



Performance of auto-calibration algorithms in the field of urban drainage modelling

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ABSTRACT

An important part in an urban drainage modelling process is model calibration. In principle calibration aims to minimize the deviation between model predictions and measured data by altering model parameters. To do this, one or multiple chosen objective functions have to be minimized or maximized. Model calibration is a complex and time consuming task even if it is done automatically. In this work a benchmark system is presented for testing the performance of existing and newly developed auto-calibration algorithms. The presented benchmark is performed on two different algorithms (Levenberg-Marquardt and Particle-Swarm optimisation) with two different objective functions (Sum-of-Squared-Error and Nash-Sutcliffe) calibrating 250 virtual generated hydrodynamic urban drainage models. Results show that calibration of these case studies is three times faster using Levenberg-Marquardt optimisation than with a Particle-Swarm optimisation. This difference is independent of the used single objective function (Levenberg-Marquardt or Sum-of-Squared-Error).

KEYWORDS

auto-calibration, benchmark, Calimero, fitness-landscape, objective function, optimisation, hydrodynamic model