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First precision spectroscopy of cesium-137 from the ground to 150 m above in Fukushima

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After the Fukushima nuclear disaster in 2011, large amounts of radioisotopes (mainly ^{137}Cs and ^{134}Cs) were released into the environment. Various monitoring activities have revealed radiation on the ground both in local and wide areas; however, aerial dose variation in the vertical direction is poorly known.
This paper presents the first results of airborne gamma-ray spectroscopy of a contamination field in Namie, Fukushima, as measured from 0 m to 150 m above the ground by drone.
We found that the gamma-ray dose rate measured at 100 m height is about seven times higher than that expected based on ground measuring, which is caused by two factors: (1) the integrated dose includes contamination of upward scattered 662-keV gamma rays and (2) radiation from ^{137}Cs is vertically collimated because ^{137}Cs is buried in the soil. We also argue novel method to obtain the distribution of radioactive substances in the soil only through aerial mapping.

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