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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Water vapor transport in the lower mesosphere of the subtropics: a trajectory analysis" *by* T. Flury et al.

T. Flury et al.

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General Response to Referee's comments

The authors thank the reviewers for their work on this paper.

We intend to adapt the article in the following way. Trajectories are now all calculated for the 2700 K isentropic surface for 3 days backward. The treated water vapor phenomena are compared to Aura MLS version 2.2 maps for the 2700 K surface. The explanation for the occurrence of the depletion and increase in water vapor remains the same and is still supported by the trajectory analysis and the corresponding MLS maps. Further we change the overview figure for all measured profiles and plot them as a function of latitude and the binning grid for the difference plot is taken smaller as suggested by Artem Feofilov. The CIRA86 zonal mean zonal wind figure is substituted

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by a ECMWF wind field at 60 km for the encountered situation on November 15. Finally some more details are given for the trajectory model.

Reply to anonymous referees #3 and #1

We would like to thank you for the remarks about the inconsistency of the MLS map altitude and trajectory altitude.

We agree that the trajectory altitudes do not correspond with the MLS map altitude for the Arabian Sea event. The MLS V 2.2 maps of 60 km (2700 K) do as well confirm our assumption of lower values above the Atlantic Ocean on November 5 and higher values one week later above northern India on November 12. In order to be consistent we now calculated 3 day backward trajectories for the 2700 K isentropic surface for both events. For the Arabian Sea event trajectories start on November 5 above the Atlantic Ocean around 21 N between the Cape Verde Islands and the Canary Islands, MLS shows H2O values in dark green of about 6.2 ppm. The 3 day backward trajectories for the Arabian sea 1 week later start in northern India and Nepal and the MLS shows there a small yellow zone of 7.4 ppm surrounded by light green of 7 ppm what is a 20 % difference to the values 1 week before above the Atlantic Ocean. Looking at the MLS maps of November 6, 7 and 8 reveals that in fact the dark green zone of 6.2 ppm on the west coast of Africa moves towards the Arabian Sea, where there was more water vapor on November 5 and thus decreased until November 8-the measurement day. On the other hand the yellow zone above Northern India, Nepal and China moves into the Arabian Sea region the days following November 12. This shows the consistency of the calculated trajectories. For the Mediterranean event trajectories were now calculated at 2700 K instead of 2600 K. The trajectories do not change much and the reason for the decrease in water vapor on the return flight remains the same. This section of the results will be carefully rewritten and the new figures will be added.

Technical Corrections p.13777 line 1: ... is difficult to achieve ... p.13777 line 5: AMSOS acronym is used before it is defined on the following page Please change Arabic Sea

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Interactive Comment

to Arabian Sea throughout the text and figure captions. p13782 line 17: Presently not much is known ...

Reply:

The suggested corrections were taken into account. Thank you.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 13775, 2008.

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