

Possible geomagnetic excursion records at around 6 and 14 ka from East China Sea

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A high-resolution paleomagnetic record was obtained from a piston core MD982195 taken in the northern East China Sea during IMAGES IV cruise. A total of 33.65 m long sediment column was recovered at a water depth of 746 m in the Danjo Basin west of Kyushu Island (31 degrees 38.33'N 128 degrees 56.63'E). Sediments were mainly composed of silty clay. Two wide spread tephra layers, K-Ah (7,300 calendar year) and AT (27,500 calendar year), were recognized at 5.1-6.0m and 21.8-22.9m. In addition, AMS 14C ages were obtained for 14 horizons using foraminifers in the sediments. The estimated age at 32 m is 41.4 kyr and the sedimentation rate ranges from 26 to 270 cm/kyr.

Paleomagnetic cube samples were taken at 5cm intervals from the core and were subjected to the study of anisotropy of magnetic susceptibility. U-channel samples were taken continuously from the core and the measurements of NRM, ARM, and IRM were conducted at 5 mm or 1 cm intervals. The results were deconvolved using ABIC minimizing algorithm by Oda and Shibuya (1996). Magnetic anisotropy shows that top 2m and 8-10m show unstable nature with K_{min} inclination of lower than 45 degrees. Other parts show stable feature with primary sedimentary fabric. However, the excursions are not obvious in inclination record. Negative inclination was found at around 6 and 14 ka. Zhu et al. (1998) also reported negative inclination records from multiple trench sites around Beijing in China. These can possibly correlated with each other. However, paleosecular variation records from Japan reported so far does not show such features. The negative inclination at around 14 ka in our record corresponds to low K_{min} inclination of magnetic susceptibility indicating the possibility of physical disturbance. However, the record at around 6 ka does not show physical disturbance indicating that the record is relatively reliable. Although careful investigation must be taken into account, we tentatively attribute these excursions as triggered by differential rotation at core mantle boundary caused by an rapid increase in sea level change triggered by melt water pulse 1A at 14 ka as a discharge from Lake Agassiz and Jomon transgression at around 6 ka.