

Equatorial Waves Simulated by Kyushu University GCM in MLT Region

Ying-Wen Chen[1]; Saburo Miyahara[2]

[1] Dept. Earth Planet. Sci, Kyushu Univ.; [2] Earth and Planetary Sci. Kyushu Univ.

It has been revealed that the global scale wave motions such as the Kelvin waves are the important components in the Mesosphere and Lower Thermosphere region [1](hereafter, the MLT region; 80-120km in height altitudes). In our research, we focus on the 2-3day period equatorial wave motions in the MLT region simulated by the T42L250 version of middle atmosphere general circulation model (hereafter, KYUSHU-GCM [2]).

We filter out the components which periods are longer than 3-day and shorter than 2-day in the zonal wind, meridional wind, temperature, and geopotential height fields of January and February 2001 obtained by KYUSHU-GCM. In this process, we found that the eastward moving components of the zonal wind, temperature, and geopotential height fields dominate, while the westward moving components of the meridional wind fields dominate in the low latitude region. We also found that the 2-3day period components mainly consist of zonal wavenumber 1 components.

By the composite analysis along the eastward moving speeds of the zonal wind field and the westward moving speeds of the meridional wind field, we identified the eastward moving components and the westward moving components as the Kelvin waves and the Mixed Rossby-gravity waves with 2-3day periods respectively. With the same composite analysis in the temperature and geopotential height fields, we found that the relationship in zonal wind, meridional wind, temperature, and geopotential height fields coincide with the structure of upward propagating Kelvin waves and mixed Rossby-gravity waves.

References

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[2] M. Yoshikawa, S. Miyahara, Excitations of nonmigrating diurnal tides in the mesosphere and lower thermosphere simulated by the Kyushu-GCM, *Advances in Space Research*, 35(2005), 1918-1924.