Estimation of the ring current structure and the inner-magnetospheric electric field through data assimilation

Shin'ya Nakano[1]; Genta Ueno[1]; Yusuke Ebihara[2]; Mei-Ching Fok[3]; Shinichi Ohtani[4]; Pontus Brandt[5]; Donald G. Mitchell[5]; Kunihiro Keika[6]; Tomoyuki Higuchi[7]

[1] ISM; [2] NIPR; [3] NASA GSFC; [4] JHU/APL; [5] JHU/APL; [6] Dept. Geophysics, Kyoto Univ.; [7] Inst. Stat. Math.

We have developed a technique to estimate the distribution of ring current ions and inner magnetospheric electric potential by assimilating the sequence of the ENA data from the IMAGE satellite into a kinetic ring current model (CRCM) by Fok et al. (2001). In this technique, the magnetospheric electric potential distribution is represented by the sum of the Volland-Stern type field and a deviation from it, and the deviation is estimated in the course of the data assimilation process. As the electric potential distribution is determined, the ring current ion distribution is consequently estimated. Using this technique, we investigated a magnetic storm on 12 August 2000, which is characterized by a peak of ENA emission around the post-midnight. The results of the data assimilation suggested that the peak is caused by the westward electric field around the post-midnight as proposed by Ebihara and Fok (2004) who calcuated electric potential distribution with another approach.