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A Parametric Sensitivity Study for the Global MHD Simulation Model by Using Large-Scale Data Analysis and Visualization

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The Magnetosphere-Ionosphere (M-I) boundary condition in the global MHD simulation (Tanaka, 2010) includes insufficient factors for the M-I coupling process, so that we have to calibrate the global MHD simulation model considering parametric uncertainty in the M-I coupling process.

For statistical analysis and visualization, case studies have been done for the global MHD simulation.

We need computational techniques to analyze simulated and observed data simultaneously. However, the amount of simulation data with high spatial and temporal resolution is very large.

Therefore in this study, we compare the ionospheric E x B plasma drift obtained from the global MHD simulation and that obtained from the SuperDARN HF Radar Network.

The simulated plasma drift are not always reproducible under a southward interplanetary magnetic (IMF) condition.

In today's presentation, we show latest results of a parameteric study of the global MHD simulation and demonstrate the evaluation of the reliability and validity of M-I coupling process in the 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

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