

On the geomagnetic direction changes and time constant of the core inferred from the geomagnetic secular variations

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The magnetic field of the Earth is generated by the electromagnetic fluid dynamics in the Outer Core of the planet, so that the temporal periodicity seems poor. The results of the studies of the paleosecular variation from lava flows (PSVL) indicate that observation for a hundred thousand years is necessary and enough to cover the directional distribution of the geomagnetic secular variation (GSV). That time constant is longer than the magnetic diffusion time in the conductive core.

Here we show the result of the comparison between the temporal and directional coverages from the various paleomagnetic studies from PSVL, lake sediments and archaeomagnetic sites, and global GSV models. The result indicates that the time for which the geomagnetic direction changes can cover the whole GSV without excursion is less than a hundred thousand years and close to the magnetic diffusion time of the outer and inner core.

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