

Lock-in depth of pDRM Acquisition on Marine Sediments of the Western Equatorial Pacific Ocean

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On reconstructing past geomagnetic-field variations from marine sediments, lock-in depth of post-depositional remanent magnetization (pDRM) acquisition has been controversial for a long time. By direct comparison of relative paleointensity (RPI) and ^{10}Be flux, Suganuma et al. (2010, 2011) proposed a lock-in depth of ~15 cm, whereas Valet et al. (2014) reported ~0 cm. We studied lock-in depth of pDRM using a marine sediment core obtained from the West Caroline Basin in the equatorial Pacific Ocean (R/V "MIRAI" MR14-02 cruise, core PC01). RPI and ^{10}Be flux did not show obvious constant shift around the onset of the Olduvai subchron and the Gauss-Matuyama transition. This implies a negligibly small lock-in depth for the studied core. We also examined the lock-in depth of the PC01 core by comparing $\delta^{18}\text{O}$ based ages of recorded polarity boundaries and GPTS ages, and by comparisons of RPI records among PC01, MD982187 (Yamazaki and Oda, 2005) and IODP Site U1314 (Ohno et al., 2012), which have different sedimentation rates. The results were consistent with the negligibly small lock-in depth of the PC01 core. This contrasts to the ~15 cm lock-in depth of the MD982187 core (Suganuma et al, 2010, 2011), which was obtained from the same area. Furthermore, Horiuchi et al. (in press) obtained lock-in depths of ~6 cm and ~10 cm from two cores in the same area. Lock-in depth may depend on lithology and depositional processes of each core.

Keywords: paleointensity, lock-in depth, ^{10}Be