

Discrimination of primary remanent magnetization during Matuyama-Brunhes polarity transition

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We report preliminary results of magnetostratigraphy from an outcrop in Boso Peninsula, which is considered to record Matuyama-Brunhes polarity transition. The outcrop is ~4m height, facing west and situated along a roadside in Terasaki, Chiba Prefecture, Japan. The sediment mainly consists of massive silt of Kokumoto Formation, Kazusa Group. The outcrop shows several tephra layers including TNTT (Byk-E) residing close to Matuyama-Brunhes polarity transition (Okada and Niitsuma, 1989).

In order to identify the polarity of primary remanent magnetization recorded, we have taken 55 paleomagnetic drill cores at intervals of 1~10 cm. Progressive alternating field demagnetization (PAFD) was conducted on all the sub-samples taken from the drill cores. The higher coercivity (>~20 mT) magnetization component has mostly positive inclination (normal polarity) and shows a swing to negative inclination (reversed polarity) at 76-91 cm below TNTT. Preliminary results of progressive thermal demagnetization shows sharp drop in remanent magnetization by heating up to 175 °C. By heating above 175 °C, magnetization decreases gradually up to 300-350 °C and becomes unstable above 300-350 °C.

In order to understand the origin of instability during heating to 30-350 °C, we have conducted progressive thermal demagnetization in combination with isothermal remanent magnetization acquisition. The results suggest the presence of (titano-)magnetite and greigite, and the production of magnetic mineral during heating above 200-350 °C in the laboratory.

Combination of thermal remanent magnetization up to 200 °C and further AF demagnetization was conducted in order to extract primary remanent magnetization hidden by the strong secondary magnetization and thermal instability, however, the extraction of primary remanent magnetization was not successful. Further improvements in demagnetization might be pursued to clarify the magnetization at the time of deposition free from later diagenesis.

Keywords: Matuyama-Brunhes polarity transition, thermal demagnetization, alternating field demagnetization, low temperature demagnetization, primary remanent magnetization, greigite