



Magnetic study of contaminated forest soils in Krušné hory Mountains

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Immission levels in Krušné hory Mountains are strongly affected by considerable concentrations of big sources of pollution (power plants burning fossil fuel, metallurgical and chemical industry), and large urban agglomerations at the foothills. The average annual deposition of PM10 in the eastern part of the Krušné hory Mts is among the highest in the Czech Republic.

With respect to complex geology in Krušné hory, we carried out detailed investigations of depth profiles on a net of permanent soil pits (depth of 40-70 cm). Magnetic susceptibility was measured in situ (Bartington MS2F stratigraphic probe, SM 400 Kappameter) and controlled by core susceptibility measurements by MS2C sensor. Samples of individual soil layers were collected for laboratory investigations (kFD, hysteresis parameters, magneto-mineralogy, HM chemical analyses). Preliminary results show that in situ susceptibility measurements agree well with laboratory data.

In most localities, increased values of magnetic susceptibility ($25 - 200 \times 10^{-5}$ SI) were clearly identified in the top-soil layers. Magnetic enhancement is limited to depths of 4-7 cm below the soil surface, usually in F, H or top of Ah soil horizons. Deeper soil horizons are characterized by much lower values of susceptibility ($5 - 30 \times 10^{-5}$ SI). At the same time, low values of kFD as well as IRM acquisition and AC demagnetization curves indicate that the accumulated anthropogenic ferrimagnetics dominate top soil layers at these localities. Contrary to the most cases, a strong lithogenic effect on soil magnetic susceptibility was observed in four localities. Magnetic susceptibility increases with the depth and reaches values up to 600×10^{-5} SI in bottom soil layers. It is evident that for final field mapping of topsoil magnetic susceptibility, representing immission load in the region, knowledge of the top-soil / sub-soil relation is needed.

This study was supported by Grant Agency of the Czech Republic through grant No. 205/07/0941,