Numerical modeling of the response of the ionospheric current system against the solar wind dynamic pressure changes

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The magnetospheric and ionospheric responses against the solar wind dynamic pressure changes have been investigated by many researchers. Because of the complexity of the magnetosphere-ionosphere coupling process, the quantitative analysis based on a comprehensive set of modeling and data has not been made yet. Data analyses and numerical modeling have been made separately; the former to get certain speculative views, whereas the latter to reproduce realistic profiles based on some simplified assumptions. In this paper, we will discuss the basic time dependent features of the ionospheric current system, computed using Tsunomura's (1999) model giving the time-changing boundary values created by numerical simulations developed by Fujita (2003a,b). This is an attempt to integrate two numerical models for the magnetosphere and the ionosphere as one of the preliminary steps towards the better understanding of the earth's electromagnetic response against the solar wind variations.