Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

PEM005-23 Room:303 Time:May 27 11:05-11:20

Response of the magnetosphere-ionosphere compound system to periodic variation of the solar wind

Shigeru Fujita[1*], Takashi Tanaka[2]

[1]Meteorological College, [2]Kyushu University

Recently, typical magnetospheric phenomena such as a substorm [Tanaka et al., 2010], a sudden commencement [Fujita et al., 2003], a theta aurora [Tanaka et al., 2004] have been investigated intensively by using a realistic global MHD model. These studies revealed the magnetospheric and ionospheric plasma processes occurred during these events in a self-consistent manner. In particular, global current circuits including the current generators are clearly presented at the first time in these studies. By investigating in detail generation mechanisms of the field-aligned current and related shear flow in the magnetosphere, we completely interpret the physical processes of these events. In this sense, generation of a new Region 2 current in the dayside magnetosphere associated with northward turn of the interplanetary magnetic field is a kind of a tutorial phenomenon for comprehension of the magnetosphere-ionosphere compound system. The current generator of this new R2 FAC is driven by plasma convection flow across pressure enhancement in the dayside cleft region. The pressure enhancement in the cleft is also supported by sunward return flow after northward turn of the IMF.

In the talk, we will present deformation of the magnetosphere-ionosphere compound system associated with periodic variations of solar wind IMF based on the concept of the magnetosphere-ionosphere compound system as explained above.

Keywords: magnetosphere-ionosphere compound system, global simulation, periodic solar wind variation, magnetospheric topology