

The authors would like to thank the reviewer for the thoughtful and helpful comments and suggestions, which have made a significant contribution to the improvement of the paper. We have considered all the comments and questions posed by the reviewer. They are listed one by one in this letter and implemented in the manuscript as text in blue color.

Comments:

The Wang et al manuscript entitled “Quality assessment of aerosol lidars at 1064 nm in the framework of the MEMO campaign” presents the quality assessment of lidar performances at 1064 nm in order to gain the confidence for establishing lidar network in China. The experiment and results in this study could be a useful experience for regularly lidar quality assessment in a large lidar network, in particular the 1064 nm lidar have been widely used however there is very few reports regarding on their hardware assessment a lidar network. Therefore, to my opinion, it can be published in AMT after minor revision. I have some comments as following.

Answer: Thank you for the general evaluation and pointing out this unclarity in the description.

The specific comments are listed below:

I recommend the authors to provide the differences in the calibration procedures between 532 nm and 1064 nm channels.

Answer: Thank you for the suggestion.

In principle both calibration procedures should be same, however, due to the weaker molecular signal-to-noise ratio (SNR) at 1064 nm compared to 532 nm for these instruments, it is very challenging to find the pure molecular signal as a reference at 1064 nm, so the calibration of 1064 nm channels were made by using the calibrated 532 nm signal in the previous.

In this study, due to the better efficiency of SPAD detection, the high SNR can be obtained in 1064 nm channels, so the adopted calibration procedures for 1064 nm channels are the same with the calibration procedures for 532 nm channels by EARLINET in the previous.

This point has been provided in the manuscript.

If possible, the dark noise test, telecover test, detection range test and Rayleigh fitting test of the six lidars should also be summarized and compared in the paragraph.

Answer: We agree with the reviewer for the suggestion, however the telecover test experiments were done by each individual manufactures, we are not able to collect these complete dataset.

Moreover, the goal of this study is to evaluate the performance of different lidar systems using the reference lidar, which is based on the self-checks were assumed to be done. Therefore, we decide to

summarize the dark noise test, detection range test and Rayleigh fitting test of the reference lidar as an example. In addition, the dark noise test were compared between the analog mode and photon counting mode.

The manuscript was modified accordingly.

The Discussion section should be omitted and the dark measurements results should be analyzed in the self-test section.

Answer: We agree with the reviewer. The related content has been re-organized into the self-test section correspondingly in the manuscript. (The similar suggestion was made out by reviewer 1).

The technical corrections:

P3L70: “at 532 nm ” to “at 355 nm and 532 nm ”

Answer: this point has been corrected in the manuscript.

P3L74: “instruments, calibration for 1064 nm attenuated total backscatter (ATB) calibration are...”
remove one “calibration ”

Answer: This sentence has been re-written in the manuscript.

*“calibration for 1064 nm attenuated total backscatter (ATB) are based on the 532 nm
ATB calibration”*

P3L80: reference missing?

Answer: We thank the reviewer for pointing out this careless. The missing reference is added in the manuscript.

Wiegner, M. and Geiß, A.: Aerosol profiling with the Jenoptik ceilometer CHM15kx, Atmospheric Measurement Techniques, 5, 1953–1964, <https://doi.org/10.5194/amt-5-1953-2012>, 2012.

P4L111: “Cirrus is” to “Cirrus was”

Answer: It has been corrected in the manuscript.

P4L113: “infrared channels” to “infrared Mie-Rayleigh channels”

Answer: It has been corrected in the manuscript.

P4L115: please check the grammer with the sentence

Answer: The grammar has been corrected in the manuscript.

“The ID numbers were made up for each lidar system at 1064nm for easier identification and their hardware parameters were provided by their manufacturers, which are summarized in Table 1.”

P5L130: the results of “telecover test” is missing

Answer: We modified the manuscript to clarify this (see the answer for the general comment).

P5L131: please define the abbreviation of “CMA”

Answer: We thank the reviewer for pointing out this inconsistency. The manuscript was modified to explain the abbreviations: the CMA is an acronym for China meteorological administration.

P6L138: since the authors uploaded the automatic “Atmospheric Lidar Evaluation program (ALiE, <https://gitee.com/mualidar/cma-lidar-comparison>)” somewhere, I suggest also document this work into AMT’s supplement if possible, so that it could be more benefit for the lidar community.

Answer: We agree the reviewer’s suggestion. We could upload the code as supplement.

P6L147: what does “system efficiencies” indicate?

Answer: We mean lidar efficiencies/transmissions.

P7L153-154: re-write this sentence

Answer: We have re-written this sentence in order to make better sense.

P7L160: should symbol S be indicates not only “lidar signal” but also backscatter coefficient?

Answer: We thank the reviewer for pointing out this unclarify. Yes, it should be both lidar signal and aerosol backscatter coefficient. It has been corrected in the manuscript.

Equation 3: “ δ ” to “ δ_i ”

Answer: It has been corrected in the manuscript.

P7L173: it is unclear what does “signal issue” mean?

Answer: It means the lidar signal at the range of 6000-7000 has distortion.

It has been explain in the manuscript.

P8L178: “can be” to “can not be”

Answer: It has been checked and corrected in the manuscript.

P8L189: define “CST”

Answer: We thank the reviewer for pointing out this inconsistency. The manuscript was modified to explain the abbreviations: the CST is an acronym for Central Standard Time.

P10L194: unclear description

Answer: It has been re-written in the manuscript.

P11L203: “it is” to “they are”

Answer: It has been corrected in the manuscript.

P12L224: “got severe distortion” means?

Answer: It has been corrected in the manuscript.

P13L249: “2017” to “2021”?

Answer: The typo has been corrected in the manuscript.

Reference L347-348:

Please update the preprint to the published one:

Mamouri, R.-E. and Ansmann, A.: Potential of polarization/Raman lidar to separate fine dust, coarse dust, maritime, and anthropogenic aerosol profiles, *Atmos. Meas. Tech.*, 10, 3403–3427, <https://doi.org/10.5194/amt-10-3403-2017>, 2017.

Answer: The reference has been replaced in the manuscript.