



## **Does the troposphere respond to polar stratospheric vortex strengthening by increasing planetary wave generation?**

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A study of the energy associated with barotropic and baroclinic planetary waves, during rapid stratospheric vortex decelerations and rapid accelerations, is presented. Positive energy anomalies associated with barotropic tropospheric planetary waves are observed during the phases of strong stratospheric vortex. High peak maxima of the energy associated with baroclinic planetary waves are observed during vortex decelerations. During the weak vortex periods, the energy associated with barotropic tropospheric planetary waves is smaller than the climatological values, and negative anomalies of the energy associated with baroclinic planetary waves occur during rapid vortex accelerations.

Results give clear evidence of the troposphere-stratosphere wave driven coupled variability: The vortex variability is forced by baroclinic planetary wave bursts. The barotropic tropospheric wave energy responds to the vortex state. Using Eliassen Palm (E-P) flux composites it was concluded that the increase of barotropic tropospheric wave energy is associated with wave generation at high latitudes. The spectra of topography and energy anomalies suggest that the increase of planetary wave excitation may be mediated by changes in the topographic forcing due to zonal mean zonal wind anomalies progressing downward from the stratosphere.