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Natural radon distribution order in Moscow region

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The work is devoted to a study of the relation between the lithology of overburden and secondary sediments, the structural geodynamic factors in Moscow region and the distribution of natural radon flux density (RFD) on the daylight surface, in soils. Negative and positive (in small dose) impacts of natural radon on humans', animals' health and plants have been studied all over the world. As a result of these studies, there have been developed standards that are used in the construction industry, in particular, when considering antiradon protection of buildings. However, the questions of sources, ways, speeds of migration and the maximum depth, with which radon can reach daylight soil in different geological conditions, have not been finally resolved. The implementation of this task on territories of large megalopolises becomes more difficult due to a high natural radioactive substances content in soils and groundwater, but even more significant because of the built-upness of these territories.

Four areas with different intensity and character of RFD anomalies were identified as a result of RFD studies on sites for buildings during the last 8 years (about 400 objects) in Moscow. While studying characteristics of a geological structure of these areas the relation between lithology of near-surface soils (and, accordingly, the content of natural radioactive substances in it; the presence of artificial radon was excluded at a sampling stage) and general high or low RFD background was confirmed, and there was no direct relation with structure of secondary rocks. But it does not explain the existence of several points and linear anomalies with high RFD values on high or low homogeneous background related with lithological character. That is why the next stage was devoted to a study of the relation between radon distribution and structural, geomorphological and geodynamic characteristics of the explored territory, in particular, arrangement of high density of fractures and permeability zones - geodynamic active zones, which had been the direct subject of our research for many years. Borders between areas with various RFD values at rough approximation coin-

cide with boundary zones between large blocks, which are interpreted as geodynamic active zones of different types. Another words the identified areas and the regional neotectonic structures are similar in the RFD field structure. In three out of four areas maximum of RFD values are located in close proximity or within the limits of borders dividing the regional geoblocks and mesoblocks. The direction of axes of anomalies in these areas coincides with some of prevailing directions of these zones. Such relation is not observed in the fourth area, where the most intensive RFD field was identified. Probably, it is due to the fact that quaternary and secondary layers have the maximum thickness there. Besides this, a probability of coordination between RFD distribution and ancient heterogeneity exists in this area. Good correlation between the maximum value of RFD field and the deepest part of Podmoskovny ancient rift trough, which is located on 800-1500 m deep, is left unclear.

As a result, considering the two most credible factors, which can influence RFD distribution on the daylight surface, we can come to a conclusion that, along with lithology of near-surface soil, the structural factor, in particular the neotectonic divisibility of Earth crust, also plays an important role in RFD distribution. This factor should be considered at radon danger forecast for urban territories and at geochemical mapping of soils in general.

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