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Simulation studies for CAWSES2 Program with Atmosphere-Ionosphere Coupled Model

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In order to understand the Sun-Earth system, some research projects are planned during the international science program "Climate And Weather of the Sun-Earth System 2 (CAWSES2)" (2009-2013). Since the phenomena in the Sun-Earth system result from complex processes, which sometimes show nonlinear coupling with each other, numerical simulations are essential for understanding physical mechanisms to cause the phenomena. In particular, simulations with Atmosphere-Ionosphere Coupled Model will be necessary for challenging issues listed by, e.g., Task Group 4 of CAWSES2: "How do atmospheric waves connect tropospheric weather with ITM variability?" (Project1/TG4), "What is the relation between atmospheric waves and ionospheric instabilities?" (Project2/TG4), "How do the different types of waves interact as they propagate through the stratosphere to the ionosphere?" (Project3/TG4), and "How do thermospheric disturbances generated by auroral processes interact with the neutral and ionized atmosphere?" (Project4/TG4). In this presentation, we will introduce previous simulation results and the current status of Atmosphere-Ionosphere Coupled Model. We will also discuss possible contributions of our modeling/simulation studies to CAWSES2.

Keywords: simulation, solar activity, climate change, geospace, upper atmosphere, ionosphere