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# ***Interactive comment on “Relationships among Brewer-Dobson circulation, double tropopauses, ozone and stratospheric water vapour” by J. M. Castanheira et al.***

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The research presented in this paper shows strong relationships of the occurrence of double tropopause events, total column of ozone, water vapour and the Brewer-Dobson circulation. Although the correlations pointed out seem clear, several points should be addressed. The results are based on monthly means, so it's not possible to study each DT event separately and reasonable doubts exist about the origin of DT events, which can occur because of very different atmospheric phenomena (foldings, overlappings, etc.) A recent paper by Wang and Polvani [1] using idealized models points out that double tropopauses are in close connection with cyclonic circulation in

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upper levels and that the air masses come from high latitudes. More recent experimental results by Añel et al. [2] using lagrangian analysis, reanalysed and radiosonde data support this view for one of the regions of the Earth with maximum occurrence of double tropopauses. Both of these contradict in some way part of the claims presented in this paper (though this one is done having into account the whole extratropics of the North Hemisphere and therefore the mechanisms contributing to the formation of double/multiple tropopauses has not to be necessarily the same for all the regions around the planet). It can be also noted that results of the impact of the QBO here presented are incremental (and in some way supported) by those previously obtained by Ribera et al. [3]. Therefore, under the light of these facts, how do you reconcile them with your results?

Juan A. Añel and Laura de la Torre

#### References

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- [3] P. Ribera, C. Peña-Ortiz, J. A. Añel, L. Gimeno, L. de la Torre, D. Gallego (2008) Quasibiennial modulation of the Northern Hemisphere tropopause height and temperature, *J. Geophys. Res.*, 113, D00B02, doi: 10.1029/2007JD009765.

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