Geophysical Research Abstracts, Vol. 7, 08435, 2005
SRef-ID: 1607-7962/gra/EGU05-A-08435

Multi-objective calibration of a river water quality model –information content of calibration data

M. Rode, U. Suhr

UFZ - Center for Environmental Research, Department of Hydrological Modelling, Brueckstrasse 3a, D-39114 Magdeburg, Germany (michael.rode@ufz.de)

The identification of river water quality models requires that appropriate data be selected for model calibration. In this study the nonlinear parameter estimator PEST was used for the multi-objective calibration of the deterministic river water quality model QSIM of the BfG (Germany). A local multi-objective sensitivity analysis was carried out to identify the parameters most affecting the model outputs. The investigation was conducted based on five extensive flowtime related longitudinal surveys with 14 sampling locations along a 536 km free-flowing reach of the German part of the River Elbe. Five output variables were calibrated. Based on 30 multi-objective calibration runs of different numbers and combinations of the data sets we found that calibration is only slightly improved using more than three data sets. Uncertainties can be decreased with an increased calibration database. For the calibration Nash and Sutcliffe coefficient cumulated distribution functions steepen progressively and the uncertainties of parameter estimation decreases with increased number of data sets. Most uncertainties are associated with the calculation of oxygen. On the investigated river reach parameter sensitivities are highly variable depending mainly on the growth of algal biomass. The total variance of the calibration data shows a strong relationship to the objective function of weighted sum of squares. The results of this study will help model users to define appropriate data collections and monitoring schemes.