

DEPENDENCE OF DOSE RATE OF GAMMA RADIATION ON THE DENSITY OF URBAN DEVELOPMENT

E. Yeboah¹, P. Macdonald¹, G. A. Yakovlev²

¹*National Research Tomsk Polytechnic University
30, Lenina Avenue, 634050, Tomsk, Russia.*

²*Tomsk State University
36, Lenina Avenue, 634050, Tomsk, Russia, eugeniayeboah64@gmail.com*

Most researches on environmental radiation monitoring focus on the effect of radiation on human health and also on the comfort of the population but not on human exposure to radiation. Even though the impact on measured dose is mostly from two natural phenomena, the level of exposure to external radiation at a particular location is often constant. When natural radioactivity such as uranium, which can be found in soil decays, it produces radon that emanates from the ground into the atmosphere. This leads to an increase in the dose of the background radiation in the environment. However, snow cover on the other hand mostly leads to a significant decrease in gamma dose rate since part of terrestrial radiation is partially covered by snow. In addition, the dose rate of gamma background radiation is increased when monitored near radiation sources such as technosphere objects. These reasons make it very important to investigate the dependence of dose rate of gamma radiation of a populated region, hence research was carried out in the city of Tomsk. Measurements were taken around a building 10 cm from the center and 1 m from the walls with 2–5 m variable pitch using a gamma-ray detector. For each measurement location, a total of 15 distinct locations were picked. A graph of dependence of dose rate against distance was then plotted and a comparison between the measured results for the different locations was done. The study revealed correlations, which indicates that the dependence of dose rate of gamma background radiation in densely populated areas increases significantly.