

MultiRISK - MODELLING NATURAL RISKS AND ITS APPLICATION UNDER ASPECTS OF GLOBAL WARMING AND LAND-USE CHANGES IN NORTHWEST ICELAND

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Snow avalanches, slush flows, rock falls, and debris flows are an enormous threat to population and infrastructure in mountainous areas, posing different risks within the same region and locality. To obtain a comprehensive natural risk assessment a multi-processual approach is therefore essential. Currently, the respective processes are modelled in different software programmes with separate data management, whereas only the results of the single processes are finally summarized and displayed in a GIS. Therefore, fundamental research is needed regarding integrative and multi-processual modelling of natural risks, in order to develop a comprehensive, modular risk analysis tool with a high temporal and spatial resolution. Such a model has the potential to calculate different natural risks for one area, e.g. with seasonal differentiation. The aim of this project is to attain a computer-based natural risk model for different processes (rock fall, snow avalanches, debris flows and slush flows) which will be developed in Northwest Iceland and applied to calculate scenarios of global warming

and land-use change. The respective process models will be integrated as modules in an open GIS-platform. Using DEMs and process parameters, hazard run-outs will be calculated and hazard zones derived. Zonation depends on the magnitude and frequency of the respective process, so that different scenarios are possible. Combining hazard zones with risk elements (e.g. people, houses, infrastructure), their damage potential, and their vulnerabilities to the respective process, natural risk zones will be delineated. These can be displayed either for a single process or a process group or for a single object at risk or a large region.

The project is associated to the scientific natural risk analysis which includes studying the geosystem as well as the vulnerability of humans and their surroundings. Natural risk analysis has a strong application potential: In terms of protecting human beings and assets, it helps to detect and therefore reduce possible damages, maybe even prevent damage.