

Be-10 フラックス変動に基づく Paleomagnetic lock-in depth の決定

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Delayed acquisition of paleomagnetic record in the marine sediment inferred from offset Be-10 flux anomaly

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Fluxes of meteoric cosmogenic radionuclide, Be-10, vary with changes of incoming cosmic-ray flux modulated by geomagnetic field intensity variations. The variability in Be-10 flux can be used for synchronization between ice cores, as well as other geological archives, such as marine sediments by comparison to relative paleointensity, which is another tracers of geomagnetic field intensity. This strategy has critical importance for identifying lead-lag relationship of abrupt environmental changes in globe, which is a key for understanding the Earth's climate system. However, the widely accepted process of post-depositional remanent magnetization (PDRM) suggests that paleomagnetic record is locked in some appreciable depths in marine sediments (paleomagnetic lock-in depth), resulting in an uncertainty of the synchronization. Here, we present clear evidences of downward offset of paleointensity drop relative to Be-10 flux anomaly at the Brunhes-Matuyama geomagnetic polarity transition, which we interpret as a result of ca. 16 cm deep of the paleomagnetic lock-in. This deep paleomagnetic lock-in implies that up to several tens of thousands years of age offset occurs when a paleomagnetic record is used for dating sediments. Therefore we propose that the potential paleomagnetic lock-in depth effect should be corrected for a precise correlation.