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京都盆地から得られた堆積物コア中の大阪層群海成層 Ma5 に対する古地磁気学・岩石磁気学的解析
Paleomagnetic and rock magnetic studies on non-marine and marine sediments in the Osaka Group cored at Kyoto Basin

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Rock magnetic analyses were performed on sediments of non-marine and marine clay in the Osaka Group cored at Kyoto Basin in order to investigate magnetic variations corresponding to environmental changes between freshwater and marine. The Osaka Group is the Pleistcene sequence formed related to sea-level changes in the glacial-interglacial cycles, and consists of alternating beds of non-marine sediment and marine clay.

KD-1 and KD-2 cores including the Osaka Group were drilled at Kyoto Basin. The Ma5 bed of marine clay had been observed between 150.00 and 141.35 m in depth on KD-1, between 190.37 and 182.21 m in depth on KD-2. The lower and upper boundaries of the Ma5 bed have been determined mainly based on the sediment facies and color.

Analyzed samples in this study were collected in 10 cm intervals from between 140.60 and 153.82 m in depth, including the Ma5 bed, and between 155.80 and 157.75 m in depth on KD-1, between 190.40 and 181.56 m in depth on KD-2.

We measured initial magnetic susceptibility, IRM intensity and hysteresis parameters, and performed progressive alternative field demagnetization (PAFD) of NRM for paleomagnetic analysis and progressive thermal demagnetizations (PThD) of IRM. Electristic conductivity (EC) and pH of clayey water stirring the sediment samples were also measured.

EC and pH value showed that the Ma5 beds lie from 151.21 to 142.40 m in depth on KD-1, from 188.60 to 182.19 m in depth on KD-2.

In variations of inclinations obtained from paleomagnetic analysis, a fluctuation corresponding to the Delta Event in the Marine Isotope Stage 17 was observed on both KD-1 and KD-2 cores. From variations in the magnetic parameters, a characteristic layer with high IRM intensity (High IRM layer) was observed on both cores. By using the High IRM layer and the zone of the Delta event as key layers for the age comparison between the two cores and by the duration of the Delta event observed in sediment cores from the North Atlantic ODP site 980, we estimated the formation age of marine clay bed Ma5. The results were 703-680 ka on KD-1, 704-696 ka on KD-2.

As characteristic magnetic properties in response to depositional environment changes, less variation in the amount of magnetic minerals, smaller particle size of magnetic mineral, and smaller amount of high coercivity magnetic minerals were recognized in the marine beds compared to the non-marine sediments.

In the marine beds, a clear correlation was observed between the particle size of magnetic minerals and EC values. Samples with higher EC value showed the presence of finer magnetic minerals. There was also a clear correlation between the abundance of high coercivity magnetic minerals and EC values. It is suggested that the difference in the amount of particle size and high coercivity magnetic minerals reflects the advanced dissolution of magnetic minerals associated with early diagenesis in marine under a reducing environment.

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