Atmos. Chem. Phys. Discuss.,
doi:10.5194/acp-2016-411-RC2, 2016

Atmospheric Chemistry and Physics Discussions

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 #1

Received and published: 18 July 2016

The manuscript "Field measurements of trace gases and aerosols emitted by peat fires in Central Kalimantan, Indonesia during the 2015 El Niño" presents the first field emission measurements of comprehensive atmospheric compositions from peat fires burning in Southeast Asia. This kind of field measurements is extremely rare and thus very valuable to the scientific community of Atmospheric Chemistry and Physics. The measurement methods used in the study are well established and the field experiment design is reasonable and justified. I expected this manuscript would only reported emissions from a rarely studied environment (which itself would add values to literature), but the discussion on the representativeness of the field measurements, comparison to previously available emission factors for the same type of emissions

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is very useful too. The authors also compare the field measured emission factors to those obtained from lab experiments, and discuss the value and importance of lab data. Peat fire burning in Southeast Asia is such an interesting and important topic from atmospheric chemistry and climate perspectives but many questions still remain as first order research problems due to the limited field data. I believe the manuscript could be much improved in terms of how to scale the field data to a large spatial area in this region, but I understand that the study is also limited by prior data and resource that could be deployed. The manuscript is well written in general, while the readability could be improved by properly introducing acronyms. In summary, I think this manuscript could be published and I list a few minor suggestions as below:

1. The manuscript points the importance and uniqueness of 2015 El Niño event. The authors need to comment on how this field measurements during a El Niño event apply to other 'normal' years, or do the authors suggest that these field measured emission factors can only apply to El Niño events? Can the difference between lab and field comparison be partly explained by the special El Niño event?

2. Related to point 1: This manuscript finds that many significant revisions of emission factors compared previously widely used EFs, mostly reductions (CO2, CH4, NH3). But as the authors point in the introduction, previous studies suggest "in Southeast Asia, in the 1980s-1990s, peatland fires were a major source of carbon to the atmosphere mainly during El Niño induced droughts . . .. " How can the authors reconcile this? The manuscript uses "the 2015 El Niño" in the title, and the authors would be expected to comment more on this event. However, such comments are very rare in this version of the manuscript.

3. P5 L14: the definition of fuel moisture is not clear. What is 'wet', what is 'dry'? Here and many places in the manuscript, the authors assume all readers know most of acronyms related to fire studies. Properly introducing them could help the manuscript reach a broad audience of atmospheric scientists.

4. P7 L29: ‘cyclones’ should be ‘cyclone samplers’? The authors need to avoid using ‘field language’ as much as possible and try to use its formal name.

5. P8 L15: poorly written.

6. P8 L21-22: here and other places, the instrument modes and manufactures should be listed as full names with company names and locations.

7. P 9, session 2.2.5: it is unclear if any control (or blank) samples were deployed for these offline measurements? For example, pre-cleaned filters shipped with other filters but without any sampling.

8. P13 L13-15: it would be very valuable if those peat characteristics were mapped and it could help to scale these point measurements to large areas and perhaps devise a parameterization to study other peat fire emission. It is very unfortunate that this study did not attempt such an analysis. What would be the authors’ recommendations to future field studies? It would be useful for other researchers who are interested in this area.

9. P15 L 36: what is ‘rapid green-up’. Again, the manuscript could be improved and reach a broader audience if these words were properly defined.

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