

SEM032-P06

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Rock magnetic study of subsurface deposits with volcanic materials in Yufu City, Kyushu

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We are conducting rock magnetic analyses on subsurface deposits consisting of volcanoclastic materials and their secondary eolian deposits in order to investigate magnetic properties and their downward variations of the eolian deposits. Samples were obtained from an outcrop and sediment core drilled at Higashiishimatu area in Yufu City.

In the sediment core of 3 m long, KiKai-Akahoya tephra (K-Ah; 7.3 ka) was recognized at 87-100 cm below the surface (bs). In a soil profile at the outcrop of 5 m in height, three tephra layers were observed: K-Ah tephra at 15-48 cmbs, Aira-Tn tephra (AT; 26-29 ka) at 212-229 cmbs, and Kujyu-Daiichi tephra (Kj-P1; 50 ka) at 383-401 cmbs. 110 and 215 samples were collected continuously by pushing 7 cc plastic cubes from the core and outcrops, respectively.

Results from analysis of lithofacies showed that the deposits beside the tephra layers consist of black, dark-brown and brown soils. The upper part of the core and outcrop consisted of black soils including K-Ah tephra. Dark-brown soils with AT tephra were observed between about 194 and 273 cmbs in the outcrop. The rest part of the core and outcrop was composed of brown soils. The existence of organic materials (4-16 weight %) was detected in black and dark-brown soil layers.

We performed measurements of temperature dependence of saturation magnetization in high temperature and isothermal remanence (IRM) in low temperature and thermal demagnetizations of 2 axes-IRM in order to identify magnetic minerals. It is suggested that the dominant ferromagnetic mineral is low-temperature oxidized (magnetized) titanomagnetite (TM10-20). The existence of hematite is also found.

We made measurements of initial susceptibility (X) and hysteresis parameters and acquisition experiments of anhysteretic remanence (ARM) and isothermal one. The following characteristic properties in magnetic parameters were observed. The frequency dependence of X (X_{fd}), ARM susceptibility (X_{ARM}) and X_{ARM}/X values are the largest at the black soil layer below K-Ah tephra, suggesting a relative large amount of magnetized titanomagnetite (Mh-TM) of single-domain (SD) size and large contribution of superparamagnetic Mh-TM. X_{fd} , X_{ARM} and X_{ARM}/X decrease downward in brown and dark-brown soil layers between K-Ah and AT tephra, suggesting downward decrease and increase in the amount and grain-size of Mh-TM, respectively. X_{fd} , X_{ARM} and X_{ARM}/X values are almost constant in dark-brown and brown soil layers below AT tephra. The relative large values of Hard IRM are observed in the black soil layer above K-Ah tephra, suggesting the presence of Mh-TM of higher coercivity.