Geophysical Research Abstracts, Vol. 7, 03472, 2005
SRef-ID: 1607-7962/gra/EGU05-A-03472

Enhanced erosion and landslide activity related to deep-seated gravitational slope deformations (DGSD): Case study DGSD Hauser Kaibling, Austria

A. Kellerer-Pirklbauer and H. Proske

Institute of Digital Image Processing, Joanneum Research, Graz, Austria
(andreas.kellerer@joanneum.at)

Deep-seated gravitational slope deformations (DGSD) are common large-scale landscape features in the crystalline basement rocks of the Central Alps of Austria. Relict as well as active forms can be distinguished. Relict forms are very much linked to paraglacial slope adjustment processes acting after glacier retreat in the Late Glacial period. Their movement generally ceased several thousand years later due to the restabilisation of the foot of the movement-affected mountain slope by the filling of valleys by glacio-fluvial, fluvial or lacustrine sediments. The basement rock is generally disintegrated due to the movement processes lasting for some thousand years. Such bedrock favours erosion and the formation of small-scale secondary mass wasting processes. The case study area DGSD Hauser Kaibling is located in the northwest of the province of Styria, Austria. The study area comprises the entire northern mountain site of the 2,015 m high Hauser Kaibling. The mountain site is characterised by a vertical extent of $c.$1,300 m, covers an area of $c.$12 km^2, and consists predominantly of phyllites and mica schist. The inclination of the main foliation is roughly parallel to the dip of the slope. During the Last Glacial Maximum (LGM) the valley glacier in the case study area reached an altitude of $c.$1,900 m a.s.l. Thus, the entire mountain was supported by the weight of the ice mass. The retreat of the glacier in combination with the unfavourable tectono-metamorphic setting caused gravity-induced stresses to act and tension fissures, staggered scarps with antithetical failure systems developed. The long profile of the mountain site clearly shows a concave uphill part (main landslide scarp) and a convex lower part (bulging). Sedimentation processes in the main valley during the Late Glacial and Holocene period caused the restabilisation. Fluvial erosion cut six small and steep valleys into the lower part of the DGSD during the same

period. Furthermore, the westerly and easterly margins of the DGSD are formed by deep valleys. The triggering of secondary mass movements as well as high erosion rates in the study area are favoured by: (i) brittled rock, (ii) steep slopes of the small valleys, (iii) supply of water by rain and snowmelt, and (iv) negative human influence (e.g. alpine skiing infrastructure). The spatial distribution of mapped landslides in the study area greatly reflects these four listed influencing factors. During the last century debris flows or flood events have been triggered on an interval of 6 to 7 years. Thus, the case study Hauser Kaibling clearly demonstrates the long-lasting impacts of DGSDs on erosional as well as on mass movement processes.