Horizontal and vertical coupling of the middle and upper atmosphere observed by airglow imagers

Kazuo SHIOKAWA[1], Daiki TAKEO[1], Aysegul Ceren MORAL[1], and Yuichi OTSUKA[1]

[1] *Institute for Space-Earth Environmental Research, Nagoya Univ., Nagoya, Japan*

The airglow imagers are powerful tool to provide 2-dimentional pattern of small-scale wave structures in the mesopause region at altitudes of 80-100 km and in the thermosphere at 200-300 km with a horizontal field of view of 500-1000 km. Multi-point long-term measurements of airglow images gives various characteristics of atmospheric gravity waves and ionospheric plasma instabilities in these altitude ranges. Since 1998, we have operated Optical Mesosphere Thermosphere Imagers (OMTIs) at various stations from high to low latitudes at Canada, Russia, Norway, Japan, US, Thailand, Indonesia, Nigeria, Australia, and Antarctica. Mesospheric and thermospheric gravity waves, medium- and large-scale traveling ionospheric disturbances, equatorial plasma bubbles, auroral disturbances, and polar cap plasma patches have been thoroughly observed by using these airglow imagers. In this presentation, we review our recent observations of vertical and horizontal coupling of the middle and upper atmosphere through mesospheric and thermospheric gravity waves based on these airglow imaging observations.

Key words: airglow imager, atmospheric gravity waves, mesosphere, thermosphere, vertical coupling