

3.107 Bioaerosol emissions during the summer precipitation in Fukushima forest revealed by radiocesium observations.

Early Career Scientist

Presenting Author:

NAHO HAYASHI, Ibaraki University, Graduate School of Science and Engineering, Mito, Japan, 17nm312r@vc.ibaraki.ac.jp

Co-Authors:

KAZUYUKI KITA, Ibaraki University, Mito, Japan

YASUHITO IGARASHI, Ibaraki University, Mito, Japan

KOUJI ADACHI, Meteorological Research Institute, Tsukuba, Japan

TERUYA MAKI, Kanazawa University, Kanazawa, Japan

TORU KIMURA, ATOX Co.,Ltd., Japan

Abstract:

Aerosol particles have been thought to deposit on land surfaces by precipitation. However, our radiocesium observation showed the events that cannot be explained by a rain deposition.

We have carried out observations of aerosol and atmospheric precipitation in Namie, Fukushima to study the dynamics of radiocesium released by the nuclear accident. As a result, radiocesium resuspensions were observed. However, carriers of atmospheric radiocesium and their suspension mechanisms have not been fully understood. Previous studies have shown that the resuspension is active in summer and biogenic particles (bioaerosol) are important, but the mechanism is not clarified. Therefore, we investigated a fluctuation of the atmospheric concentration of radiocesium by precipitation. As a result, the concentrations of radiocesium during precipitation were higher than those during non-precipitation, and it is hypothesized that the bioaerosols, such as fungi, carries radiocesium during the precipitation.

To prove the hypothesis, we measured the radiocesium and bioaerosols in the air during August and September 2016. The air filter samples were observed by a scanning electron microscope (SEM) and an optical microscope (OM). The elemental composition was measured by SEM- energy dispersive x-ray spectrometry (EDS) analysis.

A large numbers of particles were found to contain carbon compounds and to be composed of fungal cells originated from Ascomycota and Basidiomycota, judging from their color and morphology. Molecular biological analysis also revealed that Basidiomycota members dominated in the air samples commonly. The number of colored bioaerosol and the radiocesium concentrations showed a positive correlation, and the slopes of the correlations were different between the precipitation and non-precipitation events. We thus conclude that the bioaerosol particles during rainfall and non-precipitation were different.