

Search of paleomagnetic record of geomagnetic excursions in a piston core from off Okinoshima, Lake Biwa

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Lake sediments are often used for studies of paleosecular variations and geomagnetic excursions of the geomagnetic field. Although there have been several paleomagnetic studies in Lake Biwa, there is a doubt in reliability on existence of the excursion records from the 200-m core taken in 1971. In this study, we have made magnetic measurements of a piston core recovered off Okinoshima (BIW07-6, 18.42 m long) with slow sedimentation rate (about 32 cm/kyr) among six piston cores obtained in Lake Biwa in August 2007.

The main lithology of the core BIW07-6 is gray clay. We found 8 widespread tephra layers including the Aira-Tn (AT) and Sanbe-Ikeda (SI) ashes, which suggest that the core covers the time interval for about 50 kyrs. Taking cubic samples of 7 cc, we measured magnetic susceptibility and its anisotropy (AMS). We also measured natural remanent magnetization (NRM), applying stepwise alternating field demagnetization.

Results of AMS measurements show that main part of the core sediment was not affected by disturbance during the core recovery, although the top of the core down to 1.94 m was revealed to have been deformed during coring process affecting inclinations and declinations of the NRM.

The inclination variation shows a good agreement with the paleosecular variation record from BIW95-4 (Hayashida et al., 2007), and also with inclination records reported from BIW07-3 and BIW07-4 cores from the northern part of Lake Biwa. Apparent swings (shallowing) of the inclination are recognized at the depth about 8.41 m, 10.45 m and 14.97 m. There is a possibility that these records are correlative with the Hilina Pali excursion (18-23 ka), the Mono Lake excursion (32-41 ka) and the Laschamp excursion (39-41 ka), respectively.