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Interactive comment on "Chemical Composition of PM$_{2.5}$ in October 2017 Northern California Wildfire Plumes" *by* Yutong Liang et al.

Anonymous Referee #2

Received and published: 23 January 2021

First, I apologize for the tardiness of my review! The paper is well written and information packed. The investigators effectively captured samples from several unique and interesting natural fire events with various levels of aging. This work is very valuable, an excellent addition to the existing literature, and an important development given the increasing importance of fire emissions in recent years. The paper builds upon existing laboratory studies and does a fine job of addressing the difficulties and realities of real-world sampling.

This paper is not within my area of expertise (and it's been 20 years since I took organic chemistry) so the following comments may be irrelevant, but that said, I had a difficult time following some of the discussions and conclusions. The paper presents a wide range of topics and analyses. Little background is provided to bring the reader up-to-

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Discussion paper

speed on the various analyses techniques or chemical mechanisms. I wonder if the paper should be split into two papers so more thorough discussions can be provided.

There is no mention of data quality or uncertainties in the paper. These are very low concentrations and especially when ratios are presented, I question the reliability of the values.

I have a few specific comments on the text.

Line 33: Confusing sentence, suggest eliminating "primary and secondary" to simplify

Line 135: Why does the temperature only go up to 320C?

Lines 238-245: A comment on the accuracy of the forest inventories might be appropriate. I laughed at the 0.3% because these estimates have so much uncertainty.

Line 270-271: This sentence seems out of place. I don't understand how it fits into the current paragraph. What is EI?

Lines 279-288: This seems like introductory material since it is primarily on previous studies.

Lines 288-289: This seems out of place, like a discussion or conclusion point.

Line 326-327: Suggest rewrite of this sentence, as written it sounds like this work showed that hydroquinone and two other compounds were shown to be good tracers, but that's not the case.

Line 336: Suggest replacing "reached peak" with "peaked" for clarity

Line 339-340: This is a strong statement for what looks like a weak pattern in the figure. Suggest softening to something like "our observations were consistent with the hypothesis that 7-oxo-DHAA to DHAA ratio is a useful indicator…"

Line 354: Suggest adding a sentence addressing the diel concentration differences expected for OH and NO3 to complete this argument.

Line 450: "OSc of compounds can be satisfactorily predicted" This statement was not made in the previous sections, and I'm not clear on how you know it is "satisfactory".

Line 734: Instead of "label", I suggest using "symbol" in the caption

Figure 2: It is hard to distinguish the colors in these figures.

Figure 3: It would be easier to digest if the legend was in the same order as the stacked bars.

Interactive comment on Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2020-910, 2020.