

Estimate of relationship between composition of aerosol and radioactive cesium observed in Namie Town, Fukushima Pref.

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Radionuclides emitted from the Fukushima dai-ichi nuclear power plant (FNDPP) have been deposited on the soil, ocean and vegetation. Re-suspension of radioactive cesium from the soil and vegetation to the atmosphere may be one of significant path in the diffusion of radionuclides after the accident. Therefore, the quantitative understanding of these re-suspensions is important to understand future transition of radionuclides. Identification of aerosol species which bring Cs-134/137 is necessary to understand the mechanism of re-suspension, and its efficiency.

We have measured atmospheric concentration of radiation by Cs-134/137 in Namie high school where is away 30km from FNDPP. We have set seven high-volume air samplers (HV) at the site and one operated for 24 hours day by day.

Then gamma-ray emission from HVsamples was measured with Ge detector.

In this way we have gotten atmospheric concentration of radiation which interval is one day.

While sampling, we measure atmospheric concentration of aerosol: black carbon, sulfate, and the number of particle which have size dependence using Electrical Low Pressure Impactor (ELPI).

We have analyzed the aerosols which had collected on HV filter with chemical analysis such as chromatograph.

We examined for correlation between the results of analysis and atmospheric concentration of radiation. And we examined what factor affects atmospheric concentration of radiation, and where the factor comes from using Positive Matrix Factorization (PMF). The PMF is multivariate analysis which estimates factor profile and factor contribution from observed value. The analysis needs only the observed value and number of factor (i.e. need not source profile), so there is possibility of finding the unexpected source.

This study used the date of March and August, 2013.

Keywords: Fukushima daiichi nuclear plant accident, environmental radioactivity