

さまざまな太陽風インパルスに対する磁気圏応答

藤田 茂 [1]; 田中 高史 [2]

[1] 気象大; [2] 九大

Magnetospheric response to various solar wind impulses

Shigeru Fujita[1]; Takashi Tanaka[2]

[1] Meteorological College; [2] Kyushu University

Recent THEMIS observation in the dayside magnetopause-magnetosheath region detected quasi-static plasma disturbances during solar-wind dynamic pressure variations [Glassmeier et al., 2008]. The magnetospheric response to the solar wind impulse has also been studied by using satellite data by several workers [e.g., Shimbori et al, 2004 and references therein]. Corresponding to these observations, we need a systematic survey of the magnetospheric response to the various solar wind impulses by using a global MHD model. In this talk, we shall present numerical results concerning to the variation of the plasmas in the dayside magnetosphere and in the nightside magnetosphere for many conditions of the solar wind. The main results obtained from the simulation are as follows:

1. In the northward IMF condition, there appears damped oscillations of plasma pressure with period of about 5min. This oscillation is also detected in the magnetic field variation. This oscillation is the fast magnetosonic wave.
2. When rise-time of the solar wind dynamic pressure impulse is shorter than 4min. in the northward IMF condition, the damped oscillation with 5-min period appears. On the other hand, the rise-time is as long as 10min, the oscillation becomes unclear.
3. In the southward IMF condition, the damped oscillation is not clear. Namely, it is noted that the response of the magnetosphere to the solar wind impulse is controlled by the IMF Bz direction.
4. Ground signatures of the magnetospheric response to the solar wind impulse, - namely, the Preliminary Impulse and the Main Impulse -, are clearly detected when the rise-time of the solar wind impulse is less than 4 min. Even when the rise time is as long as 10min., we observe the PI and MI signatures in the ground magnetic variations, although they are not so clear.