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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Sensitivity of stratospheric Br_y to uncertainties in very short lived substance emissions and atmospheric transport" *by* R. Schofield et al.

Anonymous Referee #4

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Review of Schofield et al.

This manuscript presents a trajectory based estimate of transport of VSLS into the stratosphere through the TTL, focusing on the sensitivity to various parameterized processes. The manuscript is well thought out and well written, and sould be publishable in Atmospheric Chemistry and Physics subject to minor revisions. My only major substanstive concern is that the authors could explore a little more the realism of the ERA-Interim convective detrainment rates, since they identify this as a key uncertainty.

General comment: The authors note that there is not an easy way to validate the ERA-Interim convective detrainment rates. I think however that there might be some simple

ways to check the realism of these rates. One way would be to use something like the vertical strucutre of CloudSat cloud fraction to compare to the vertical structure of detrainment rates. This would not provide a quantitative comparison, but might be able to provide gradient information on whether the vertical and horizontal structure of detrainment rates are reasonable, as well as checking some of the seasonal assumptions.

Detailed comments:

P24174, L11: is the analysis dependent on what theta surface the parcels are started on?

P23174, L20: knowing these fractions and how they varied would be interesting.

P24175: Figure 2 could use another sentence of explanation: it is just the initial values from table 2 with the lifetime applied right? Also, could you show (maybe just for initial lifetime, maybe in 2 more panels) the alternate source gas distribution from Kerkweg?

Also: for table 2: can you show the sum of total Bry for each distribution set?

P24177,L19: see general comment above about a way to try to evaluate the detrainment.

P24184, L3: does this fraction of trajectories matter for the subsequent entry distribution of Bry? Do you need to account for it using your method (it seems like it might dilute the air you are trying to quantify).

P24184, L8: The description of an 'hourglass shape' did not make sense to me in these horizontal maps. Please rephrase.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 24171, 2010.

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