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Atmospheric Measurement Techniques Discussions

Interactive comment on "EARLINET Single Calculus Chain – technical – Part 1: Pre-processing of raw lidar data" *by* G. D'Amico et al.

Anonymous Referee #3

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The paper presented by D'Amico et al. is very important for the EARLINET community as it describes the pre-processing of the lidar signals from very different lidar systems.

I am happy that many of my comments from the first review stage were already included. Thus, most of my previous comments are obsolete and from my point of view the paper has significantly improved. However, I still have some questions/comments.

After addressing these minor comments, I can recommend the paper for publication.

General comments:

-Please check all variables, parameter, indices some of them are used double for dif-

ferent purposes (see examples in specific comments): -Structure: I still think that the Introduction and the ELPP section can be merged even if there is not so much repetition as in the previous manuscript version. Then you could also make an own section for 2.1. (–> Sec 2) and 2.2 (–> Sec 3) . In my opinion also Section Application and Validation and conclusion could be merged as well, as quite some topics are repeated directly after each other.

-Gluing: The paper states that error calculation is done at every stage and propagated and finally handed over to ELDA. However, I miss realistic error estimation for the gluing procedure. Is it possible for the glued near-range signal to give estimates of the error? Furthermore, the gluing is finally done at one point(bin), right? Is there any additional error introduced to noise of signals? If yes, can this be described? Finally, if gluing is done for Raman signals, does the gluing introduce a "step" which might result in an artificial extinction? If yes, how could one overcome this shortcoming, i.e. by not gluing finally at ONE bin.

-Give formulas also for error calculation while performing vertical and temporal smoothing -Figure 3: In my opinion a way to complicated, maybe the authors could think of how to make it more illustrative. -Rayleigh calculation: How do you exactly calculate the molecular contributions? I.e., give formula for molecular density.

-Does the FWHM of the interference filters needed to be taken into account for the very different lidars?

- Maybe a comparison with already published Rayleigh profiles can be useful, as this is an important input for the optical profiles.

-Table 2: Please also give values for the Raman wavelengths, i.e., 387 and 607 nm

-In general it would be interesting to have a table what parameter are needed to be provided by the lidar operator before ELPP can successfully be operated and what choices the lidar operator is allowed to do (i.e. choose method for smoothing). This

would give a consistent picture what is done automatically and for which parameter the lidar operator has still its own responsibility.

-What do you mean with “fully traceable”(e.g. Conclusions, line 21) ? How do you ensure that an end user can completely follow which methods /parameters/corrections were applied.

Specific comments:

10389, Line:17 ff. I would prefer to add 1-2 sentences more for motivation here in the introduction why it is so important to have a unified pre-processor module (i.e. because of the heterogeneity of lidars within the network). This is stated somewhere later, but should be given already here as the introduction should motivate the work.

10392, line 2: What do you mean with quality-certified procedures, can you give reference to literature or section in your paper.

10394, line 12: add data before acquisition

10395, line 2: How is it possible to put the measurement ID in the raw files as it is associated only after registering in the data base according to line 8-9 at the same page!

10396, line 9: Wouldn’t it be better to have all detected signals in one file?

10396, line 11: atmospheric transmission you refer to molecular extinction only, right? This should be stated clearly!

10398: line 11: Is it useful to offer linear, cubic, spline smoothing? What is the preferred option for what? Can the user choose? If yes, what’s about the homogeneity promised for the SCC if the user can choose so many options.

10399/10400: Do you have a reference for all four formulas? You cannot just write down the equations and criterion without any reference or explanation.

10400: line 3: Same as above: “It is easy to show” –> show it or give reference

10404: line 5: Is it valid to use the ideal gas law for calculation the molecular number density for air? If yes give reference and best give also formula.

10404, equation 9: How do you integrate this formula from a numerical point of view? There are many options in the literature...

10408, line 17 ff. I am confused you use “c” sometimes with lower case sometimes with upper case. Are these different variables?

10408, Eq. 10 and 11. Where does this formula(criterion) come from? Can you give reference? Otherwise explain why it should work.

10409,line 16. What is “n”. It is a positive integer, ok, but for which variable does it stand for?

10410,line 16. “C” was already used as a variable; even if you refer to a region you should try to use symbols etc. only once!

10413, Eq. 14,15: I think “k” was already used somewhere else, for example Eq. 5

10413, line 8 and 9: Time–> time and add bracket before “Fig. 2”

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 10387, 2015.