Mobile forms of Copper and Zinc in Soils from Areas With Different Functional Load of the St. Petersburg

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The present study investigated the actual content of Zn and Cu mobile fractions (buffer-extractable) in soils of different land-use scenarios within the Krasnogvardeisky District of Saint-Petersburg (Russia). The data were obtained via atomic adsorption spectrophotometry, analyzing ammonium acetate buffer-extracts (pH 4.8) of soil samples collected. The buffer-extracted metals are considered to be the most mobile fractions at given soil pH conditions. The results have shown low concentrations of mobile Zn and Cu in soils of recreational, agricultural and even industrial areas, fluctuating relative to the local area soil background values (Zn = 1.2; Cu = 2.70 mg•kg-1). Substantial levels of contamination were found in the loamy sand technogenic soil (Technosol) of residential area, indicating highly elevated levels of mobile Zn and Cu in the topsoil. Median topsoil metal concentrations three times exceeded the maximal permissible concentrations for soils (Zn = 23.00; Cu = 3.00 mg•kg-1), reaching the maximal values of 69.58 mg•kg-1 for Zn and 10.17 mg•kg-1 for Cu respectively. All the soils were found to have increased OC levels and neutral to almost alkaline pH of the upper horizons in comparison with control soil at the recreational area. Studied soils were characterized by different clay content, however low CEC was common for all the soils. Metal concentrations were significantly correlated with soil properties, strongly affected by the pH, OC and CEC (R = 0.80-1.00). The analysis of variance also showed a land use type significant influence on the metal content in topsoil.