



Magnetic susceptibility of soils in the area of Poland - anthropogenic or natural origin of the anomalies?

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The cornerstone of magnetic monitoring is affirmation of fact that magnetic iron minerals, whose presence in soils can easily be detected by magnetic susceptibility measurements, are components of numerous industrial dusts. Beckwith et al. (1986) demonstrated that there is a linear dependence between magnetic particles content and content of heavy metals like: Cu, Fe, Pb and Zn (in urban dusts). A similar dependence was observed in atmospheric dusts (for Pb, Cu, Zn, and Cd) by Hunt et al. (1984). If the origin of magnetic particles and a considerable part of heavy metals permeating into soils as a result of industrial emission or imission is the same, the application of magnetic susceptibility measurements for the detection of potential high risk-areas is possible.

During the preparation of “Geochemical atlas of Poland” (Lis, Pasieczna, 1995), a set of more than 20 000 soil samples from the whole area of Poland was collected. They were gathered over a 5 km x 5 km grid, from two depth levels: 0 – 20 cm and 40 – 60 cm. In 2002, the Atlas of Magnetic Susceptibility of Soils in Poland (Magiera et al., 2002) was published. The map of susceptibilities was evaluated on the base of higher-level sample measurements only. In this way, primary anomalies were located, mostly associated mainly with city agglomerations and mining areas, but in some cases natural sources could not be excluded. The poster presents the results of ongoing analogous measurements for lower-level samples. A comparative analysis of both level maps enables the diversification of all anomalies into two subsets: of anthropogenic origin and caused by local geological conditions. Similar measurements (for two levels) of soils

and alluvial sediments from delta of Vistula river (north Poland) were published by Nawrocki et al. (2000).

References:

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