

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

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P2, Ln15: “Russell et al. (2010) utilized AERONET-retrieved SSA, AAOD, and absorption Ångström exponent (AAE) as indicator to separate the contributions of BC, organic matter (OM), and mineral dust to the absorbing aerosol fraction.” That is incorrect: This work suggested a preferred classification scheme, not a “separation”.

P2, L21: “. . . and to infer the fine or coarse mode fraction in the aerosol size distribution”  
What does it mean?

P3, L10: “The uncertainty in SSA is expected to be of the order of 0.03 (Holben et al.,

C1

1998).” The reference is incorrect.

Eq. (4) in my view is incorrect. The correct equation for the measured backscattering should be something like  $\text{Beta} = f_{\text{dust}} \cdot \text{Beta}_{\text{dust}} + f_{\text{nd}} \cdot \text{Beta}_{\text{nd}}$ , where  $f_{\text{dust}} = \text{AOD}_{\text{dust}} / \text{AOD}$ ,  $\text{AOD} = \text{AOD}_{\text{dust}} + \text{AOD}_{\text{nd}}$ . If phase functions of dust and non-dust are very different, and they usually are because of the particle size difference, then Eq. (4) is not correct.

I may be wrong as I did not work with the lidars before. But if I am correct, then this error (or assumption) propagates in all derivations below. I suggest a major revision with authors addressing this key point first.

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C2