

## **Gravity waves in the thermosphere simulated by GAIA**

Yasunobu MIYOSHI<sup>(1)</sup>, Hitoshi FUJIWARA<sup>(2)</sup>, Hidekatsu JIN<sup>(3)</sup> and Hiroyuki SHINAGAWA<sup>(3)</sup>

(1) Kyushu University, Fukuoka, Japan

(2) Seikei University, Tokyo, Japan

(3) NICT, Tokyo, Japan

It has been recognized that upward propagating gravity waves play an important role on the momentum and energy balance in the thermosphere. In this study, the effects of gravity waves on the thermosphere/ionosphere system are investigated using a whole atmosphere-ionosphere coupled model (GAIA). 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 of gravity waves from the lower atmosphere to the thermosphere/ionosphere. The high horizontal resolution of the neutral atmospheric part of GAIA is about 1.0 degree longitude by 1.0 degree latitude, so that this model can simulate large-scale gravity waves in the whole atmosphere. Our simulation results indicate that gravity wave activity in the thermosphere has significant seasonal and latitudinal variations. In this study, we focus our attention on gravity wave activity in the winter thermosphere. Some of gravity waves in the winter thermosphere is originated from the polar night jet in the stratosphere/mesosphere. Moreover, the impacts of gravity waves in the thermosphere on variability in the ionosphere are shown.