Review of Holmes, et al. 2026 ESSD-preprint

This revised manuscript describes calculations of the age of smoke from wild and prescribed fires across the USA that were measured using two aircraft. Two different methods are used to establish the age of smoke: one which used in-situ measurements of wind and another which used a trajectory model informed by several reanalysis products.

This dataset is unique and comprehensive, with measurements made at an impressive scale, and the data has evidently clear use. The manuscript is excellent, with the methodology and results very clear. Careful and substantial consideration has been given to the quantification of uncertainty, and this is elaborated well in the text. Although I was not an original reviewer, I believe the responses to previous reviewers adequately address their concerns. Other than a few minor changes to improve the clarity of figures, I have little to suggest that would improve the scientific content of the manuscript. However, the dataset is not particularly user-friendly at the moment, and further additions to the manuscript could provide useful information to remedy this.

I recommend that the article be accepted subject to minor revisions. I have outlined suggestions for these below.

Comments about the data usability:

1. *File structure:* When going to the ASDC folders for smoke age indicated by the URLs, there are often several files which are not directly relevant (although potentially useful). For instance, in the DC-8 data, there are files pertaining to water vapour measurements from an instrument. To aid the reader, it would be useful to add to Section 4 the prefixes used for the files containing the age of smoke data: fireaq-fire-Flags and FIREXAQ-FSU-SMOKEAGE so that it is easy to retrieve data. Similarly, please indicate the filename prefixes and contents of files in these folders containing auxiliary data which the authors believe are useful to contextualise the age of smoke data. Perhaps this would be best as a table.
2. *Metadata:* In the fireaq-fire-Flags data files, there is a comment which contains information about the metadata tabulated data file. This is liable to be missed by users (particularly as it is named wrong in the metadata files), which is a shame as it is a detailed and apparently very useful file. Please add to Section 4 a link to the file:

FIREXAQ-FIREFLAG-TABULARDATA_Analysis_20190724_R12_thru_20190905.xlsx found at https://www-air.larc.nasa.gov/cgi-bin/ArcView/firexaq?ANALYSIS=1

3. *File format:* The data is presented in ICARTT format. Though this is used by many NOAA-operated instruments, they are not trivial to open or navigate by naïve users due to their varied header sizes and changing number of columns. Perhaps the authors could suggest specific Python (or equivalent) packages that can be used to easily open these for quick looks, or software that does, especially since code which generated the figures is unfortunately not provided. If no such software exists, a brief description of the file format and any quirks (such as the use of -9999 for NaNs) would suffice.

General comments about the manuscript

4. I think it's clear that this is a large and useful dataset from context, but it may be nice to include a short paragraph explicitly about how this dataset differs from/advances upon previous datasets in scale, location or otherwise. However, I appreciate that the manuscript is already quite long for ESSD as is.

Specific comments about the manuscript

5. *Abstract:* While commendably clear, this abstract is rather long at over 400 words. Perhaps the authors could consider cutting it down a little? I believe ESSD has no word limit on abstract, so there's no need to if the authors think this can't be done while maintaining clarity, but its length may unnecessarily discourage future readers.
6. *Figure 1:* I think the two different subplots are used to make it easier to view fires in different regions of the US rather than for a particular scientific reason (if so, it was unclear in the text). However, it would be good to make this clear in the caption and label the subplots. Additionally, for readers unfamiliar with US geography, it may be useful to show these sub-figures relative to the contiguous US.
7. *Figures 4, 5 and 6:* I think the diagonal line is a 1:1 line rather than a line of best fit, but it would be good to make this clear and keep the format consistent between figures.

8. *Figure 7b:* I found this figure difficult to interpret. Maybe it's just me, but I think this shows the spread in the rise time uncertainty relative to the rise time, but from the text I think the intent is to show the magnitude of the uncertainty relative to the rise time. The uncertainty PDFs look like they're squashed versions of the time, so presumably this distribution is pretty centred on 50% uncertainty for most time values? But it's hard to see whether there's a systematic trend of uncertainty magnitude with time which I think is what's implied. If the authors particularly want to include this, then rather than the dashed lines, perhaps new axes might be useful, plotting time on x-axis against percentage uncertainty magnitude on the y-axis?

Technical corrections:

9. *Line 145 (and elsewhere):* Table 2 is referred to before Table 1. This might be picked up in typesetting, but the tables should be re-ordered and relabelled accordingly.
10. *Sec 2.4 (and throughout):* Subscripts which are words or abbreviations of them should be in Roman (upright) font, rather than italics. Variables/indices in subscripts such as *m* should remain italic.