Geophysical Research Abstracts
Vol. 21, EGU2019-14706, 2019
EGU General Assembly 2019

Impact of river geomorphology on in-stream nitrate retention in the Bode catchment, central Germany

Xiangqian Zhou, Xiaoqiang Yang, Seifeddine Jomaa, and Michael Rode

Helmholtz Centre for Environmental Research - UFZ, Department of Aquatic Ecosystem Analysis and Management, Magdeburg, Germany (xiangqian.zhou@ufz.de,xiaoqiang.yang@ufz.de,seifeddine.jomaa@ufz.de,michael.rode@ufz.de)

River networks play an important role in nutrient transport, retention and export from terrestrial to coastal ecosystems through complex interaction of hydrological, geomorphological and biogeochemical processes. Our physical understanding of the interactions between river geomorphology and nutrient retention in river networks is still limited. To investigate the relationship between nutrient retention and stream morphology (sinuosity and stream width), the fully-distributed catchment nitrate model (mHM-Nitrate) was applied in the Bode catchment (3300 km2 Germany). The stream width represented in the mMH-Nitrate model was modified to simulate natural cross section area. The sinuosity of Bode river network was divided into four classes (1-1.5, 1.5-2, 2-2.5, and >3). The baseline situation of the stream sinuosity was dominated by a first-class sinuosity (1-1.5). Different scenarios of stream sinuosity and stream width were generated considering the land use, soil type and slope. Then, the mHM-Nitrate model was used to quantify the nitrate retention between the different scenarios compared with the baseline conditions. Preliminary results showed that different combinations of sinuosity and stream width result in different uptake fractions from the total nitrate load. In addition, how much the effects of sinuosity and stream width are controlled by other factors (such as transit time, soil type and land use), were investigated using the mHM-Nitrate model. This kind of study, will definitely allow us to gain further insights on how effective restoration and nutrient mitigation management can be reached at the catchment scale.