

[P-061/ATM-1] Upper Atmospheric Tidal Waves in the Northern Polar Region

Jong-Kyun Chung¹, Gunhwa Jee², and Young-In Won³

¹*EOS Research Group, Korea Astronomy and Space Sciences Institute, Korea*

²*Center of Climate Sciences, Korea Polar Research Institute, Korea*

³*Goddard Space Flight Center, National Aeronautics and Space Administration, USA*

Atmospheric tides and gravity waves are the principal dynamic features of the mesospheric and lower thermospheric regions (MLT). Tides and gravity waves transport energy and momentum horizontally and vertically, and thus provide dynamical linkage between the troposphere/stratosphere and the MLT region where vertically propagating waves are dissipated. Atmospheric tides with global scale show regular phases with harmonic periods of 24-hr, due to the solar radiative heating of water vapor in the troposphere and ozone in the stratosphere.

A ground-based Michelson Interferometer was used to examine the upper mesospheric tidal waves near the altitude of 87 km by observing nightglow emission in near infrared region of $1\sim 2\ \mu\text{m}$ at Kiruna, Sweden ($67.90^\circ\ \text{N}$, $21.10^\circ\ \text{E}$). In this paper, we report the 12-, 8-, and 6-hr oscillations of hydroxyl temperature observed at the northern polar region during the winter season between 2001 and 2004. Temperatures from the hydroxyl nightglow are analyzed in a homogeneous way to extract amplitudes and phases of the 12-, 8-hr, and 6-hr oscillations in mesospheric altitudes ($\sim 87\ \text{km}$). We investigate the occurrence of the major tidal oscillation in relation with planetary waves, other geophysical factor, and also discuss the behaviors of the tidal waves in the polar region.