

Interactive comment on “Field measurements of trace gases and aerosols emitted by peat fires in Central Kalimantan, Indonesia during the 2015 El Niño” by Chelsea E. Stockwell et al.

Anonymous Referee #2

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Review of “Field measurements of trace gases and aerosols emitted by peat fires in Central Kalimantan, Indonesia during the 2015 El Niño”, by C. E. Stockwell et al., 2016.

The manuscript by Stockwell et al. presents measurements from 2015 peatland fires in the Indonesian province Kalimantan. The findings presented in this manuscript both add to and modify previous lab-based measurements of peat combustion, amending a handful of key EFs that were previously only available from laboratory studies, while confirming the validity of laboratory studies for estimating EFs for species that are not easily measured in the field. The paper is well-written, cohesive and thorough, and my assessment is that it merits publication in ACP after the following issues are addressed.

Specific Comments

Page 2, line 19 – “(2012)” - is that a reference? It should be included properly here.

Page 4, line 32 and Page 19, line 10 – I don’t think it’s necessary to put “in preparation” here – it is included in the reference itself. However, please include a full reference for this work if possible, including a full author list and title.

Page 5, lines 11-12 – please explain what $n=1$ is in reference to, or simply state, if this is the case, that there was only a single sample of each type analyzed in the lab study.

Page 5, line 33 – it would be helpful to the reader to direct them to Table S1 at this point, rather than making them wait to find out about the table until the next page.

Page 6, lines 4-25 – a map/diagram of the sites would help put this entire sampling description into context.

Page 12, lines 20-25 – where are the ERs if I want to look at them? A lot of this discussion is very qualitative and vague (i.e. “seven of these nine cases agree...” – what about the other two? And what were they? It would seem reasonable to spell that out or offer something specific about the differences between the FTIR and the WAS sample that would alleviate the reader’s concern that there is something we should know about the alleged differences. I understand that the analysis were not set up to evaluate differences, and yet to just allude to it but not give us anything further is more suspicious.

Page 12, lines 33-35 – many of the uncertainties are unreasonably precise – i.e., 0.867 ± 0.479 and 0.860 ± 0.433 . Please round these to make them more reasonable for reporting. Page 13, lines 2-3 the “overlap” isn’t very surprising, considering that the range in your work is from 0.3 to 1.44. Overlap isn’t hard, and likely shouldn’t be emphasized like this. “Are consistent”, perhaps.

Page 13, lines 10-15 – I’m not fond of the idea of alluding to something that should be done, and then just saying “we haven’t attempted this yet.” Why bring it up? Or why not attempt to include the analysis here?

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Page 14, lines 5-16 – I have issues with this plot, and with the implication that the overlap in time is so fortuitously going to take something with 7 points, eliminate 3, and leave you with a four point plot that has an r^2 of 0.674, and that you're going to give it any actual credence. I don't think you "confirmed" the MAC near 0.1 at all. You just eliminated points until the remainder of your points came slightly close to giving you a line. This either needs far more justification, or it shouldn't be included.

Page 14, line 36 – please comment on the differences between the Liu et al. paper using SSA 781 and you using SSA 870 nm, and what kind of linearity you expect for the two different locations, and how that affects your comparison. Also, this comparison of the observed aerosol parameters with literature values would benefit from having a table like S3 included.

Page 15, line 36 – “and other factors” is very vague. Please expound.

Page 16, line 13 – you “interpolated” between two points to find something. How did you do this? Was it linear? Why? How do you know?

Page 15-16, Section 3.3. This section feels very hand-wavy. I would like to see a more quantitative and step-wise analysis presented for the comparisons mentioned to previous studies and other kinds of peat BB observations in this paragraph. Some of the comparisons mentioned are presented with little defense as to their relevance and/or the validity of the comparison (i.e., the interpolation mentioned above.)

Page 17, line 33 – “the lab value is actually the sum of isomers compared to a single isomer from the GC analysis. . .” please explain this more, including references to the table, in which I see no evidence of a difference between a sum of isomers and a single isomer. Is this for a particular compound or set of compounds? Be specific.

Page 18, line 14 – you should reassure the reader that the ~37% of unidentified or tentatively assigned mass peaks of the NMOG mass is not going to negatively affect your assumption that you are measuring all the carbon to be factored into your EF

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calculations. I'm sure it's not significant, considering the major non-NMOG carbon species, but this should be recognized.

In Table 1, Table 2, Figure 1, etc., there are numbers that are both too precise considering the standard deviations reported, and I dislike the excel-style presentation of numbers with exponents written as (e.g.) 1.67E-3.

Re: Table S1 – there are a handful of things that would make this table easier to digest, without having to search out other information. Instead of “Y/N type” or “Y/N what” as a header, eliminate Y/N and just include the type/what or put “none” or “unknown” where applicable. Also, please spell out here what the peat fuel types are, so that I don't have to go back and find that in the paper (in the footnote would be fine.) “day-mon” should be “DD-Mon”. Why are there some plumes included that aren't lettered? These don't seem to add anything to the paper. “sec” is not a word or a shortform (as a direction). For Depth of Burn, “~ site avg” is redundant. “site avg” is fine. Why is so little known about site 6? Re: Winds – “av, max, dir” implies you'll have numeric values below. Maybe leave the “av, max, dir” part out, and just consider it a verbal description of the winds. Be consistent with spacing and vertical cell centering. Also, for all three supporting information tables (S1-S3), please be consistent about font size and styles and remove bold settings. Table titles should all be uniformly sized. For all supplement tables, if these are being submitted as they are now in an excel file, a sans serif font is likely best for readability. If you're preparing a printed document, a simple serif font is also acceptable (i.e., Times New Roman.)

Technical Comments Page 5, lines 4-5 – don't use semicolons in place of commas. Page 5, line 26 – remove the hyphen from “at six-different peatland. . .” Page 6, line 10 – no need for “(#2)” after “This site. . .” Page 11, line 12 – there is a missing or extra parenthesis here. Page 18, line 28 – “ $0.35 \pm .1 \times 10. . .$ ” – the .1 should be 0.10. Page 19, line 1 – “Six of the nine. . .” Page 19, line 11 – the Putra et al. paper in preparation needs to be included in the reference list. Tables 1, S2 and S3: “ethyne”, “ethene”, “propene” (and in the text and Figure 1, where applicable).

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