

Detection of a climatological short break in the Polar Night Jet in early winter and its relation to cooling over Siberia

Yuta Ando¹, Koji Yamazaki², Yoshihiro Tachibana¹, Masayo Ogi³, and Jinro Ukita⁴

¹ *Mie University, Tsu, Japan*

² *Hokkaido University, Sapporo, Japan*

³ *University of Manitoba, Winnipeg, Canada*

⁴ *Niigata University, Niigata, Japan*

The Polar Night Jet (PNJ) is a strong stratospheric westerly circumpolar wind at around 65°N in winter, and the strength of the climatological PNJ is widely recognized to increase from October through late December. Remarkably, the climatological PNJ temporarily stops increasing during late November. We examined this short break in terms of the atmospheric dynamical balance and the climatological seasonal march. We found that it results from an increase in the upward propagation of climatological planetary waves from the troposphere to the stratosphere in late November, which coincides with a maximum of the climatological Eliassen-Palm flux convergence in the lower stratosphere. The upward propagation of planetary waves at 100 hPa, which is strongest over Siberia, is related to the climatological strengthening of the tropospheric trough over Siberia. We suggest that longitudinally asymmetric forcing by land–sea heating contrasts caused by their different heat capacities can account for the strengthening of the trough. Key words: seasonal evolution, atmospheric dynamics, stratosphere–troposphere interaction

Reference

Ando, Y., K. Yamazaki, Y. Tachibana, M. Ogi, and J. Ukita, 2017: Detection of a climatological short break in the Polar Night Jet in early winter and its relation to cooling over Siberia, *Atmos. Chem. Phys. Discuss.*, <https://doi.org/10.5194/acp-2017-882>, in review.