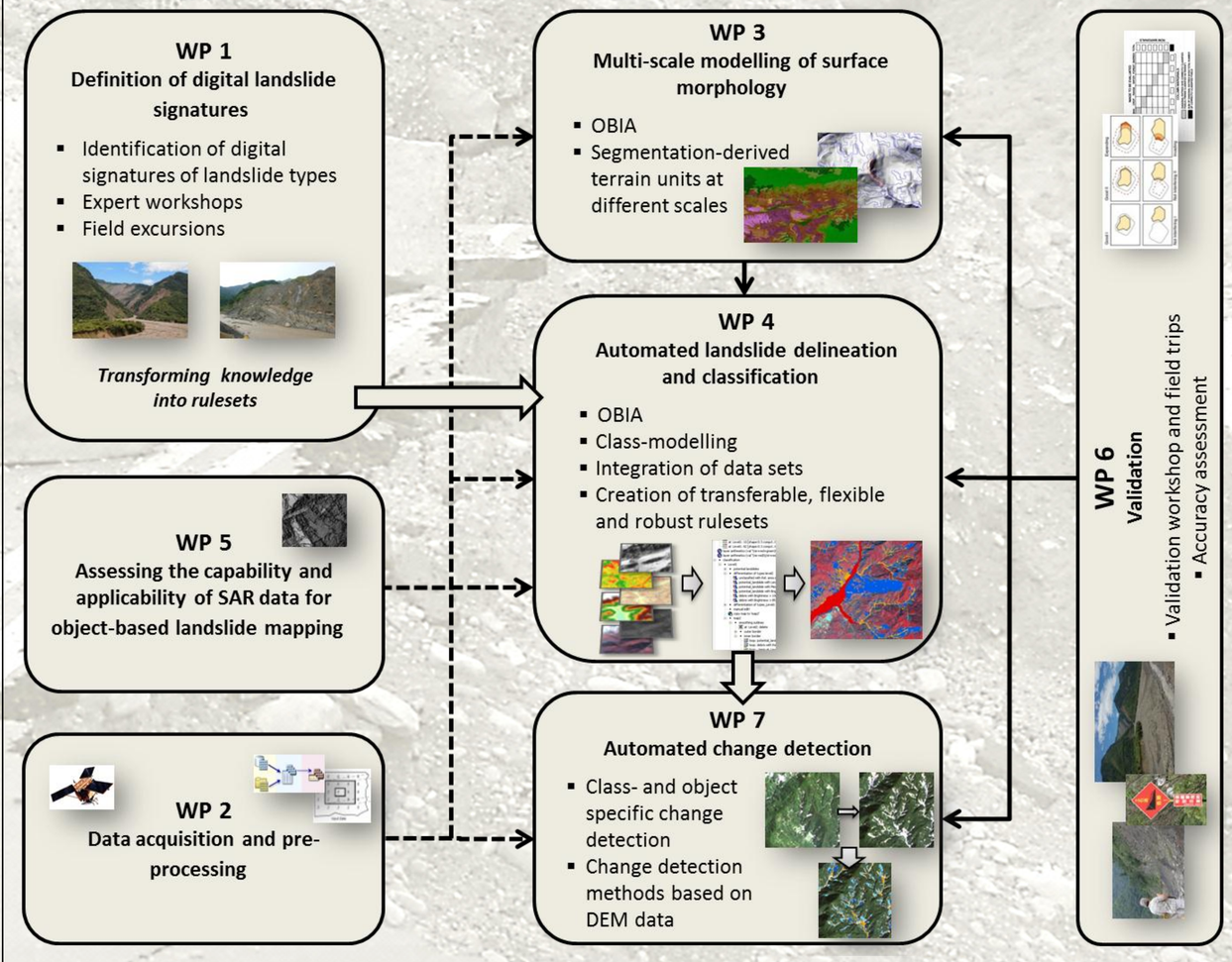
3. Methodological framework

The iSLIDE project addresses the following main tasks, which are elaborated in seven work packages (WPs):

- The definition of **digital signatures of landslide types** to facilitate the transformation of expert knowledge into computer-based rules.
- The **integration of multiple data sets** (optical and SAR satellite imagery, DEMs and terrain unit layers, ancillary data) from different sources and sensors to take into account the most suitable characteristics of each data set.
- The application of **innovative and advanced OBIA methods**.
- The iterative **validation** of the procedures and results to achieve a mature level of automation, robustness and transferability.



Integration of various data layers



4. Study sites

The methodology will be developed and applied in landslide affected study areas in the greywacke zone in Salzburg, **Austria**, and in northern and southern **Taiwan** (Baichi catchment and Huaguoshan catchment).

5. Expected results

The developed OBIA framework will complement existing approaches in landslide research. It will come up with **innovative solutions** that enable the creation of reliable and comparable landslide classification maps.

6. Conclusions

The **integrated semi-automated landslide delineation, classification and evaluation framework** is designed to break new ground in the field of object-based landslide analysis, especially with respect to conceptual and methodological developments.
The project will make an essential contribution towards the development of a methodology that is I) **objective**, II) **transferable** across areas, III) **robust** against changing input data and resolutions, and IV) **automated**.
Semi-automated, integrated workflows will definitely support ongoing activities in the long-term monitoring of landslide prone areas and the fast delivery of reliable results (location, extent of landslides) in emergency cases.

References

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