

Interactive comment on “Evolution of multispectral aerosol optical properties in a biogenically-influenced urban environment during the CARES campaign” by M. Gyawali et al.

Anonymous Referee #3

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Gyawali et al. investigated aerosol optical properties in a biogenically-influenced urban environment during the CARES campaign using the photoacoustic spectrometer as well as other instruments. An advantage of the photoacoustic spectrometer is that it can avoid the artifacts associated with the filter-based method (e.g., Aethalometer). Therefore, this kind of optical measurement, especially in combination with the chemical composition information, is useful for a better understanding of the optical properties of black carbon (or elemental carbon). My overall assessment is that the information presented in the study is a useful addition to the literature. Thus, this manuscript should not be rejected. However, it is not acceptable in its present form and re-review is necessary.

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1. A substantial concern is the measurement uncertainties, which have been pointed out by both reviewer 1 and reviewer 2. This question can not be avoided. The authors should add a detailed discussion on the absolute uncertainties on all of the measurements mentioned in the manuscript.

2. I also noticed that different wavelength pairs are used to calculate the AEA values for the two sites (Page 7120). As the authors mentioned in their response to reviewer 1, “the choice of wavelength pairs was driven by the best measurements over the longest time period during the campaign”. To my understanding, the so-called “best measurements” depend on the measurement uncertainty. However, this kind of description is too cursory for a scientific paper. In other words, the uncertain issues should be presented quantitatively.

3. In addition, I am very disappointed that only OA results from the AMS measurement are presented, although OOA and HOA results are mentioned occasionally. HOA and OOA should be presented separately in Figure 3 and Figure 5. Influences of the abundance of OOA on the AEA values should also be investigated.

4. At both sites, babs (Mm^{-1}) correlated well with BC concentration (Figure 7). However, I am not sure whether these results necessarily mean that the MAC values would exhibit little variations. Thus, I suggest that MAC values should also be calculated for each data point, rather than only relying on the slope of the linear regression of babs on BC concentration. Moreover, the influences of OA, OOA and sulphate (e.g., their concentrations as well as abundance) on the MAC values should also be added in the revised manuscript.

5. Some minor comments. Page 7122, Line 1~2, please reword the sentence. Page 7128, Line 9, I am confused about the use of T1 and T2. Please clarify or reword the sentence.

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