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Triggering of the tropospheric baroclinicity by the persistent stratospheric wind regimes

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There are increasing evidences that the highly stratified layer of the Earth's atmosphere is dynamically coupled to the troposphere, where most of the day-to-day weather takes place. The near-surface amplification of the initial stratospheric wind anomalies includes the eddy feedback within the troposphere. However the detail of this process is not fully understood. Motivated by the tropospheric amplification of the initial stratospheric wind anomalies, we provide insight on the following questions: (1) Does the stratospheric persistent wind regimes have the capacity to generate new eddies in the troposphere? (2) In which way the stratospheric persistent westerlies affect the existing eddies within the troposphere? To address the above questions, we use the daily mean meteorological quantities from NCEP-NCAR) and ECMWF as well as three types of model simulations including: Free-running, nudged stratosphere and fully-nudged (both troposphere and stratosphere are being nudged) experiments. Our results show that the shallower troposphere during Weak Vortex Regime (WVR) restrict the upper tropospheric baroclinicity while the deeper troposphere during Strong Vortex Regime (SVR) provides a window of opportunity for the generation of new eddies within the troposphere. In order to answer the second question of this research, we track the Rossby Wave Packets (RWPs) in different status of the stratospheric flow. Our results show that there is large regional differences in the response of the RWPs to different Stratospheric Wind Regimes (SWR) .