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Geochemical features of heavy metals distribution in soils of the karst region of oil production (Perm krai)

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The Vernadsky law for global chemical elements dissipation states that all environments have all the elements, but their distribution is irregular. Soil as bioinert system is not an exception. The knowledge of chemical content in the system investigated helps to solve various environmental issues. To achieve the solution it is essential to know reference content of the elements. Thus, the soil is a very important object of investigation relative to this problem. The average content of some elements within distinct regions depending on geological structure and selective development of various rocks can be significally different from mean content of the given elements in other regions and from percentage abundance of the Earth crust globally. V. Vernadsky thought that utilization of percentage abundance values could possibly give misinterpretation in a huge amount of cases while calculating concentration and dissipation of chemical elements. He was concerned in usefulness of an average biosphere rock content of the area studied instead of percentage abundance values for applied tasks. In order to characterize common geochemical features of such regions the terms local or regional percentage abundance values were introduced. These are mean content values of chemical elements and could be volumetric, atomic or gravimetric.
Many elements in their distribution and proportion of occurrence forms become dependent on resource management. This causes the phenomenon that in many cases it is almost impossible to determine the average content of chemical elements for soils just before starting point of anthropogenic activities.
There was considerable amount of work done by A. Vinogradov for studying the distribution of chemical elements in soils, especially in European part of Russia. However, by now percentage abundance of many elements should be updated due to irregularly growing anthropogenic influence on environments.
The "Arapov Klyuch" log is located in the impact zone of the oil field, in the karst area of oil production.
Determination of heavy metals content was carried out by X-ray fluorescence analysis using the SPECTROSCAN MAX-G waveguide X-ray fluorescence spectrometer (Saint-Petersburg) in the laboratory of ecology and nature protection of PGNIU.
Based on the obtained measurement results, calculations of a complex index of total soil contamination by heavy metals have been performed.
According to the results of the research, the content of oil products was found on all sites, but the excess of the permissible level was fixed only on some.
Comparing the obtained data on the content of heavy metals on the investigated test plots with the background territory, it can be concluded that there is no significant deviation of the values in the total amount, the background content is basically homogeneous in comparison with the investigated territories.
The study of the content of heavy metals in this area did not reveal significant excesses, mainly the content of elements is within the limits of specifications. The total chemical contamination is detected within the permissible level.