



Interconnection of urban pressure, sediment yield, and hydrophobic pollutants distribution among particle-bound and dissolved export

Marc Schwientek, Hermann Rügner, and Peter Grathwohl

University of Tuebingen, Center for Applied Geoscience, Tuebingen, Germany (marc.schwientek@uni-tuebingen.de)

Measuring and in particular predicting the transport of hydrophobic pollutants is complicated by its two-phase character (dissolved/particle-bound). The measurement of dissolved concentrations is often hampered by low concentrations while representative sampling of particle-bound pollutants is difficult due to the inherent heterogeneity of river bed sediments. Recent advances have shown that sampling of bulk water samples at varying suspended particles concentrations enables the determination of robust and catchment-specific metrics of sediment-related as well as dissolved concentrations of organic pollutants such as polycyclic aromatic hydrocarbons or heavy metals. In combination with time series of sediment concentration and/or turbidity, results further indicate that the annual sediment yield of a catchment, but also the respective distribution coefficients of the transported grain size fractions, are decisive, on the one hand, for the loading of particles with hydrophobic urban pollutants and, on the other hand, for the relative fractions of particle-bound and dissolved transport. For given distribution coefficients, systems with low sediment yield tend to a more gradual pollutant export via the dissolved phase, while catchments with intense sediment production are dominated by pulsewise export by the particulate phase. For catchment managers, this results in the challenge to capture the rare flood events in order to determine annual loads. In conclusion, a concept is presented which enables predictions of pollutant distribution and sediment contamination based on easy assessable catchment and chemical parameters.