Geophysical Research Abstracts
Vol. 17, EGU2015-4894, 2015
EGU General Assembly 2015

Detection of dominant modelled nitrate processes with a high temporally resolved parameter sensitivity analysis

Marcelo Haas, Björn Guse, Matthias Pfannerstill, and Nicola Fohrer
Christian-Albrechts-University of Kiel, Institute of Natural Resource Conservation, Department of Hydrology and Water Resources Management, Germany (mhaas@hydrology.uni-kiel.de)

The river systems in the catchment are impacted by nutrient inputs from different sources of the landscape. The input of nitrate from agricultural areas into the river systems is related to numerous processes which occur simultaneously and influence each other permanently. These complex nitrate processes are represented in eco-hydrological models. To obtain reliable future predictions of nitrate concentrations in rivers, the nitrogen cycle needs to be reproduced accurately in these models. For complex research questions dealing with nitrate impacts, it is thus essential to better understand the nitrate process dynamics in models and to reduce the uncertainties in water quality predictions.
This study aims to improve the understanding of nitrate process dynamics by using a temporal parameter sensitivity analysis, which is applied on an eco-hydrological model. With this method, the dominant model parameters are detected for each day. Thus, by deriving temporal variations in dominant model parameters, the nitrate process dynamic is investigated for phases with different conditions for nitrate transport and transformations.
The results show that the sensitivity of different nitrate parameters varies temporally. These temporal dynamics in dominant parameters are explained by temporal variations in nitrate transport and plant uptake processes. An extended view on the dynamics of the temporal parameter sensitivity is obtained by analysing different modelled runoff components and nitrate pathways. Thereby, the interpretation of seasonal variations in dominant nitrate pathways is assisted and a better understanding of the role of nitrate in the environment is achieved. We conclude that this method improves the reliability of modelled nitrate processes. In this way, a better basis for recent and future scenarios of nitrate loads management is provided.