[EJ] Evening Poster | H (Human Geosciences) | H-CG Complex & General

[H-CG26]What scientists should do for reconstruction after Fukushima Daiichi Nuclear Power Plant Accident

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Seven years have passed since the Fukushima Dai-ichi Nuclear Power Plant accident on March 2011. Some local villagers have started returning their own home. Most of suspension on shipment of agricultural products from Fukushima has been released. Scientists temporarily concentrated on Fukushima-related issues are returning to their own research topics although we still need to solve various problems from application levels to pure scientific topics. For example, it is critical for farmers in Fukushima how to recover productivity of decontaminated agricultural lands. Radiocesium (Cs)-bearing microparticles having relatively high specific radioactivity (Bq/kg) had recently been discovered; however, the fate of the Cs-bearing microparticles, e.g., inert or not, is not well understood to date. It is about time for rural planning scientists to propose their own opinions rather than reporting case studies. We had preliminary discussion at ASA, CSSA and SSSA International Annual Meeting in Tampa, USA 2013 by driving a session of "Battles of Soil Scientists in Fukushima, Japan". In addition, we had "Battles of soil scientists for recapturing Fukushima land from Nuclear Power Plant accident. What can we do then?" last year. In this session, we are looking forward to presentations from soil and water sciences to social and agronomic sciences related to interaction of human and nature under the condition of post-nuclear power plant accident.

[HCG26-P02]Effects of Clay Mineral Composition on Soil Water and Ion Movements in the Vicinity of Soybean Roots

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Radioactive cesium was emitted from the disabled Tokyo Electric Power Company’s Fukushima Dai-ichi Nuclear Power Plant on March, 2011, and diffused into the environment, including agricultural area in eastern Japan. As one of most effective countermeasure to reduce Cs uptake by crops, additional potassium (K) fertilization at applying basal fertilizer is recommended. Clay mineral compositions are one of important factors governing ion behaviors in soils. It is well known that the retention of alkali cations such as K, Rb, and Cs is highly associated with their adsorption on frayed-edge site (FES) located at boundary of mica core and vermiculite structure. Therefore, it is expected that mineral composition also affects K and Cs movements including root uptake in the rhizosphere. In this study, using a rhizobox system, soil water and ion movements in the vicinity of soybean roots were investigated for two sands with different treatments. Weathered biotite was used as an additive of clay mineral and mixed with Toyoura sand at 5% per dried soil. Toyoura sand with or without weathered biotite was repacked to soil box compartment (width:14 cm x height:10 cm x length: 3 cm) in rhizobox system. Mass water content of the samples was adjusted to 15%. The soybean roots which were pre-grown up to root length of around 6 cm were placed on the surface of soil box compartment. The soybean in the rhizobox was grown for around 10 days in the climate controlled room. After the growth, soil box compartment was removed from the rhizobox and sliced at 2.0 mm interval. Mass water content and ion concentration of each sliced sample were measured. Results showed mass water content in the sand decreased due to root uptake and more significant decrease was observed near roots (within 10 mm). More

reduction on mass water content was observed for the sand with weathered biotite. It is observed that increase of ion concentrations including K near roots (within 5 mm) for sands with both treatments, while Cs concentration maintained constant regardless of distance from the roots in the sand with weather biotite. It indicates that weather biotite reduced Cs mobility in the vicinity of roots.