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相対古地磁気強度記録に見られる堆積物の磁気特性変化の影響
Rock-magnetic artifacts on long-term relative paleointensity variations in sediments

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Long-term changes of geomagnetic field intensity, including possible dependence on lengths of polarity intervals, provide fundamentally important information for understanding the geodynamo. A positive correlation between paleointensity and polarity interval length was previously suggested from an Oligocene (ca 23-34 Ma) relative paleointensity record at Deep Sea Drilling Program Site 522 in the Atlantic Ocean, which is the only continuous paleointensity data set published so far for this age interval. We have conducted a paleomagnetic study of Eocene to Oligocene sediments at three sites in the eastern equatorial Pacific Ocean. Our objectives include revisiting the issue of the paleointensity-polarity length correlation. Magnetic properties of the sediments meet the frequently used criteria for reliable relative paleointensity estimation. Although short-wavelength normalized remanence intensity fluctuations associated with polarity boundaries and possible geomagnetic excursions agree among the three sites, long-term changes are inconsistent. Apparent positive correlation between normalized intensity and polarity length was observed, but the normalized intensity has an obvious anti-correlation with the ratio of anhysteretic remanent magnetization (ARM) to isothermal remanent magnetization (IRM), which is mainly controlled by the relative abundance of biogenic and terrigenous magnetic minerals. Furthermore, the normalized intensity correlates with sedimentation rate. These facts indicate a lithological contamination on the normalized intensity records. The dependence on ARM/IRM and sedimentation rate is also evident at Site 522. It is inferred that variations in sedimentation rate and the relative abundance of biogenic magnetite on depositional remanent magnetization acquisition efficiency may not be well compensated by the normalization. It is therefore premature to conclude that stronger geomagnetic fields were recorded during longer polarity intervals from currently available normalized intensity records.