**Air-soil exchange of semi-volatile organic compounds in a central European receptor area : diurnal variations and influence of soil moisture and soil properties**

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Soils are a major reservoir of semi-volatile organic compounds (SOCs) in the environment and air-soil exchange is a key process controlling the atmospheric concentrations and regional fate of pollutants, at least far from primary SOC sources.

In this study, concentrations of polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs) and organochlorine pesticides (OCPs) in air and soil, their fugacities (*f*a and *f*s) and the experimental soil-air partitioning coefficient (*K*SA) were determined at two background sites in the Gt. Hungarian Plain in August 2013, based on soil and air sampling (various heights above ground; (Cabrerizo et al., 2009)). Moreover, the diurnal variations and the influence of soil moisture and soil properties on air-soil exchange is investigated. The day-night temperature amplitude in soil was 290.6-307.8 K.

Soil concentrations showed large variabilities for all compounds (59.6-3393 ng.g-1 for Σ16PAHs, 0.38-0.83 ng.g-1 for Σ7PCBs, 0.86-26.4 ng.g-1 for Σ12OCPs and 0.018-0.067 ng.g-1 for Σ9PBDEs).

Gaseous concentrations of all compounds were higher during the day (mean day/night ratio ranged from 1.04 for BDE 66 to 8.45 for PCB 28), except for pentachlorobenzene (PeCB). Day-to-night variations were more pronounced for all compounds close to the ground (mean day/night ratio ranged from 1.43 for PeCB to 14.4 for *p,p’*-DDE), , except for PCB 118, which suggests that volatilization from the soils driven by temperature is strongly influencing concentrations in air.

The measured fugacities in air and soil suggest that soil acts as a sink for the low chlorinated PCBs, *γ*-hexachlorocyclohexane (*γ*-HCH) and *o,p’*-dichlorodiphenyltrichloroethane (*o,p’*-DDT), but as a source for the high chlorinated PCBs, PAHs, *o,p’*-dichlorodiphenyldichloroethane (*o,p’*-DDD), *p,p’*-DDD and PBDEs. In the case of PeCB, hexachlorobenzene (HCB), *α*-HCH, *β*-HCH and *p,p’*-dichlorodiphenyldichloroethylene (*p,p’*-DDE), diurnal variations in the dominating fluxes were observed with volatilization being the dominant process occuring during the day and deposition during the night.

Reference:

Cabrerizo, A., Dachs, J., Barceló, D., 2009. Development of a soil fugacity sampler for determination of air - soil partitioning of persistent organic pollutants under field controlled conditions. Environ. Sci. Technol. 43, 8257–8263. doi:10.1021/es9020525