

Construction of Precise Contamination Maps in the Fukushima Site

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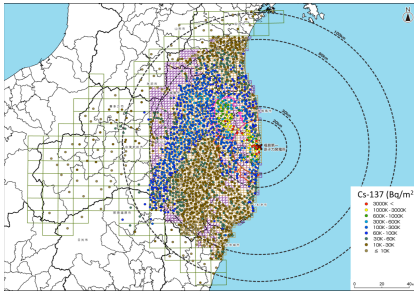


Fig. 1 ¹³⁷Cs deposition map normalized to June 14, 2011.

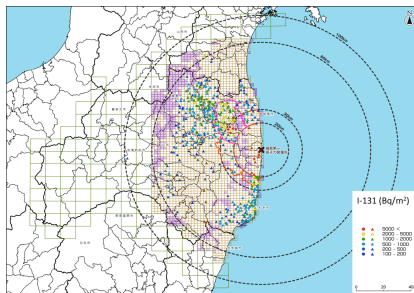


Fig. 2 ¹³¹I deposition map normalized to June 14, 2011. A circles indicates locations where statistically significant data were obtained for the whole five samples.

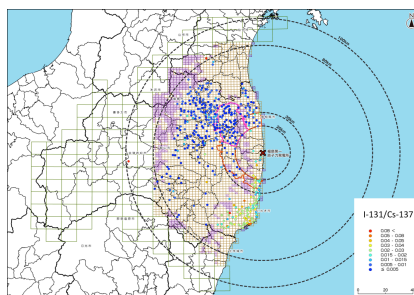


Fig. 3 Distribution of ¹³¹I/¹³⁷Cs concentration ratios. In the southern region from the site, higher ratios were observed. This would suggest that the region was contaminated by different pathways from other regions.

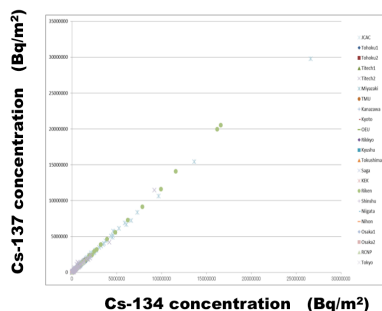


Fig. 4 Correlation of concentrations between Cs-137 and Cs-134.

Abstract -Several different kinds of maps on contamination due to the Fukushima nuclear accident were constructed based on the results of extensive environmental monitoring conducted from June 6, 2011 to July 8 in order to clarify the contamination conditions around the Fukushima site.

1. Methods

1) Soil sampling and radionuclide analyses: The region within 80 km from the Fukushima nuclear power plant site was divided into rectangular areas at 2x2 km² and the region between 80 to 100 km and the rest of the Fukushima prefecture were divided into areas at 10x10 km². One appropriate location was selected for each area, and five soil samples per location were collected using a plastic container up to 5 cm depth. More than 10,000 soil samples were collected and analyzed using Ge detectors to quantify radioactivity of several dominant radionuclides. At each location, the dose rate in air was measured by a calibrated survey meter.

2) Car-borne survey: Car-borne surveys were performed using six taxis equipped with KURAMA systems which successively send dose and position data through a cellular network. The survey data were saved on the main server on time and shown on the screen with a Google Earth picture. Roads at more than 17,000 km were covered by the surveys.

2. Results

1) Soil sampling and radionuclide analyses: Concerning gamma-ray emission nuclides, maps showing nuclide concentration per area were constructed for ¹³⁷Cs, ¹³⁴Cs, ¹³¹I, ^{129m}Tc, ^{110m}Ag. Further, maps for ²³⁸Pu, ²³⁹⁺²⁴⁰Pu, ⁸⁹Sr and ⁹⁰Sr were constructed by analyzing 100 selected samples.

2) Car-borne survey: After noises were removed, dose rates were superimposed on map data by the Geological Survey Institute which provides the standard map data of Japan.

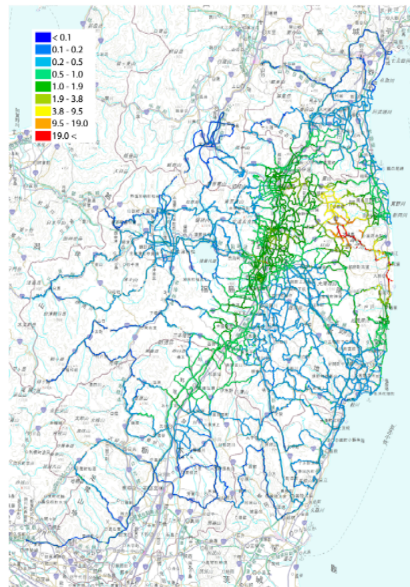


Fig. 5 Dose rate distribution in air (μ Sv/h) obtained from car-borne survey carried out in June, 2011.



Fig. 6 Car-borne survey data obtained about 30 km north west from the Fukushima site.

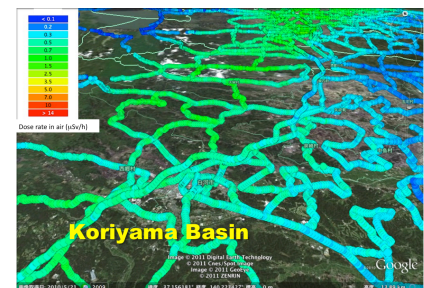


Fig. 7 Car-borne survey data obtained around the Koriyama Basin located in the middle of the Fukushima prefecture.

3. Summary

Radionuclide deposition maps and dose rate maps were constructed based on extensive environmental monitoring using standardized accurate methods. The obtained data are expected to be utilized for evaluation of environmental consequences and human health effects, and for judgment of countermeasures. The authors would like to thank all persons who helped the project directly and indirectly.