

Mineralogical Characterization of Soils in Gosan, Prehistoric Site, Jeju Island, Korea

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About 80% of Jeju soils derived from volcanic ash are classified as Andisols known to form a large amount of amorphous minerals. The study area is in a prehistoric site, Gosan-ri, Jeju, Korea and dominant solid phases in clay fraction of the volcanogenic soils are the layered silicates [1]. The objectives of the study were to investigate characteristics of mineral assemblages, morphological and chemical composition and to deduce mineralogical transition processes in this area.

12 soil samples were collected from 19 cm to 100 cm depth in Jeju, Korea. Sedimentation method for particle size separation and sequential extraction of the soil samples using citrate, bicarbonate and dithionite (CBD), and ammonium oxalate to get rid of free and crystalline iron oxides from soils were used. XRD and SEM/TEM-EDS analyses were used to characterize mineralogical characteristics, mineral assemblages, morphological characteristics and chemical composition.

The results of particle size separation in both soil series appeared in similar mineral assemblages of sand and silt fraction consisting of biotite, anorthite, albite, quartz and olivine. And clay fractions in most depths were composed of kaolinite, quartz, chlorite, illite, basaluminite and amorphous Fe-Si-Al oxyhydroxides. SEM/TEM-EDS analyses of the sand and silt showed morphologically similar and which of clay showed round in shape. After sequential extraction, there was no significant change in the components, but morphologically transformed from round to irregular due to removal of Fe coating.

These results suggest that morphological transformation of clay minerals in this area mainly associated with noncrystalline minerals including Fe-Si-Al oxyhydroxides. As the result of mineralogical investigation for the soil profile in the study area, clay minerals as the weathering end products remained mainly kaolinite and chlorite.

[1] Ha et al. (2002) *Econ. Environ. Geol.* **35**(6), 491-508.