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An analysis of radiocesium distribution map due to accident of the Fukushima Dai-ichi nuclear power plant by using stere

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The Great East Japan Earthquake on March 11, 2011 generated a series of large tsunami waves that resulted serious damage to the Fukushima Daiichi nuclear power plant (NPP) and radioactive materials were discharged to the environment. After this accident, various types of measurements were performed to obtain the affected range and concentration of radioactive material depositions. In particular, the aerial radiation monitoring (here after ARM) has measured the ambient dose-rate and radiocesium deposition in large areas including those above the forest and the high mountain which people couldn't enter easily on foot or by vehicles, it is useful for grasping the distribution of contamination. It is thought that understanding the feature of the place where the radiocesium has deposited leads to solving the behavior in the atmosphere of the radiocesium discharged by the accident. In recent years, a stereoscopic slope mapping method has developed by the progress in analysis using digital elevation model (DEM) and being used widely. Since the geographical feature can be visualized to 3D-images by this technology, it is used for understanding the geographical features in various fields. In this research, we tried to analyze in visible clearly about the distribution of the radiocesium deposition by lapping the ARM results over the stereoscopic slope map.

The distribution map of the radiocesium deposition which was obtained by the ARM was lapped over the stereoscopic slope map of the whole of Japan by using 10m-mesh DEM data. The DEM data we used for analyzing the ARM data were employed 1.8-km, 3-km, and 5-km mesh data for the areas around the NPP, East Japan, and West Japan, respectively. The ARM data between each point of measurement were interpolated by using a GIS software. The interpolated data were outputted as a 25-m mesh data of the dose-rate map. Here we have lapped the data over the stereoscopic slope map

As a result, the high dose-rate areas more than 1.0 micro Sv/h spread from the NPP to 80 km northwestward, and it turned out southwest from there that the place more than 0.1 micro Sv/h. As for this distribution, radiocesium seems to pass along the low elevation areas between high mountains. On the other hand, the southern part of Iwate Prefecture and the southern part in Ibaraki Prefecture showed that the place more than 0.1 micro Sv/h is flat places comparatively.

It can become the assistance which solves the radiocesium diffusion and its migration by applying this technology to the detailed measurement result used the other monitoring, such as the radiation surveys by using unmanned helicopters.

Keywords: Stereoscopic slope map, Aerial monitoring, Accident of Fukushima Daiichi nuclear power plant, Radiocesium