Are biological aerosols involved in resuspension processes of Fukushima radioCs?: Preliminary observations

YASUHITO IGARASHI[1*], TERUYA MAKI[2], KAZUYUKI KITA[3], CHISATO TAKENAKA[4], TAKESHI KINASE[3]

[1] Meteorological Research Institute,1-1 Nagamine, Tsukuba 305-0052, Japan; yigarash@mri-jma.go.jp
[2] Kanazawa University, Kakuma, Kanazawa 920-1192, Japan; makiteru@se.kanazawa-u.ac.jp
[3] Ibaraki University, Bunkyo, Mito 310-8512, Japan; kazuyuki.kita.iu@vc.ibaraki.ac.jp
[4] Nagoya University, Furo-cho, Nagoya 464-8601, Japan; chisato@agr.nagoya-u.ac.jp

The present authors have carried out field observations for atmospheric re-suspension of the radioactive cesium (Cs) originated from the Fukushima Dai-ichi Nuclear Power Plant (FDNPP) accident in contaminated area in Fukushima prefecture (Namie) by the accident to assess the atmospheric effects.

After ceasing the surge of the primary emission from the FDNPP site by the accident, so-called resuspension has continued from the contaminated area. As a result of the observation it was known that 1) during summer Cs concentration increases in such typical Japanese village-vicinity mountain area and that 2) radioactive particles in summer seem to be dust from its appearance and their optical micrograph with a sort of our preconception. Whereace we realized, in the course of the research, that most of the particles collected on the filter were of biological origin from electron-microscopic analysis. Considering the known fact that true fungi concentrate Cs due to misidentifying Cs as potassium, we hypothesize that the fungal spore could be the major contributing host particle for Cs resuspension.

So, we have carried out preliminary observations at the Namie site during summer and winter for the possible bioaerosol detections by using the fluoresence microscopy and DNA analysis. In this presentation, we will show the results for the bioaerosol number concentrations by fluoresence microscopic counting and predominant species by the DNA analysis.

The Cs resuspension through the terrestrial ecosystemic cycle could be possible, for instance, in the case of cedar pollen. However, bio-resuspension related to the fungal spore or related bioaerosol emission is a quite novle hypothesis. The hypothesis is under tests by observations as well as model simulations through budget analysis, etc., which could contribute better understanding of anthropogenic Cs behavior in the terrestrial environment.