

Interactive comment on “Comparison of the optical properties of pure and transported anthropogenic dusts measured by ground-based Lidar” by Zhijuan Zhang et al.

Anonymous Referee #1

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General Comments:

"Comparison of optical properties of pure dust and transported anthropogenic dusts measured by ground-based Lidar" describes two cases and statistical analysis of pure and anthropogenic dust based on the polarization sensitive lidar observations. The depolarization ratio by lidar is an important parameter for dust studies, but authors utilize "volume depolarization ratio" which represents non-sphericity of particles in qualitative manner because it depends on scattering ratio. At least "particle depolarization ratio" should be used to describe the characteristics of dust quantitatively. Also authors should clearly distinguish the mixing of dust and pollutant "internally" or "externally"

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throughout the study. From these points of view, this manuscript must be fundamentally revised before publication.

Specific Comments:

Spelling "Lidar" is not common. Just "lidar" is adequate.

L128, what is the time resolution of surface weather data?

L134, refer Figure 1.

L190, Winker et al.(2009, not 2006) compared the detectors in CALIOP, not the lidar in SOCAL.

L201, the depolarization ratio represents statistical properties of particles in the observed volume, not a single particle.

Eq(2), how did author retrieve beta₁₀₆₄? By Fernald method?

L228, does low DEP and high CR correspond to pollution? It seems coarse sphere, like sea salt.

L240, if dust is reported at stations and dust layer is detected above PBL by lidar, is it pure or transported?

L318, what is the target of statistical analysis? All data during October 2009 and June 2013? Or, some restriction by scattering ratio? What is the height range?

L367, what is the physical meaning of skewness and kurtosis for histograms?

Figure 1, describe the time period in which the number of dust events were counted.

Figure 3 and 5, unit for panel (a) is unnatural. Is it $10^{-2}/\text{km}/\text{sr}$?

Figure 3, PBL height at 0 UTC was above the cloud layer. How lidar can detect it without effective signal?

Figure 4 and 6, all trajectories touch the ground. Are these paths reliable?

Figure 9, (b) for pure and (a) for anthropogenic dust.

Technical Corrections:

L53, L58, L89 etc, unify the usage of "," and ";".

References, J. Quant. Spectrosc. Radiat. Transfer

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2017-1000>, 2017.

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