The innermost magnetospheric model combined with the IGRF

Youhei Kajikawa[1]; Yutaka Tonegawa[1]; Keiji Sakata[2]
[1] Dept. Aero. & Astro., Tokai Univ.; [2] Dept. of Aeronautics and Astronautics, Tokai Univ

http://www.ea.u-tokai.ac.jp/

We attempted to construct the model of the innermost magnetosphere combining an existing ring current model with the IGRF. We adopted the Tsyganenko 2000 model [*Tsyganenko*,2000] as the ring current model and the 10th generation of the IGRF as the geomagnetic field instead of the purely dipolar background field.

Recently, the latest version of the Tsyganenko model [*Tsyganenko*, 2007] has been published. In the model, the cylindrical harmonic function is adopted to calculate the field of the equatorial current system and it is possible to take into account the asymmetry of the tail current. However, since the shortage of the data observed at the innermost part of the magnetosphere, the model still has some inaccuracies in the innermost region.

Our approach is to calculate the innermost magnetic field from the ring current obtained from the magnetohydrodynamic momentum equation, magnetic gradient drift, and other equations that describes the physical conditions directly. This method requires dividing the model into the plural parts, but it can estimate the magnetospheric conditions from the arbitrary plasma pressure distributions. It is more advantageous than the harmonic function formed without enough data in the region. In this study, we chose following conditions and assumptions; (1) the background field of the 10th generation IGRF, (2) zero tilt angle of the geomagnetic pole, (3) quiet magnetospheric condition.

The calculation result shows that the effect of the background field becomes significant with the decrease of the radial distance. We will report the profile of the current density distribution and the magnetic field configuration and discuss about the availabilities of the model.