Secular variation of inclination with a timescale of tens of thousand years

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Relative paleointensity records of marine sediments revealed that geomagnetic field fluctuations between polarity reversals contain variations with a timescale of tens of thousand years and longer. However, discussion on directional secular variations has been limited for timescale of tens to a few thousand years in general. This is probably because directional variations of the timescale of tens of thousand years are not easy to be detected due to the small amplitude of variations, often close to measurement errors, and difficulty in precise inter-core correlations. Exceptionally, inclination variations of the timescale of tens of thousand years were discussed using sediments from the western equatorial Pacific in terms of possible relations with persistent non-dipole components and orbital forcing (Yamazaki and Ioka, 1994; Yamazaki and Oda, 2002; Yamazaki et al., 2008). We revisited the problem of the long-term inclination secular variations using sediments from the Okhotsk Sea; three piston cores and nine gravity cores adjacent to each other were available. The sediments are of late Pleistocene age, and relative paleointensity was used for the age control. Inclination variations with the timescale of several to tens of thousand years are visible. Further accumulation of datasets for better spatial and temporal distribution is expected for elucidating geomagnetic field behavior of this timescale. For tectonic application of paleomagnetism assuming the virtual geocentric axial dipole field, a period of order of 100 kyr is required to average out secular variations to detect differences of several degrees in paleolatitudes.

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