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Atmospheric Chemistry and Physics Discussions

Interactive comment on "The surface aerosol optical properties in urban areas of Nanjing, west Yangtze River Delta of China" *by* B. L. Zhuang et al.

Anonymous Referee #1

Received and published: 7 September 2016

This manuscript presents surface aerosol optical properties based on two years of measurements by an Aethalometer and a Nephelometer at an urban site in Nanjing. Authors analyzed their seasonal to diurnal variability and discussed their relationships with relative humidity, wind direction, and visibility. Overall this manuscript is clearly written. Its study provides an important observation-based characterization of aerosol properties over the study area. Meanwhile, manuscript could be further improved in a few aspects as I comment below.

Major comments:

1. The first impression from reading through the manuscript is that it presents so many numbers that readers could easily get lost. It is especially the case when it presents

the literature survey in the Line 70 – 91. I would suggest summarize those number in a way that readers can better grab readers's interest, for example, presenting them in a Table. This is also related to my major comment #2 as below.

2. It seems to me the content in the paragraph 345 – 367 closely relates to that in the Line 70 – 91. Why joint them together and put relevant numbers in Table 3?

3. Another major comments is about the RH effect on optical properties of hydrophilic particles. While water vapor is an important factor affecting the optical properties, this manuscript tends to overstate its role in the seasonal variability of aerosol optical properties. For example, higher SC, smaller AAE, and SAE in summer season are extensively attributed to the higher RH value. However, the seasonality of surface aerosol property is also influenced by the variability of PBL height, dry/wet deposition, and aerosol emissions. The roles of these factors are rarely discussed in the manuscript.

Specific comments:

52–56: The radiative forcing results should be updated to the latest IPCC report, i.e., the 5th AR.

200: Are the measurements from this single site able to represent the "urban area of Nanjing"? Please justify.

221: "moisture absorption growing" –> "water-uptake growth" or "hydroscopicity"

273–274: It is neither persuasive nor clear to the reviewer to say "SSA is also large in afternoon possibly because the dilution effect of well developed boundary layer on scattering aerosol is weaker than that on absorbing aerosols." Please justify or present more clearly.

Technical corrections:

17: than –> than aerosols

58: is mostly resulted from –> mostly results from

61: are corrected based on –> are based on

63: among –> among countries in

69–70: “Uncertainties in . . . the rest of the world.” –> “Uncertainties of the aerosol radiative forcing and corresponding climate effects in these regions might be much larger than those of the rest of the world.”

188: were directly –> , which were directly

201: the scattering aerosols’ optical properties –> aerosol scattering properties

207: might be mostly resulted from –> might result from

375: 0.87 –> 0.78

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