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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Water vapor budget associated to overshoots in the tropical stratosphere: mesoscale modelling study of 4–5 August 2006 during SCOUT-AMMA" *by* X. M. Liu et al.

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Answer to D. Grosvenor's Comment

Thank you for posting this comment. This should lead to a significant improvement of the manuscript.

D. Grosvenor (hereafter DG) points that the use of mixing ratios is not so useful to quantify the hydration by overshooting convection and to compare different simulation results because the result depends on the size of the domain. At least he proposes

that each time a mixing ratio is given in the paper, the size of the domain should be given too. According to DG, a much more useful quantity is the mass of water that remains in the stratosphere after the ice has totally evaporated.

All these points have been addressed: - Each time mixing ratios from other studies are given, the sizes of the domain have been added. This implied new comments in section 5.1. Direct comparison can be done with the simulation of Grosvenor et al. (2007) because the domain size is very close to the one used for the Chad case. Only a qualitative comparison with the WRF simulation of Chemel et al. (2009) can be given due to the difference in the domain size. - We have tried to compute the mass of overshooted water that remains in the stratosphere for the Chad and the Aïr cases. The reference mass used for the computation is the mass of stratospheric water in the Grid 3 domain when ice starts to appear in the stratosphere. For the Aïr case, we only could give an upper limit for this estimation. For the Aïr case a lot of ice remains in the domain: we recall here we had to stop the comparison between model results and observations at 19:50 UT on August 5, because model and observation start to differ from that time. A more detailed computation could be done for the Chad case with a lower limit and an upper limit. These numbers are now given in Table 3. The Chad case results are shown in a new Figure (Fig. 15) and our result are now compared with the estimations given in the DG ACPD comment from the Chemel et al. (2009)' simulation and from the Grosvenor et al. (2007)' simulations. Note that the recent paper by Iwasaki et al. (2010) is now referred since they also give an estimation of the water mass budget associated with a case of overshooting convection.

These new findings are now mentioned in the abstract and in the conclusion which have been partially rewritten.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 3975, 2010.