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Discussions

Interactive comment on "Technical note: Absorption aerosol optical depth components from AERONET observations of mixed dust plumes" *by* Sung-Kyun Shin et al.

Anonymous Referee #4

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"General comments" The analysis of the AAOD components of mixed dust plumes is an important topic for scientific community and the proposed method to apply a lidar technique to the AERONET v3 inverse products could be very interesting. However, the authors should clarify key issues to make robust and rigorous the approach presented in this note. Besides, major revision of the overall presentation should be properly addressed before the publication.

"Specific comments": 1) The level 2.0 assures the quality level of of direct and inverse AERONET products. What about the level (1.0, 1.5 or 2.0) of the AERONET data used in this study? 2) Have the authors used the AERONET's recommended loading con-

straint (AOD>0.4 at 440nm) for inverse products? 3) Shin et al., 2018 reported specific conditions for PLDR in case of pure mineral dust: "To select observations representative of pure mineral dust conditions, only AERONET data with a 440/870 nm Ångström exponent below 0.4 and a fine-mode fraction below 0.10 have been selected in this study." The authors should explain how they overcome both these conditions considering the values of PLDR reported in Shin et al., 2018 in different FMF and Ångström exponent domains. 4) The methodology for the retrieval of AAOD of dust and BC components is based on Equation (6). From the description of methodology, the authors assumed the same single aerosol layer of depth h for both aerosol mixing and dust. Furthermore, the integrated-values of the extinction coefficient for the mixed plume and the dust component were solved by assuming the extinction coefficient constant in the layer. The AOD AERONET product represents the integration of the vertically varying extinction coefficient in the entire atmospheric column. The authors should explain how the integration domain of the total columnar mixing aerosol (AOD) can be limited to a single layer in which the aerosol mixing and the dust component are limited. Furthermore, the assumption of vertically non-varying extinction coefficient should be in-depth explained.

"Technical corrections" p. 3 l. 4 Please, explicit the amount of AERONET bands (not 'several') p. 4 l. 11 Probably, a bracket is missing p. 8 l. 9 'Eqs (6) and (6)'. Please, control the reference to equations. p. 8 l. 31 'therefoe'