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Interactive comment on “Investigating the two-component model of solid fuel organic aerosol in London: processes, PM₁ contributions, and seasonality” by D. E. Young et al.

Anonymous Referee #1

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This is a very well-written paper describing the identification of organic aerosol formed from solid fuel combustion (SFOA) as measured by Aerosol Mass Spectrometers (AMS). In a complementary paper, the authors have performed the positive matrix factorization analysis (PMF) to identify different OA factors; in this paper, they probe the SFOA factor to understand its behavior. This work is of great utility to the community since the formation and processing of solid fuel combustion is highly variable and arguably poorly understood. I recommend that this work be published in ACP once they have addressed the following minor revisions.

-General comment: The fact that two SFOA factors are identifiable, arguably due to dif-

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ferent combustion efficiencies is very important, in this reviewer's opinion since emissions from solid fuel combustion sources are too frequently lumped together in a single category. I would argue that this should be stressed in the paper where appropriate, since they represent two different sources (i.e., solid fuel with different combustion efficiencies).

-Abstract, page 20847, lines 13-16: From the remainder of the paper, it is evident that SFOA1 is largely attributed to southern sources and SFOA2 is largely attributed to easterly or westerly air masses, but I find it somewhat confusing with the directional clarifier in the abstract. I would recommend removing the text "in the south" and "in the east and west" such that this sentences reads "The split between the two factors is likely governed. . .where SFOA1 best represents more efficient combustion and SFOA2 represents less efficient combustion". This should also be addressed in the Conclusion section.

-As a follow-up comment, the authors, at the top of page 20858, state that the meteorological data "do not provide representative insight in to spatial differences in the SFOA concentrations". Further, the SFOA2 factor also appears to extend to the south. It is not clear why a discussion of the directional measurements is included when the authors appear to discredit their robustness.

-Section 4.3, pages 20860-20861: It is unclear to this reviewer why "Role of fuel type" and "Role of burn conditions" are subsections under "Role of atmospheric processing". To me, it would make sense to re-organize these sections (in their current order) as Sections 4.2.1, 4.2.2, and 4.2.3 since they all relate back to Section 4.2, Investigating the behavior of SFOA.

-Page 20864, lines 1-5: I find these two sentences to be confusing, since in the first sentence, the authors -state that they could not identify SFOA from the data, yet SFOA are still significant with respect to total OA. If the SFOA do not exist in the data set, how certain can you be that the factor is significant? Perhaps I am simply misinterpreting

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the authors' meaning, in which case I would request that these sentences be re-written for clarification.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 20845, 2014.

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