



Using a Beta model for flood loss prediction in mountain areas

Sven Fuchs (1), Micha Heiser (1), Margreth Keiler (2,3), Maria Papathoma-Köhle (1), Matthias Schlögl (1,4), Andreas Zischg (2,3)

(1) University of Natural Resources and Life Sciences, Institute of Mountain Risk Engineering, Vienna, Austria (sven.fuchs@boku.ac.at), (2) University of Bern, Institute of Geography, Bern, Switzerland, (3) University of Bern, Oeschger Centre for Climate Change Research, Mobiliar Lab for Natural Risks, Bern, Switzerland, (4) Zentralanstalt für Meteorologie und Geodynamik (ZAMG), Staff Unit Earth Observation, Vienna, Austria

Natural hazards result in major losses in European mountain regions and beyond. These losses result from the effects of climate change as well as from an increase of values exposed. Yet, the factors influencing exposure and therefore losses, i.e. vulnerability, have gained less attention to date. Vulnerability is defined as the degree of loss resulting from the impact on elements at risk, such as buildings located on torrential fans. Recent studies have focused on evaluating vulnerability to dynamic flooding in European mountain regions using proxies from individual case studies and based on an empirical ex-post approach. However, the transferability to other case studies and therefore the ability of such models to actually predict future losses is debatable. Consequently, an overview on physical vulnerability in mountain catchments is needed, which effectively addresses a knowledge gap about whether vulnerability is hazard-dependent. In this study, we present a model based on loss data from several torrential events in Austria and Italy, which clearly show that a single vulnerability function is sufficient to predict losses and to provide probabilities of destruction under specific hazard magnitudes. The model results confirm that vulnerability curves are transferable and significantly increases the predictive power of risk analyses.