

## **GEOCHEMICAL ASSESSMENT OF SOIL CONTAMINATION BY TOXIC ELEMENTS IN URBAN TALLINN (ESTONIA)**

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First time in Estonia there was carried out the monitoring of pollution of soils on the territory of the biggest industrial city of the country, its capital Tallinn. In the frame of a joint project "Urban geochemistry of Tallinn", supported by Scientific and Environmental Affairs Division NATO, 532 topsoil samples from an area of 1291,2 square km were analysed for 40 elements. The special attention in the interpretation of the results was paid to heavy metals as a most toxic and harmful for health of the people. Statistical factor analyses of obtained and new geochemical data have been used to identify: 1) primary contaminants associated with natural sources of pollution; 2) secondary contamination attributed to processes of pollution in the results of industrial activity. Trends in the changing dominance of these environmental factors reflect changes in technogenic impact. Calcium, Mg and Mn showed natural enrichment arising from subsurface parent carbonate rocks. The polluted areas of urban Tallinn are clearly outlined for As, Cr, Cu, Ni, Pb, Sb, Sn and Zn. The elevated concentrations in the local geochemical anomalies exceed the background level in 7-9 times. Geochemical mapping of the contamination confirmed that the extremal concentrations of heavy metals are caused by input from anthropogenic sources and permitted to typify the latter. Study of geochemical mobility of Cr, Cu, Mn, Ni, Pb and Zn by sequential extraction revealed that only about 50% from the total content of these elements can participate in the biochemical cycles. The geochemical monitoring showed that the level of soil contamination in the city by Co, Cr, Cu, Ga, Ni and Pb decreased during last ten years.