

ON THE ROLE OF GLOBAL MAGNETIC FIELD CONFIGURATION IN AFFECTING RING CURRENT DYNAMICS

Y. Zheng¹; S. G. Zaharia²; M. H. Fok¹

1. NASA Goddard Space Flight Center, Greenbelt, MD, United States.

2. LANL, Los Alamos, NM, United States.

Plasma and field interaction is one important aspect of inner magnetospheric physics. The magnetic field controls particle motion through gradient, curvature drifts and E cross B drift. In this presentation, we show how the global magnetic field affects dynamics of the ring current through simulations of two moderate geomagnetic storms (20 November 2007 and 8-9 March 2008). Preliminary results of coupling the Comprehensive Ring Current Model (CRCM) with a three-dimensional plasma force balance code (to achieve self-consistency in both E and B fields) indicate that inclusion of self-consistency in B tends to mitigate the intensification of the ring current as other similar coupling efforts have shown. In our approach, self-consistency in the electric field is already an existing capability of the CRCM. The magnetic self-consistency is achieved by computing the three-dimensional magnetic field in force balance with anisotropic ring current ion distributions. We discuss the coupling methodology and its further improvement. In addition, comparative studies by using various Tsyganenko magnetic field models will be shown. Simulation results will be put into a global context by analyzing the morphology of the ring current, its anisotropy and characteristics of the interconnected region 2 field-aligned currents.