

Space weather studies based on magnetometer observations and simulations

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Ground magnetometer observations provide us with information about current systems in the magnetosphere and ionosphere during SC, PC, DP2, substorms and storms. The current circuit is composed of ionospheric currents, field-aligned currents, ring currents and so on. Combining the magnetometer data with model calculations, we may be able to identify the currents responsible for the ground magnetic perturbations and physical processes of the generation and transmission of the currents. Kakioka and Memambetsu are properly located for the study of the current systems developed during storm and substorms. Kakioka is far from the polar ionosphere and out of the equatorial region, which provides disturbances due to the magnetopause current and ring current. Memambetsu is located only 10 degs poleward of Kakioka, but the magnetic disturbances are well under influence of the ionospheric currents extending from the polar ionosphere and of the field-aligned currents. Furthermore, when we combine these stations with high latitude and equatorial stations, we obtain more realistic current systems in the magnetosphere and ionosphere. Magnetosphere-ionosphere current systems deduced from magnetometer data and simulations will be presented for several space weather events at the meeting.

Keywords: magnetometer observation, MHD simulation, ring current simulation, magnetosphere-ionosphere current system, geomagnetic storm, substorm