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## Comparison of short-period gravity waves observed by CCD imagers at Shigaraki and Rikubetsu for 1998-1999

# Mitsumu Ejiri[1], Kazuo Shiokawa[2], Tadahiko Ogawa[3], Kiyoshi Igarashi[4], Takuji Nakamura[5], Toshitaka Tsuda[5]
[1] STEL, Nagoya Univ, [2] STE Lab., Nagoya Univ., [3] STE Lab., Nagoya Univ, [4] CRL, [5] RASC, Kyoto Univ.

Using three all-sky cooled-CCD imagers simultaneous observation of short-period gravity waves has been carried out since October 1998 at Shigaraki and Rikubetsu for airglow emissions of OH, OI(557.7nm) and OI(630.0nm). Such long-term multi-point observations of short-period gravity waves have not been reported.

In this presentation, we will classify the characteristics of gravity waves observed in OH and OI(557.7nm) images at these two stations for 1998-1999. Horizontal wind data obtained by two MF radars at Wakkanai and Yamagawa will be also used to show background wind profiles.

Simultaneous observation of short-period gravity waves has been carried out using three all-sky cooled-CCD imagers at Shigaraki (34.9N, 136.1E) and Rikubetsu (43.5N, 143.8E). They have five filters on a wheel, a fish-eye lens which has a field-of view of 180 degrees, and a back-illuminated cooled-CCD camera with 512x512 pixels. OH and OI (557.7nm) images are obtained with time resolutions of 2.5-5.0 min at Shigaraki and 5.5 min at Rikubetsu. The two sites are separated in a horizontal distance of about 1200 km. These imagers are operated automatically since October 1998.

For long-term gravity wave imaging data, Wu and Killeen [GRL, p.2211, 1996] have reported a strong seasonal dependence of mesospheric gravity wave activity, with a peak in summer and much reduced activity in winter, using 14-month imager observations of the OH nightglow at the Peach Mountain Observatory, Michigan (42.3N, 83.7E). Higashikawa et al. [master thesis, Kyoto University, 1999] and Maekawa et al. [master thesis, Kyoto University, 2000] have shown from long-term imaging observation at Shigaraki that the horizontal propagation directions of the gravity waves are generally northeastward (southwestward) in summer (winter). Taylor et al. [GRL, p.1797, 1998] and Shiokawa et al. [GRL, p.4057, 2000] have reported that similar wave structures are observed simultaneously at two stations separated with a horizontal distance of 660-1200 km. However, there have been no statistical studies of short-period gravity waves using long-term multi-point imaging data. Possible reasons of this broad distribution of gravity waves are 1) the source of gravity waves in lower altitudes has large geographical extent and the background wind that filters out upward-propagating waves is uniform over the extent, and 2) the waves propagate horizontally through the Doppler duct.

In this presentation, we will classify the characteristics of gravity waves observed at Shigaraki and Rikubetsu from October 1998 to October 1999 to show the seasonal variation and latitudinal differences of gravity wave propagations. Horizontal wind data obtained by two MF radars at Wakkanai and Yamagawa will be used to show background wind profiles.