**Bulk atmospheric deposition of persistent organic pollutants AND PAHS in central Europe**

Nežiková Barbora1, Degrendele Céline1, Čupr Pavel1, Hohenblum Philipp2, Moche Wolfgang2, Prokeš Roman1, Vaňková Lenka1, Kukučka Petr1, Martiník Jakub1, Audy Ondřej1, Přibylová Petra1, Holoubek Ivan1, Weiss Peter2, Klánová Jana1, Lammel Gerhard1,3

1Masaryk University, Research Centre for Toxic Compounds in the Environment, Brno, Czech Republic, 625 00 Brno, e-mail: [nezikova@recetox.muni.cz](mailto:nezikova@recetox.muni.cz); 2Umweltbundesamt, Wien, Austria, 1093; 3Max Planck Institute for Chemistry, Multiphase Chemistry Department, Mainz, Germany, 55128

**Introduction**

Polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and organochlorine pesticides (OCPs) are ubiquitous and toxic contaminants. Once they are emitted into the atmosphere, they are partitioning between the gaseous and the particulate phases. One way of transferring these compounds from the atmosphere to other compartments of the environment is via deposition (dry or wet). Very few data exist on deposition fluxes on the regional scale. The aim of this study is to provide novel deposition data for Central Europe and to explore the seasonal and spatial variations of these.

**Materials and methods**

Total deposition samples were simultaneously collected at six sites in the Czech Republic and Austria from September 2011 to August 2012. Additional deposition samples were collected at Czech sites in 2012 - 2015. The sampling duration was three months with filters changed every month.

Except one rural Czech site, all sites can be considered as background sites with limited anthropogenic influence. The deposition samplers used1 consist of a collecting vessel (250 mm diameter) made of borosilicate glass, a stainless-steel particulate filter holder located at the bottom of the collection vessel and a glass column containing the sorbent XAD-2.

All samples were extracted in dichloromethane using an automatic Soxhlet extractor, pre-cleaned on silica column, and were analysed by means of gas chromatography and mass spectrometry. The targeted compounds were 15 PAHs, 6 PCBs and 12 OCPs.

**Results**

For all seasons and sites investigated, Σ15PAHs deposition fluxes ranged 23.2 – 1053.8 ng m-2 d-1, while Σ6PCBs and Σ12OCPs total deposition fluxes ranged 64.3 – 4387.5 and 410.3 – 7835.4 pg m-2 d-1, respectively. Fluoranthene and pyrene were the main contributors to the PAHs’ deposition fluxes, accounting on average for 19 % each, while deposition fluxes of PCBs and OCPs were dominated by PCB153 (26 %) and γ-hexachlorobenzene (30 %), respectively.

In case of PAHs, significantly higher deposition fluxes were observed at the rural site Znojmo-Kuchařovice (KUC). This suggests that primary emissions are controlling PAHs’ deposition fluxes. The highest deposition flux of Σ15PAHs was generally found in spring. For Σ6PCBs, a significantly higher deposition flux was observed in KUC. There were no clear seasonal variations found for deposition fluxes of PCBs. For Σ12OCPs, no clear spatial trend was found, and the seasonal maximum was observed in summer.

In case of PAHs, their partitioning amongst the filters and XAD sorbent varied with compound and season. Although OCPs and PCBs in air hardly partition to the particulate phase, on average 44 % of their deposition fluxes were found on filters, suggesting that deposition of the particulate phase is more efficient than of the gaseous substances, or that the latter is subject to negative sampling artefacts.

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**References**

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