

Effects of thermospheric gravity waves on the thermosphere-ionosphere system simulated by high resolution GAIA

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It has been recognized that short-period fluctuations (0.5 hour- 2 hour) associated with gravity waves play an important role on the thermosphere-ionosphere (TI) system. In order to investigate effects of thermospheric gravity waves on the TI system, we have developed an atmosphere-ionosphere coupled model (GAIA) with high horizontal resolution (about 1.0 degree longitude by 1.0 degree latitude). The GAIA contains the region from the ground surface to the upper thermosphere (about 500km altitude), so that we can simulate excitation of gravity waves in the lower atmosphere and their upward propagation to the thermosphere. Furthermore, the GAIA simulation with higher horizontal resolution (about 0.5 degree longitude by 0.5 degree latitude) is conducted. In this study, we focus our attention on gravity wave activity in the winter thermosphere/ionosphere. Our simulation result indicates that fluctuations with periods (0.5 hour - 2 hour) associated with thermospheric gravity waves are more significant in the winter hemisphere. Fluctuations of electron density in the F-region due to upward propagating gravity waves are also studied.

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