

Simulations of the polar thermospheric disturbance using a three-dimensional nonhydrostatic model

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It is now well recognized that severe local wind systems are occasionally generated in the auroral thermosphere. Behavior of the neutral wind cannot be explained simply by Joule heating, heating through particle precipitation, or ion-neutral drag. Our previous studies using a two-dimensional nonhydrostatic model suggest that interaction between local heating and large-scale background flow could result in fairly large vertical winds in the thermosphere. In the two-dimensional model, however, all physical quantities are assumed to have no dependence in the latitudinal direction, which is not necessarily realistic. In order to study the thermospheric dynamics in more realistic way, a three-dimensional high-resolution nonhydrostatic thermospheric model has been developed. Using the model, we investigate the interaction between local wind and large-scale background flow in the polar thermosphere. Some typical cases for thermospheric disturbances will be presented and discussed.