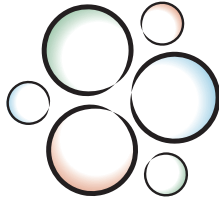


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**ABSTRACTS**

Volume 11

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## ACTIVITY CONCENTRATION OF $^{210}\text{Pb}$ IN AEROSOL IN SERBIA IN THE PERIOD OF 2014-2020 AND THE COMPARISON BETWEEN RESULTS FROM URBAN AND RURAL SAMPLING STATIONS

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Aerosol sampling and monitoring of naturally occurring and artificial radionuclides is readily performed within the frame of Environmental radioactivity monitoring in the Republic of Serbia. It provides information important for the preservation of the public health and the environment from the harmful effects of ionizing radiation. This type of monitoring has been performed in Institute of Nuclear Sciences Vinča for more than 30 years now. The radionuclides that are measured are: naturally occurring  $^{210}\text{Pb}$ , artificial radionuclide  $^{137}\text{Cs}$  and cosmogenic radionuclide  $^7\text{Be}$ . Particle reactive radionuclides such as  $^{210}\text{Pb}$  and  $^7\text{Be}$  have been used as atmospheric tracers for studying environmental processes such as cloud scavenging and precipitation [1], aerosol transit and residence times in the troposphere [2], and aerosol deposition velocities [3]. The fission product  $^{137}\text{Cs}$  is an indicator of anthropogenic pollution caused by nuclear weapon atmospheric tests and nuclear power plant accidents. Seasonal variation in  $^{137}\text{Cs}$  in air is an indicator of the stratosphere-troposphere exchange processes [4]. In most aerosol samples in later years, the activity concentration of  $^{137}\text{Cs}$  is below the minimal detectable activity and therefore it was not taken into the consideration in this paper. The activity concentration of  $^7\text{Be}$  is dependent on the movements of large air masses and vertical mixing in the atmosphere and also was not discussed in this paper.

In this paper, the activity concentration of  $^{210}\text{Pb}$  in aerosol samples, obtained over the period from 2014. to 2020., was discussed. Sampling is performed using constant air flow pumps and Whatman filter papers on 6 measuring stations distributed in various parts of the country. Three stations are in urban areas of cities of Belgrade, Vranje and Zaječar and other three are in rural areas (Palić and Zlatibor) or removed from the urban part of the city (Meteorological station in Vinča). The monthly composite sample from each sampling station was ashed at the temperature below  $400^\circ\text{C}$ . After ashing, the residue aerosol is measured on HPGe detectors using a standard gamma spectroscopy method [5].

The results for  $^{210}\text{Pb}$  are of the order of magnitude of  $10^{-4}$  to  $10^{-3}$   $\text{Bq}/\text{m}^3$ . The activity concentration in all investigated samples shows temporal dependence with the maxima in the winter months and minima observed during the spring and summer. Also, the comparison between the results obtained from the rural and urban locations was performed in order to investigate the influence of the air pollution present in the urban areas on the activity concentration of  $^{210}\text{Pb}$ . The values, obtained at stations located in rural parts, ranged from (0.056 – 3.3)  $\text{mBq}/\text{m}^3$ , while for stations located in urban areas the range was from (0.125 – 2.9)  $\text{mBq}/\text{m}^3$ . It can be seen that from all the data that the activity concentration of  $^{210}\text{Pb}$  was lower in rural areas. Two outliers were observed at Palić station, located in the plane and along the path of the prevailing south – east wind, possibly bringing aerosols from Deliblatska pescara (Deliblato Sands) [6].

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