

We would like to thank the editor for handling our manuscript and the reviewer for providing constructive and supportive comments based on their reading of the paper. Please find our responses (regular text) to the reviewer's comments (**bold text**).

(RC1) Line 95: Suggest changing "...the smoke production process:" to "...the smoke production process, defined as:"

(AC) We have made this change to the revised manuscript.

(RC1) Lines 105-108: A clarification of what "effective temperature" (T_f) actually means is warranted here since emissivity does not appear in Eqs. (2) and (3). This implies that T_f is a radiant temperatures rather than actual fire temperature as measured with a thermometer, but the intended meaning is not clear from the text.

(AC) The reviewer makes a pertinent point. As they suggest, the earliest papers that include a "retrieved fire temperature" parameter refer to it as "radiant temperature," as it assumed an emissivity of one. An example can be found in Dozier (1981): [https://doi.org/10.1016/0034-4257\(81\)90021-3](https://doi.org/10.1016/0034-4257(81)90021-3). However, later papers began using either the term "effective temperature" or simply "temperature." We chose to use the former, as the latter term implies an actual surface temperature. The first example of the term "fire effective temperature" appears in Dennison & Matheson (2011): <https://doi.org/10.1016/j.rse.2010.11.015>, with a more recent instance in the review by Wooster et al. (2021): <https://doi.org/10.1016/j.rse.2021.112694>. We have made the clarification clear in the revised manuscript stating that these "fire effective temperatures" are, in fact, the estimates of the radiant temperature of the fire, rather than the kinetic temperature that might be measured with a thermometer. They assume that the fire is a grey body (e.g. <https://doi.org/10.1071/WF12197>) but make no assumptions with regards to the actual emissivity value.

(RC1) Eq. 2 and 3: Please make mathematical notation here and in text consistent, e.g. within Eq. 2 and 3 the variable p is sometimes italicized and sometimes not.

(AC) We have made this change to the revised manuscript.

(RC1) Eq. 2 and 3: As the effective temperature temperature is define,

(AC) Comment appears to be incomplete. However, we saw that while T_r refers to retrieved effective temperature, this was not clear from the text and have clarified this in the revised manuscript, which this comment may be referring to.

(RC1) Eqs. 4 and 17: Here also please use italics consistently for variables and constants - see comment above in reference to Eqs. 2 and 3.

(AC) We have made this change to the revised manuscript.

(RC1) Line 147: Suggest using Oxford comma for clarity: "oak kindling, pine forest litter, and soybean crop residue."

(AC) We have made this change to the revised manuscript.

(RC1) Line 163: Symbols/characters between "each image that had" and "600 K" seem to be garbled.

(AC) Apologies, this was meant to read "T > 600 K." We have made this change to the revised manuscript.

(RC1) Line 171: Suggest writing "(L_FD+L_SD+L_C)" as "(L_FD, L_SD, and L_C)" for clarity.

(AC) We have made this change to the revised manuscript.

(RC1) Line 369: Not clear what the uncertainty (0.28) attached to the mean m_k represents or how it was calculated.

(AC) This is the propagated uncertainty of the values used to calculate the mean (i.e., from the three values and their standard uncertainties on Line 365) - we have made this clearer in the revised manuscript.

(RC1) Eqs. (15): I think the condition here should be \geq to be consistent with the K-line detection described in section 4.1.

(AC) We have made this change to the revised manuscript.

(RC1) Line 385: Here and later in text change "timeseries" to "time series".

(AC) We have made this change to the revised manuscript.

(RC1) Fig. 7: Please state approximate spatial dimensions of panel (b).

(AC) The spatial resolution of Fig. 7b is 4 m and the size of the scene is 1020 x 2160 m. We have added this to the caption in the revised manuscript.

(RC1) Fig. 8: Based on the panels above I would expect the MCE to show a bit more spatial variability. Would a nonlinear color scale possibly reveal more features?

(AC) Thank you for the suggestion, and we agree that one might well expect more spatial variability in MCE. We did try several color scales to highlight this, but with no real success in revealing more

features than those that can be seen already (some flaming activity at the fire front with some small flaming spots behind in the smoldering zone).

The fire in Fig. 8 was mostly smoldering when the aircraft imaged it, as the K-line was only detected in 1.4% of the detected active fire pixels. This dominance of smoldering activity area explains the lack of MCE variability. We have mentioned this explicitly in the caption and in future we look forward to analysing new data of more flaming dominated wildfires.

(RC1) Supplement Figs. S1-S11: Change "Times series" to "Time series" in captions.

(AC) We have made this change to the revised manuscript.