MAGDAS Project and Its Application for Space Weather

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One purpose of the Solar Terrestrial Physics (STP) research is to support human activities in the twenty-first century from an aspect of fundamental study. The scientific new aim for the STP society is a creation of new physics; (1) couplings of the complex and composite systems and (2) macro-and-micro-scale couplings in the Sun-Earth system. The goals for the attainment of the purpose are to construct Network Stations for observations and Modeling Stations for simulation/empirical modeling.

In order to study the complexity in the Sun-Earth system, the Space Environment Research Center (SERC), Kyushu University started to construct a new ground-based magnetometer network, in cooperation with about 30 organizations in the world. The SERC will conduct the **MAGDAS** (**MAG**netic **D**ata **A**cqusition **S**ystem) observations at 50 stations in the **CPMN** (**C**ircum-pan **P**acific **M**agnetometer **N**etwork) region, and the FM-CW radar observations along the 210˚magnetic meridian, in order to study dynamics of plasmaspheric changes during spasce storms and substorms, electromagnetic responses of magnetosphere-ionosphere-thermosphere to various solar wind changes, and penetration mechanisms of DP2-ULF range disturbances from the solar wind into the equatorial ionosphere.

In the present paper, at the first we will introduce our real-time data acquisition and analysis of MAGDAS/CPMN system, and preliminary results of this system; (1) monitoring of the global 3-dimensional current system to know the electromagnetic coupling of high-latitude and Sq current systems, and (2) monitoring of the plasma density to understand space plasma environment change during space storms. In the second, we will present the FM-CW radar system at L=1.26 to deduce electric field from the ionospheric plasma drift velocity. From 24hr monitoring of the ionospheric drift velocity with 10-sec sampling by the FM-CW radar observation, (3) we can understand how the polar electric field penetrates into the equatorial ionosphere.