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Kinematic dynamo under the influence of electrical conductivity of the mantle: An implication for new submarine cable observations

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Global scale geoelectric field measurements using long submarine cables have been made in Ocean Hemisphere Project. An observational constraint on the amplitude of toroidal field variation at the CMB was obtained by analyzing the geoelectric field data, but it was not known if the constraint was consistent with the dynamo process in the fluid core. We made numerical calculations of kiniematic dynamo under the effect of electrical conductivity of mantle in order to test the plausibility of the obtained strength of the toroidal field. It was confirmed that the observed toroidal field strength may be naturally attained by such dynamos. Also, it is found that having submarine cables at higher latitude (around 50 degree) would be helpful to detect the toroidal field variation at the CMB.

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