

## ***Interactive comment on “Deep convective injection of boundary layer air into the lowermost stratosphere at midlatitudes” by H. Fischer et al.***

### **Anonymous Referee #1**

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This paper presents an interesting case study of Troposphere to Stratosphere Transport over the mid- latitudes based on an original and useful data set including a number of trace gas measurements and particle number concentration measurements obtained from aircraft flights during the MINOS campaign. It is well structured and has an adequate level of meteorological analysis to support the findings from the measurements.

However I have a few points that might be taken aunder consideration from the authors of this paper.

1) In case C1 I do not think that the aircraft measurements taken within the lower most stratosphere. As it can be seen from Fig. 1b (PV values below 1.5 pvu), the measurements in case C1 were taken below or close to the tropopause. From my point of view the case C1 is more complex because it seems that we have injection

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of BL air to the UT and at the same time we have a tropopause fold which injects stratospheric air at 8 km, thus inducing mixing in the UT of BL and LMS air.

According to this, the percentage mixing of BL air in the LMS for case C1 (Table 1) is rather simplistic approach. I suggest that the authors should have a look on this possibility and possibly present for case C1 percentage contributions of BL and LMS air in the UT.

2) In Table 1, after having a quick look on the calculations of the percentage BL and UT air in LMS, I have the impression, if I understood well the equations (1) and (2), that in case C3 (for CO) BL% is 25.6 and UT% is 100% and not 15% and 59%, respectively.

3) I would like also to suggest that the authors a few lines for the possible reasons that in cases C2 and C3 the particle number concentration is small, already from Section 3 and not only in the conclusions. This would help the reader already from the beginning to recognise the reasons for the opposition of these measurements relative to the trace gas measurements.

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Interactive comment on Atmos. Chem. Phys. Discuss., 2, 2003, 2002.

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