

2021年度 博士前期課程学位論文要旨

学位論文題名 (注: 学位論文題名が英語の場合は和訳をつけること)

Changes on distribution of absorbed dose rates in air in an urban area after the Fukushima Daiichi Nuclear Power Plant accident

福島第一原子力発電所事故後の都市部における空間線量率分布の変化

学位の種類: 修士 (放射線学)

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注: 1 ページあたり 1,000 字程度 (英語の場合 300 ワード程度) で、本様式 1~2 ページ (A4 版) 程度とする。

Due to the accident of the Fukushima Daiichi Nuclear Power Plant, large amounts of artificial radionuclides were spread around eastern Japan. Tokatsu area, located in the northwestern part of Chiba Prefecture, is a pathway of radioactive plume and the absorbed dose rate in air increased rapidly after the accident. The national and local governments conducted dose rate surveys in the area, but no surveys have been conducted on the detailed changes in dose rates and dose rate distributions. Therefore, the surveys were conducted in the area in 2015 and 2020.

A NaI(Tl) scintillation spectrometer was positioned inside the car, and the count rate inside the car (cps) was measured every 30 s along the route. At the same time, the shielding effect by the car body and the dose rate conversion factor were estimated. In addition, the energy spectrum was obtained by unfolding the pulse height distributions measured at 43 points in order to enable detailed evaluation radiation dose.

The average absorbed dose rate in air in the survey conducted in 2020 was 54 nGy/h, which was 21% lower than that in 2015 (68 nGy/h), and average dose rates from artificial radionuclides was 11 nGy/h, which was 48% lower than that in 2015 (21 nGy/h). These were lower than the dose rates expected from physical decay alone. Since this survey was conducted mainly on asphalt, this result could be attributed to weathering. There are two types of asphalt in the Tokatsu area: high porosity asphalt (main roads) and low porosity asphalt (local roads). Absorbed dose rate in air showed a peculiar distribution with high dose rates due to radioactive cesium deposited on the high porosity asphalt roads (NRs 6 and 16). Although there was no significant change in the distribution, the absorbed dose rate in air measured on the high porosity asphalt had a larger decrease compared to that measured on low porosity asphalt. It was thought that not only the effects of different degrees of weathering, but also many human activities such as frequently performed road construction work due to high traffic volume contributed to the measurement trend.