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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Analysis of water vapor LIDAR measurements during the MAP campaign: evidence of sub-structures of stratospheric intrusions" *by* P. D'Aulerio et al.

P. D'Aulerio et al.

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1. "dehydration": this term was adopted in the previous version to designate deficit of water vapor concentration with respect to the typical situation. We agree with the reviewer that this use is inappropriate and the text has been modified.

"mixing": In the layer A of the November 7th case, the deficit of water vapor is rather conserved if compared with the ECMWF data 96 hours before, without evidence of mixing. We stress the fact that is not case of the Potential Vorticity, decreasing from 3.6 PVU to less than 1 PVU along the trajectory). The shallow layer B, as results also from the cross section and confirmed from the tracer values, is more similar to

a filament detached from the primary fold, than a part of a reversible system In the second case there is evidence of an increase in the water vapor concentration both along the trajectory and in the lidar data, compared to the values provided by ECMWF at the origin. This is a more clear sign of possible irreversible mixing.

2. See also the answer 3 to the second reviewer comment. Missing a correspondence between the two profile in cases analyzed, we do not provide an image including both the measurements. However we would stress, as reported in the paper, that periodic comparison and validation of lidar data were performed during the two months of MAP campaign and a good agreement has been found in absence of strong horizontal motion. The case reported in this paper it not meant to highlight the lidar quality, but to describe the streamer transport. The data validation provides error budget that is cited in the paper (end of section 2)

3. Section 3 has been rewritten taking into account the remarks of both reviewers

Minor comments:

4. Presence of multiple PV secondary fold has been frequently detected as reported in literature. The mechanism for their generation is mainly based on dissipation due to wind shear. A detailed discussion of such effect is out of the aim of this paper. For this we modified the sentence in the introduction highlighting references addressing these issues(Newell et al., 1999, Bithell et al. 2000)

All the technical comments 1-3, 5 have been implemented in the text

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Interactive comment on Atmos. Chem. Phys. Discuss., 4, 8327, 2004.

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