

## Characteristics of small-scale gravity waves in the Arctic winter mesosphere

\*JING LI<sup>1</sup>, TAO LI<sup>2,3</sup>, QIAN WU<sup>4</sup>, YIHUAN TANG<sup>2</sup>, ZHAOPENG WU<sup>1,3</sup>, JUN CUI<sup>1</sup>

1. Planetary Environmental and Astrobiological Research Laboratory (PEARL), School of Atmospheric Sciences, Sun Yat-sen University, Zhuhai, Guangdong, China, 2. CAS Key Laboratory of Geospace Environment, School of Earth and Space Sciences, University of Science and Technology of China, Hefei, Anhui, China, 3. CAS Center for Excellence in Comparative Planetology, Hefei, Anhui, China, 4. High Altitude Observatory, National Center for Atmospheric Research, Boulder, CO, USA

Using the long-term datasets observed with an OH all-sky imager, a Fabry-Perot Interferometer at Resolute Bay observatory, Canada (74.7°N, 94.9°W), Microwave Limb Sounder and reanalysis data, we study the characteristics of small-scale gravity waves (GWs) with the horizontal wavelength less than 20 km in the Arctic winter mesosphere during 2014-2016. The observed small-scale GWs may be excited in the mesopause region, such as secondary wave generated by primary wave breaking, or a result of baroclinic instability processed in the stratosphere, and the interaction of planetary waves with the background winds. In addition, almost all of the small-scale GWs occurred in 2015/2016 anomalous winter, when both the strong El Nino-Southern Oscillation (ENSO) and anomalous Quasi-biennial Oscillation (QBO) happened. Further studies are needed to explore the mechanism of GW excitation and propagation.

Keywords: Small-scale gravity waves, Arctic winter mesosphere, OH airglow imager, Background wind, ENSO