



An extended magnetic susceptibility map of soils in Eastern Austria – first interpretational results

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In recent years, magnetic susceptibility mapping of soils has developed to a widely used method in studies of anthropogenic pollution. It yields a reliable delineation of polluted areas quickly and at low cost. However, the method is still a qualitative one because we lack comprehensive knowledge of the background susceptibility – the natural susceptibility within the soils. This background susceptibility is controlled by many factors, e.g. underlying geology, climate and topography.

In Austria, there exist archived soil samples for all provinces. The samples were taken in a grid of 4 x 4 km – partly in even denser grids. Until now, we measured the magnetic susceptibility for the samples from five of the provinces: Burgenland, Carinthia, Lower Austria, Styria and Upper Austria. These provinces form the middle and eastern part of the country. The measurements were used to produce magnetic susceptibility maps for the upper 20 cm of soil and for the layer between 20 and 50 cm.

Apart from showing the pollution hot spots in the country, these measurements can also be used to investigate the natural background susceptibility. They cover a wide range of parent materials and soil types. First analyses of the data show that one of the most important influences on soil susceptibility is the water regime, independent of the parent material. Soil types that are formed by (partial) waterlogging have low susceptibilities (gleysol, stagnosol, stagnic phaeozem). A second group with generally low values are those with a low pH-value and a high amount of organic matter which may form complexing agents that release and relocate iron (podzol, half-bog soils).

The analysis of the influence of parent material showed that for example soils formed on rocks of the Bohemian Massif (granitoides, gneiss and granulite) display signif-

icantly distinct susceptibility distributions. The highest susceptibility values occur within Carinthia, where rocks of the Central Alps dominate, and in the Vienna basin on loess and other fine sediments where chernozem, parachernozem and colluvium are the main soil types. Soils formed on siliceous sandstone in the flysch zone have the lowest susceptibility values. A closer investigation showed that 73 % of the soils formed on this parent material display reductomorphic characteristics. The last example shows that parent material and soil type are often closely related.

The presentation will concentrate on the influence of different parent materials and soil types on the magnetic susceptibility in the top 50 cm of the soil.

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