

Analysis of each radionuclides discharged by the Fukushima Daiichi Nuclear Power Plant measured by airborne surveys

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Many radioactive substances were released by the Fukushima Daiichi nuclear power plant accident occurred on March 11, 2011 in the atmosphere. A lot of short half-life nuclides which are ¹³¹I, ¹³²Te (¹³²I) and ¹³³I, etc., in addition to longer half-lived nuclides such as ¹³⁴Cs and ¹³⁷Cs. The estimated release amount of these nuclides from the reactor 1st to 3rd unit is reported, but it's found to be quite different in the short half-lived nuclides by the reactor units. Because the radioactivity ratio of ¹³⁴Cs and ¹³⁷Cs was slight different between the reactor units, it can be considered that the valuable source is obtained by the measurement of ¹³⁴Cs/¹³⁷Cs ratio in the environment around the Fukushima Daiichi nuclear power station at the present stage when the nuclides with short half-lives had already decayed. We have measured high-resolution gamma-ray spectrum using an unmanned helicopter equipped with LaBr₃(Ce) detector in a 3-km range from the power station which was near to the release source of the radioactive cesium. Because the LaBr₃(Ce) detector has high resolution of gamma rays, the discrimination of many nuclides is possible. In addition, there is extremely much number of the data provided by the distribution measurement with the unmanned helicopter. Because a new map was illustrated by the analysis of the ¹³⁴Cs/¹³⁷Cs ratio, we report the outline.

Keywords: unmanned helicopter monitoring, radionuclide distribution