

***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 comment by Juan Añel has two points. Starting by the later point, we do not see a direct connection between our paper and the paper by Ribera et al. (2008). In our paper, we discuss the impact of the QBO on the area covered by double tropopause events, whereas the paper of Ribera et al. discusses the impact of QBO on the pressure and temperature of the first tropopause. We do not see how the results of one study support the results of the other.

With respect to the mechanisms for the occurrence of double tropopauses (DTs), our analysis does not exclude DT events associated with other processes than intrusions of

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tropical upper tropospheric/lower stratospheric (UTLS) air into the extratropical lower stratosphere. However, our study suggests that, at least on the hemispheric scale, a large fraction of DT events is associated with that type of tropospheric intrusions. Moreover, recent studies (e.g. Homeyer et al., JGR, 2011, and references therein) analyze several case events of DTs associated with intrusions of tropical UTLS air into the extratropical lower stratosphere. It is interesting to note that some of the diagnosed tropospheric intrusions occur in the region studied by Añel et al. (2012).

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Interactive comment on *Atmos. Chem. Phys. Discuss.*, 12, 12391, 2012.

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