**Atmospheric
Measurement
Techniques**
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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 #1

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The manuscript of D'Amico et al. presents the pre-processing procedures developed to be used by all EARLINET lidar systems. The manuscript (and the related tool) is both an important contribution to lidar processing community and an important guide for the stations who wants to become part of EARLINET. The detailed technical description is welcomed and I consider being of a real interest for the scientific community. However, several corrections (see below) should be taken into consideration before the manuscript is published.

General comments: Even though the authors claim that their tool can be used both autonomously and as part of Single Calculus Chain, it is not obvious from the text. The

authors should be clear throughout the text how this tool can be used in an autonomous way and be useful to lidar scientist outside the EARLINET. Along the text the authors refer many times the need for the "SCC database" or to some parameters defined in the optical processing module of the SCC and it is not clear how this is possible for the autonomous way.

I consider Section 2.1. kind of confusing. Please try to reorganize the material in a more logical way and a better-structured manner. A suggestion could be to introduce first all the possible input and output files, then introduce all the checks done to the data, the most important input variables etc.

Section 2.2. – Please just describe the procedure with text because I found references to loop variables (p, c) confusing. Moreover, the authors start counting from 0, which is also confusing. The text in this section should definitely be improved to avoid misunderstandings.

Section 4-Please discuss in here limitations and future developments (if any) of this software.

Specific comments: p. 10388, l 2: The authors claim that this is a pre-processing tool for lidar data. But in the text you refer only to aerosol lidars. Is the tool useful also for other types of lidars (ozone, temperature, . . .)? Please clarify.

p. 10391, l 2: "Each lidar configuration includes this definition of a usecase". This is not clear. Aren't use-cases predefined? Are they flexible to define in each lidar configuration? . . .)? Please clarify.

p. 10392, l 24: "without any recording". It is not clear to me what this means.

p. 10393, l 20: "the SCC database". Why do you call it SCC database and not MySQL database? This is an example of confusing autonomous and SCC use.

p. 10395, l 6-9: Why do you need to register single measurements in the database to retrieve the parameters?

p. 10395, l 16-20: Is this option available in stand-alone use? …)? Please clarify. This is one of many examples of confusing autonomous and SCC use.

p. 10395, l 29-: Why should the user choose one option over the other? Are both options "quality assured" procedures. This could lead to inconsistent results.

p. 10397, l 21: "atmospheric and/or electronic background". Is it possible to subtract only electronic background? The authors probably meant "atmospheric and (optionally) electronic background".

p. 10398, l 24: Does the ELPP ensure that the averaging time window includes stable atmospheric scenes, or is this just a suggestion to the users? …)? Please clarify.

p. 10401, l 19: Please define the variable Delta. Also clarify the use of delta t. Is it trigger-delay (as defined in line 7) or rangebin width (as defined in line 24)?

p. 10402 l.1: The symbol q is an unusual symbol for altitude. Symbols z or h are widely used by the scientific community. Why introducing a new one? It is a little confusing.

p. 10404, eq. 7: The symbol delta_m is usually used for linear molecular depolarization ratio. Is this the quantity the authors refer to? If not, using this notation could create confusion. Also, the refractive index of standard air should be n_{s}, to be consistent with rho_{s}.

p. 10404 eq. 8: Smol variable is depending on wavelength. Please add (lambda).

p. 10406 l 1: This screening is performed by ELPP? Please specify the procedure.

p. 10406 l 4-6: Please explain why you propose/use these two different procedures.

p. 10407 l 19: According to the text (and Fig 3.) if r < r_th, no gluing is attempted. Isn't it possible that you can still find some useful region for gluing? For example, if the first guess produces a wide region, maybe the first half of the bins are not correlated, but the second half are correlated and can be used for gluing. …)? Please clarify.

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p. 10408 l 10-13: Your description is not clear for me. Why you get more than one slopes? Do you mean residuals? …)? Please clarify.

p. 10408 In your eq 10: This should be "c" not "C". Please write the complete equation ($k1 - k2 < ....$).

p. 10408 l 14-21:You specify in here that for N > 30 you check only that the difference of slopes ($k1 - k2$) is small, but why don't you check that k1 and k2 are near 0 (zero mean test)? Are these tests equivalent? …)? Please clarify.

p. 10409 l 16: Please specify the default/typical value of n.

p. 10411 l. 10: "generic lidar profile". Please specify if in here you refer to the raw signals.

p. 10413 l 4: Isn't there a simpler way to describe N? It looks like N is the integer division of integration time width and raw time resolution, or that N is the number of averaged profiles? …)? Please clarify.

p. 10422 Table 1: "with respect to linear laser polarization direction" .Probably a better way would be "plane of polarization of the emitted laser beam".

Technical corrections: p. 10389, l 21: … and [is] described...

p. 10394, l 28: … (a) dedicated NetCDF variable(s) …

p. 10410 l 5: … elastic cross (polarized) signals …

p. 10413 l 5: … integration time window(s) width …

p. 10423 Table 2: According to Bucholtz (1995), the molecular depolarization factor at 355 should be 3.010 not 3.001.

p. 10425 Fig 2: Some boxes are used for action ("Read input file") others for the start of a section ("Preprocessing of channel c"). Different notation should be used.

p. 10426 Fig 3: In the box near the text "Slope test" Delta should be Delta_k. ————
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