



Origin and solubility of heavy metals in soils in the areas of former ore mining in the Sudety Mts.

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Total concentrations of heavy metals, as well as their solubility and speciation were examined in soils in 6 sites of historic metal ore mining in the Sudety Mts. (SW Poland). The main aim object was to illustrate the difficulties in distinguishing between natural and anthropogenic origin of metals, which is required by Polish legal regulations concerning land reclamation. Waste material collected from the mine spoils, remaining in the landscape, contained high amounts of some heavy metals (Cu, Pb, Zn, Ni, and As: up to 9940, 13600, 6150, 17600, and 40600 mg/kg, respectively), and the neighbouring soils, considered as natural, contained high metals concentrations as well, with maximum values for Cu, Pb, Zn, Ni, and As: 3430, 2090, 3660, 4400, and 11500 mg/kg, respectively. Those values exceeded by manifold soil quality standards. We concluded that for the assessment of environmental risk, additional data will be needed, such as metal solubility and speciation. Heavy metals in soils were, generally, poorly soluble in weak extracting agents, such as neutral salts, whereas their potential solubility, determined in 1M HCl, differed strongly among soils and mine spoils. The results of metal speciation, obtained by using sequential extraction, can be helpful in estimation of environmental risk caused by the presence of metals in the soils.