Geophysical Research Abstracts
Vol. 20, EGU2018-12109, 2018
EGU General Assembly 2018

Impact of geological structures on the geometry and kinematics of an active deep-seated rockslide (Ötztal valley, Austria)

Christina Rechberger (1), Christian Zangerl (1), Erwin Heine (2), Erich Draganits (1), Christine Fey (3,4)

(1) Institute of Applied Geology, University of Natural Resources and Life Sciences, Vienna, Austria (christina.rechberger@boku.ac.at), (2) Institute of Surveying, Remote Sensing and Land Information, University of Natural Resources and Life Sciences, Vienna, Austria, (3) alpS GmbH - Centre for Climate Change Adaption, Innsbruck, Austria, (4) TIWAG - Tiroler Wasserkraft AG, Innsbruck, Austria

Deep-seated rockslides are common phenomena along deep glacial Alpine valleys, of which many are encountered in foliated metamorphic rocks, such as phyllites, mica-schists and paragneisses. Generally, the spatio-temporal evolution of these rockslides is controlled by an interplay of various predisposing factors such as lithology, geological structure, in-situ stresses, groundwater flow, glacier retreat and permafrost degradation, and temperature fluctuations.
Since several years, a highly active rockslide (ca. 0.5 m/year) located in the upper Ötztal valley (Tyrol, Austria) is studied with regard to rockslide kinematics, deformation and failure processes. The investigated compound rockslide is 400 m wide and 600 m high (main scarp at 2850 m. a.s.l.) and is situated at a SE-facing slope above the Marzellferner valley glacier. Since 1893 the glacier has retreated by approx. 2 km and has shrunk in thickness of more than 150 m. A temporal relationship between glacier retreat and rockslide activity has been identified. Geologically, the rockslide is situated within the Ötztal Crystalline of the Upper Austroalpine Nappe System and is composed of paragneisses with interlayering mica-schists and banded amphibolites. Structurally, geological features such as foliation planes, compositional layering, joints, and brittle fault zones influence the failure geometry and the kinematics of the rockslide. On surface geomorphological structures i.e. primary and secondary scarps, uphill and downhill facing scarps, graben structures, trenches and tension fractures are mapped. These features enable a geometrical and geomechanical reconstruction of the initial failure process and the subsequent deformation characteristics. Furthermore, the complex evolution of individual rockslide slabs showing different displacement rates is obtained.
Based on deformation monitoring and geological field mapping a preliminary geological, geometrical and kinematical model of the deep-seated Marzellkamm rockslide and its relationship to the structural inventory is presented.