



Quantifying uncertainty inherent to state-of-the-art flood risk assessment

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Referring to state-of-the-art flood risk assessment (FRA), flood hazard is typically characterised by three normatively defined scenarios. In the frame of this paper this widely accepted and applied standardized FRA approach considers the scenarios HQ30, HQ100 and HQ300 with respect to the EU Floods Directive. This range of scenarios typically does not cover the required range of scenarios from “no damage” to “worst case” leading to an underestimation of the overall flood risk. Additionally, flood vulnerability is analysed based on Corine Land Cover data and the digital cadastral land register, respectively. This simplified approach enables just a generalised examination of human exposure, exposed structures and potentially affected environmental properties. However, the high variability in most relevant processes (hydrology, hydrodynamics) or some processes themselves (e.g. sediment transport) are generally neglected. Therefore, the reliability of risk assessment is highly dependent on data availability and data accuracy. Especially, an increase in data accuracy (considered scenarios, topographical data, simulation results and vulnerability data) enables a more robust calculation of hazard and vulnerability. Therefore, benefits of integrating additional data sources and processes to standardised FRA are analysed based on case studies in Austria. These sources and processes are (1) the consideration of a broadened range of scenarios from “no damage” to “worst case” (2) the consideration of morphological river bed variability (3) the definition and evaluation of failure scenarios and (4) the implementation of in-field mapping information and interviews. Results indicate that due to the proposed additional analyses more robust results can be expected. However, much more time, data and resources are needed. Therefore, this revised flood risk assessment concept is only appropriately applicable on detailed studies or rivers where reliable data is available.