

STUDIES OF RADON CONCENTRATION IN RESIDENTIAL AND PUBLIC BUILDINGS LOCATED IN THE TIEN SHAN FOOTHILLS AND THE NEVA LOWLAND AREAS

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The large territories of the Republic of Kazakhstan and the Russian Federation are characterized by a different radiation environment due to the mining (coal, gas, non-ferrous metals and uranium), the geological conditions, seismic activities and mountainous areas. In this case, the radiation environment is influenced by radioactive gases (radon, thoron), together with their decay products, and radioactive aerosols formed in natural chains of uranium and thorium series. Thus, one of the most important tasks of radioecological research is the analysis of radon concentration in residential and public buildings. Radon enters the building from the ground, through foundations and floors, or directly from building materials. As a result, a rather high radiation background can be registered in the building. Especially if the house has the high concentration of uranium-thorium series radionuclides, or if materials with a high uranium concentration were used in its construction. Also, if there is a positive temperature difference inside and outside the building, a pressure gradient arises and an additional mechanism appears that contributes to the entry of radon. This mechanism is usually much more important than the diffusion transfer of radon [1].

Therefore, it seems to be interesting to study the concentrations of radon and its decay products in residential and administrative buildings, and especially in new energy-efficient buildings [2]. In present work, the objects of research were buildings located in the foothill regions of the Tien Shan (Almaty region), because tectonic faults and the rocks are additional sources of radon. On the other hand, it would be interesting to compare experimental data on radon concentration obtained in buildings located in mountainous areas with data obtained in buildings built in the Prinevskaya lowland area (with the corresponding geological structure) at the zero mark of the height and depth reference system (region of St. Petersburg).

In this work, data on radon volume activity were obtained and analyzed in the period from February 2021 to February 2022 in housing and public buildings of Almaty and St. Petersburg. As a result, the radon concentration distributions were obtained at all levels of administrative and residential buildings. The dependences of radon volume activity on temperature, humidity and pressure were analyzed. Also, in some local places the high radon volume activity was detected. Such radon «jets» can add an additional radiation load to the total exposure dose for the population from natural radiation sources.

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1. V.I. Zhrebchevsky, N.A. Maltsev, «Measurement of the content of radon and thoron in samples», SPb.: VVM Publishing House, ISBN 978-5-9651-1299-9, 2020.
2. Yarmoshenko, I.V., Onishchenko, A.D., Malinovsky, G.P. et al. Radon concentration in conventional and new energy efficient multi-storey apartment houses: results of survey in four Russian cities, Nature, Sci. Rep. 10, 18136 (2020). <https://doi.org/10.1038/s41598-020-75274-4>

The speaker is a student or young scientist

No

Section

1. Nuclear technology and methods in medicine, radioecology

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