

Relation between the interannual variability in the stratospheric Rossby wave forcing and zonal mean fields suggesting an interhemispheric link in the stratosphere

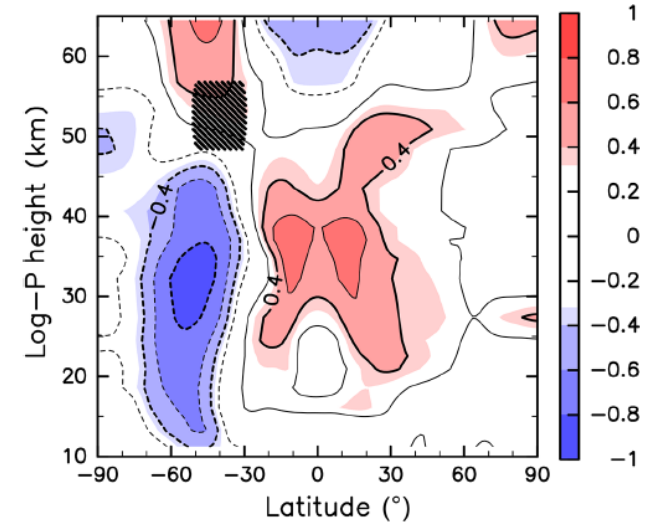
Focusing on the interannual variabilities in the zonal mean fields and Rossby wave forcing in austral winter, an interhemispheric coupling in the stratosphere is examined using reanalysis data MERRA-2.

In the present study, EP flux divergence averaged over the regions where the absolute value of the EP flux divergence is maximized in the winter in the Southern Hemisphere (SH), $[\nabla \cdot \mathbf{F}]_A$, are used as a proxy of the Rossby wave forcing. The interannual variabilities in the zonal mean Temperature \bar{T} and zonal wind \bar{u} are significantly correlated with the $[\nabla \cdot \mathbf{F}]_A$ in both the SH and Northern Hemisphere (NH).

The interannual variability in the strength of the residual mean flow in the SH stratosphere is consistent with \bar{T} . The absolute angular momentum around the Equator at the altitude of 40 km is small when the wave forcing is strong, which provides a pathway for the cross-equatorial residual mean flow.

These results indicate that an interhemispheric coupling is present in the stratosphere.

(a) Corr. \bar{T} with $[\nabla \cdot \mathbf{F}]_A$ 1980–2017



(b) Corr. \bar{u} with $[\nabla \cdot \mathbf{F}]_A$ 1980–2017

