



Soil pollution in Central district of Saint-Petersburg (Russia)

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Analysis of soil samples of upper horizon for the content of chemical elements (Fe, Mn, Cu, Zn, Pb, Ni, Cr, Co, Cd, Ba, Sr) was carried out by atomic emission with inductively coupled plasma. A relative indicator of soil contamination degree is a concentration coefficient, representing the ratio of metal content in tested soil samples to the local background value of the corresponding element. Total pollution index is calculated by the concentration coefficients, which are greater than 1, taking into account the hazard class of metals (1 class – Zn, Pb, Cd; 2 – class Cr, Ni, Cu ; 3 class – Fe, Mn, Sr, Ba).

Analysis of trace element of urban soils demonstrated mosaic patterns of pollution for Central district. The method of correlation sets constructing and factor analysis revealed three groups of chemical elements having a strong and significant association with each other: Pb-Cu-Cd-Zn-Ba, Ni-Cr-Co, Fe-Mn. Elements of the first group are characterized by high values of concentration coefficient and are the main pollutants – their average content is 3-11 times higher than background values. Strontium does not have strong correlation with the other elements, and its lowest concentration coefficient indicates that the element can not be regarded as a pollutant.

The spatial distribution of the total pollution index identified several sources of pollution, the origin of which may be different. The main reason is probably the impact of vehicle emissions, although local pollution of soil is possible (the soils, contaminated during reconstruction of lawns, dumping of construction materials, etc.).

Differentiated assessment of database shows that 48% of samples refer to dangerous pollution category, 37% – to moderately dangerous category, 15% – to allowable category. Thus, almost half of the district is characterized as dangerous in terms of soil contamination.

Solution of the problem of soil contamination is recommended in three ways: reducing the intensity of vehicular traffic through the historic center of the city, improving the quality of transport emissions, removal of contaminated soil layers in particularly polluted areas and the introduction of clean soil, optimization of verdurization of the urban environment, as a means of reducing the flow of atmospheric pollutants in soil.