



Turbidity (NTU) as a proxy for total suspended solids (TSS) and total concentration of POPs in river water: results from field studies and controlled laboratory experiments

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Transport of hydrophobic organic pollutants in rivers is mainly coupled to transport of suspended particles. As turbidity and TSS are correlated on-line monitoring of turbidity (e.g. by optical backscattering sensors) may be used as a proxy for the concentration of suspended particles in rivers and for an assessment of annual pollutant fluxes of total PAHs (and likely other highly hydrophobic organic pollutants). This was confirmed by a 1.5 years monitoring campaign where the total concentration of polycyclic aromatic hydrocarbons (PAHs), the amount of total suspended solids (TSS) and turbidity was measured on a monthly basis in water samples from 5 neighbouring catchments in Southwest Germany (see Grathwohl et al. Session HS2.7). To further verify this approach pronounced flood events were sampled at high temporal resolution in 3 catchments in Southwest Germany (Ammer, Goldersbach, Steinlach) and analyzed accordingly. Turbidity was also monitored on-line. In addition, a set of laboratory experiments was performed where samples with different “turbidities” were artificially produced by mixing of natural sediments with river water (Ammer catchment) and subsequent sampling of the supernatant water after various time periods of sedimentation. Samples were analyzed as above and in addition for grain size distribution. The results showed that turbidity and TSS were linearly correlated over very large turbidity ranges (up to 900 NTU for the flood samples and up to several thousand NTUs in the lab experiments). From linear regressions of turbidity vs. total PAH concentrations in water, mean concentrations of PAHs on suspended particles [mass/mass] could be calculated. These were in close agreement with the values from the previous studies. Grain size distribution of suspensions did not severely effect PAH concentrations on suspended particles.