

Development of a global magnetosphere-ionosphere-thermosphere coupling model and its application to space weather studies

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Space weather studies requires global numerical models of space environment along with various observational data. Global numerical models also serve to predict space weather phenomena. A number of global magnetohydrodynamics (MHD) models have been developed to study plasma processes in the magnetosphere. To include the magnetosphere-ionosphere coupling processes, some of the MHD models include an ionosphere submodel which closes the field-aligned currents originating in the magnetosphere. However, such submodels do not fully include the ionosphere-thermosphere system. Models of the ionosphere-thermosphere, on the other hand, strongly depend on magnetospheric input such as the electric field and particle precipitation. To include magnetosphere-ionosphere-thermosphere (M-I-T) processes self-consistently, we are developing a global coupled M-I-T model, based on the Kyushu University magnetosphere-ionosphere model and the STEL thermosphere-Ionosphere model. The coupled model will be described, and preliminary results will be presented and discussed.