

Interactive comment on “Microphysical particle properties derived from inversion algorithms developed in the framework of EARLINET” by D. Müller et al.

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General comments:

General comment The manuscript presents the algorithms used in EARLINET for the retrieval of profiles of atmospheric aerosol microphysical properties using Raman Lidar profiles. The discussion is on two alternative approaches. The paper has been designed in order to present both methods in a separate way but trying to show the similarities and differences starting from the common core of this retrieval schemes. After section 2 the manuscript presents the analyses of each method in a way that do not favor a real comparison between both approaches.

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We used the algorithms to test assumptions on retrieval accuracy of microphysical properties in general if the real part is known accurately (UH/TROPOS algorithm) and how well ALL microphysical parameters can be derived without such an assumption (UP algorithm).

Including formal aspects like the elaboration of figures the paper seems a juxtaposition of two papers. I encourage the authors to apply to the whole manuscript the procedures they have applied to section 2.

If we want to perform a direct comparison, we either need to reanalyze the results from the UH/TROPOS algorithm in order to compare them to the UP results (this work will take 6 months or more), or we need to reanalyze the results of the UP algorithm in view of how the sensitivity study was carried out with the UH/TROPOS algorithm. This work will also take 6 months or more.

The paper is worthy to be published in AMT after the authors answer to the criticism raised in the following lines and include the appropriate changes in the manuscript.

Particular comments As the manuscript includes two alternative retrieval procedures the introduction includes a separated description of the evolution of each algorithm. The methodology section includes the description of the two algorithms, in this way a general background including aspects that are common to both methods is presented before. This structure helps the reader to understand the similarities and differences between both methods. Here follows as a general comment on figures. The use of panels with various figures could be justified in terms of offering an overview on the tests performed, but there must be a compromise between the number of graphs in the panels and the size of these graphs to guarantee an appropriate illustration of the discussion. In this sense, I suggest to increase the size of figures included in the panels either reducing the number of graphs per panel or splitting the panels. This last comment applies specially to figures 4, 5, 6 and 7.

We refer to our replies to reviewer 1 who made similar comments regarding these

C5820

figures.

Another comment on figures is related to differences in format depending on the link to one or other retrieval algorithm. The different basis of the methods justifies the differences in format of the figures 2 and 3, but the quality of this last one must be improved.

We refer to our replies to reviewer 1.

Nevertheless, Figure 4 represents a study on PU method similar to that described in Figure 2 for TROPOS/UH method while the formats are really incoherent.

We tried to make the figures look more coherent.

In section 3 the graphical illustration used to present the discussion on simulation results must be similar for both methods. In fact the level of coordination shown in section 2 of the manuscript was not applied in this other relevant section of the paper.

It is nearly impossible for do a 1-by-1 comparison of the results from the two algorithms as the intention and goal of the simulations was different for the two algorithms. We inserted section 4.3 in which we try to compare the results from the two algorithms.

Detailed comments

In section 2.2.1 it is appropriate to give a short justification of the number of runs, eight, used to evaluate the impact of uncertainties in the optical profiles derived from Raman lidar over the retrieved microphysical properties.

With regard to the TROPOS/UH algorithm we give a justification at the end of section 314 – 326 of the revised manuscript.

We added text regarding the Potsdam algorithm, lines 248 – 253.

The authors must explain the meaning of the acronyms: QT, RPCRI, IPCRI: : :

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C5821

the size of these graphs to guarantee an appropriate illustration of the discussion. In this sense, I suggest to increase the size of figures included in the panels either reducing the number of graphs per panel or splitting the panels. This last comment applies specially to figures 4, 5, 6 and 7. ... The different basis of the methods justifies the differences in format of the figures 2 and 3, but the quality of this last one must be improved.

Therefore, we reduced the number of graphs in Figures 3 and 4 and improved the quality.

The authors must explain the meaning of the acronyms: QT, RPCRI, IPCRI

Qt-software:

Qt is a cross-platform application framework that is widely used for developing application software that can be run on various software and hardware platforms with little or no change in the underlying codebase, while still being a native application with the capabilities and speed thereof. Qt is currently being developed both by the Qt Company, a subsidiary of Digia, and the Qt Project under open-source governance, involving individual developers and firms working to advance Qt.

We added:

Using Qt- cross-platform application framework the Qt-based front-end allows the user to interactively explore the results and to plot further details (right box) for selected coordinates (grid points) (left box).

RPCRI, IPCRI:

Is explained on page 12830, line 11.

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 12823, 2015.

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