The ecological crisis in the region necessitates and urges the development of complex approaches towards the solution of this problem. The conjugate study of each geosystem component, namely: soils, waters, atmosphere, plantings, etc. is required here, this providing for identification of the level of their technogenic pollution and obtaining of the integral indices of ecological danger.

Migrating through natural transporting channels, the pollutants re-distribute between landscape components and lead the environment towards geochemical anomalies. Territorial distribution of surface concentration of the pollutants (technogenic anomalies) depends upon the following factors: turbulence of aerial flows, air humidity, local relief, distance from the source of pollution, height of the throw and its heat and physico-chemical specificity, wind direction and speed, etc.

Theoretical and experimental studies prove that not only the nature of redistribution and the concentration of the pollutants are of decisive character: the level of the pollutants’ ecological danger must also be considered. From hygienic point of view, the danger of landscape pollution is defined through the level of possible impact of chemical substances upon both the contacting environment and its components (air, waters, soils, food) and, directly, the man. The major criterion of hygienic assessment of ecological danger is known as saturation norm (human-harmless) for concentration of chemical elements in landscape components (SN). This is a quantitative index. The coefficient of the element danger (Cd) is defined as a proportion of the substances’ content in the component of the environment and the substances (SN).

However, since only insignificant quantity of chemical elements and compounds has their fixed SNs today, the use of this method is limited.

The index of the natural component pollution intensity (Pj) is also important in assessment of ecological situation, as well as the integral index of the landscape ecological danger (1), expressed in conditional units [1].

The calculation formula is as follows:

\[ P_j = \sum K_{ci} \cdot M_i; \quad l_n = \sum P_j \cdot T_j \]
is the chemical element danger (toxicity) index (according to the class of danger: 4,1 and more - 1 class; 2.6 - 4 - 2 class; 1 - 2.5 - 3 class); 1) Tf is a translocations index of harm, expressed in conditional units (2- for soils, 3 - for air, 4 for subsurface waters, 5 - for biomass); m is the quantity (j) of landscape components and n- the quantity of the chemical elements under analysis.

The given formula allows for consideration of ecological significance of landscape components and the synergic action of its inherent elements; the definition of these ecological parameters is based upon the conjugate analysis and summarizing of the components indices of anthropogenic impact.

The precise definition of the level of ecological danger in the landscape requires that all integral indices be ranked from the weakest to the strongest. The landscape complexes of the central part of the city of Chernivtsi, for example, are ecologically characterized as very dangerous (I = 220 and more). This confirms the conclusion of its ecological tension and the necessity of the measures to clean the corresponding city areas.

The integral indices of ecological danger have reflected every landscape-functional region of the city, proving that the areas within the region can be ecologically heterogeneous (geochemical fields, geoecotopes).

Anthropogenic impact is expressed in migration of harmful chemical substances (including highly toxic, allergenic and cancerogeneous). The source of pollution comes from transporting and agricultural objects and the objects of municipal economy. Migrating, the pollutants follow the scheme: “atmosphere - soil - waters (both surface and subsurface)”.

Complex pollution of all the environments strengthens the impact of separate polluting components. This is why further studies of the city environment quality (on a landscape basis) seem to be of urgent importance, as well immediate conduction of complex measures to reduce the pollution (in the first place that, which comes from transport means), and instillation of regular ecological monitoring.

References


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