The MHD simulation of the solar corona using the synoptic frame map of the solar photospheric magnetic field and the SOHO/EIT coronal temperature map

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In simulation studies of the solar corona, the synoptic map format data of the solar photospheric magnetic field have been used as the boundary value to specify the period of interest. This approach successfully works, however there remain two problems. The first one is that the synoptic maps are constructed by collecting the data made at different date, for example, daily or hourly. Thus the synoptic map represents the surface distribution averaged over one solar rotation. The other problem is that in most cases the boundary plasma is assumed uniform.

To improve the first point, we used the synoptic frame [Zhao et al. 1999], a modified version of the synoptic map that can include the solar differential rotation and the most recent changes on the solar surface and therefore specify more correctly the time of interest. To improve the second point, we recently we performed the MHD simulation using the global temperature map at the coronal base [Hayashi et al., 2006].

In this paper, we will show the simulation results using both the synoptic frame map of the solar surface magnetic field and temperature map. With these two features of our simulation, the situation to be simulated is better specified and the nonlinear MHD interactions between magnetic field and plasma in the solar corona and solar wind will be better simulated.