

Responses to RC1:

We would like to thank the reviewer for his sharp comments and suggestions, which have improved significantly the quality of our manuscript. We have addressed all reviewer's points and detailed point by point replies are provided below.

Details:

P. 2: Continental scale network:

Following the reviewer's suggestion, we added the following sentence in the conclusion:

"In this respect, TOLNet has the potential to become the first continental-scale high-quality ozone lidar network that could be operated over an extended period of time."

Sec. 2: lidar specs details

Following the reviewer's suggestion, we added the following text in sections 2.1:

"(12-bit digitizer)". The laser pulse energy (in the UV) and number of bits were already mentioned in sec. 2.2.

P. 9, line 21:

"ground" removed

P. 10, line 12:

"much" added

P. 10, line 30: co-location

Following the reviewer's suggestion, we added the following reference in the text:

"(e.g., Vogelmann et al., 2011)"

P. 12, line 3: structures left in the averages on fig 5

The structures left in the mean profiles of fig. 5 are caused by changes in the number of samples used to average. Because we are dealing with a low number of coincidences (13-17 at most), the impact of low sampling can be significant, especially at the edges (top and bottom) of the profiles, where this number goes down to just a few samples. In order to clarify this point, we added the following sentence at the end of the paragraph:

"This approach also minimizes the impact of residual noise associated with changes in the number of samples used for the comparisons"

P. 12, line 7: typo

Thank you, we corrected, now reading *"ozonesonde"*

P. 14, line 21: TMF and aerosols

We agree with the reviewer that the choice of TMF was not motivated by the absence of particles. For clarity we now use the following sentence:

"...exists, and partly because the SCOOP campaign took place at Table Mountain Facility, a high-elevation site,"

P. 15, line 10: BDM cross-section uncertainties

Following the reviewer's suggestion, we added the following:

"..., leading to typical uncertainties of 2-4%, depending on the wavelength and temperature considered (e.g., Weber et al. (2016); Viillon et al., 2015)."

P. 16, line 9: text

Following the reviewer's suggestion, we added the following:

"Addition"

P. 16, line 9: fig. 9

As mentioned in the figure caption, the profiles and +/- 1 sigma uncertainty are plotted in the left column. For clarity, we made the uncertainty lines a little bit thicker (note that no estimates were provided for TOPAZ, hence the missing curves for this one instrument). The spike at the top of the TOPAZ profile comparisons is simply due to the fact that a very low (and changing) number of coincidences is used at the very top.

P. 19, Sect. 7: statement on retrievals

We are not sure what the reviewer means here. In this section, we have several sentences referring to the retrievals:

"After significant efforts validating the TOLNet data processing algorithms, the SCOOP campaign provided an unprecedented opportunity to validate the..." and "Together with the measurements, many aspects of the data processing algorithms, such as ozone absorption cross-sections, the definition of effective vertical resolution, and the uncertainty budget, were standardized and validated. This thorough validation of both the measurements and retrievals gives high confidence in the quality and reliability of the TOLNet ozone lidar profiles".

P. 20, Sect. 8: perspective for aerosol corrections

Indeed TOLNet has some plans in the future to provide improved ozone retrievals that include aerosol corrections. We added the following two sentences:

"Finally, additional coordinated efforts within TOLNet are planned to provide improved ozone retrievals including aerosol corrections. Several groups (e.g., TOPAZ) have previously implemented an optional correction, and future efforts within TOLNet will concentrate on the possible homogenization of aerosol corrections across the network."

Syntax change suggestions:

All corrected.