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Solar wind data assimilation using 3D MHD simulation

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Solar wind propagates among interplanetary space embedding large disturbed structures. They have significant effect on planetary environment. In order to understand their propagation and development in the simulation constrained by observations, we try data assimilation for solar wind case. Solar wind propagation is simulated by solving a three-dimensional magneto-hydrodynamic (MHD) equations with inner boundary condition is based on SOHO/MDI magnetic field observation and related wind velocity, density, and temperature by empirical models. Solar wind velocity from interplanetary scintillation (IPS) observation is put into the simulation by weighting as a function of observation and system (model + inner boundary) errors. The latter is simulated to obtain as a function of heliospheric radius. Including the attempt to improve the assimilation reflected region, we will show present status of solar wind data assimilation.

Keywords: solar wind, data assimilation, simulation, MHD