A relative paleointensity record of the last 3.2 m.y. from western equatorial Pacific and remanent magnetization lock-in depth

Yukihiro SAKURAMOTO[1], *Toshitsugu Yamazaki[1], Yosuke Miyairi[1], Katsunori Kimoto[2], Yusuke Yokoyama[1]

1. Atmosphere and Ocean Research Institute, The University of Tokyo, 2. Japan Agency for Marine-Earth Science and Technology

We conducted a paleomagnetic study on a sediment core (MR14-02 PC01) taken from the western equatorial Pacific. The aim of this study was firstly to obtain a relative paleointensity (RPI) record older than 2 Ma; the number of available RPI records older than 2 Ma was still limited, and a global stacked curve has not yet been established. Another aim was to examine the controversial lock-in depth of remanent magnetization acquisition by comparing RPI and ^{10}Be abundance profiles during polarity transitions.

Core PC01 covers the last ~3.2 m.y. with an average sedimentation rate of 5 m/m.y. Magnetic properties of the sediments satisfy the criteria for reliable RPI estimations, and a RPI record from ~0.6 to ~3.2 Ma was obtained by normalizing NRM intensities with SIRM. A reliable age model based on the oxygen-isotope (δ^{18}O) stratigraphy was established for sediments older than 1.8 Ma. The RPI record up to 2 Ma from core PC01 agrees in general with the paleointensity stacks PISO-1500 and Sint-2000. However, long-term trends of the RPI record show anti-correlation with the ratio of ARM to SIRM, as pointed out for other cores by Yamazaki et al. (2013). This suggests that changes in the ratio of biogenic to terrigenous magnetic mineral component in the sediments may have contaminated the RPI record.

RPI and ^{10}Be flux of core PC01 did not show any obvious offset around the onset of the Olduvai subchron and the Gauss-Matuyama transition. This implies a negligibly small lock-in depth for core PC01. We also examined the lock-in depth of core PC01 by comparing δ^{18}O based ages of recorded polarity boundaries and GPTS ages, and by comparisons of RPI records among PC01, nearby MD982187 core (Yamazaki and Oda, 2005), and IODP Site U1314 in the North Atlantic (Ohno et al., 2012), which have different sedimentation rates. The results were consistent with the negligibly small lock-in depth of core PC01. A lock-in depth of ~0 cm was also reported from Indian Ocean sediments by Valet et al. (2014). It was revealed that lock-in depths obtained from sediment cores in the same region by the identical method are different: ~15 cm for MD982187 core (Suganuma et al., 2010; 2011), ~6 cm and ~10 cm for two cores of Horiuchi et al. (2016), and ~0 cm in this study. Lock-in depth may be controlled by small differences in lithology and depositional processes of individual cores through mechanisms that we do not yet understand.

Keywords: paleointensity, Beryllium isotope, DRM lock-in depth

