Comparison between atmospheric gravity waves and E region radar echoes at Tanegashima during the SEEK-2 campaign

Fumiki Onoma[1]; Yuichi Otsuka[2]; Kazuo Shiokawa[3]; Tadahiko Ogawa[4]; Susumu Saito[5]; Mamoru Yamamoto[6]

[1] STELab, Nagoya Univ; [2] STEL, Nagoya Univ.; [3] STE Lab., Nagoya Univ.; [4] STE Lab., Nagoya Univ; [5] IRPG, CRL; [6] RASC, Kyoto Univ.

We observed OI and OH-band airglow images with an all-sky airglow imager at Tanegashima(131.0E, 30.5N) during the SEEK-2 campaign in July and August 2003. 567 OI images and 753 OH-band images were obtained under clear sky conditions. Wavy airglow structures which might be caused by gravity waves were seen in the OI and OH airglow images. Occurrence rates of gravity waves in both images were 44% and 79%, respectively.

From these images, we picked up wavelength and propagation velocity of dominant wavy structures. In 6 events, the structures propagated toward northeast at about 37 m/s while they propagated toward southwest at about 59 m/s in 9 events. These trends are very similar to the results of previous observation during the SEEK campaign in 1986. In addition, quasi-periodic (QP) radar echoes with periods of 5-10 minutes were observed at around 100km altitude with the 31.57 MHz LTPR radar at Tanegashima. In the all nights except one night, FAI echoes were observed. Gravity waves and QP echoes were simultaneously observed in eight events, in six (two) of which gravity waves propagated toward southeast (northeast). This tendency suggests a possible relationship between southward or northward-propagation gravity waves and generation of QP echoes.