

# ***Interactive comment on “A tropospheric pathway of the stratospheric quasi-biennial oscillation (QBO) impact on the boreal winter polar vortex” by Koji Yamazaki et al.***

**Koji Yamazaki et al.**

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Dear Dr. Paul Pukite, Thank you for your comment and interest in our paper. We agree that the QBO has a wavenumber=0. But, the QBO interacts with polar night jet through modulating planetary wave propagation as previous studies show (i.e., Baldwin et al., 2001). In the present study, we show that the QBO interacts with the tropical troposphere that is zonally non-uniform. Hence the QBO produces non-zonally uniform convection anomalies. These convection anomalies cause off-equatorial effects through Rossby wave propagation. The QBO itself is forced by upward propagating equatorial waves such as Kelvin wave, mixed Rossby-gravity wave, and above all gravity waves

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(Holton and Harkim, 2012 “Introduction to Dynamic Meteorology”).

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