

The authors have done a great job in addressing the comments, which I raised in the first round review. From my perspective, the manuscript is ready to be accepted for publication except for very few edits, which either are of technical nature or aim at making some key statements made in the rebuttal directly available in the published article. I can only repeat my original statement: it is a great piece of work in terms of data set, scientific quality, presentation quality and transparency of assumptions and data processing chain behind the final data products.

Thank you again for the positive comments, and for the very thorough and substantial review that greatly improved the manuscript.

Minor and Technical Comments

Question and rebuttal concerning potential bias in F_{org} resulting from nitrate being undetected by the PALMS: the rebuttal is perfectly satisfactory. I still recommend to add one or two sentences to the main manuscript making the point that this potential bias is expected to be small based on chemical data from other instruments and nearby size ranges.

We have added the following sentences to clarify this:

"Nitrate mass fraction is not quantified by PALMS for the non-refractory particle classes, but this is likely produces only a minor bias in κ because nitrate concentrations were small (Nault et al., 2021). For example, for submicron sizes, the median AMS nitrate mass fraction was 2.4%, with 25th and 75th percentiles of 0.9% and 4.6%, respectively, when total AMS concentrations were positive."

Question and rebuttal concerning refractive index and assuming spherical core-shell morphology (\rightarrow Mie theory) for calculating MAC of BC: The key argument made in the rebuttal that good closure was achieved with this set of assumptions between calculated and measured absorption, at least when concentration levels were above LOD, should be added to the manuscript. It is important that resulting absorption is as accurate as feasible for this peculiar data set, whereas the study is not designed to assess the optimum assumptions regarding refractive and morphology in general.

We have added the following:

"It is important to note that this study is not designed to evaluate the characteristics of BC refractive index and morphology (e.g., core/shell), but that these parameters are assumed. These assumptions are discussed in more detail in Sect. 4.1.3."

Question and rebuttal concerning Equation 3: there appears to be a misunderstanding. I was not questioning whether or not Eq. 3 is appropriate to calculate κ for OA as a function of O/C. Instead I questioned whether this equation dealing with a second order effect is the very one deserving emphasis with being placed on a separate line with equation number, while the ZSR mixing rule, which addresses the first order effect, is "hidden" in text form (lines 403-404 for AMS constrained composition) or not marked as being a specific implementation of the ZSR mixing rule (Eq. 4 for PALMS constrained composition). Small edits to the text could guide the reader even better.

We have not added an equation for the ZSR formalism, as this is widely understood and we feel is simply described by the terms "volume-weighted" (or "mass-weighted" for the PALMS F_Org method). We have added clarifying statements at the indicated lines pointing out that this we are using the ZSR approach.

Line 228: ...to infer particle hygroscopicity...
Added this phrase.

Lines 243-245: Partially redundant to previous paragraph. Is it actually required in the paragraph on light absorption? I suggest to blend it into the previous paragraph, e.g. the sentence starting on line 229.
Done.