
5 Process-based investigations and monitoring of deep-seated landslides

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5.1 Introduction

Through the consolidation of alpine settlement areas there have been an increasing number of incidents in recent years related to the activity of landslides in Northern Tyrol (Austria). This has led to humans, buildings, and communication and transportation routes being increasingly threatened. In 1999 a rockfall event in Huben (Ötztal, Austria) destroyed a wood mill and cut the main power supply for the inner Ötztal. In the same year increased deformation rates at the Eiblschrofen (Schwaz, Austria) induced reoccurring rockfall events. In early summer 2003, parts of the deep-seated Steinlehen rockslide system (Gries i. Sellrain, Austria) were reactivated, causing an acceleration of a sliding slab (Henzinger 2005). Secondary events in the form of increased rockfall activity were the direct consequence of these slope movements and demanded temporary evacuations and roadblocks as immediate measure. In order to protect the road and settlement area permanently a safety dam was built. After the floods in Tyrol in August 2005, parts of the complex Zintlwald landslide system (Stengen, Austria) accelerated. This was triggered on the one hand by increased water infiltration of the slope and on the other hand by intense fluvial erosion of the slope foot. As a consequence important supra-regional infrastructure such as sections of the Arlberg national road were destroyed. In addition, the possibility was given that a rapid landslide could dam the river Rosanna. Considering that a collapse of this dam would entail a sudden flood event downstream, a monitoring and warning system has been installed.

This case study showed that slowly moving slopes can develop into rapid landslides with a high power of destruction. More often they can lead to differential block movements causing damage to the infrastructure on the surface and below the ground. For instance, long and wide cracks were discovered on buildings situated on the deep-seated Niedergallmigg-Matekopf landslide (Fließ, Austria, Kirschner and Gillarduzzi 2005).

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