Geophysical Research Abstracts
Vol. 13, EGU2011-10979, 2011
EGU General Assembly 2011

Assessing prospective flood risk – case studies from Austria

Clemens Neuhold and Hans Peter Nachtnebel

Institute of Water Management, Hydrology and Hydraulic Engineering, University of Natural Resources and Life Sciences, Vienna, Austria (clemens.neuhold@boku.ac.at)

The assessment of flood risk comprises of hazard assessment and vulnerability assessment. Flood hazard varies due to hydrological characteristics, land use change, climate change, etc. Flood vulnerability strongly depends on human behaviour, flood mitigation and flood protection as well as susceptibility and exposure. The exposure to floods increased substantially during the past decades due to change in land use from agricultural to industrial and residential areas in former flood plains, leading to a significant increase in physical and human exposure and consequently higher damage potential.

This paper aims at developing new approaches and methodologies to assess prospective flood risk to enable strategic regional development within flood prone areas. Therefore, state of the art approaches – assessing the current state of development – are extended by future development scenarios based on several data sources referring to demography, land use, building types, settlement characteristics, historic data, etc. Based on this information the scenarios (1) "status quo", (2) "extrapolation of previous development" and (3) "realistic maximum development" are assessed based on various hydrologic scenarios (HQ30, HQ100, HQ300 and extreme events). New approaches are developed, tested and validated based on two case studies in Austria. Both case study sites are characterised by rural settlements exposed to medium sized rivers (Mattig and Große Rodl) whereas the municipality of Pfaffstätt/Mattig (case study 1) is not protected against floods at all, and the municipalities Scharzgrub, Rodl and Höflein/Großen Rodl (case study 2) are protected against a 100-years flood. Therefore, aspects of risk and residual risk are discussed by this paper and are incorporated to the presented flood risk assessment methodologies.

Both case study sites show remarkable increase of flood risk (discounted on 2010) – for case study 1 an increase of the expected annual losses is estimated at roughly 40% until 2100 (2010: 180000€a; 2100: 250000€a); for case study 2 tremendous increases are expected as areas without protection are highly likely to be adapted (filling up to HQ100 level) and settled. Nevertheless, an increase of the expected annual losses by a minimum of five times the current values has to be expected (2010: 5000€a; 2100: 28000€a). The results clearly indicate that the consideration of prospective development scenarios is needed to enable comprehensive and anticipatory flood risk assessment providing a reliable basis for adequate flood risk management strategies.