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Interactive comment on "Measurement of size dependent single scattering albedo of fresh biomass burning aerosols using the extinction-minus-scattering technique with a combination of cavity ring-down spectroscopy and nephelometry" *by* Sujeeta Singh et al.

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The paper deals with one the interesting and poorly understood field of biomass burning (BB) aerosol optical properties. I have a couple of questions regarding this study are as follows:

Author's wrote "The SSA and AAE values in this work do not fit well with current schemes that relate these factors to the modified combustion efficiency (MCE) of a

burn" but they have not done proper validation or check because they don't have MCE calculation but present as a major finding in their abstract. They concluded burn condition does not control the SSA and AAE and mention as a one of the major findings in abstract but have not tested SSA and AAE correlation with either MCE or BC/OA ratio. Recently Pokhrel et al. (2016) shows BB SSA shows very strong correlation with EC/(EC+OC). How authors divide flaming and smoldering stages of fires? Page 7 line 249: Author's mentions "even though the size distribution did not change over the course of weeks, but observed decrease in optical values suggests that could be due to changes in chemical properties of the soot, but in line 241 they wrote that result in this work will only be compared to literature observation of fresh shoot". How could chemically change soot be compared with fresh soot? Page 8 line 255: what is the logic behind to adjust 580-660 nm range, not 500-580 nm range? Page 10 line 329: Author's mentions Cedar have higher SSA at flaming state than the smoldering stage for 300 nm particles. What is the region behind this? Do authors want to say organics absorb more than black carbon in 500-660 nm? Since more BC is produced during flaming and more OC is produced during smoldering (Ward et al., 1992). Page 10 line 351-354: Author's mentions there was no observable trend of SSA as a function of particle size and again wrote SSA diverged significantly at larger diameters. What do these sentences signify? And in Line 353 they mention particle size clearly plays the major role in determining the scattering or absorption properties. How that does not affect the SSA? Page 11 Line 394: Author's concluded that due to lack of variability in their SSA values for different wavelength the MCE of the burns for their work is < 0.92 based on Liu et al. (2014) study. If so, then why they called flaming for such burns? Based on Yokelson et al. (1996) definition, MCE of 0.9 represents roughly equal amount of flaming and smoldering and MCE $\sim$0.8 are pure smoldering. Page 12 Line 398-400: Author's mention that higher SSA values in field measurements than their observation suggest that the MCE values of wildfires are higher than controlled laboratory burns. They did not explain why burn with higher MCE could have higher SSA values. It is clear from laboratory studies that burns with higher MCE have lower

SSA (Pokhrel et al., 2016; Liu et al., 2014; McMeeking et al., 2014) supporting the fact that more BC will produce during flaming stages of burns (Ward et al., 1992). Page 12 Line 408-410: Author's mentions, despite of having similar burn conditions with Hopkins et al. (2007), they found different SSA values for white pine than that of ponderosa pine needles/twigs. But they do not mention how they compare the burning conditions because they don't have either BC/OA or MCE calculations in their study. Throughout the document, authors wrote soot. Do they want to say only soot produced during biomass burning?

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