

Interactive comment on “Field measurements of trace gases emitted by prescribed fires in southeastern US pine forests using an open-path FTIR system” by S. K. Akagi et al.

Anonymous Referee #1

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The authors analyze three prescribed fires using an open-path FTIR placed strategically downwind prior to the fires being lit, and compare their observations during the burn to those of two close-cell FTIRs deployed to the same prescribed fires, one on the ground and one airborne. The authors clearly detail their findings, both qualitatively and quantitatively, and use their results to comment on the implications for both short-term and 8-hour exposure to firefighters working on firelines. This paper connects to previous papers from this group, and even to papers already published from these prescribed fires, but the findings presented here still merit publication as they include the first open-path measurements of prescribed fires in this manner.

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Quantifying emissions from evolving fires is clearly a complex problem, and the authors have described this complexity in a way that sometimes feels almost as meandering as the smoke itself. At times, the writing style feels somewhat incoherent and drifting. The worst example of this is the first paragraph of Section 3.2, which contains an overwhelming amount of information on EFs for a single paragraph, and seriously lacks direction. Please clean up this paragraph by separating it into specific topics, and then clearly and individually express these in individual, connected paragraphs.

Page 18503, lines 25-27: “Methane and methanol EF appear to follow a decreasing “step-wise” trend from smoldering dominant to flaming-dominant platforms, correlating with low to high MCE.” First, the order of the bars in Fig. 6 is confusing to me. In normal left-to-right reading, I would have probably placed the early fire information to the left, and progressed to the right (i.e. LAFTIR, OP-FTIR “early”, OP-FTIR “late”, AFTIR). Second, I disagree that the methane EF appears to follow a decreasing “step-wise” trend from smoldering (late) to flaming (early). Beyond the fact that it seems awkward to follow “late” to “early” as a progression – better to suggest that it follows an increasing “step-wise” trend from early to late – this isn’t true for Block 22b for methane, which actually has a lower “late” EF for methane than “early”. And contrary to the next statement “Trends are not so straightforward for EF(C₂H₄)...” there *is* a consistent decrease in the EF for C₂H₂ between “early” and “late” for C₂H₂, even though the authors suggest there is not. Please clarify this.

Technical comments:

Page 18503, line 5 – there should be a comma after “samples”, not a semicolon.

Fig. 1 caption: Be consistent with the “DD Mon” or “Mon DD” date type. (2 Nov or Nov 2... not both.)

Fig. 2: I can’t tell the difference between the lines for Primary and Secondary in the legend. They look identical. And I assume they refer to roads, but that is also not made clear here, nor is this in the text.

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Fig. 6: “The OP-FTIR EF have been broken down into “late” (blue) and “early” (orange) as shown in Fig. 5.” Technically, the colors blue and orange are not “as shown in Fig. 5”. Those are the primary differences between Fig. 6 and Fig. 5. Reword this.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 18489, 2013.

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