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Interactive comment on "A Match-based approach to the estimation of polar stratospheric ozone loss using Aura Microwave Limb Sounder observations" by N. J. Livesey et al.

Anonymous Referee #3

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The authors have applied Match technique approach to quntify the polar stratospheric ozone loss using the product of MLS Lagrangian Trajectory diagnostics and MLS measurements. They have also investigated several uncertanties on the estimation of ozone loss using different crtieria in this method. Then compared the current work with previous studies for Arctic winter 2004/05. Obviously this work has lower Arcitc ozone loss compared with most of other published works. For the Antarctic winter, this study also underestimates the partial column ozone loss (350-880K) compared with Kuttipurath et al. Although the authors discussed this in Page 10058, but I think it would be better to explain more why this method produces lower ozone loss than

others. The authors also estimates Arctic and Antarctic ozone loss for most of MLS period (2004-2013).

The paper is well organised and written and the objective of the paper is quite clear. This work extends the quantifying the ozone loss for Arctic and Antarctic winter and will be definitely used for the next WMO ozone assements and has a wider interest to the scientific community for studying the polar stratospheric ozone loss. The paper is suitable for publication at ACP, here I just have a few minor comments.

Minor comments:

1) It is still vital to calulate ozone loss based on the information from the products of MLS LTDs. It seems that the products used from LTDs include (trajectory latitude,longitude, time, potential temperature and temperature, sPV, equivalent latitude (EqL)) in Page 10047 Lines 22-25. The current work is mainly based on using sPV. Can you recalculate the ozone loss using EL which have been also widely used by other researchers to see if there is any large difference?

2) Fig2c shows the mean sPV for all points along the match trajectoies as a function of mean EL, why there is no EqL value larger than 75N (I know the MLS is only observed below 82N)?

3) Fig3(d). Why the ozone hour rate of change around 450 K is always positive from 1 Jan to mid-Jan 2015?

4) delete "L." in Line 6 Page 1044.

5) Line 2 Page 10045, change "sondes" to "ozonesondes"

6) Lines 17, 27 in Page 10047, is it "analysis" or "reanalysis"?

7) Line 8 Page 10049, for the sPV, do you used the samer criterion for all altitude levels?

8) Line 10054, can you explain more about "decent assumption" and "mixing assump-

tion"?

9) Line 1 Page 10061 why "temperature"?

10) Table 1, remove "W." or "W. Feng et al. (2007)"

11) Table 2, change "MLS Match" to "This work", Also use "Kuppippurath et al.", it would be better also include published year.

12) Figure 2a, why uses "1000s"? The number in the Figure sometimes is overlapped, need to replot it to make it clear.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 10041, 2015.