Geophysical Research Abstracts
Vol. 17, EGU2015-12604, 2015
EGU General Assembly 2015

Using large volume samplers for the monitoring of particle bound micro pollutants in rivers

Steffen Kittlaus and Stephan Fuchs

Institute for Water and River Basin Management, Department Aquatic Environmental Engineering, Karlsruhe Institute of Technology, Karlsruhe, Germany (kittlaus@kit.edu)

The requirements of the WFD as well as substance emission modelling at the river basin scale require stable monitoring data for micro pollutants. The monitoring concepts applied by the local authorities as well as by many scientists use single sampling techniques. Samples from water bodies are usually taken in volumes of about one litre and depending on predetermined time steps or through discharge thresholds. For predominantly particle bound micro pollutants the small sample size of about one litre results in a very small amount of suspended particles. To measure micro pollutant concentrations in these samples is demanding and results in a high uncertainty of the measured concentrations, if the concentration is above the detection limit in the first place. In many monitoring programs most of the measured values were below the detection limit. This results in a high uncertainty if river loads were calculated from these data sets.

The authors propose a different approach to gain stable concentration values for particle bound micro pollutants from river monitoring: A mixed sample of about 1000 L was pumped in a tank with a dirty-water pump. The sampling usually is done discharge dependant by using a gauge signal as input for the control unit. After the discharge event is over or the tank is fully filled, the suspended solids settle in the tank for 2 days. After this time a clear separation of water and solids can be shown. A sample (1 L) from the water phase and the total mass of the settled solids (about 10 L) are taken to the laboratory for analysis. While the micro pollutants can't hardly be detected in the water phase, the signal from the sediment is high above the detection limit, thus certain and very stable. From the pollutant concentration in the solid phase and the total tank volume the initial pollutant concentration in the sample can be calculated. If the concentration in the water phase is detectable, it can be used to correct the total load.

This relatively low cost approach (less costs for analysis because of small sample number) allows to quantify the pollutant load, to derive dissolved-solid partition coefficients and to quantify the pollutant load in different particle size classes.