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Two years of atmospheric deposition monitoring of polycyclic aromatic hydrocarbons (PAHs) in five European river catchments: Results and comparison with PAH-concentrations in soils

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In the last decades, environmental scientists have focused on point source soil and groundwater pollution. Compared to point source pollution, recent findings show that diffuse pollution occurs in comparably low concentrations almost worldwide. The main pathway is transport by and deposition from the atmosphere. Ongoing enrichment of pollutants in soils and sediments through this pathway could result in long term risks for groundwater even in areas far away from emission.

This research investigates the deposition and soil burden of polycyclic aromatic hydrocarbons (PAHs) in five European catchments chosen by the AquaTerra project, an integrated project of the 6th EU RTD Framework Program. The projects' objective is to provide a scientific basis for improved river basin management by obtaining a better understanding of the river-sediment-soil-groundwater system. This might be adaptive to European efforts to respond to variances due to changes in climate, landuse and pollution of air, soil and water.

Within this goal in mind, 17 PAHs from the EPA priority list including pyrene were chosen as representatives for persistent organic pollutants (POP), as they occur worldwide due to combustion of fossil fuels. They are also stable enough to be monitored with a time-integrated bulk deposition sampler, which uses a funnel-adsorber-cartridge device. Sampling occurs in two month intervals to minimize costs and sample numbers. Soil samples taken from profiles beneath the deposition samplers are expected to show vertical distribution of PAHs in relation to soil properties, and the deposi-

tion record. Finally, the investigation of groundwater could track down possible PAH-fluxes.

Field investigations took place in the small catchment of Brévilles (France) and several sub-catchments of the large river basins Danube, Ebro, Elbe and Meuse. All areas show significant seasonality in the atmospheric deposition of PAHs with higher deposition rates in winter (factor 2-3). Overall, the highest deposition rates have been found for the Danube (150 [ng m^{-2} d^{-1}] up to 1400 [ng m^{-2} d^{-1}]), followed by Meuse, Elbe and Brévilles with decreasing values. The Ebro showed the lowest deposition rates very clear, with a minimum in the Pyrenean mountains (20 [ng m^{-2} d^{-1}] up to 60 [ng m^{-2} d^{-1}]).