Geophysical Research Abstracts
Vol. 16, EGU2014-5222, 2014
EGU General Assembly 2014

Linkage between Riverine Nitrogen and Hydrological Response in Central Germany: Insights from High Resolution Data

Seifeddine Jomaa (1,2), Malek Alsuliman (2), Iyad Aboud (2), Sanyuan Jiang (2), and Michael Rode (2)

(1) Helmholtz Centre for Environmental Research - UFZ, Department of Bioenergy, Magdeburg, Germany (seifeddine.jomaa@ufz.de), (2) Helmholtz Centre for Environmental Research - UFZ, Department Aquatic Ecosystem Analysis and Management, Magdeburg, Germany (malek.alsuliman@ufz.de, iyad.aboud@ufz.de, sanyaun.jiang@ufz.de, michael.rode@ufz.de)

Rain storms are main drivers of nitrogen losses in Central Europe. However, the effects of storm events on riverine nitrogen (N) dynamics and their relationship to runoff generation are still poorly understood. Generally, good evaluation and understanding of the dynamical behaviour of surface water quality variables is mainly limited by the monitoring strategy and sampling frequencies. In this study, the dynamics of riverine N and storms effects in two catchments with strongly deviating land use conditions in Central Germany were investigated through continuous high resolution measurements. In-stream 3 years of semi-continuous (15 min) measurements of nitrate and discharge were conducted at 3 gauging stations within the Selke catchment (463 km^2), which represents a catchment with moderate to low nitrate concentrations. The data used here were generated by the German's Terrestrial Environmental Observatories (TERENO). Additionally 3 years of continuous data from the nitrate rich Weida catchment (99 km^2) were used. The Weida is characterized by high nitrogen leaching compared with the Selke catchment.

Discharge-nitrate concentration data from the catchments show distinctive patterns, suggesting flushing and dilution responses. Preliminary results revealed that the patterns of the hysteresis between discharge and nitrate differed during the hydrological year (winter and summer), where the antecedent conditions play a crucial role on runoff generation, and in turn nitrate concentration. The nitrate-discharge hysteresis behaviour changed strongly from autumn to spring with weaker hysteresis effects in late spring. This indicates a shift from a nitrogen-source limited to a nitrogen-transport limited system. This behaviour was more pronounced in the nitrate rich stream Weida than in the nitrate poor stream Selke.