



Flood Frequency Analysis using different flood descriptors – the Warsaw reach of the river Vistula case study

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Flood frequency analysis (FFA) is customarily performed using annual maximum flows. However, there is a number of different flood descriptors that could be used. Among them are water levels, peaks over the threshold, flood-wave duration, flood volume, etc.

In this study we compare different approaches to FFA for their suitability for flood risk assessment. The main goal is to obtain the FFA curve with the smallest possible uncertainty limits, in particular for the distribution tail. The extrapolation of FFA curves is crucial in future flood risk assessment in a changing climate.

We compare the FFA curves together with their uncertainty limits obtained using flows, water levels, flood inundation area and volumes for the Warsaw reach of the river Vistula. Moreover, we derive the FFA curves obtained using simulated flows. The results are used to derive the error distribution for the maximum simulated and observed values under different modelling techniques and assess its influence on flood risk predictions for ungauged catchments. MIKE11, HEC-RAS and transfer function model are applied in average and extreme conditions to model flow propagation in the Warsaw Vistula reach. The additional questions we want to answer are what is the range of application of different modelling tools under various flow conditions and how can the uncertainty of flood risk assessment be decreased.

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