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Atmospheric Measurement Techniques Discussions
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# *Interactive comment on* "Comparison of aerosol properties retrieved using GARRLiC, LIRIC, and Raman algorithms applied to multi-wavelength LIDAR and sun/sky-photometer data" *by* V. Bovchaliuk et al.

**Anonymous Referee #2**

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Lines 135-136: "Such differences. . . significantly"

Has this been shown? If yes, please provide the reference. To my knowledge, previous studies showed that GARRLiC and LIRIC agree well. Since you also do not show "significant" differences in the cases you present here, please rephrase this statement.

Line 277: ". . .typical for urban-industrial particles"

Please provide reference.

Line 390: "Volume concentration profiles are presented in Fig. 16"



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Discussion paper

Plot the total LIRIC concentration (fine+coarse) to compare with the one-mode (total) GARRLiC concentration.

Lines 450-457: “The latter two features. . . tropospheric aerosols.”

The model used for the non-spherical particle calculations has not been proven to work for backscattering in any case. There are many publications that show that it does not work always accurately (e.g. Wiegner, M., J. Gasteiger, K. Kandler, B. Weinzierl, K. Rasp, M. Esselborn, V. Freudenthaler, B. Heese, C. Toledano, M. Tesche, and D. Althausen (2009), Numerical simulations of optical properties of Saharan dust aerosols with emphasis on lidar applications, Tellus B, 61, 180-194, doi: 10.1111/j.1600-0889.2008.00381.x.)

So, the fact that GARRLiC includes the lidar measurements in the retrieval does not make it more accurate, if the model it uses cannot reproduce the 180o measurements well, for all cases. The differences between the algorithms cannot be explained following the reasoning in the text. You should state the problems with the non-spherical particle modelling, providing relevant literature and conclude that based on this, the results are not conclusive and that more work needs to be done with respect to their validation.

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