Development of an automated prediction method of CME arrival with SUANOO-CME

*Daikou Shiota[1], Kanya Kusano[1]

1. Institute for Space-Earth Environmental Research, Nagoya University

CMEs, especially their internal southward magnetic fields, are one of the main drivers of geomagnetic disturbances and hence the prediction of CME arrival to the Earth. The prediction of CME arrival to the Earth and the southward magnetic flux brought by the CMEs are one of crucial tasks for space weather forecast of magnetic storms.
Recently, we have developed a new MHD simulation capable of reproducing the interplanetary propagation of multiple CMEs with internal magnetic flux rope (Shiota & Kataoka 2016) called as SUSANOO-CME. The simulation solves propagation of solar wind and CMEs in the inner heliosphere outer than the inner boundary at 30 Rs where the speed of all the balk flow exceeds fast mode speed. The information of solar wind and CME is specified at the inner boundary with empirical and analytical models. The CME model has many free parameters such as the orientations of the internal magnetic flux rope, etc. Hence, in order to execute this simulation for use in real time forecast, we need a method to specify the free parameter that we cannot get any clue in the real time observations.
In this study, we present test results of MHD simulation (SUSANOO-CME) for from May to September of 2005, applying a new method to specify the parameters of the CME model derived from only real time observations (SDO, GOES). We will evaluate the scores for forecast and discuss the current status of our capability for use in real time forecast.

Keywords: space weather, coronal mass ejection, solar wind, MHD simulation

