EGU2020-8490
https://doi.org/10.5194/egusphere-egu2020-8490
EGU General Assembly 2020

From Large Scale Hazard Mapping to Risk Assessment

Gregor Ortner[1,2], Michael Bruendl[1], David N. Bresch[2,3], and Yves Bühler[1]

[1]WSL Institute for Snow and Avalanche Research SLF, Davos, Switzerland
[2]Institute for Environmental Decisions, ETH Zurich, Zurich, Switzerland
[3]Federal Office of Meteorology and Climatology MeteoSwiss, Zurich, Switzerland

Various studies show that changes in the climate system, such as temperature rise and extreme precipitation events strongly influence gravity driven hazards. In 2018, the research programme “Climate Change Impacts on Alpine Mass Movements” began at the Swiss Federal Institute for Forest, Snow and Landscape Research WSL. Within this programme, we develop a framework to model risk caused by climate and socio-economic change. In a first approach, we model avalanche risk in central Switzerland. The changing hazard disposition is modelled with the RAMMS::LSHM Large Scale Hazard Mapping method and risks are assessed with the probabilistic, Python-based risk assessment platform CLIMADA developed at ETH Zurich. We use several hazard scenarios considering different 3-day increases in snow height, an algorithm for determining potential avalanche release areas, a high-resolution terrain model and a forest layer to model the spatial distribution of avalanche hazard for each of the chosen scenarios. The so-derived hazard indication maps are taken as input into CLIMADA to estimate the risk to buildings and infrastructure applying various functions to quantify the avalanche impact.
The result are risk maps which depict spatial and temporal changes of avalanche risk based on various hazard scenarios. The combination with exposure and damageability information, leading to spatio-temporally explicit risk maps provides a comprehensive basis and allows for the appraisal of appropriate risk management options. A risk based approach for lifelines and residential areas will contribute to decision support and highlight adaptations needed for climate change.