

We would like to thank the reviewer for their valuable suggestions and time. Our responses are given below.

Anonymous Referee #4 Received and published: 19 April 2016

Referee Comment: Pg 3 Ln 25-26. The authors explain about observation of fire transitions from flaming to smoldering. It would be good to add information or clarify how was this done. Also how fractions of flaming to smoldering (Pg 5 Ln 28-30) were maintained during different experiments.

Author Response: We have not attempted to control transitions from flaming to smoldering. Once a fire was ignited, it was left to burn. Fire integrated absorption and extinction were utilized to avoid over-emphasizing properties of the smoldering or flaming portion of the burn.

Referee Comment: Pg 7 Ln 29. This statement about EC/OC depends more on burn conditions than fuel type can mislead. As it is shown in this study (Fig. 2), for certain fuels, such as peat, the different combustion types do not change EC/OC significantly. Therefore, fuel types do influence the EC/OC ratio.

Author Response: We have altered the sentence to read, “Furthermore, this data demonstrates that EC/OC depends significantly on burn conditions in addition to fuel type.”

Referee Comment: Pg 8 Ln 24-26. The authors suggest that EC/(EC+OC) ratio is able to predict AAE. I think the r of the least square fit is not that strong for this case ($r=-0.79$) different from fitting for SSA. The statement may need to be revised.

Author Response: We agree with the referee that r value for AAE fit is not that strong. We have modified to the sentence to read, “In fact, the robustness of the fits suggests that the EC/(EC+OC) ratio is able to predict the SSA and, to some extent, AAE even though information on particle size distribution, lensing, brown carbon, and fuel types are not present, a rather surprising, but useful result.”

Referee Comment: Pg 8 Ln 29-30. I think the RMSE values from fit of this study and fit by Liu et al. (Table 3) are not similar. They are about 20-30% different. The statement may need to be revised.

Author Response: The sentence has been modified to read, “For the MCE approach, the RMSE is similar whether coefficients from a least squares fit to our data are used or whether the coefficients proposed by Liu et al. (2014) are used, though the error is slightly lower when the coefficients from the fit to our data are used.”

Technical comments

Referee Comment: Pg 4 Ln 6. What does it mean “a canister filled with Perma-Pure”? Perma-Pure is a manufacturer name.

Author Response: We change the sentence to read, “Dilution flow was generated from ambient air by passing it through an active-charcoal and permanganate (Purafil) scrubber to remove gas

phase absorbers (O₃ and NO_x) followed by a HEPA filter to remove particulates”.

Referee Comment: Pg 6 Ln 14. What is temperature of filter storage?

Author Response: We have rewritten the sentence to include the temperature of filter storage. It now read, “Filters were stored in clean aluminum foil-lined petri dishes sealed with Teflon tape, and stored frozen (-20⁰ C) before and after the analysis”.

Referee Comment: Pg 7 Ln 18-19. I am confused with this statement. Liu et al. provided parameterization only for 405 and 532 nm, and on Fig. 1, there is no black fitted line for panel C (660 nm). So what does 660 nm refer to?

Author Response: We have deleted the sentence “At 532 and 660 nm, there are also notable errors at low MCE.”

Referee Comment: Pg 9 Ln 22-23. This sentence is not finished?

Author Response: We have removed the extra word.

Referee Comment: Pg 10 Ln 10. Provide correlation plot and value of SSA at 660 nm and at 637 nm in SI.

Author Response: We were not able to obtain exact values of SSA at 637 even though we contacted Vakkari et al. The analysis is based on close inspection of their published figures with a program that converts figures to numerical values. We would not feel comfortable publishing exact values without the approval of Vakkari et al.

Referee Comment: Pg 10 Ln 22-25. In which table we can find the SSA and AAE for Indonesian peat and the other fuels?

Author Response: SSA and AAE values for all burns are available in SI (Table S2).

References:

Liu, S., Aiken, A. C., Arata, C., Dubey, M. K., Stockwell, C. E., Yokelson, R. J., Stone, E. a, Jayarathne, T., Robinson, A. L., Demott, P. J. and Kreidenweis, S. M.: Aerosol single scattering albedo dependence on biomass combustion efficiency: Laboratory and field studies, *Geophys. Res. Lett.*, 41, 742–748, doi:10.1002/2013GL058392, 2014.

Vakkari, V., Kerminen, V.-M., Beukes, J. P., Titta, P., Zyl, P. G. van, Josipovic, M., Wnter, A. D., Jaars, K., Worsnop, D. R., Kulmala, M. and Laakso, L.: Rapid change in biomass burning aerosols by atmospheric oxidation, *Geophys. Res. Lett.*, 2644–2651, doi:10.1002/2014GL059396, 2014.