Characteristic of Vertical Wavenumber Spectra in The Lower Stratosphere Observed with COSMIC GPS Radio Occultation

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   Vertical wavenumber spectra of atmospheric temperature perturbations in the lower stratosphere were analyzed by using COS-MIC GPS Radio Occultation data. This study used high resolution profiles from January 2007 to December 2009 derived from the Full Spectrum Inversion retrieval method (Tsuda, et.al., 2011). The height range between 20 to 27 km was selected considering the atmospheric conditions are relatively stable over the entire latitude range. We investigated latitude variations of spectra over two longitude regions; 90 to 150 and 170 to 230 degree east, considering land and ocean distributions. The logarithmic spectral slope of temperature perturbations in the equator region agrees with the model spectrum throughout the year showing saturated gravity wave due to convective activity. It has been depicted an annual variation in the spectral slope at mid latitude in northern hemisphere, which is close to -3 in winter and gradual (-2.4 to -2.7) in summer. It also found an annual variation at mid latitude in southern hemisphere, which behaves differently from northern hemisphere, showing a latitudinal drift of the region southward (from 20S to 60S) from May through October. These variations are related with jet stream as described from zonal wind data. We calculated the moving average of z-score value that showed good correlation between temperature variance, spectral slope, and zonal wind.

        : vertical wavenumber spectra, temparature perturbations
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