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# Integrated semi-automated landslide delineation, classification and evaluation

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Landslides constitute 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 in order to assist hazard and risk analysis. Hence, it is of high importance to make use of effective techniques in order to gather information about the exact location, extent and type of landslides in a fast and transparent manner. Object-based image analysis (OBIA) provides a great potential for semi-automated landslide detection and classification, since - in comparison to pixel-based approaches - not only spectral, but also spatial, morphometric, textural, as well as contextual properties can be addressed. Through the integration of multiple data sets landslides can be examined in a more efficient way, making use of the most suitable properties of the available information layers.

Within the project "iSLIDE - Integrated Semi-automated Landslide Delineation, Classification and Evaluation", funded by the Austrian Science Found (FWF), we address such issues by developing a methodological framework for landslide delineation, classification and evaluation through the integration of optical remote sensing data and digital elevation information, as well as terrain unit layers using innovative OBIA methods. Additionally, the potential of SAR data for object-based landslide mapping will be investigated. The methodology will be developed and tested in Austrian as well as Taiwanese study areas, which are frequently affected by landslides. An important component of the framework is the definition of digital signatures of landslide types that facilitate the transformation of expert knowledge into machine-understandable rules. Such a conceptual foundation will make the approach robust and transferable to other study areas, en route to fully automated landslide analysis. Furthermore, the development of automated object-based change detection methods will enable a fast detection of fresh landslides after landslide events, as well as the monitoring of existing landslides. Classification results are repeatedly evaluated by applying novel accuracy assessment methods. Thus, the classification scheme will be improved, and subsequently also the accuracy of the final outputs. The proposed framework is designed to contribute to an increased reliability, transferability and automation in object-based landslide detection, classification and change detection, as well as evaluation through developing innovative methods and applying fully integrated workflows. It is expected that this research will break new ground in the field of object-based landslide analysis, especially with respect to conceptual and methodological developments. The project work will constitute an essential contribution towards the development of a methodology that should be I) objective, II) transferable across areas, III) robust against changing input data and resolutions, and IV) automated. The proposed framework and first outcomes will be presented.