Basic State and Gravity Wave Simulated by High-top Global Non-hydrostatic Atmospheric Model NICAM

Chihiro KODAMA[1], Shingo.WATANABE[1], Tomoe NASUNO[1], Masaki SATOH[1,2], and Hiroyasu KUBOKAWA[2]

[1] *Japan Agency for Marine-Earth Science and Technology, Yokohama, Japan*
[2] *Atmosphere and Ocean Research Institute, the University of Tokyo, Kashiwa, Japan*

This study investigates dependency of the simulated basic state and gravity wave on horizontal and vertical resolution of the global atmospheric model. We used high-top version of non-hydrostatic icosahedral atmospheric model, NICAM. The horizontal and vertical resolutions were swept from 56 km to 14 km and from 2 km to 300 m, and no gravity wave scheme was employed. The high-top NICAM reproduces the realistic structure of the zonal mean basic state in the troposphere and the middle atmosphere. As the vertical resolution is decreased, strength of easterly jet, tilt of polar night jet, and lower-stratospheric zonal wind are improved, and the strength of polar night jet becomes stronger. Momentum flux and energy spectrum analysis suggested that the decrease in vertical resolution generally causes less upward propagation of gravity wave and leads to the enhancement of polar night jet, consistent with Watanabe et al. (2015). As the horizontal resolution is decreased, gravity wave momentum flux is reduced and both the polar night jet and easterly jet are suppressed.

Key words: gravity wave, non-hydrostatic atmospheric model, resolution dependency

References (if needed)

Watanabe, S., K. Sato, Y. Kawatani, and M. Takahashi, 2015: *Geosci. Model Dev.* , **8**, 1637-1644.