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POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) IN REMOTE BULK AND THROUGHFALL DEPOSITION: SEASONAL AND SPATIAL TRENDS

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Abstract

Polycyclic aromatic hydrocarbons (PAHs) were measured in atmospheric deposition in a Nature Park located in the North of Spain over a period of one year (June 2010–May 2011). Total PAH deposition was evaluated monthly by combining samples collected over two-week periods, using 6 throughfall and 2 bulk precipitation collectors distributed over the study area. The latter consisted of glass funnels (with vertical sides) attached to Pyrex glass bottles. PAH determination was performed by liquid-liquid extractions and analysis by high-performance liquid chromatography associated with fluorescence detection. Throughfall deposition revealed a loss under the canopy of 12% of the total atmospheric PAH deposition due to precipitation interception. Spatial variability between the 6 throughfall collectors reached a maximum of 25% during the wet season. Temporal trends showed significant variations of 27 to 54% throughout the year. PAH deposition increased during winter, due to higher emissions from domestic heating, less photoreactivity of the compounds and intense leaching of the atmosphere by wet deposition. Average daily fluxes were estimated for 6 quantified PAHs (PHE, ANT, PYR, B(b)F, B(k)F and B(a)P) at $182 \pm 27 \text{ ng m}^{-2} \text{ d}^{-1}$, which agreed with studies previously carried out in other local rural areas. The major compounds were phenanthrene and pyrene, both markers of traffic emissions.

Key words: annual flux, bulk deposition, polycyclic aromatic hydrocarbon, seasonal trend, throughfall deposition

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