Spatial validation of semi distributed model in Selke catchment in Germany.

Salman Ghaffar (1), Seifeddine Jomaa (), and Michael Rode ()

(1) Helmholtz Centre for Environmental Research [U+02D7] UFZ, Aquatic Ecosystem Analysis and Management, Germany (salman.ghaffar@yahoo.com), (2) Helmholtz Centre for Environmental Research [U+02D7] UFZ, Aquatic Ecosystem Analysis and Management, Germany (seifeddine.jomaa@ufz.de), (3) Helmholtz Centre for Environmental Research [U+02D7] UFZ, Aquatic Ecosystem Analysis and Management, Germany (michael.rode@ufz.de)

Nitrogen models on catchment scale have key value identifying terrestrial loading and nitrogen transfer within river networks and evaluating water quality according to changing land use and climate factors in the future. An unresolved problem in applying distributed water quality models is their often unknown spatial validity because of spares spatial nutrient concentration data. For this reason, the semi distributed hydrological water quality model HYPE (Hydrological Predictions for the Environment) is used for the spatial validation of hydrology and nitrogen driven model parameters in Selke catchment. The nested meso-scale Selke catchment is characterized by different land uses and soil types distributions from the upper to the downstream parts having area of 463 km2 located in Eastern Germany in lower Harz mountain ranges. First, the simulations are conducted at three main stations using 20 years of observed data. Second, the model is calibrated at these stations with different dominating land use and soil characteristics. The DREAM (DiffeRential Evolution Adaptive Metropolis) algorithm, which is based on Markov Chain Monte Carlo (MCMC) approach, was used for multi-objective and multi-site calibration and uncertainty analysis. After the calibration of hydrological and nitrogen driven parameters, these parameters will be tested for validation in other 13 internal sub-catchments of different size and geographical characteristics.
The model results will help us to assess the spatial validity of the suggested model and identify minimum data requirements for application of distributed nitrate catchment models. Moreover the results will also be used for upscaling of this model in other small and large catchments having similar characteristic than the Selke catchment.