

## Parameterization of Auroral Electron Precipitation and the Jupiter Thermosphere-Ionosphere Model

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A fast-rotating planet, Jupiter, has a unique solar wind-magnetosphere-ionosphere-thermosphere coupling system whose energetic coupling is much different from the case of the Earth. The dominant energy source of the system is the fast rotation energy which is transported from the corotating neutral atmosphere through ion drags in the ionosphere. In order to investigate the role of the thermosphere and ionosphere in this coupling system, we have developed a new numerical model which solves the three-dimensional momentum and energy equations in the pressure coordinate system and obtained the global distribution of neutral wind and temperature. The model includes the following processes: ionization and heating effects through solar EUV absorption and auroral particle precipitation, cooling through IR radiation of  $H_3^+$ , heat conduction, turbulent diffusion, and ion drag and Joule heating caused by the electric field deposited by magnetospheric convection. Simulation results after 1-Jovian rotation are consistent with the results of other models and observations. On the way of this model development, we simulate the degradation process of auroral electrons in hydrogen compound atmosphere with a Monte Carlo technique and parameterize the rates of ionization and heating as functions of incident electron energy and flux.