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Comment

Interactive comment on “Aerosol extinction to backscatter ratio derived from passive satellite measurements” by F.-M. Bréon

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I would like to ask the author to consider quoting more accurate values for the ranges of lidar ratios reported in Burton et al. (2012). In that paper, we presented lidar ratios for various types only in the form of a figure and not a table, which may have made it difficult to read off accurate values. The 25-75 percentile ranges for the 532 nm lidar ratio for the aerosol types addressed on page 2358 are 17-27 sr for maritime, 45-51 sr for dust, 55-73 sr for smoke, 53-70 sr for urban. Please consider using these ranges instead of the very rough estimates that are quoted in this manuscript. The values measured by our group (as well as the 5-95 percentile ranges if you prefer) are available in tabular form for greater convenience in a follow-on paper currently under review in AMTD: <http://www.atmos-meas-tech-discuss.net/6/1815/2013/amtd-6-1815->

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2013.html. I would also like to thank Albert Ansmann and Anonymous Referee #1 for pointing out that Burton et al. (2012) discuss measurements made with airborne High Spectral Resolution Lidar and not Raman lidar.

In addition, the lidar ratios for CALIPSO for the polluted dust on page 2358, line 13 are outdated. The values for the current version of CALIPSO processing are 55 sr for 532 nm and 48 sr for 1064 nm. The values can be found in the CALIPSO documentation here: http://www-calipso.larc.nasa.gov/resources/calipso_users_guide/data_summaries/layer/#dq

This manuscript addresses a retrieval of a lidar ratio climatology from the POLDER satellite. A global climatology of lidar ratio is indeed of great potential interest to the lidar community. However, I think this paper would be more useful to lidar scientists if a few additional items are addressed more clearly. First, the extinction-to-backscatter ratio is described prominently in the abstract and elsewhere as the inverse of the scattering phase function at 180 degrees. This is incorrect. More accurately, the extinction-to-backscatter ratio or lidar ratio is the inverse of the product of the single scattering albedo and the phase function at 180 degrees, as indicated correctly on the last line of page 2356. Would the author discuss how the aerosol single scattering albedo is measured or retrieved, and whether the results for the lidar ratio are appropriate for cases for which the single scattering albedo is not 1? Also, please consider adding a discussion of the fact that the POLDER-retrieved lidar ratios are column equivalent values rather than range-resolved (altitude dependent) values such as would be measured by Raman or HSRL. How does the presence of more than one aerosol type in the column (e.g. dust and marine or pollution and marine) affect the retrieved value? Are all altitudes weighted equally or do the aerosols near the top of the atmosphere have a greater effect on the retrieved lidar ratio?

Thank you for considering these suggestions.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 2351, 2013.

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