

Paleomagnetic and environmental magnetic records from piston core sediments of the Oki Ridge, Japan Sea

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During the Images VII cruise in 2001, a giant piston core MD01-2407 was recovered from the Oki Ridge in a water depth of 932m in Japan Sea. This core, 55.28m in length, is mainly composed of alternating layers of homogeneous light colored silty clay and laminated or bioturbated dark colored silty clay, occasionally intercalating volcanic ash layers. Age of the upper 12.3m was estimated from characteristic dark color layers, which are called TL layers, and widespread tephra layers. We investigated magnetic properties of u-channel samples continuously collected from these core sediments, attempting to obtain high-resolution records of past geomagnetic field and paleoenvironmental changes.

At the horizons of the TL layers, magnetic concentration parameters show decreased values, while magnetic grain-size parameters were relatively increased and high-coercivity magnetic minerals like hematite were relatively increased. It is also suggested that magnetic minerals were partly dissolved by reductive diagenesis, particularly during the isotope stage 2 and 4.

Measurements of natural remanent magnetization show occurrence of anomalous magnetic directions at several horizons, which may represent geomagnetic polarity excursions in the Brunhes chron, such as the Mono Lake excursion. The NRM intensity normalized by ARM for the interval above 13 m did not show significant correlation with a standard paleointensity record, such as Sint-800. This is probably due to variation of lithology including volcanic ash layers and effect of the diagenetic changes of magnetic minerals. At several intervals below 13 m, however, the NRM/ARM data show similarity with Sint-800, suggesting a possibility that paleointensity record is partly preserved even after reductive diagenesis.