

Sources of Gravity Waves in the Upper Mesosphere at King Sejong Station, Antarctica (62.22°S, 58.78°W)

BYEONG-GWON SONG¹, HYE-YEONG CHUN¹, YONG HA KIM²,
HOSIK KAM², CHANGSUP LEE³, IN-SUN SONG³, and PETER PREUSSE⁴

¹ *Department of Atmospheric Sciences, Yonsei University, Seoul, Korea*

² *Department of Astronomy and Space Science, Chungnam National University, Korea*

³ *Division of Polar Climate Research, Korea Polar Research Institute, Korea*

⁴ *Institute of Energy and Climate Research (IEK-7: Stratosphere)
Forschungszentrum Jülich, Jülich, Germany*

Gravity wave momentum flux (GWMF) in the stratosphere estimated from temperature perturbation using the HIRDLS and the SABER data is found to be maximal in the Antarctic Peninsula in wintertime. King Sejong Station (KSS) is located in the hot spot where strongest GW activities occur in the Antarctic Peninsula. GW activities in the upper mesosphere that are represented by hourly wind variances observed from the VHF meteor radar at KSS during 8 year (2007–2014) are investigated. Seasonal variations in GW activities revealed two peaks in April–May and August–September, although interannual variations are considerable. In the troposphere and stratosphere near KSS, GWMF estimated from the high-resolution ECMWF analysis is well correlated with the residual of nonlinear balance equation (RNBE), a diagnostics of GWs associated with the jet stream, calculated using the ERA-Interim reanalysis. The RNBE in the upper stratosphere is correlated well with the observed GWs in the upper mesosphere, especially in April and September. In order to investigate sources of the observed GWs in the upper mesosphere precisely, backward integration of a 3-dimensional GW ray-tracing model (GROGRAT) is performed with wave characteristics observed from the meteor radar and the airglow all-sky camera at KSS. Seasonal and interannual variabilities in GW sources will be presented in the conference.

Key words: gravity waves, Antarctic Peninsula, upper mesosphere, jet stream

References

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