

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

Anonymous Referee #2

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This paper analyzes reanalysis and satellite datasets to investigate the statistical relationship among the double tropopause, tropical upwelling, ozone and water vapour.

It is not very clear to me what the authors try to discuss using these correlation analyses. Please consider the following two points.

(1) Please include the analysis of the Rossby wave activity which would be the key (but missing in the current manuscript). This is because (as the authors also mention) this should be the primary cause of the BD circulation, double tropopauses, and variations in ozone and water vapour.

(2) Please make it clear which process is mainly considered, the quasi-horizontal isen-
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tropic transport near the lowermost stratosphere, or the cross-isentropic stratospheric deep circulation including the tropical upwelling. The current manuscript seems to discuss both and gives no conclusion about which is more important or what are the relative contributions to the ozone and water vapour variability.

One more point: If the authors want to use ERA-Interim ozone and water vapour data, they first need to show some validation analyses (Note that Dragani QJRMS 2011 made some ozone product validations). In particular, the analysis using ERA-Interim stratospheric water vapour may be dropped because (as the authors also mention) the ERA-Interim water vapour has very little influence from observations.

Other comments:

Section 3.3.1: About QBO, Baldwin et al. (Rev. Geophys., 2001, Figure 13) showed that the maximum upward velocity anomaly is found during the easterly shear phase (and thus the maximum upward displacement is found during the easterly phase).

Figure 5: HALOE and MLS water vapour measurements show biases during the overlapping period. How did the authors merge the two data sets?

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