

APPLICATION OF A GLOBAL MHD SIMULATION MODEL OF EARTH'S MAGNETOSPHERE ON SPACE WEATHER FORECASTING

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During the past four decades, the global magnetohydrodynamics (MHD) simulation of Earth's magnetosphere has been widely used for the investigation of large-scale behavior of the plasma environment around the Earth. Due to the limited use of MHD in certain regions, different coupling processes have been taken into account in these simulations for the magnetosphere in order to obtain a more sophisticated modelling, for example, the electrostatic coupling with the ionosphere, and the dynamical coupling with inner magnetosphere in which the particle drift physics are numerically implemented. In recent years, it has been attempted that the global MHD simulation has been applied in the space weather forecasting, with the real-time solar wind conditions from the spacecrafts ACE/DSCOVR at L1 point are mapped to the upstream of the magnetosphere through the ballistic method. Here, we following the similar approach based on the well-developed global MHD model of magnetosphere, and offer the 30–60 mins advance forecasting for the geomagnetic activities, ground magnetic perturbations, and the global evolution of Earth's magnetosphere. The forecasting results are then evaluated according to the comparison with the observations.