

Interactive comment on “Aging of aerosols emitted from biomass burning in northern Australia” by A. Milic et al.

This paper has been greatly improved after the first revision. After reading through the revised paper and response, a minor revision was considered here:

Major comments:

1) To response 6:

The addressing here is quite right. The dilution will not change the f_{44}/f_{60} ratios assuming the variation of volatility due to dilution will not change the SOA/BBOA fraction very much. However, the mixing with other plumes which contains comparable or higher OA mass concentration compare to BB plumes, will greatly change the f_{44}/f_{60} ratio. E.g., If the biomass burning plumes mixed with the biogenic dominated air mass, f_{60} will decrease and f_{44} is possibly going to change as well.

Although the authors added the possibility of dilution effect in the explanation, the sentence is not in a proper position (originally in last sentence in the first paragraph of page 10), should be mentioned in the f_{44} vs f_{60} explanation of Page 9 line 19 to 21 and other relevant places.

2) For the whole 3.2.2 section.

I did not see the meaning of this paragraph. The $\Delta OA/\Delta CO$ cannot be used for the SOA formation since the $\Delta OA/\Delta CO$ (ΔOA or ΔCO) from different fresh BB plumes can vary within a wide range (more than a factor of 10) depending on combustion material, condition etc. E.g., (Aiken et al., 2009). The authors do not know $\Delta OA/\Delta CO$ from different fresh BB plumes surround this observation site are constant or not. And mixing with fresh or aging plumes from other fires or plumes is possible, which will change the initial $\Delta OA/\Delta CO$ ratio. I suggest to delete this part.

Similar comment also applies to 3.2.1 section $\Delta O_3/\Delta CO$. The initial $\Delta O_3/\Delta CO$ is unknown or the authors should give the range of $\Delta O_3/\Delta CO$ for fresh BB plume.

3) Section 3.2.4 (the biomass burning events) is too long. There is too much unnecessary detailed information from each fire. Please shorten this section (cut or move some information to the supplementary materials) and give the necessary conclusion. I did not see the scientific points that the authors want to address here.

Minor comments:

The definition of organics is very wide, which can also refer to gas-phase organics. Please use the abbreviation “OA” instead of “organics” when referring to organic aerosol to avoid confusion.

Page5 Line 16: add abbreviation name of “(OOA)” after “oxygenated OA”

Page 16 line 20 not only “the influence of BB emissions”, but also “the aged SOA from different sources.” Can influence this f_{82} ratio.

Aiken, A. C., Salcedo, D., Cubison, M. J., Huffman, J. A., DeCarlo, P. F., Ulbrich, I. M., Docherty, K. S., Sueper, D., Kimmel, J. R., Worsnop, D. R., Trimborn, A., Northway, M., Stone, E. A., Schauer, J. J., Volkamer, R. M., Fortner, E., de Foy, B., Wang, J., Laskin, A., Shutthanandan, V., Zheng, J., Zhang, R., Gaffney, J., Marley, N. A., Paredes-Miranda, G., Arnott, W. P., Molina, L. T., Sosa, G., and Jimenez, J. L. (2009). Mexico City aerosol analysis during MILAGRO using high resolution aerosol mass spectrometry at the urban supersite (T0) - Part 1: Fine particle composition and organic source apportionment, *Atmos Chem Phys.* 9, 6633-6653