

Localized Gravity Wave Forcing in the Lower Stratosphere – Role of the East Asian and North Pacific Hotspot

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Orographic hotspot constituted by Eastern Asian orography generates gravity waves interacting with low-level positioned critical line provided by the Aleutian High leading to zonally asymmetric breaking already in the lower stratosphere (Pisoft et al, 2018, Sacha et al, 2015). That can play an important role in the polar vortex stability and therefore influence frequency of sudden stratospheric warmings. The localized gravity forcing is also connected with formation of planetary waves and has significant impact on the strength and structure of the zonal-mean residual circulation too (Sacha et al, 2016).

In the presented analysis, we assessed the gravity wave hotspot behavior in the lower stratosphere using sensitivity simulations performed with a mechanistic circulation model. The study was supplemented also by composite analysis applied to the nudged chemistry climate model CMAM30 allowing to describe the implications of the gravity wave drag variations. We focused on the impact of various spatio-temporal characteristics of the localized GW activity, and potential coupling with tropospheric climate oscillations like ENSO and NAO.

Key words: gravity waves, localized forcing, stratosphere

References

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