

SHRIMP U-Pb zircon geochronology for tephra layers: implications for refined chronology for geomagnetic reversal boundaries

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Geomagnetic field intensity records from marine sediments have contributed to improved understanding of variations in the Earth's magnetic field and have helped to establish age models for marine sediments. However, lock-in of the paleomagnetic signal at some depth below the sediment-water interface in marine sediments through acquisition of a post-depositional remanent magnetization (PDRM) adds uncertainty to synchronization of marine sedimentary records. Recently, Suganuma et al. (2010) presents clear evidence for a downward offset of the paleointensity minimum relative to the ^{10}Be flux anomaly at the Matuyama-Brunhes (M-B) geomagnetic polarity boundary, which they interpret to result from a 16 cm PDRM lock-in depth. This lock-in depth indicates that a certain age offset probably occurs when a paleomagnetic record is used for dating marine sediments. This phenomenon also suggests that the accepted ages for the geomagnetic polarity boundaries, including the M-B boundary, are needed to be reconsidered.

Plio-Pleistocene marine sedimentary sequences are widely distributed in the Boso and Miura Peninsula, central Japan. Because these sequences have a significantly high sedimentation rate with well-preserved planktonic and benthic foraminifera fossils, it is possible to reconstruct a detailed geomagnetic behavior along the polarity boundaries such as M-B and upper Olduvai boundary with high resolution oxygen isotope records. In addition, several wide-spread tephra layers (Byakubi, Kd38, and Kd39) are accompanied with these geomagnetic polarity boundaries. Based on SHRIMP (The Sensitive High Resolution Ion Microprobe) geochronology for single zircon crystals, U-Pb ages of these wide-spread tephra layers have been investigated. This strategy has a critical importance for obtaining absolute ages of the marine sedimentary sequences, including the geomagnetic polarity boundaries. In this presentation, we will report tentative results of the SHRIMP U-Pb ages for tephra layers with implications for refining chronology for these geomagnetic reversal boundaries.