

Interactive comment on “Absorption Angstrom Exponent in AERONET and related data as an indicator of aerosol composition” by P. B. Russell et al.

Anonymous Referee #2

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With the employment of aerosol Absorption Angstrom Exponent (AAE) and Extinction Angstrom Exponent (EAE), the authors tried to determine aerosol compositions from AERONET and space-bore measurements. The combination of AAE with EAE extends the application of widely used AERONET data and provides a straightforward way to classify aerosol types into urban industrial, biomass burning, and dust from the cluster analysis. The results are convincing and solid. I recommend publication after stated revisions.

1. More detailed information about the data shown in Figure 1 and Figure 2 are necessary. About 6 different campaigns were included in these two figures, but no brief

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introduction about any of these campaigns and the measurements. It's very hard for the audience to fully understand the results without any background knowledge about the experiments and how the data were obtained.

2. Figure 4 showed data collected from 11 AERONET sites. However, the authors didn't provide any discussion about the data. Are those data the annual mean results or just for specific season? For example, over Maldives, the switch of Indian monsoon will bring different aerosols to the site, more marine aerosols during summer and more continental aerosols in the winter. Thus, different AAE value and SSA spectral pattern at different period might be observed at one site. For the site with distinct aerosol sources, it's crucial to identify the air mass and aerosol sources.

3. The effect of sea-salt aerosols on the results is missing. For the sites over the remote ocean and near the coast, large amount of sea-salt will be detected and mixed with other aerosols. The existence of sea-salt particles might affect aerosol size, EAE value, and SSA spectral dependence. More discussion about the impact of sea-salt aerosols on the findings is needed.

4. Figure1 and 4 are not well presented. The markers are confusing.

5. One important publication showing SSA spectral dependence from AERONET data is missing: Eck, T. F., et al. (2005), Columnar aerosol optical properties at AERONET sites in central eastern Asia and aerosol transport to the tropical mid-Pacific, *J. Geophys. Res.*, 110, D06202, doi:10.1029/2004JD005274.

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