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Atmospheric Chemistry and Physics Discussions

Interactive comment on "A numerical study of tropical cross-tropopause transport by convective overshoots during the TROCCINOX golden day" *by* J.-P. Chaboureau et al.

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The authors thank the reviewer for the helpful remarks.

1) Major comment on the high vertical velocities. It is very worthwhile to underline that vertical velocities of 60 m/s are plausible. Such high vertical velocities have already been observed and simulated as reported by Wang (2003) and Mullendore et al. (2005). The decrease of the vertical velocities with time is also comparable to the one shown by Mullendore et al. (2005) in their Fig. 11. Finally the choice of introducing the grid-4 at 18:00 UTC was coincident with the takeoff time of the Geophysica. We agree that an earlier insertion of the grid-4 would be more relevant. However the computer

allocation for the project had been completely consumed and did not allow us to redo the simulation.

2) Discussion of Fig. 3. Strength of convection in the simulation. As shown in Fig. 5, the maximum vertical velocity indeed decreases between 18:30 and 20:30 UTC from 60 to 30 m/s. The vertical velocity is, however, still large in the simulation. Further, low BTs in the MSG images result in vertical transport due to convection, but also to the spreading of the anvils in the TTL. So the discrepancy in the simulation can also be due to a lack of ice at high altitudes due to the saturation adjustment in the microphysical scheme. The sensitivity to such a process will be studied in a future work.

3) The vertical coordinate has been added in Fig. 2

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