



Evaluation of Different Calibration Strategies in Combination with Different Optimization Algorithms for a Semi-Distributed Hydrological Model

Markus Wallner, Uwe Haberlandt, and Jörg Dietrich
Germany (wallner@iww.uni-hannover.de)

A main application for hydrological modelling is the projection of the hydrological cycle for changing climate and landuse conditions. This view into the future is accompanied by considerable uncertainties. The assignment for hydrologists is to reduce these uncertainties where possible. On hydrological scales a detailed physical description of the system, due to the availability of input data and incomplete process knowledge is not possible. As a result conceptual models which are related to the physic and the hydrology of a catchment via parameters were developed. The determination of general parameters for these models is one challenge which has to be met by hydrologists.

Our study consists of two different parts. In the first one we compared different calibration strategies for the parameter estimation of a semi-distributed hydrological model. The calibration strategies were the (a) Lumped, (b) 1-Factor, (c) Distributed and (d) Regionalization. These methods were applied in combination with three different optimization algorithms (PEST, DDS, SCE) in three different sub-catchments of the Aller-Leine River Basin in Northern Germany. The second part of our study focused on the validation of the spatial transferability of the estimated parameters from the calibrated models, which in our opinion is a clear indicator of model robustness. Therefore we transferred the parameters of the calibrated catchments to two uncalibrated catchments.

Even if for the first part of our study the Regionalization was behind our expectations, the second part, the transferability of parameters, clearly showed the potential of this method. However, also the Lumped approach indicated a similar spatial model robustness.