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Comment

***Interactive comment on* “Estimation of lifetime of carbonaceous aerosol from open crop residue burning during Mount Tai Experiment 2006 (MTX2006)” by X. L. Pan et al.**

Anonymous Referee #1

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Review of Manuscript Number: Atmos. Chem. Phys. Discuss., 12, 14363–14392, 2012

General Comments: The paper “Estimation of lifetime of carbonaceous aerosol from open crop residue burning during Mount Tai Experiment 2006 (MTX2006)” is based on the measurements of elemental carbon, black carbon, CO, and organic carbon during June 5–13 2006 at the summit of Mount Tai (Mt. Tai). Sampling was made during intensive open crop residue burning. The draft has dealt with the ratios of EC(BC)/CO, OC/CO and also used the FLEXPART WRF model. The draft ends with a discussion of removal efficiency of EC and OC combining FLEXPART results. However topic is

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of interest, I have serious concerns about the methodological approaches particularly interpreting the ratios. The transport time of smoke particles was estimated using the FLEXPART WRF but from which specific plume as you have got numerous, see the MODIS plot? Is the site influenced by one plume at a time or mixed of many? No, then how to attribute ratios of ECa/CO, OC/CO, OC/ECa at transport time ($t=0$) and becoming the representative of fresh burning plume without suffering any scavenging. The discussion is too simplistic and I am not sure if the ratios of EC/CO and OC/CO can be fixed for various plumes (presumably if they are in different stages (flaming/smoldering) of biomass burning surrounding the site). Unless quantify the variability in emission ratios of EC/CO and OC/CO at sources, the interpretation of removal efficiency is going to be erroneous. More importantly, the measurements period is too short just several days in the month of June 2006. In China fossil fuel based emissions are also significant sources of carbonaceous species, and how to delineate the influence is not described? There so many issues which are questionable. Even if I assume the approaches are correct (which is not the case really), such analysis should be represented by reasonably LONG PERIOD of observations. Unfortunately, I do not find any merit points in this work which can be paid attention by researchers working in this topic. Therefore, I cannot recommend this draft for the publication in ACP. I suggest the authors make following suggestions (section wise) in whatever case.

1. Introduction: Though atmospheric properties of BC have been highlighted, it is important to make report of biomass burning related inventories of BC and OC (please refer following works (Streets et al., 2003a, b) and updates.

Streets, D. G., et al., 2003a. An inventory of gaseous and primary aerosol emissions in Asia in the year 2000. *Journal of Geophysical Research*, 108(D21), 8809, doi:10.1029/2002JD003093. Streets, D.G., Yarber, K.F., Woo, J.H., Carmichael, G.R., 2003b. Biomass burning in Asia: Annual and seasonal estimates and atmospheric emissions. *Global Biogeochem. Cycles* 17, 1099. doi:10.1029/2003GB002040.

Line 20-24, Describing BC/CO, EC/OC ratios will require a comprehensive citation of

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other works such as following recent work in Asia (I just came across). Cite also elsewhere in related sections of the draft.

Sahu, L. K., Y. Kondo, Y. Miyazaki, P. Pongkiatkul, and N. T. Kim Oanh (2011), Seasonal and diurnal variations of black carbon and organic carbon aerosols in Bangkok, J. Geophys. Res., 116, D15302, doi:10.1029/2010JD015563.

2 Experimental: This section is better written but period of observations should be clearly mentioned.

3 Results and discussion

Schemes of FLEXPART WRF model and definition of transport time should be separately presented in a subsection before discussing the observations. Measurements of BCe in PM1 and PM2.5 were done alternatively in time reference, therefore samples are different for PM1 and PM2.5. Then what is the use of such correlation if BCe is not measured simultaneously, I mean how you adjusted the time lag.

3 Conclusions: This section should be more comprehensive and just do not describe the finding of each section.

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