

Responses to Referee #2:

We thank referee's helpful and constructive comments and review. The referee's comments are listed in *italics*, and our responses in black with revised texts in **bold black**. Please note that figure number has been revised according to Referee #1's comments and suggestions.

This paper is well thought out and contains a thorough analysis of the differences between OMI and MLS profile retrievals. The writing can be somewhat "dense" at times and this reviewer suggests that some of the long, highly complex sentences be split into two to make the reading less difficult. Other than a few minor changes listed below, this manuscript is recommended for publication.

Well, all my underlines and color have disappeared. I hope that you can follow my changes.....

Minor changes: Page 1: line 17-19 remove the words "larger" and "smaller" Larger than what?

This sentence shows the comparison results of the post-RA period with relative to those during the pre-RA period as we show the comparison results during the pre-RA period in the previous two sentences. To avoid confusion, we have changed the sentence to "**Compared to the retrievals during the pre-RA period, OMI retrievals during the post-RA period ...**"

Line 20,23 & 25 comparisons.

Done.

Line 25 significant bias

Done.

in the Line 28-9 The sentence about 261hPa MLS ozone sounds very "arrogant" as if MLS is being validated with OMI and not the other way around. Suggestion- just state that they agree well at this pressure and leave out the interpretation as you have done on Page 5.

We deleted this sentence, because we already have the agreement statement in the abstract.

Page 2: line 11 change 'in' to 'at' Line 29 ozonesondes measure Line 32 remove "but also....validated"

Done.

Page 3 line 22 comparisons

Done.

Page 4, line 21 remove "in the stratosphere".

Done.

Line 21-22: Please either explain how the cross track position changes as a function of latitude here or refer to section 3.

We have added "The **threshold of** cross-track position ...**(More details will be discussed in Sect. 3).**"

Page 6, line 1 change is to are (data is plural) Line 2 to the top of Line 3 change "for avoiding" to "to avoid" Line 20: OMI a priori is used in the calculation Line 24: The ozone column Line 27: remove "SOC comparison" and add an 's' to "are for comparisons"

Done.

Page 7, Line 2,3 Remove "only, missing to.....than 7hPa"

Done.

Line 13:mask which is consistent

Done.

Line 32: (red lines), the OMI

Done.

Page 8 line 3: change to: “these comparisons are similar to the OMI/MLS comparisons shown in 2006 in Lui et al although both OMI and MLS versions are now different and this study is done.....”

Done.

Line 15: change “Such worse comparison” to “The larger differences”

Done.

Line 24-5: please reference cross track biases or include a plot.

We have added (Huang et al., 2017) as a reference.

Line 33: This supports the theory that...

Done.

Page 9: line 11: remove “especially”

Done.

Page 10: Line 30: as in the introduction, please reduce the conclusion to “the two agree at 261 level”

We have removed the sentence and added to the previous sentence **“indicating the scientific use of MLS ozone at 261 hPa in applications such as the OMI/MLS TOR method”**

Page 11: line 1 add “see Figure 2” after “trend analysis” Line 7 & 8 change “of” to “at”

Done.

Line 10- you need stronger words to dissuade people from using the data in the upper strat from 30-90N

We have revised it as **“... where there are significantly large trends of up to -5%/year...”**

Line 24: ...not suitable for trend studies... This is a conclusion and should be either moved or repeated in the conclusion section.

We have rephrased it in the conclusion section as **“These significant bias trends indicate that the current ozone profile product is not suitable for trend studies, especially during the post-RA period.”**

Page 12: line 10: profiles

Done.

Page 13: remove “original”

Done.

Figure 4 & 5: Why is there such a positive bias in 70-90 South above 1 and below 100 hPa plot in figure 5 (SZA) but not figure 4?? Shouldn't it “smear out” and be a red streak in the latitude plot like in the north high latitudes (Fig 4)? Please explain.

The large positive mean biases with 85°-90° solar zenith angles in the southern hemisphere are due to their large solar zenith angles. In Figure 4, mean biases at southern high latitude regions include not only large mean biases due to the large solar zenith angles during southern winter, but also smaller and/or negative mean biases with smaller solar zenith angles during southern summer. Naturally, large positive biases with large solar zenith angles during southern hemisphere winter are smeared out by more frequent smaller or negative biases with smaller solar zenith angles during other seasons. Also the figure shows very similar patterns between south and north high latitudes.

Figure 6 is very “cluttered” with text. Please remove N= for the lower two plots as it is redundant information.

Done.

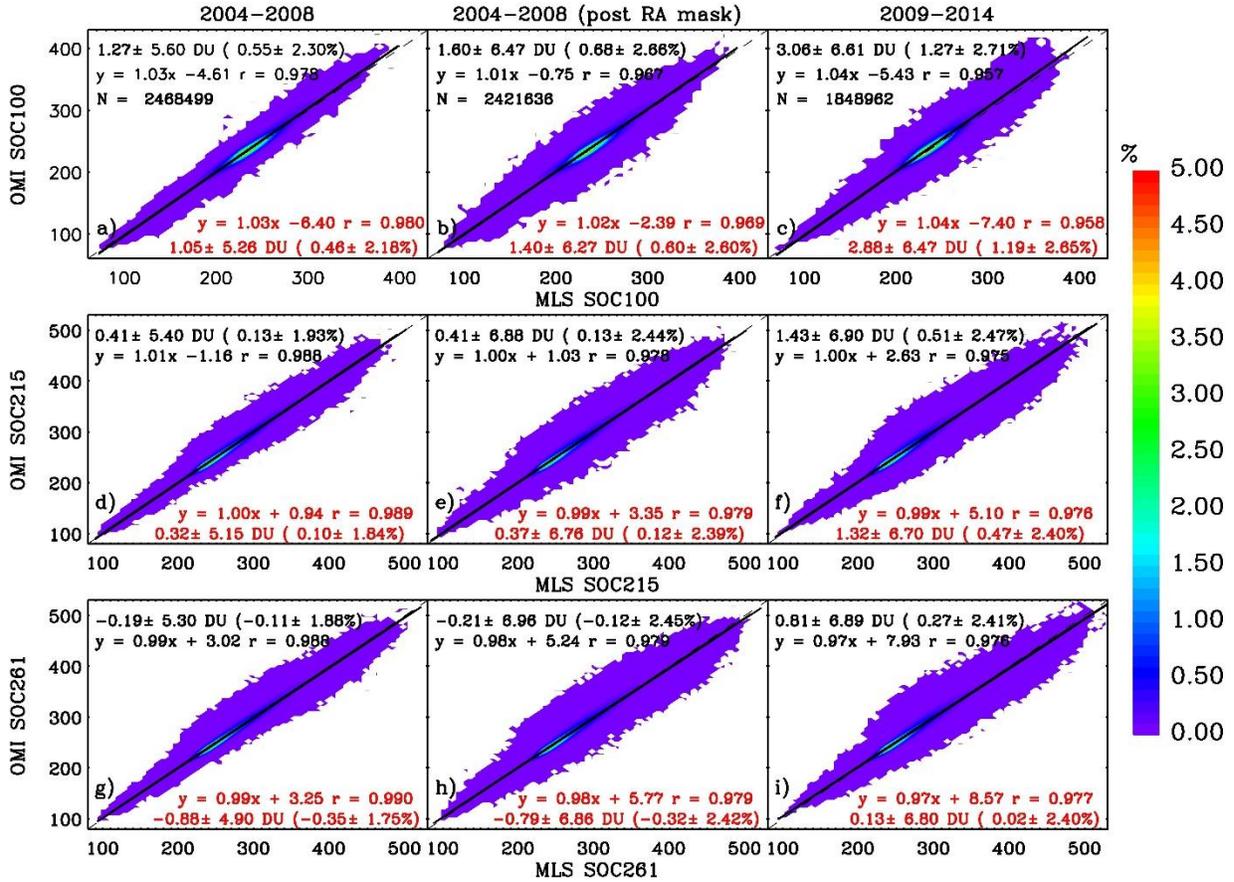
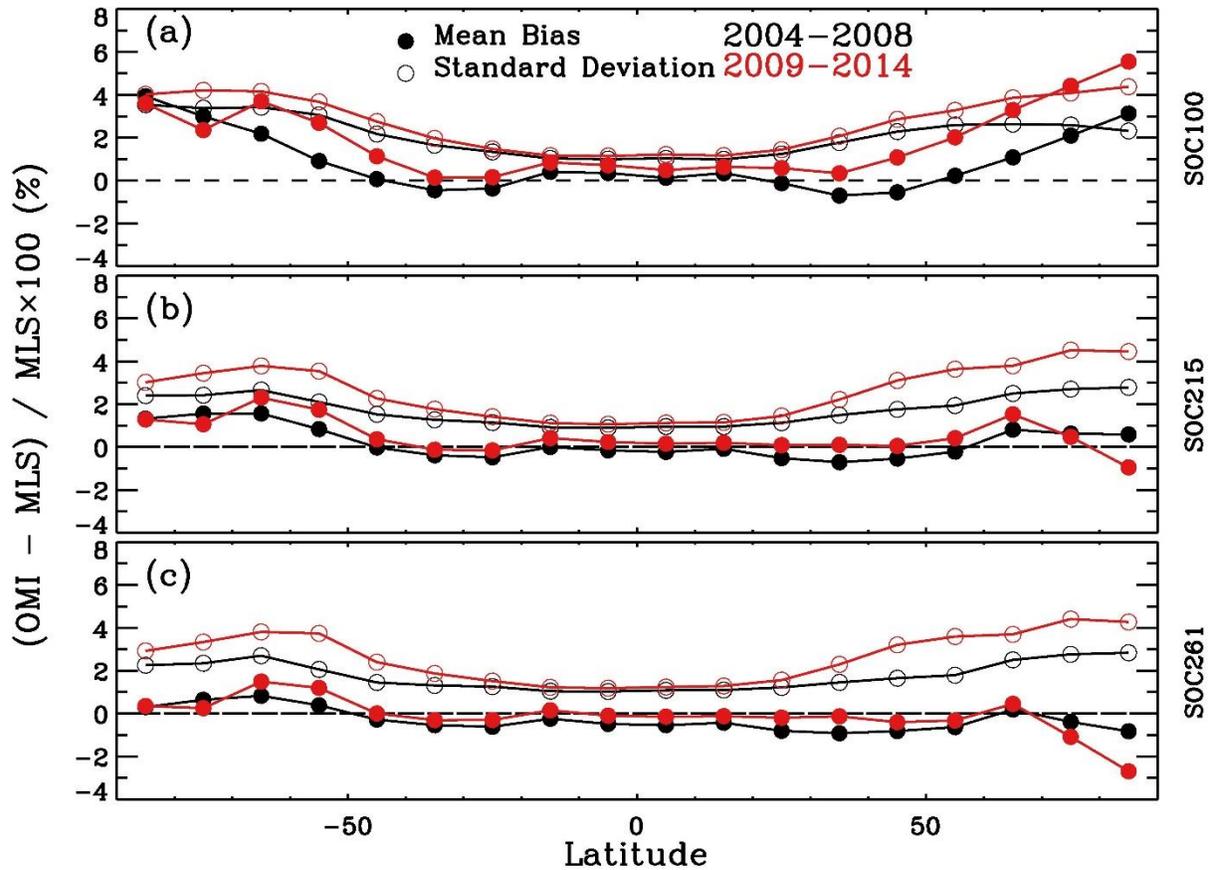


Figure 7: Please scale the middle plot to the same absolute scale as the other two (-4 to 6 or -3 to 7 would be fine)

Done.



Huang, G., Liu, X., Chance, K., Yang, K., Bhartia, P. K., Cai, Z., Allaart, M., Ancellet, G., Calpini, B., Coetzee, G. J. R., Cuevas-Agulló, E., Cupeiro, M., De Backer, H., Dubey, M. K., Fuelberg, H. E., Fujiwara, M., Godin-Beekmann, S., Hall, T. J., Johnson, B., Joseph, E., Kivi, R., Kois, B., Komala, N., König-Langlo, G., Laneve, G., Leblanc, T., Marchand, M., Minschwaner, K. R., Morris, G., Newchurch, M. J., Ogino, S. Y., Ohkawara, N., Pitters, A. J. M., Posny, F., Querel, R., Scheele, R., Schmidlin, F. J., Schnell, R. C., Schrems, O., Selkirk, H., Shiotani, M., Skrivánková, P., Stübi, R., Taha, G., Tarasick, D. W., Thompson, A. M., Thouret, V., Tully, M. B., Van Malderen, R., Vömel, H., von der Gathen, P., Witte, J. C., and Yela, M.: Validation of 10-year SAO OMI Ozone Profile (PROFOZ) product using ozonesonde observations, *Atmos. Meas. Tech.*, 10, 2455-2475, doi: 10.5194/amt-10-2455-2017, 2017.