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Characteristics of current roadside pollution of soils in Upper Silesia

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The aim of the study was qualitative recognition of contemporary roadside pollutants deposited on topsoils in areas located in close vicinity to roads with high traffic volume (main roads, ring roads). So far, the determination of pollutant content in soil samples has shown only the amount of pollutants deposited on soils over long time period, without the possibility to assess the quality changes in type of deposition and to determine the present structure of roadside pollution. Moreover, in many cases, it is difficult to distinguish roadside pollution from other industrial sources. In order to avoid this issue and recognize currently emergent threats of road traffic origin, three monitoring plots filled with quartz sand had been installed in Zabrze, Gliwice and Opole (Poland) close to arteries with high traffic volume. For installation of monitoring plots 7 cm of topsoil had been removed and replaced by boxes filled with clean quartz sand with known chemical composition and neutral magnetic properties (diamagnetic). This sand was treated as neutral matrix for the accumulation of traffic pollution.

Results of chemical analyses of heavy metal contents and magnetic susceptibility measurements of removed topsoils have shown that the highest content of Fe, Mn, Zn, Pb, Cu, Cr and Ni were observed in Zabrze. Amount of Zn and Pb exceeded threshold values. Magnetic susceptibility values were also the highest in Zabrze. In all investigated areas magnetic susceptibility values and heavy metal contents decreased with the distance from the road.

Measurements of sand from monitoring plots which were executed after 3, 6 and 12 months of exposure have shown that values of magnetic susceptibility have increased during these time periods. It is visible especially in surface layer of sand. Initially magnetic susceptibility value of quartz sand which was used as matrix after first year of exposure increased from 0,25 $\times$ 10^{-8} m^3kg^{-1} to 300 in Zabrze, 50 in Gliwice and 30$\times$ 10^{-8} m^3kg^{-1} in Opole. The highest increase in magnetic susceptibility was observed after 3 months of exposure.