# The influence of geomorphological factors and parent material origin on Pb, Cu and Zn content in soil surface horizons as exemplified by the Sudety Mountains and Sudeten Foreland

## Wpływ czynników geomorfologicznych i pochodzenia materiału podstawowego na zawartość Pb, Cu i Zn w warstwie powierzchniowej gleby na przykładzie Sudetów i Przedgórza Sudeckiego

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Long-lasting research (2006–2011) on total content of Cu, Zn and Pb in arable soils from an area of Sudetes and Sudeten Foreland allowed to collect the results concerning their concentration in surface soil horizons in 1438 points covering the whole mentioned area, except fragments of the highest altitude AMSL. The results were divided into two partial populations, one of them included the samples collected on areas where covers of sedimentary rocks of glacial origin are dominating (Sudeten Foreland), while the second one included the soils formed from decomposed rocks and delluvial formations (Sudetes area). Upper 5% was excluded from the pool of available results for each subpopulation in order to eliminate the areas where elevated concentrations of anthropogenic origin may occur. It was demonstrated during the course of geostatistical analysis, the nugget effect for all examined elements is distinctly higher for samples subpopulation from mountain area when compared to foreland. Concurrently, the range of autocorrelation is lower in mountain area than in foreland. Moreover, for semi-variograms discussed, anisotropy on a direction NW – SE is visible in mountain area which is connected to the course of mountain ranges of Sudetes. In fragmented mountains area with slopes of different exposure crossed with numerous ridges, autocorrelation ranges are distinctly lower on the foreland where glacial, fluvio-glacial and aeolian processes led to higher degree of material mixing, making it more uniform spatially. Relatively high nugget variance in Sudetes area proves large differentiation on short distances, which may be also connected to land relief but also to the presence of rocks of different composition and weathering processes. Concurrently, statistical analysis conducted for relationships between the content of fraction <0.02 mm, organic matter content and content of particular metals conducted for both populations demonstrated that concentration of all examined heavy metals in foreland soils increases clearly with an increase in the content of fraction <0.02 mm, and decreases for mountain soils subpopulation. This relationship is of a logarithmic character for both subpopulations. According to the authors interpretation, the reason of such a trend may be blowing of fine material relatively poor in terms of heavy metals content from foreland to mountain area in interglacial periods.