



Objective calibration of the hydrological model SEROS for the Odra watershed

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Hydrologic models often contain parameters that cannot be measured directly but which can only be inferred by a trial-and-error process that adjusts the parameter values to closely match the input-output behaviour of the model to the real system it represents. Traditional calibration procedures, which involve manual adjustment of the parameter values are labour-intensive, and their success is strongly dependent on the experience of the modeller. Automatic methods for model calibration are objective. However, many studies have shown that such methods have difficulties in finding unique parameter estimates. Most hydrological methods suffer from similar problems, e.g. the existence of multiple local optima in the parameter space with both, small and large domains of attraction (i.e. a sub-region of the parameter space surrounding a local minimum) or discontinuous first derivatives. The consideration of these problems resulted in the development of a robust and efficient global optimisation algorithm called 'shuffled complex evolution' (SCE) global optimisation algorithm developed at the university of Arizona.

Within the EU funded project FLOODRELIEF the hydrological model SEROS (Surface Energy and Routing Scheme) is calibrated for the Odra watershed and used for flood forecasting purposes. The calibration is performed by use of the SCE algorithm. SEROS is a grid based model system which solves the coupled surface energy and water balance equations in each grid. Runoff is transported into the river system by use of a unit hydrograph approach and then along the river channel system by a kinematic wave approximation.

The calibration period for the SEROS system is the four years from 1992 until 1995. Data for the period 1996 until 1999 are used for validation purposes. Each of 39 sub-

catchments is calibrated separately. The model efficiency shows a large regional variability. The calibration procedure and the validation with observed streamflow data are discussed.