



Improvement of magnetosphere structure calculations using eccentric dipole to account for the internal magnetic field

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In this paper we build upon the results previously produced by numerous attempts, including our own, to approximate the geomagnetic field with a an eccentric dipole instead of spherical harmonics expansions. Among other motivations to do so is that dipole-related effects are much more pronounced relative to higher-order harmonics at large distances from the Earth, and that the shift of the order of magnitude about 0.1 Earth radii is significant enough for many magnetospheric structures such as the current sheet.

We present the results of multivariate simulated annealing, which includes translational and rotational repositioning of the dipole. We also include similar results produced for Mercury and Saturn, and we extend Earth-related data with Oersted and Cluster measurements in order to further improve our accuracy.