

Interactive comment on “What do correlations tell us about anthropogenic–biogenic interactions and SOA formation in the Sacramento Plume during CARES?” by L. Kleinman et al.

Anonymous Referee #2

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General:

This paper explores anthropogenic(A)-biogenic(B) interactions during the CARES field campaign and builds upon the findings of Setyan et al and Shilling et al. Using linear regression analysis, the authors explore the sources of OA observed during CARES, perturbations to OA, and synergies between A-B interactions. The paper is very well written and is recommended for publication after consideration of the following comments.

My main comment is similar to that posed by reviewer #1. The authors clearly state

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2 main objectives in the paper: to determine if OA is dominantly from A or B sources, which they did. The second objective is to determine if synergies exist between biogenic and anthropogenic sources that would enhance the production of OA; this wasn't explicitly determined. The paper would greatly benefit from a discussion both in the abstract as well in the discussion section of what their findings mean for A-B interactions. Do the authors mainly see evidence for enhanced OA due to synergies between A-B interactions or do correlations between episodes of elevated OA and tracers for anthropogenic emissions suggest a coincidental relationship or do the authors see evidence for both depending on the subset of data? Answering this question more explicitly would greatly improve the conclusions drawn from this work.

The authors should also provide more interpretation for the variable and sometimes high values of A-B interaction factors. Do these provide evidence of A-B synergies?

Another comment is that the last paragraph of the introduction on page 25386 is one of the main conclusions of the paper, “Although there is a high anthropogenic, high biogenic, subset that stands out as having high concentrations of delta OA, most of the spatial variability of OA within a transect and delta OA amongst transect can be explained by CO or delta CO, respectively. These observations suggest a primarily anthropogenic origin for OA produced in the Sacramento plume. In contrast, the variability of background OA is much better explained by background CH₃OH, which suggests a biogenic origin. As background OA is more abundant than OA formed in the Sacramento plume, the plume OA, though correlating best with CO, is expected to have a ¹⁴C signature of non-fossil, biogenic carbon.” The current writing in the abstract that makes mention of this finding is vague. I recommend adding a 1-2 sentence version of this paragraph in the abstract.

Typos:

Page 25384, Line 8: “later” should be “latter”

Page 25386, Line 28: “observation” should be plural

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Page 25397, Line 10 has an extra "a"

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 25381, 2015.

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