

信楽MU観測所の長期大気光撮像観測に基づく中間圏・熱圏大気波動の水平位相速度スペクトルの変動

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Long-term variation of phase velocity spectra of mesospheric and thermospheric waves observed in airglow images at Shigaraki

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Using airglow imagers, there have been many studies of atmospheric gravity waves on their wavelengths and horizontal phase velocities. Vertical propagation of gravity waves depends highly on their horizontal phase velocities as shown in the dispersion relation of gravity waves. However, long-term variation of horizontal phase velocity spectra of the gravity waves, which can be measured by airglow imagers, have not been studied. In this study, we use 3-dimensional FFT procedures developed by Matsuda et al. (JGR, 2014) to analyze the horizontal phase velocity spectra of gravity waves by using 557.7-nm (altitude of 90-100 km) and 630.0-nm (altitude of 200-300 km) airglow images obtained at Shigaraki MU Observatory (34.8 deg N, 136.1 deg E) over ~16 years from October 1, 1998 to July 26, 2015.

Results about 557.7-nm show clear seasonal variation of propagation direction of gravity waves in the mesopause region. They have two peaks of power spectrum density (PSD) of horizontal phase velocity. One is from 0 to 20 m/s, and the other is from 20 to 100 m/s. They have different directions for all seasons. Results about 630.0-nm also show two peaks, i.e., one from 0 to 40 m/s, and the other from 40 to 200 m/s that is southwestward for all seasons. In the presentation, we will show more detailed results for gravity waves with low and high phase velocities.