



Anticipatory flood risk assessment under climate change scenarios: from assessment to adaptation

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According to the Centre for Research on Epidemiology Disasters, floods are the type of natural disasters that affected the highest number of people from 1900 to 2008 worldwide. Specifically, Austria suffered from heavy floods in recent years, affecting thousands of people and causing billions of Euro in economic losses. Although there is yet no proof that these accumulated extreme events are a direct consequence of climate change, they may indicate what can be expected.

Currently, comprehensive climate modelling research is being conducted for Austria that may lay the foundation for enhanced climate impact assessments (regional climate modelling under consideration of different global models and varying scenarios). However, the models so far have neither special focus on Austria nor a distinct definition of boundary conditions for Austria. Therefore, results of climate models are considered as too unreliable and inconsistent for predicting changes in flood characteristics, especially at a regional to local scale. As a consequence, adaptation strategies have to be derived from integrated impact analyses that are based on dissecting mechanisms and drivers for changes and not only on the dimension of climate change.

This paper discusses a dynamic flood risk assessment methodology considering potential spatial and temporal developments of hazard and vulnerability under climate change scenarios. The approach integrates quantifiable results from assessments of hazard, exposure and sensitivity and the qualitative, interview based, assessment of adaptive capacities. Flood risk assessment will be conducted for the current state in Austria and enhanced by potential (1) flood scenarios increased by a climate change allowance (2) demographic development scenarios (3) land-use change scenarios and (4) adaptation policy assessment to identify regions especially prone to flooding. Comparing the current state with various anticipatory hazard and vulnerability scenarios provides the basis for a sensitivity analysis of whether climate change impacts or demographic and land use development mainly triggers the increase of damage potentials. Based on this sensitivity analysis, a ranking of priority regions with a current and future need for action will be conducted and illustrated by means of qualitative risk categories ranging from low priority to high priority. Out of these priority areas, three relevant case studies will be chosen and analysed on a micro scale level to enable risk analyses including climate change adaptation assessment on the regional and local level. In the frame of the case studies, a micro-scale risk assessment approach will be applied based on expected annual losses and the influence of adaptation capacity on the overall flood risk. All scientifically derived results will be discussed in community based scenario workshops. This participatory tool enables stakeholders to address the relevant determinants of vulnerability, to point at so far unconsidered locally important context conditions and to come to conclusions about envisaged useable adaptive measures.