

Localized thermospheric disturbances simulated by a whole atmosphere general circulation model

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Many observations and numerical simulations have shown the existence of thermospheric disturbances with various spatio-temporal scales, such as traveling atmospheric disturbances (TADs). TADs have been studied in association with auroral activity and as manifestation of the atmospheric gravity waves. However, sources of TADs other than auroras are not well-known. Causes of the variety of TADs are also unknown. In order to investigate generation and propagation characteristics of TADs, we have performed numerical simulations with a whole atmosphere general circulation model developed by Miyoshi and Fujiwara [2003]. Our simulation results show that the high-latitude energy inputs produce thermospheric disturbances in both cases of geomagnetically disturbed and quiet periods. In particular, it is found that large-scale TADs are generated even during a geomagnetically quiet period [Fujiwara and Miyoshi, 2006]. The simulation results also suggest lower atmospheric effects on generation of localized disturbances in the upper thermosphere. In addition, dissipations of the large-scale TADs generated in association with auroral activity produce localized disturbances. In the present study, we focus our attention on the localized disturbances in the upper thermosphere. The generation mechanism of the localized disturbances will be discussed here.