



The Norwegian susceptibility mapping program for rock falls, shallow landslides, debris flows and snow avalanches

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The Geological Survey of Norway has proposed to provide susceptibility maps (scale 1:50'000) for the entire Norwegian territory (385'000 km²), for four processes (rock falls, landslides, debris flows and snow avalanches) in a relatively short time (2 years). This screening of the territory will provide a solid base to prioritize future works. Inventories of events in Norway are too partial to be used for automatic mapping at national scale. Moreover only few datasets are available for the entire country: a 25 m resolution grid of elevation, geological maps and superficial deposits maps. So simple physical models have been developed and implemented in GIS to achieve the task. For each of the processes considered, one method is used to detect the potential source areas and another one to estimate the possible zones of propagation. For rock falls, the source areas are detected by a procedure of slope analysis and the propagations are estimated using a 3D "fahrböschung" angle. The source areas of snow avalanches are based directly on the slope angles, and the propagations are calculated using a new 3D GIS implementation of the alpha-beta method of Bakkehøi et al (1983). Horton and Jaboyedoff (this session) have recently developed an innovative debris flows modeling procedure (sources and propagations) able to map large areas. Models for shallow landslides mapping are certainly the most numerous on the market (coupling for example an infinite slope model with some hydrological parameters). Nevertheless, when working on very large areas, at low resolution, the knowledge of required calibration parameters is poor, and by consequence the results also. So tests and developments are still in progress on various mapping procedures for shallow landslides. This susceptibility mapping program is a first step, and its results will serve of input for hazard and

eventually risk assessment.