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[U-05_30PM2]Interrelation between Life, Water, Mineral, and Atmosphere

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Wed. Apr 30, 2014 4:15 PM - 5:45 PM 419 (4F)
Life in Earth is based on a diversity of physical and chemical dynamism and processes of Earth in the 4 billion years of history. It is substantially said as the history of interrelation between Life, Water, Mineral (Solid Earth) and Atmosphere. Interdisciplinary approach, way of thinking and communication are necessary. This session will be a cradle for such kind of interdisciplinary research.

5:15 PM - 5:30 PM

[U05-P13_PG]Soil micromorphology and the effect of biotic activity

3-min talk in an oral session

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Soil is formed on a boundary between geosphere and biosphere in relation with hydrosphere and atmosphere. The major component is quite very fine-grained particles which are not still unknown in detail. A great variety of microbes are associated in soil (e.g., Hattori, 1987). Hattori (2006) suggests that there is a possibility some bacteria produce very fine-grained mineral particles, silica-nano particle as a part of soil material. Micromophology is observed under petrological microscope. The technique for preparation to make thin section from unconsolidated soil is followed by method in FitzPatrick (1993). Soil fragments are examined by scanning electron microscope. Samples are collected from recent cultivated soil (Okayama University Farm), fluvial soil (Sendai City), rice field soil (150 to 2000 years old fluvial soil from Okayama University), paleosol (about 3000 years old organic rich fluvial soil from Dhaka City, Bangladesh).The formation of microaggregates: The structure of soil macroaggregate (1～2mm) which is composed of microaggregates (0.05～0.3mm) and sand grains of mineral and rock fragments is observed in the recent cultivated soil from Okayama University Farm. Similar microaggregates (0.1～0.5mm), structure with heterogeneous granular domains is observed in rice field soil from Okayama University. A paleosol from Dhaka, which is not considered to have artificial effects, also consists of microaggregate. The aggregates do not have distinctive boundary but are distinguished by different compositions (content of organic materials, deposited ferri-hydrite and .manganese dioxide, particles of mineral and rock fragment). Root pipes and cracks are associated in the soil. The compound structure is interpreted to be formed under effects of microorganisms, root and physical process as demonstrated by previous soil research (e.g., FitzPatrick, 1993). The formation of silica-nano particle: Under scanning

electron microscope, surface of mineral grain has structures caused by weathering, for example embayment, fracture and etch pit. Crystallized nano-sized minerals are formed on weathered surface of a mineral. A bacterial cell surrounded by radiate fibrous mineral is found. The feature indicates a possibility that some bacteria promote to form minerals. And also there is a possibility that a part of inorganic soil materials might be formed relation with organism.FitzPatrick, E.A. (1993) Soil Microscopy and Micromorphology, WileyHattori, T. (1987) Microbial life in the soil, IwanamiHattori, T. (2006) Soil Microorganisms, 60(2), 105-107