



The extratropical QBO signature

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The extratropical QBO signature is analyzed in the ERA-40 reanalysis and MAECHAM5 general circulation model datasets. We examine the seasonal asymmetries of the secondary meridional circulation associated with the QBO. In agreement with previous studies the results reveal a strong seasonal dependence of the QBO residual circulation. This is characterized by a two-cell structure symmetric about the equator during autumn and spring. However, anomalies strongly weaken in the summer hemisphere and strengthen in the winter hemisphere leading to an asymmetric QBO residual circulation characterized by a single cell structure displaced into the winter hemisphere during the solstices. We also look into a possible mechanism for the seasonal asymmetries base in the interaction of Rossby waves with the tropical QBO easterly and westerly wind layers. Secondly, we analyse the QBO modulation of the high latitude circulation in both hemispheres. The largest QBO signature in the northern stratosphere occurs during winter. However, during the southern winter, planetary waves do not disrupt the southern stratospheric vortex and the largest QBO signature is found during the late spring (November), at the time of the final warming (Balwind et al., 2001). Here we examine the high latitude QBO signature in function of the latitude-height structure of the zonal wind in the tropical region in order to determine how the extratropical response depends on the vertical phase structure of the QBO. We will focus on the northern winter stratosphere and the southern stratosphere during November, when the largest QBO signature is observed. We will also look into the interaction mechanism in both hemispheres through the analysis of the QBO signal induced in the Eliassen Palm (EP) flux.