



Sensitivity and uncertainty analysis of the hydrological model J2000

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Three different types of sensitivity analyses were used on the calibration parameters of the distributed hydrological model J2000 applied in the Wilde Gera catchment (13 km²) in Germany: (1) One dimensional inspection of each single parameter, (2) two dimensional analysis by response surfaces and (3) multidimensional assessment of parameter sensitivity and interactions by Monte-Carlo-Runs. For all three different approaches the complete feasible parameter space was sampled using a latin-hypercube sampling algorithm.

The main focus of the study was the quantification of the influence of the single calibration parameters on the model results, the detection of parameter interactions, and the provision of a basis for an uncertainty analysis of the model.

The findings were that: (1) parameter sensitivities are highly dependent from the selection of efficiency criteria or objective functions which are used to measure their influence; (2) the J2000 model is highly dominated by parameter interactions which can be detected and quantified by two- and multi-dimensional analysis.

The paper will concentrate on the demonstration of the applied methodology and will show how it can be used for the definition of sound calibration strategies and the quantification of model uncertainty.