Prediction of passage time of CME-caused shock wave using 3D interplanetary simulation

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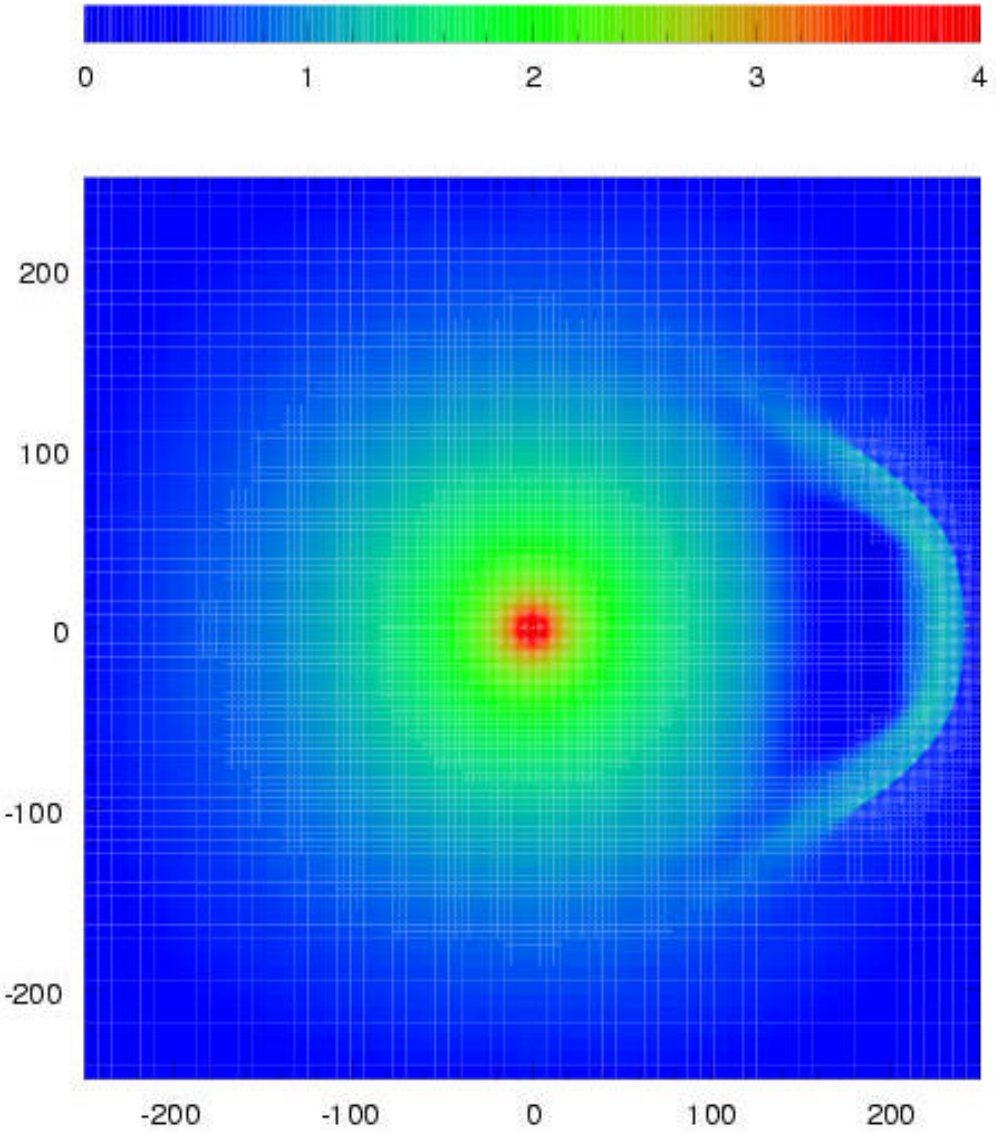
It is important to obtain an arrival time and a scale of a interplanetary shock wave caused by a coronal mass ejection (CME) for prediction of space weather phenomena in early stage. In our previous talk in the 2004 Joint Meeting, we reported that we applied our three-dimensional adaptive mesh refinement code to simulations of interplanetary shock wave propagation and achieved both a size of a simulation box of 2AU and cells smaller than solar radius.

In this time, we aim some CME events and compare results of simulations with observational results on strength and passage time at the Lagrange L1 point. Prediction is different from reproduction of a phenomenon after an event. There are only limited information to be able to use for prediction.

Therefore it is difficult to adjust model parameters to simulation results to observational data of a penomenon. For prediction, one can take values of these parameters to reproduce many phenomena roughly instead of right values for individual phenomena. We investigate how accurate our present simulation model is in prediction of scale and passage time of CME-caused shock wave. And we discuss ways of improvement of our model.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