

# The fine scale structure of the annual cycle in stratospheric temperatures observed from GPS Radio occultation

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It is known that the Brewer–Dobson circulation (BDC) plays a vital role in controlling the stratospheric temperature in both annual and interannual time scales (Yuleva et al. 1994, Fueglistaler et al. 2011, Young et al. 2011). The present study focuses on fine scale structure of the stratospheric temperature variability in relation to BDC using GPS Radio occultation measurements. It is observed that tropical and extratropical temperatures are significantly negatively correlated throughout the stratosphere. The out-of-phase relationship between tropical and extra tropical temperature starts at the altitude ~ 15 km and found to be the strongest at altitude between 17-22 km (lower stratosphere) and stronger at altitude above 22 km in the mid- and upper stratosphere. The out-of-phase relationship between tropical and high latitudes strongly depends upon seasons. The correlation between tropical mean temperatures and temperatures at high altitudes reveals clearly fine vertical and seasonal features. During September-February, out-of-phase relationship is dominated by Southern Hemispheric (SH) extratropical lower stratosphere (17-22 km) and Northern Hemispheric (NH) mid- and upper stratosphere (22-40 km). During March-May, both NH and SH extratropical stratosphere contribute to out-of-phase relationship whereas during June-August, SH extratropical stratosphere mainly contributes to out-of-phase relationship. In addition to BDC, role of ozone variations on temperatures and static stability structure on the out-of-phase relationship will be discussed during the conference.

Key words: Stratospheric temperature, Brewer–Dobson circulation, Annual and interannual cycles

## References

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