Japan Geoscience Union Meeting 2012
(May 20-25 2012 at Makuhari, Chiba, Japan)
©2012. Japan Geoscience Union. All Rights Reserved.

STT03-07 会場:102A 時間:5 月 23 日 11:35-11:55

航空機モニタリングによる放射性セシウムの沈着量の測定
Radioactive cesium distribution released from Fukushima Daiichi NPP by aerial radiation monitoring

近藤 敦哉 [1*], 眞田 幸尚 [1], 杉田武志 [1], 鳥居 建男 [1]
KONDO, Atsuya[1*], SANADA, Yukihisa[1], Takeshi Sugita[1], TORII, Tatsuo[1]

[1] 日本原子力研究開発機構
[1]Japan Atomic Energy Agency

We measured the ambient dose-rate and the deposition amount of radioactive cesium by using four helicopters in the whole area of East Japan to investigate the influence of the radioactivity that released in the atmosphere due to the disaster of the Fukushima Daiichi NPP (Nuclear Power Plant), Tokyo Electric Power Company (TEPCO), occurred by the East Japan earthquake and tsunami on March 11, 2011. It reports on the measurement technique and the result.

A massive radioactive materials emitted from the NPP was released in the atmosphere due to the disaster and contaminated soils in the wide area in East Japan. Therefore, we have carried out the airborne radiation monitoring (ARM) in the whole area of East Japan, and investigated the influence of the radioactive cesium of the deposition to the ground level.

The ARM can plainly and promptly understand the distribution of the ambient dose-rate and the deposition of radioactive cesium by measuring gamma rays from the urban area to the forest over the wide range. An aerial radiation monitoring has following advantage. (1) The widespread distribution of radionuclides can be measured with short time by less manpower. (2) Descriptive contour maps of the deposition of the radioactive cesium can be depicted. (3) The radioactivity of the mountains and forests can be measured.

We were each equipped with a different measurement system in four helicopters, and they are large-size NaI scintillation detectors (16 x 4 x 2 inches or 16 x 4 x 4 inches) are being used inside/outside of each helicopter in-flight Both counting rates and the pulse-height distribution data (energy spectrum) were detected at each second. We also installed the GPS sensor in the helicopter, and measured the latitude, the longitude, and the altitude of the helicopter at the same time.

The flying altitude from the ground was obtained by subtracting the altitude obtained by the DEM (digital elevation model) data from that of the helicopter. The attenuation coefficient of air was obtained by flying at some altitudes (150 ? 900 m) in above the test-line selected for the comparison with the ground data. Moreover, the conversion coefficient of the ambient dose-rate was calculated by the comparison of the ambient dose-rate measured by an NaI survey-meter with the counting rate at 1 m height evaluated by using the attenuation coefficient.

Furthermore, the deposition amount of radioactive cesium (Cs-134, Cs-137) on the ground was evaluated according to the dose-rate-to-radioactivity conversion coefficient obtained by the result of the in situ Ge measurement on the ground.

We also made maps of the dose-rate and the deposition of radioactive cesium by using the IDW (inverse distance weighted) procedure as an interpolation method of a GIS software.

The map of the ambient dose-rate is shown in Figure 1. It has been understood for the region where the dose-rate is high to extend from the NPP for northwestward, and wide to Gunma Prefecture from the vicinity of Fukushima City in the direction of the southwest. This map is utilized to determine the decontamination area and estimate the variation of contamination areas.

キーワード: 航空機モニタリング, 放射性セシウム, 福島第一原発, 東日本大震災
Keywords: Airborne survey, Radioactive cesium, Fukushima Daiichi NPP, East Japan earthquake

©2012. Japan Geoscience Union. All Rights Reserved.

STT03-07 会場:102A 時間:5 月 23 日 11:35-11:55