



“Gheorghe Asachi” Technical University of Iasi, Romania



DISTRIBUTION OF HEAVY METALS IN SOILS IN A POSTGLACIAL RIVER VALLEY - A GEOCHEMICAL LANDSCAPE APPROACH

Paweł Sowiński^{1*}, Katarzyna Glińska-Lewczuk², Barbara Kalisz¹, Aleksander Astel³

¹University of Warmia and Mazury in Olsztyn, Faculty of Environmental Management and Agriculture, Department of Soil Science and Land Reclamation, 3 Plac Lodzki, 10-727 Olsztyn, Poland

²University of Warmia and Mazury in Olsztyn, Faculty of Environmental Management and Agriculture, Department of Water Resources, Climatology and Environmental Management, 2 Plac Lodzki, 10-719 Olsztyn, Poland

³Pomeranian University in Słupsk, Biology and Environmental Institute, Environmental Chemistry Research Unit, 22B Arciszewskiego Str., 76-200 Słupsk, Poland

Abstract

The paper deals with the amounts of total and plant available forms of heavy metals (Pb, Cr and Cu) and relation between soil properties in three catenas in postglacial area of the Łyna River valley, NE Poland. The results were presented on the background of four geochemical landscapes distinguished within the study area: eluvial or trans-eluvial, eluvial accumulative, trans-super-aqual and super-aqual. The average total content of heavy metals amounted to: Pb – 14.05 mg kg⁻¹ d.m., Cu – 9.96 mg kg⁻¹ d.m. and Cr – 46.25 mg kg⁻¹ d.m. The share of plant available forms in total forms of HM amounted on average: Pb – 30.13%, Cu – 37.10% and Cr – 1.28%.

In spite of relatively low levels of heavy metals in soils of the studied area, the amounts of metallic forms varied between geochemical types of landscape. The analysis, supported by PCA ordination, resulted in significant relations between heavy metals contents and amounts of organic matter and clay fraction (< 2 μm) as well as inverse relation to the share of sandy and gravel fraction in soil. The most abundant in heavy metals were soils in supra-aqual geochemical landscape (Pb, Pb_a, Cu and Cu_a) and eluvial accumulative geochemical landscape (Cr and Cr_a). Based on the amounts of accumulated metals, the geochemical landscape types created the following order: super-aqual > trans-super-aqual > eluvial accumulative > eluvial / trans-eluvial.

Key words: chrome, copper, lead, pollution

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