

Numerical space weather forecast of the solar wind and radiation belts

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Large-scale solar wind structures and the magnetohydrodynamics (MHD) parameters at the Earth's position are essential for driving the space weather phenomena such as geomagnetic storms, geomagnetically induced currents, and radiation belt enhancement. We report our recent progress on the real-time space weather modeling of the solar wind and radiation belts. The global MHD solar wind model and the Fokker-Planck type radiation belt model are coupled via the time-varying solar wind MHD parameters at the Earth's position to give a quantitative estimate of the outer belt electron flux for a week in advance. The background solar wind source at 30 solar radii is provided from two different models; global MHD corona model and IPS data assimilation model. Coronal mass ejection (CME) is the most challenging factor to simulate in real-time. We show our test approach how to simulate the CMEs in real-time based on IPS observations.