

Sedimentary record of geomagnetic secular variation and excursions in piston core samples from Lake Biwa

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Several important records of geomagnetic excursions have been reported from the eastern Asian region, including a pioneering work on core samples from Lake Biwa. It is difficult, however, to investigate detailed features and possible correlation of these reported excursion records at present, mainly because of unresolved issues about chronology and reliability of the older paleomagnetic records. Here we report initial paleomagnetic results from newly obtained piston-core samples, which were recovered from the central part of Lake Biwa in 2007. Our piston cores of about 10 to 20 m long are mainly composed of homogeneous bluish gray clay and silty clay, intercalated with several volcanic ash layers. A preliminary age model based on tephrostratigraphic correlations suggests that the longest core covers the time interval for about 50 kyrs, providing an average sedimentation rate of about 30 cm/kyr. Measurement of anisotropy of magnetic susceptibility (AMS) suggests that main part of the core sediments were not affected by disturbance during the coring. Systematic declination shifts at several horizons suggesting that the corer might have corkscrewed into the sediments. Nevertheless, natural remanent magnetization (NRM) data from our cores show directional variations similar to the paleosecular variation records for the last 10 kyrs and 30 kyrs, which were reported from piston cores obtained in 1995. At the intervals between the Aira-Tanzawa (AT) and the Sanbe-Ikeda (SI) ash (40-50 ka), anomalous magnetic directions associated with significantly low intensity values. This feature may be manifestation of the Laschamp excursion, although our record does not exhibit directional change close to 180 degrees.