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.

V. Bovchaliuk et al.

bovchaliukv@gmail.com

Received and published: 31 May 2016

(1) 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.

(2) Yes, it is try that previous studies shows agreement of results obtained using GARRLiC and LIRIC. But, both Dakar events shows significant differences in retrieved LR. From that and from algorithm's differences I have made a conclusion that retrieval re-

sults can significantly differs.

(3) I just delete the word "significantly". The sentence now is "Such differences in the algorithms can influence the results obtained by the two systems."

(1) Line 277: ". . .typical for urban-industrial particles" Please provide reference.

(2) Sorry, it is my misprint. Thank you very much for pointing me out!

(3) Changed to continental clean particles.

(1) Line 390: "Volume concentration profiles are presented in Fig. 16" Plot the total LIRIC concentration (fine+coarse) to compare with the one-mode (total) GARRLiC concentration.

(2) In Fig. 1 I plotted volume concentration profiles LIRIC (total, fine and coarse) and GARRLiC (total). I didn't plot errors to stay figure clear. Fine mode particles have small contribution in total volume concentration. Similar situation is for event on 29 March 2015.

(1) 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.)

(2) Agree, I have rephrase sentence according to your comment.

(3) "The latter two features can be caused by additional LIDAR information presented into the algorithm, which corrected the modelling of phase function at the 180o (Dubovik, O., Sinyuk, A., Lapyonok, T., Holben, B. N., Mishchenko, M., Yang, P., Eck, T. F., Volten, H., Munoz,O., Veihelmann, B., et al.: Application of spheroid

models to account for aerosol particle nonsphericity in remote sensing of desert dust, Journal of Geophysical Research: Atmospheres (1984–2012), 111, 2006) direction or the model cannot reproduce well the measurements at the 180o (Müller, D., Veselovskii, I., Kolgotin, A., Tesche, M., Ansmann, A., and Dubovik, O.: Vertical profiles of pure dust and mixed smoke–dust plumes inferred from inversion of multiwavelength Raman/polarization lidar data and comparison to AERONET retrievals and in situ observations, Appl. Opt., 52, 3178–3202, doi:10.1364/AO.52.003178, http://ao.osa.org/abstract.cfm?URI=ao-52-14-3178, 2013; Wiegner, M., Gasteiger, J., Kandler, K., Weinzierl, B., Rasp, K., Esselborn, M., Freudenthaler, V., Heese, B., Toledano, C., Tesche, M., et al.: Numerical simulations of optical properties of Saharan dust aerosols with emphasis on lidar applications, Tellus B, 61, 180–194, 2009.) direction."
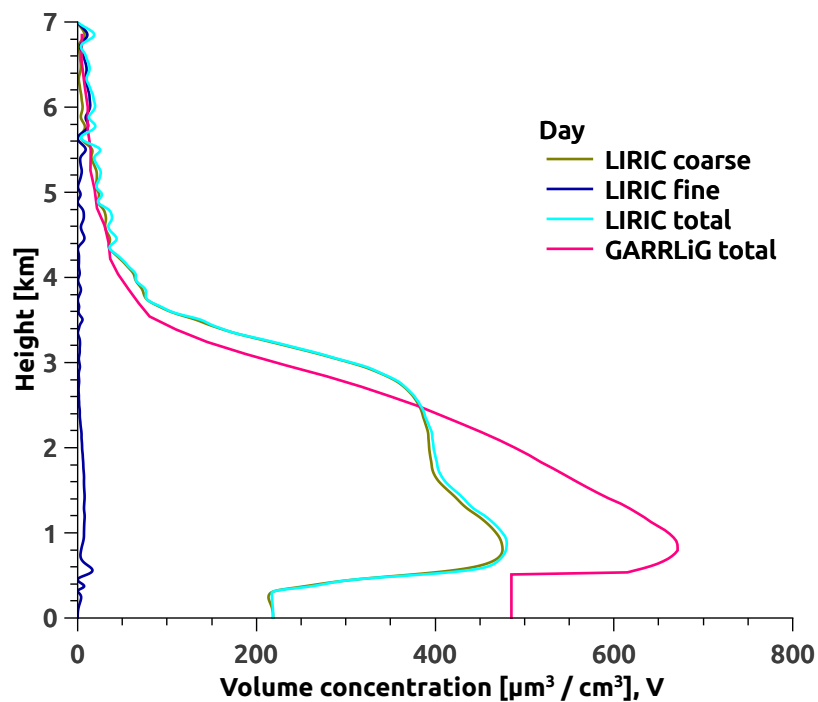
C3

Fig. 1. LIRIC_fine-coare-total_GARRliC-total_volume_concentration