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# Influence of Measurement Uncertainties on Results of Hydrological Models

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For the set-up of water management plans, models are used to predict the risk of flooding. These predictions have an uncertain character because a lot of errors can play a role. Model output uncertainty related to measurement errors are the temporal and spatial uncertainties connected to the input data and the data used for calibration, the uncertainty on the boundary conditions and the initial state and uncertainty related to the geometry of the river and the characteristics of the structures.

The results of a rainfall-runoff model can serve as input or an other method is with measurements and stage-discharge relationships.

In the first case the errors related to rain data need to be quantified. Uncertainty at rainfall registration results from the location of the rain gauge, the calibration of the measurement devices and wind effects. The sensitivity of the final model results of the errors in local rainfall made by using Thiessen polygons is quantified. This data sensitivity research of rain gauge network requires generation of large numbers of Thiessen polygons. Further there are errors related to other inputs for the rainfall-runoff model like the relation between impervious and pervious area which will influence the amount and duration of run-off.

For the second case the stage-discharge relationships also include some important errors caused by measurement errors, interpolation for extreme circumstances, corrections for plant growth and missing information regarding changes in the river geometry due to construction works and changed profile because of flooding and sedimentation.

Inputs like geometry of the river and characteristics of the structures also have error bounds around them.

A global uncertainty analysis making use of Latin Hypercube Monte Carlo sampling is performed for all the input errors. The sampling variation is according to previous investigation about errors from literature and own experience.

A list with magnitudes of the errors is made to serve as a general guideline for uncertainty assessment of hydrological and hydraulic models. These errors are general and can give as such too wide uncertainty bounds around the results. The model results can become too uncertain for scenario analysis and management decisions. However; for evaluation of scenarios it is sure that some of the uncertainties do not change between scenarios and so these uncertainties disappear when the difference is considered between two scenarios. Together with the list of errors and the most important sources of uncertainty, also an overview is given of what kind of uncertainties do not change regarding management options.