

Influence of the electrical conductivity heterogeneity at the CMB on the flow and magnetic field in the core

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The effects of electromagnetic induction in the heterogeneous mantle on the observed electromagnetic fields have been studied numerically to investigate possible causes of short time-scale variation known as the geomagnetic jerk. We found previously that the jerk-like magnetic and electric field variations observed at the surface of Earth can be explained by an input of a sudden variation of the toroidal field at the top of the core and large-scale conductivity heterogeneity of which conductivity is about 100 times higher than the background electrical conductivity. In this study, the effect of the heterogeneity on the flow in the core and magnetic field is evaluated by using a simple plane model of a heterogeneous mantle. Preliminary results suggest that the signature of the magnetic field may be detected as a stationary field at the Earth's surface if the heterogeneity is planetary scale, but the penetration length of its effect in the core is much shorter than the length scale of the heterogeneity.

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