**REGIONAL MODELLING AND VALIDATION OF LONG-TERM SOLUTE AND SEDIMENT TRANSPORT IN THE CATCHMENT OF THE WAHNBACH RIVER**

H. Bogena and B. Diekkrüger
Geographical Institute, University of Bonn

Simulating water quality and soil erosion in meso-scale catchments may involve a low accuracy of the model output, because of the lack of detailed information at this scale. Therefore long-term simulations presume a detailed validation of the model results at different time and spatial scales, because model and parameter uncertainty can lead to incorrect results. We present the methodology and first results of the analysis and the simulation of the solute and sediment transport of the past 50 years in the small catchment of the Wahnbach River, which covers an area of about 70 km². Water transport and suspended load are simulated by means of the physically based continuous simulation model OPUS. The model was chosen because it simulates all necessary processes at different time scales (single events up to decades). Since OPUS is designed to simulate the processes at single slopes the catchment is discredited into a number of slopes, which are linked by the channel. The model was modified to simulate interflow and groundwater flow and was calibrated on small sub-catchments with different land use distributions. The land use in the catchment of the Wahnbach River changed from an agricultural dominated to a pasture dominated landscape in the past decades, due to increasing water protection requirements. Simultaneously the grade of sealing due to settling has increased. This alteration requires an application of the developed model system under changing boundary conditions. The catchment drains into a drinking water reservoir, which was constructed in the late 50’s. Since this time sediment was accumulated in the front basin of the reservoir enabling the quantification of the sediment export of the last 40 years. Furthermore the water quality of Wahnbach River is determined since 20 years on a daily resolution providing an excellent possibility for a validation of the model system under a changing environment. Simulating water quality and soil erosion in meso-scale catchments may involve a low accuracy of the model output, because of the lack of detailed information at this scale. Therefore long-term simulations presume a detailed validation of the model results at different time and spatial scales, because model and parameter uncertainty can lead to incorrect results. We present the methodology and first results of the analysis and the simulation of the solute and sediment transport of the past 50 years in the small catchment of the Wahnbach River, which covers an area of about 70 km². Water transport and suspended load are simulated by means of the physically based continuous simulation model OPUS. The model was chosen because it simulates all necessary processes at different time scales (single events up to decades). Since OPUS is designed to simulate the processes at single slopes the catchment is discredited into a number of slopes, which are linked by the channel. The model was modified to simulate interflow and groundwater flow and was calibrated on small sub-catchments with different land use distributions. The land use in the catchment of the Wahnbach River changed from an agricultural dominated to a pasture dominated landscape in the past decades, due to increasing water protection requirements. Simultaneously the grade of sealing due to settling has increased. This alteration requires an application of the developed model system under changing boundary conditions. The catchment drains into a drinking water reservoir, which was constructed in the late 50’s. Since this time sediment was accumulated in the front basin of the reservoir enabling the quantification of the sediment export of the last 40 years. Furthermore the water quality of Wahnbach River is determined since 20 years on a daily resolution providing an excellent possibility for a validation of the model system under a changing environment.