A Parametric Sensitivity Study for Magnetosphere-Ionosphere Coupling Process in a Global MHD Simulation

Satoko Saita[1]*, Akira Kadokura[2], Shigeru Fujita[3], Takashi Tanaka[4], Akira Sessai Yukimatu[2], Shinichi Ohtani[5], Ken T. Murata[7], Tomoyuki Higuchi[6]

[1]TRIC, [2]NIPR, [3]Meteorological College, [4]SERC, Kyushu University, [5]JHU/APL, [6]ISM, [7]NICT

We present a parameter study of simulated processes of the magnetosphere-ionosphere (M-I) coupling using the global MHD simulation code developed by Tanaka (2010).

The boundary conditions for the M-I coupling include some scaling factors. These factors are adjustable and are determined through trial and error. The main goal of this study is optimization of these scaling factors in the boundary condition by use of a data assimilation technique.

In this paper, we examine the effects of varying the scaling factors to the ionospheric electric field potential map using a global MHD simulation.

References:
Tanaka, T., A. Nakamizo, A. Yoshikawa, S. Fujita, H. Shinagawa, H. Shimazu, T. Kikuchi, and K. K. Hashimoto (2010), Substorm convection and current system deduced from the global simulation, J. Geophys. Res., 115, A05220, doi:10.1029/2009JA014676

Keywords: global MHD simulation, sensitivity analysis, ionospheric electric field potential map, aurora, ionospheric conductivity, field-aligned current