

Relative paleointensity and inclination anomaly during the last 8 m.y. obtained from eastern equatorial Pacific sediments (IODP Site U1335)

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We conducted a paleomagnetic study of the upper ~55m of IODP Site U1335 cores taken from the eastern equatorial Pacific during the Expedition 320. U-channel samples were taken from the spliced core sections. All magnetic chrons in the geomagnetic polarity time scale down to C4n.2n (~8.1 Ma) are recognized in the magnetostratigraphy, which indicates continuous sedimentation. Rather low sedimentation rates of the cores, 5 to 9 m/m.y., limit resolution of paleomagnetic records. However, the cores are suitable for elucidating long-term geomagnetic-field behaviors such as a relation between geomagnetic-field intensity and polarity length.

Magnetic property measurements and TEM observations showed that magnetic mineral assemblages of the sediments are dominated by oxidized biogenic magnetites. A few degrees of negative inclination anomalies (defined as observed inclination minus the inclination expected from the hypothetical geocentric axial dipole) are observed. This is consistent with the available time-averaged field models showing negative inclination anomalies in Pacific low latitudes. We used ARM as a normalizer of relative paleointensity estimations. An upcore decrease of the ratio of ARM susceptibility to SIRM ($k_{\text{ARM}}/\text{SIRM}$) occurs at about 4.2 Ma, which is associated with a decrease of sedimentation rates. Average relative paleointensities increase corresponding to the $k_{\text{ARM}}/\text{SIRM}$ change. The inverse correlation between relative paleointensity and the $k_{\text{ARM}}/\text{SIRM}$ ratio indicates that changes in the relative abundance of biogenic to terrigenous magnetic minerals partly contaminated the relative paleointensity record, as pointed out by Yamazaki et al. (2013). We scaled the RPI record so that the average paleointensity younger than 4.2 Ma (the onset of chron C2Ar) equals that of older. The relative paleointensities averaged for individual polarity chrons did not show any correlation with polarity length or polarity during the last 8 m.y.

Keywords: paleointensity, inclination anomaly, IODP