



Geostatistical validation and cross-validation of magnetometric measurements of soil pollution with Potentially Toxic Elements in problematic areas

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Field magnetometry is fast method that was previously effectively used to assess the potential soil pollution. One of the most popular devices that are used to measure the soil magnetic susceptibility on the soil surface is a MS2D Bartington. Single reading using MS2D device of soil magnetic susceptibility is low time-consuming but often characterized by considerable errors related to the instrument or environmental and lithogenic factors. In this connection, measured values of soil magnetic susceptibility have to be usually validated using more precise, but also much more expensive, chemical measurements.

The goal of this study was to analyze validation methods of magnetometric measurements using chemical analyses of a concentration of elements in soil. Additionally, validation of surface measurements of soil magnetic susceptibility was performed using selected parameters of a distribution of magnetic susceptibility in a soil profile. Validation was performed using selected geostatistical measures of cross-correlation. The geostatistical approach was compared with validation performed using the classic statistics.

Measurements were performed at selected areas located in the Upper Silesian Industrial Area in Poland, and in the selected parts of Norway. In these areas soil magnetic susceptibility was measured on the soil surface using a MS2D Bartington device and in the soil profile using MS2C Bartington device. Additionally, soil samples were taken in order to perform chemical measurements.

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