

Responses of Geomagnetic Storm and Magnetospheric convection to the extreme solar wind conditions

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To estimate the extreme value of the geomagnetically induced current (GIC), estimation for the extreme value of geomagnetic disturbances and its time variations are essential. It is well known that geomagnetic disturbances are produced from the magnetospheric current systems driven by the interaction between the solar wind and the magnetosphere. So, it is important to understand the response of the magnetospheric current systems to the extreme solar wind conditions. Magnetospheric convection and geomagnetic storm are parts of the important elements for the magnetospheric current systems. The geomagnetic storm is believed to be developed by the enhancement of the magnetospheric convection. However, both phenomenon show different behavior to the extreme conditions of the solar wind electric field. In the case of magnetospheric convection, its development is saturated by the extreme conditions of the solar wind. On the contrary, in the case of geomagnetic storm, its development is linearly growth depending on the intensity of the solar wind electric field. Based on the data analysis of the previous great geomagnetic storm events, we will show the difference for the responses of magnetospheric convection and geomagnetic storm, and will discuss about the responses of geomagnetic disturbances to the various kinds of extreme solar wind conditions.

Keywords: Geomagnetic Disturbances, Magnetospheric Convection, Geomagnetic Storm, Magnetospheric Current System, Solar wind - Magnetosphere Interaction