>> SYNTHESIZE MOUNTAINS OF KNOWLEDGE <<

Submitted Abstract

ID IMC22-FSAbstr- 165

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Country		Switzerland
Region		Western Europe

Title	Automated Large Scale Avalanche Hazard Indication Mapping.
Keywords	Avalanche, Hazard Mapping, Large Scale, Protection Forest, Hazard Indication Mapping
Type	List Of Focus Session
Focus Session ID	25

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Abstract

Snow avalanches threaten people and infrastructure in alpine regions around the globe. In order to be able to assess the avalanche risk for these infrastructures, hazard mapping procedures have been developed and successfully applied. They combine avalanche history, terrain analysis, field investigation and snow climatic information with numerical simulations. Avalanche hazard maps show the hazard on a parcel-by-parcel scale and are used for land use planning purposes. In Switzerland, four different zones are defined based on the frequency and pressure of an avalanche. In the area of highest hazard (red), it is forbidden to build houses; in the moderate hazard zone (blue), houses are allowed to be built, but have to be reinforced to withstand impact pressures of up to 30 kPa. But this costly procedure is only elaborated where large values are at risk. In all other alpine regions (90 % in the case of the canton of Grisons), avalanche hazard is not systematically assessed.

To close this gap, we developed an automated approach to generate spatial continuous hazard indication mapping based on digital elevation models. This enables the calculation of different scenarios with return periods ranging from frequent to very rare as well as with and without taking the protective effects of the forest into account. This approach combines the automated delineation of potential release areas, the estimation of release depths and the numerical simulation of the avalanche dynamics, applying the well-established RAMMS model, which is applied for hazard mapping in Switzerland and further countries. This procedure can be applied worldwide, where high spatial resolution digital elevation models, detailed information on the forest and data on the snow climate are available. It enables reproducible hazard indication mapping also in regions where no avalanche hazard maps yet exist, which is invaluable for climate change studies. In this contribution we give an outlook on already performed and planned applications in different countries on various continents.

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