

# Upper atmosphere research using a magnetosphere-ionosphere-thermosphere coupling model

# Hiroyuki Shinagawa[1]; Shigeru Fujita[2]; Takashi Tanaka[3]; Naoki Terada[4]

[1] STEL, Nagoya Univ.; [2] Meteorological College; [3] Kyushu University; [4] STE Lab., Nagoya Univ.

Upper atmosphere research requires global numerical models along with various observational data. In the studies of the magnetosphere, a number of global magnetohydrodynamics (MHD) models have been developed to study plasma processes and dynamics. 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.