

# ***Interactive comment on “Impacts of Regional-transported Biomass Burning Emissions on Chemical and Optical Properties of Carbonaceous Aerosols in Nanjing, East China” by Xiaoyan Liu et al.***

**Anonymous Referee #3**

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The manuscript measured the chemical and optical properties of carbonaceous aerosols in Nanjing and attempted to elaborate impacts of the biomass burning (BB) originated from regional transport on the carbonaceous aerosols. The topic is of interest but the manuscript is not well written. There are several factors hinder publication of the manuscript at the present form, and a major revision is needed.

Major comments:

1. The title is “Impact of regional-transported biomass burning emissions on chemical

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and optical properties of carbonaceous aerosols in Nanjing, East China”. Therefore, It is assumed that the measured aerosol properties in Nanjing with and without BB impact should have large difference. Figure 5 shows that there are moments with low BB impact on Nanjing. Did the chemical and optical properties of carbonaceous aerosols under the low BB influence reveal a significant difference from those under the high BB influence? 2. Figure 5 shows that the fraction of BB-OC and BB-WSOC is nearly the same throughout the measurement. Does this mean that the emission ratios of WSOC/OC from other anthropogenic sources are the same as BB, or is it the coincidence from the calculation by the equation 6 and 7? 3. Since the authors attempted to investigate the impact of BB on carbonaceous aerosols, why did the authors only measure the absorption of BrC in WSOC, instead of the absorption of total BrC in OC? There are also water-insoluble BrC from BB. 4. Page 8, Line 17, the authors concluded that secondary OC is weak and stable only based on the OC/EC ratio ranging from 2 to 4 during the severe pollution period. The conclusion is arbitrary. Firstly, the OC/EC ratio ranging from 2 to 4 are rather large. Secondly, previous studies have indicated that SOA contribution during haze days during wintertime in China is considerable. For example, Huang et al. (2014) showed SOA contributed 44%-71% to the OA mass in four megacities of China during wintertime. Sun et al. (2013) revealed that SOA contributed 31% to the OA mass in Beijing in winter.

Minor comments:

Page 2, Lines 11-15: What is the difference among those portions of OC? Page 2, Lines 15-16: Does it indicate that BrC is more absorptive than BC? Page 2, Line 26: what is “the most frequently method”? Page 3, Line 3, “that” should be removed? Page 3, Line 18, “impact” should read “impacts”. Page 3, Line 21: “than” should read “compared to”. Page 3, Lines 25-27: Are the three parameters are specially used for BrC from BB? Page 3, Line 28: What is HULIS? Page 7, Line5, “give” should be “given”. Page 8, Line 10, “uncertainty” should be “variation” Page 10, Line 25, “which illustrating the necessity of parameter BB-OC”. The sentence is hard to understand.

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References: Huang et al., High secondary aerosol contribution to particulate pollution during haze events in China, *Nature*, 514, 218–222, <https://doi.org/10.1038/nature13774>, 2014. Sun et al., Aerosol composition, sources and processes during wintertime in Beijing, China, *Atmos. Chem. Phys.*, 13, 4577–4592, <https://doi.org/10.5194/acp-13-4577-2013>, 2013.

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