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The Influence of Input Data on Flood Risk Estimates

Tobias Sieg^{1,2} and Annegret Thielen¹

¹University of Potsdam, Institute of Earth and Environmental Science, Potsdam, Germany (tobisieg@uni-potsdam.de)

²GFZ German Research Centre for Geosciences, Section Hydrology, Potsdam, Germany

The management of risks arising from natural hazards requires a reliable estimation of the hazards' impact on exposed objects. The data sets used for this estimation have improved during the recent years reflecting an increasing amount of detail with regard to spatial, temporal or process information. Yet, the influence of the choice of data and the degree of detail on the estimated risk is rarely assessed.

We estimated flood damage to private households and companies for a flood event in 2013 in Germany using two different approaches to describe the hazard, the exposed objects and their vulnerability towards the hazard with varying levels of detail. One flood map is based on local flood maps computed by the European Joint Research Center not including embankments, while the other flood map was derived especially for this particular flood event. Exposed elements are mapped using the land use based data set BEAM (Basic European Asset Map) and with an object-based approach using OpenStreetMap data. The vulnerability is described by ordinary Stage-Damage-Functions and by tree-based models including additional damage-driving variables. The estimations are validated with reported damage numbers per federal state and compared to each other to quantify the influence of the different data sets at various spatial scales.

The results suggest that a stronger focus on exposed elements could improve the reliability of impact estimations considerably. The individual assessment of the influence of the different components on the overall risk points out promising next steps for further investigations.