Reply to the comments of the reviewer.

We would like to thank the reviewer for finding time to read our manuscript and for giving valuable comments to improve the manuscript. We have made modifications to the manuscript accordingly and reply to the specific comments below.

Kind Regards,

Mika Komppula, on behalf of all co-authors

Comments from Reviewer#1, *and our replies:*

The publication of the work presented by M. Komppula and its coworker is about systematic lidar measurements of aerosol performed during a year in India in the framework of the EUCAARI project. This work provides interesting new data and several parameters derived from lidar measurements have been calculated. However methods are not presented and then the methodology nor the accuracy can be evaluated. A lot of results are presented according to seasons with no significant differences (according to error bars) and no comments, interpretations and conclusions have been given so far. This work needs to be considerably improved for data interpretation to be published in ACP.

The methodology and references for backscatter and extinction calculations are presented, and more discussion of the results has been added. The standard deviations in the figures are explained more carefully to avoid confusion. Also the references for previous work has been updated.

In addition, the reference list was modified to meet ACP format.

Details of the main comments

1. The method to compute backscattering profiles and AOD are not explained and no references were given. Please explain how backscattering coefficient are calibrated. Same comments for AOD (P 31129 line 20-24).

Althausen et al. (2009) was mentioned in the data analysis chapter as the basis for data evaluation. Now that has been also added with other references to the lidar instrument chapter where the retrieved parameters are mentioned for the first time. Few additional sentences were added to clarify the methods, but point-to-point explanation would be found from the sited references.

This part was added: "The nighttime profiles are determined using the Raman lidar method (Ansmann et al., 1990) and for the daytime profiles Fernald-Klett method (Fernald, 1984; Klett, 1981) is used. Detailed description and steps of the determination of the parameters for PollyXT lidars is found in Althausen et al., 2009."

2. All the results present through figure 3 to 8 shows large error bars, suggesting that none of the results are significant. Authors should comments better the significance and comments about what should be noticed.

A general explanation of the figures was added in the chapter 3.1 before figure 3 to avoid confusion. The "error bars" mentioned by the reviewer are not the actual error bars of the shown mean profile of the

certain parameter. They are and represent the variation (standard deviation) within all single profiles calculated during the particular three month period. Considering this fact, it is obvious that by looking at the mean profiles one finds a notable seasonal variation.

This part was added: " Considering the following figures from this point on (Figures 3-8), the thick lines in the figures represent the seasonal average profile averaged from all single profiles available for that particular season. The numbers of profiles are indicated in the title of each subplot. The horizontal bars represent the standard deviation among this set of single profiles, which shows the variation within that season. Thus they should not be misinterpreted as error bars of the calculated mean."

3. A lot of different parameters were derived from the lidar measurements but no interpretation nor comparison with other locations were given.

Each parameter is discussed under its specific chapter and compared with related studies at the region. A separate chapter (3.6) was added where comparison to few other locations with multi-year datasets are made.

4. The publication terminates by what we are expected to see in the publication. I suggest to suppress this advertisement (p 31137 line 17-24) and provide some scientific conclusions to the work.

The last paragraph was deleted, being also outdated. Main points of comparison to previous work was added in the conculsions and few closing sentences were added.

Minor comments

P 31125 line 2 ; Abstract- 3+2 is not informative, please give more details or remove

- *Was changed to: "3 backscatter + 2 extinction + 1 depolarization"*

P 31125 line 26: This sentence is too polemic. It gives the impression that the Indian coauthors do not participate to the publication. "Countries" and "battle" are not appropriate. I suggest "Observations in this polluted area are crucial for climate changes. . ..."

- *Was changed to: "However, observations in this polluted area are crucial to reveal information of the local air quality and climate change…"*

P 31126 line 6: Please specify by whom and give references.

- *Ramanathan et al., 2001b reference was added.*

P 31129 line 8: replace "a rain" by "rain"

- corrected

P 31129 line 20-24: This part is not clear for a non-lidar person.

- *See the response to the first main comment. This section was opened bit more, but the detailed descrptions of commonly used methods are left for the references.*

P 31132 line 6: "a bit" instead of "bit". This sentence is not clear it needs to be rephrased.

- *The sentence was rephrased: ” The normal-day value is a bit higher of what we see in our results as the mean of the season but still it fits well within the standard deviation of all the single profiles of our measurements.”*

P 31132 line 13: replace twice "in the" by "during". Add "the" before "lowest".

- *corrected*

P 31137 line 21: put capitals at Optical Thickness

- *This chapter was deleted as suggested by the earlier comments.*

P 31144 figure 1: consider removing the small map that does not give any useful information. Also consider providing the Gual Pehari location with may be other EUCAARI sites.

- *With the more detailed map we would like to emphasize the vicinity of New Delhi, and being at the outskirts of such megacity. We now mention all the other EUCAARI lidar-sites in the site description section (first paragraph) and provide a newer EUCAARI-reference.*