

Summary

The work extensively evaluates the differences between the physicochemical properties of atmospheric aerosols in urban areas of Upper Silesia at two categories of sites: road traffic and urban background sites.

Sampling points were selected in pairs. In each pair, the traffic point was affected by heavy road traffic, whereas the background one was beyond the traffic influence; both were affected in the same way by other pollution sources (municipal, industrial, etc.).

The concentrations of PM_{10} and $PM_{2.5}$, chemical composition of PM (16 PAHs and 7 heavy metals, respectively, gas chromatography and atomic absorption spectroscopy), elemental composition of PM surface layer (X-ray photoelectron spectroscopy), micro-analysis of PM particles (scanning electron microscopy), and the upper PM layer reflectance and absorbance were determined.

The effects of heavily trafficked roads and crossroads on PM_{10} and $PM_{2.5}$ concentrations, the effects of road traffic on indoor air quality, and the effects of crossroads during rush hours on the aerosol concentrations were investigated.

Inside and outside PM_4 concentrations were measured simultaneously for selected apartments (portable samplers) and their proportions (I/O) compared.

The heavily trafficked roads and crossroads appeared not only to raise the PM concentrations in their vicinity but also to change such PM properties as its granular composition (including the proportion $PM_{2.5}/PM_{10}$), its trace element and polycyclic aromatic hydrocarbon content, its morphology and optical properties.

The innovativeness of the approach consists in analyzing the elemental composition of the surface layer of dust particles simultaneously at the two sites: the site affected by road traffic and the reference site beyond the traffic effect. The elemental composition of PM at the sites of these two kinds differs significantly.