

Research on the quasi-2 day wave observed with the Tromsø MF radar

Hiroyuki Iwahashi[1], Satonori Nozawa[2], Seiko Imaida[3], Ryouichi Fujii[2], Shin-ichiro Oyama[4], Yasuhiro Murayama[4], Tromsø MF radar group Nozawa Satonori

[1] Particle and Astrophysical Sci., Nagoya, [2] STEL, Nagoya Univ, [3] Particle and Astrophysical Sci., Nagoya Univ, [4] CRL

By using mesospheric wind data obtained between 70 and 91 km with the Tromsø MF radar (65.58 deg N, 19.22 deg E) over about 3 years occurring from November 1, 1998 to December 31, 2001, we have examined characteristics of the quasi 2 day oscillations (45-55 hours) generally accepted as 'quasi 2 day wave'. So far we had reported that (1) the seasonal variation, (2) short-time variability, (3) variability of the period, (4) ratio of zonal and meridional amplitudes of the wave. One of the most prominent features is that the quasi 2 day wave observed at Tromsø shows a clear seasonal variation: the amplitude is strong (25 m/s at maximum) in winter months over the height region between 70 and 91 km, while in summer months it is weak (less than 5 m/s) below 82 km and weaker (about 15 m/s at maximum) than that in winter months at and above 82 km. The seasonal variation is different from that reported from middle and low latitude station data.

We have examined altitude profiles of the phase as well as the ratio of the zonal to meridional amplitudes of the quasi 2 day wave observed with the Tromsø MF radar. In most events over 3 years, phase profiles indicate long vertical wavelengths (more than 100 km) and the ratios of meridional and zonal amplitude are distributed to be around 1. These results suggest that these observed oscillations are likely to be mixed Rossby-gravity normal mode. To make this conclusion more reliable, we examine wind data obtained at Poker Flat (65.1 deg N, 147.5 deg W), Alaska operated by Communication Research Laboratory to determine the zonal wave number of the quasi 2 day wave. In this talk, we summarize characteristics of the quasi-2 day wave observed at Tromsø. In particular we will show altitude profiles of the phase as well as the zonal wave number of the wave, and discuss its origin.