

Remanent magnetization of a sediment core from Haneji-naikai, Okinawa : Diagenetic modification of magnetic mineral

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We have studied magnetic properties of sediment core samples from the Haneji Inner Bay and the Shioya Bay on the northwest coast of Okinawa Island in order to investigate runoff of red soils associated with environmental changes in the watershed. Here we present results of measurements of natural remanent magnetization (NRM) of the core sample from Haneji-naikai Bay.

Pass-through measurement of the u-channel samples revealed that NRM above 120 cmbsf (cm below sea floor) has a stable component, which shows linear decay toward the origin (MAD <10 degree). By contrast, NRM intensity below 130 cmbsf is only 2% of the upper interval and no characteristic magnetic component was isolated (MAD ≥ 10 degree). While low-field magnetic susceptibility shows gradual down-core decrease of at 100-150 cmbsf, anhysteretic remanent magnetization (ARM) decreases sharply at 140-160 cmbsf. Isothermal remanent magnetization (IRM), which was measured for discrete cubic specimens of 1 cm³ subsampled from the u-channels, showed consistent variation with the ARM. It was also found that proportion of low-coercivity (<0.3 T) magnetic minerals (S-ratio) decreases at 140-160 cmbsf. Thermal demagnetizations of three-component IRM made for selected specimens suggest abundance of titanomagnetite and magnetite at the upper interval, but such medium to low coercivity minerals were not observed in the lower part. It is suggested that a loss of fine-grained magnetite have occurred due to reductive diagenesis, resulting destruction of stable NRM signals below 130 cmbsf.

Keywords: paleomagnetism, natural remanent magnetization, diagenesis, sediment, red soil, Okinawa