



Urban dust settled at different sides and levels of a High Building next to a major road in Budapest: Integrated Magnetic, Mineralogical and Geochemical Study

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We collected urban dust during two years, on seasonal basis, in 8 standard sampling pots with continuous supply of distilled water, placed at 2, 9, 21 and 33 m, on the front and back sides, respectively, on a 40 m high building. After the vacuum filtering and air-drying of the samples, magnetic measurements, mineralogical and geochemical analysis were carried out on them as well as on car exhaust filters. Then remarkably similar magnetic properties of the settled dust and the exhaust filters suggested that the anthropogenic contribution to the dust is traffic induced. The traffic induced pollution is best reflected in the apparent susceptibilities of the samples, which show a strong seasonal dependence. The settled dust has the highest values of apparent susceptibilities, the highest amounts of dust and the highest concentrations of Pb during summer. The bulk mineral composition of the dust also depends on the season, since the dust becomes enriched in dolomite, coming from a hill behind the building during spring and even more in summer. The most important metal bearing phases identified mineralogically are magnetite and clay minerals. The metals showing significant enrichment compared to background values are Pb, Zn and Cu. Most of the Pb is found in magnetite, while Zn is distributed between magnetite and clay minerals. Concerning vertical variations, they are most pronounced during summer. The amounts of dust, apparent susceptibilities and concentration of Pb all have maximum values at 9 m, on both sides of the building. The concentration of Pb at 9 m and higher exceeds the threshold limit by 8-35 times during summer. The shielding effect of the building from the traffic induced pollution is seen only at the lowest level in every season.

When trying to account for the observed pattern of the distribution of the pollution, we compared it with the predictions of an air flow model published for high buildings with similar morphology and wind conditions and found no correspondence between model and observations.

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