

Interactive
Comment

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.

Anonymous Referee #2

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This is an interesting paper comparing simulations and data collected during one TROCCINOX event. My main comments revolve around the concern that the highest vertical velocities on the finest grid might be due to nonphysical processes.

Specific Comments

1) [Major Comment] I wonder to what extent the high vertical velocities obtained in the authors' simulations may be arising from nonphysical adjustments associated with the introduction of the finest nested grid, which seems to have been initialized at 18:00 UTC (lines 1&2 p. 13005). Fig. 5 shows the maximum grid-4 vertical velocity is about 67 m/s at 18:00 UTC, and that this vertical velocity exceeds the vertical velocity on grid

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4 at all other times except 18:20 UTC. According to Fig. 5, the maximum grid-4 vertical velocities are bounded at a much lower level (roughly 30 m/s) after 19:10 UTC.

Similarly, the time-series of the water vapor plume displayed in Fig. 6, begins just 10 minutes after the introduction of grid-4, and its origin could be related to initial adjustments on the fine mesh. I strongly recommend that the authors redo this simulation and insert the fine mesh no later than 16:00 UTC. (Fig. 7 suggests that 13 UTC would be an even better time to insert the fine mesh.)

2) Discussion of Fig. 3: it seems like the simulated convection on finest grid (grid 4) decays significantly between 18:30 and 20:30 UTC whereas the observed convection maintains a similar intensity or perhaps strengthens slightly. The simulated convection also appears to decay on grid 3 during this period, but not as dramatically as on grid 4. The weakening of the convection on grid 4 is also apparent in Fig. 5. Is the simulated convection failing to match the sustained strength of the observed system? If so, this needs to be better conveyed to the reader in the discussion of Fig. 3.

3) It would be helpful to add physical height to the vertical coordinates given in Fig. 2, since much of the discussion of this figure is presented in terms of the height of the Geophysica.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 13001, 2006.

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