

Problems in relative paleointensity estimation using marine sediments

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Recent progress in paleointensity estimation using marine sediments revealed large paleointensity variations with periods of the order of 10 to 100 kyrs. Frequent paleointensity lows seems to correspond to geomagnetic excursions. However, fidelity of the sedimentary paleointensity records still has many problems. In this paper, I discuss followings.

(1) Statistical distribution of relative paleointensity values is close to the normal distribution in some records, whereas it is skewed to a lower intensity in other records. The cause of the difference is unclear, and we do not know which is correct. Even in absolute paleointensity data, it has not yet been proved whether the geomagnetic field intensity is normally distributed or not.

(2) ARM is most widely used as a normalizer of DRM acquisition efficiency of sediments. But ARM has a drawback that it is sensitive to interactions among magnetic grains. In some sediments, normalization by IRM seems to work better. We need to understand magnetic interaction at DRM acquisition.

(3) Averages of normalized intensity vary with sediment lithologies. In some sediment cores, normalized intensities correlate with sedimentation rates. These observations indicate that variations in sediment lithology and sedimentation rates affect efficiency of DRM acquisition, and contaminate relative paleointensity records. It is necessary to develop methods to evaluate quantitatively these effects and correct them.