Geophysical Research Abstracts
Vol. 15, EGU2013-6714, 2013
EGU General Assembly 2013
© Author(s) 2013. CC Attribution 3.0 License.

The existence state in the soil of radioactive cesium from the Fukushima Dai-ichi nuclear power plant accident by imaging plate photograph

Yukihiko Satou and Keisuke Sueki
University of Tsukuba, Tsukuba, Ibaraki, Japan (yukihiko@ri-center.tsukuba.ac.jp)

In the accident of the Fukushima Daiichi nuclear power plant, the wide area in east Japan was polluted seriously with radioactive cesium. But, unlike Chernobyl, reactor core explosion did not occur in Fukushima. Therefore, it is thought that many radioactive nuclides emitted into the atmosphere were in the gas state and aerosol. However, when the imaging plate photographs of the surface soils in Fukushima was observed, many granular radionuclides existed. Then, in order to confirm a radioactive cesium of particle state, the treatment for the soils contaminated with radioactive cesium by using chemical operation was tried.
Three type soils, that is, paddy soil, river sediment, and sea sand, were made applicable to research. The contaminated soil samples were collected in Fukushima and Ibaraki prefecture. Radioactivity concentrations of 137Cs and 134Cs were measured by using gamma-ray spectrometry with a high pure germanium (HPGe) detector. After the radioactively measurement, soils had been burned in oven for five hours in 500 degree Celsius. Concentrated hydrochloric acid was added to soil samples, and they were heated for three hours. These samples were divided into residue and elution by centrifugal separation, and then radioactivity of cesium contained in residue was measured.
After chemical operations, 70% and 85% of radioactive cesium from river sediment and sea sand were extracted approximately into elution, respectively. In contrast, in the soil of the paddy field, only 30% of radioactive cesium was approximately eluted. When radiation image photograph of the residues of all three types of soils were taken and observed, the granular radioactive nuclides remained clearly in paddy soil and river sediment. In contrast, all the granular radioactive nuclides in sea sand disappeared after treatment.
The results of above things that desorption of radioactive cesium depend on the kind of soil. Furthermore, it was suggested that there was radioactive cesium of particle state in paddy soil and river sediment. It is a possibility that the substances on which radioactive cesium are concentrated depends on the kind of soil. The necessity of clarifying adsorption objects and particle state in the actual condition was suggested to elucidate Fukushima accident in more detail.