Geophysical Research Abstracts
Vol. 15, EGU2013-7190, 2013
EGU General Assembly 2013

Protection of large alpine infrastructures against natural hazards

Jörg Robl (1), Manfred Scheikl (1,2), and Stefan Hergarten (3)

(1) Universität Salzburg, Institut für Geographie und Geologie, Salzburg, Austria (Joerg.Robl@sbg.ac.at), (2) alpinfra, consulting + engineering gmbh, Salzburg, Austria, (3) Universität Freiburg, Institut für Geo- und Umweltnaturwissenschaften, Freiburg, Germany

Large infrastructures in alpine domains are threatened by a variety of natural hazards like debris flows, rock falls and snow avalanches. Especially linear infrastructure including roads, railway lines, pipe lines and power lines passes through the entire mountain range and the impact of natural hazards can be expected along a distance over hundreds of kilometers. New infrastructure projects like storage power plants or ski resorts including access roads are often located in remote alpine domains without any historical record of hazardous events.
Mitigation strategies against natural hazards require a detailed analysis on the exposure of the infrastructure to natural hazards. Following conventional concepts extensive mapping and documentation of surface processes over hundreds to several thousand km^2 of steep alpine domain is essential but can be hardly performed.
We present a case study from the Austrian Alps to demonstrate the ability of a multi-level concept to describe the impact of natural hazards on infrastructure by an iterative process. This includes new state of the art numerical models, modern field work and GIS-analysis with an increasing level of refinement at each stage. A set of new numerical models for rock falls, debris flows and snow avalanches was designed to operate with information from field in different qualities and spatial resolutions. Our analysis starts with simple and fast cellular automata for rockfalls and debrisflows to show the exposure of the infrastructure to natural hazards in huge domains and detects "high risk areas" that are investigated in more detail in field in the next refinement level. Finally, sophisticated 2D- depth averaged fluid dynamic models for all kinds of rapid mass movements are applied to support the development of protection structures.