

Review of manuscript doi:10.5194/acp-2016-504, 2016

Biomass Burning Aerosols and the Low Visibility Events in Southeast Asia

by

H. Lee, R.Z. Bar-Or and C. Wang

General comments:

The authors have put a lot of effort to improve the manuscript that is now clearer in terms of both presentation and analyses. However I recommend major changes to be made to consider the manuscript suitable for publication. Please refer to the detailed comments below to improve presentation of the results. Some restructuring of the manuscript is still needed especially in the methods/results sections.

Specific comments:

Line 62: A paper on health impacts from fires was recently published in Scientific Reports that could be worth citing (www.nature.com/articles/srep37074):

“Population exposure to hazardous air quality due to the 2015 fires in Equatorial Asia”

by P. Crippa, S. Castruccio, S. Archer-Nicholls, G. B. Lebron, M. Kuwata, A. Thota, S. Sumin, E. Butt, C. Wiedinmyer & D. V. Spracklen

Line 80: please rephrase “various climate variabilities...in different temporal scales”

Line 81: ENSO is actually “El Niño–Southern Oscillation” (remove “and” and type Niño correctly)

Line 133: replace “included” with “adopted”

Line 177-180: please rephrase the last part of the sentence

Line 181: The first part of this section still refers to model settings so should be merged with section 2.1. From Line 198 the authors are discussing model evaluation with respect to precipitation, so this discussion should be moved either at the beginning of the results or merged to section 4 when the influence of different meteorological boundary conditions is analyzed. Please also consider summarizing it.

Line 324: “highlighted green areas” could be removed unless you explicitly refer to Figure 3.

Line 408: change “in causing degradation of air quality” with “in degrading air quality”

Line 413: “haze event occurrence across from...” this part is not clear, please rephrase

Line 419-422: You are not accounting for other anthropogenic emissions in your simulations, so this sentence should be supported by a literature reference and possibly linked to any evidence/results in your paper.

Line 436: is this distance inferred from Figure 9? If so please refer to the figure or provide appropriate reference.

Line 482: wrong figure number. It should be Fig 7b and c.

Line 493: replace “similar to” with “similarly to”, also in other parts of the manuscript

Line 494: It is not clear how you are able to infer the contribution from different regions. You should mention this somewhere in the methods. In general all the presented results should be supported by a clear explanation on how have been derived in an appropriate method section.

Line 496: Section 3.3 is too long and dispersive. The authors present the role of winds, wet scavenging, quantify the contribution of fire emissions to different regions/cities and finally introduce the role of different emission inventories. Please consider reorganizing and summarizing. The paragraph from line 496 could be moved to the model description or merged to the discussion on the emission inventories. You could separate these sections and have one for meteorological and one for emissions influence.

Line 510: “wind field” should be “wind fields”, check this through the paper.

Line 514-523: this part could be integrated with the content in section 2.2 where the authors evaluate the model in terms of precipitation. However I recommend organizing a new section where the model evaluation is discussed.

Line 532: which “modelled results”? please be more specific/rephrase, also with respect to the subsequent sentence starting with “To examine such an influence”.

Line 548-549: please rephrase and be more specific on which modeled results you are referring to.

Line 588: It would be better to summarize your findings instead of mentioning what you have done.

From line 591: please check the use of tenses.

Line 599: it would be good to add how many of these events were likely to be due to fires.

Line 601: rephrase as “but also in those”. “Pollutions” should be “pollution”

Line 602: please rephrase this sentence and link better to the previous conclusions.

Line 606: remove “as well”

Tables:

Table 2: Please provide more accurate description in the caption. Refer to the TRMM dataset used for observations and mention the different model runs.

Table 3: Please mention that the table includes comparison of different model runs/emissions. Also there are several typos (e.g. “VLD” instead of “LVD”). More details on how the terms in the last column are computed should be provided either in the caption or in the methods. If it is simply the difference from 100% maybe the whole column could be removed. There is an error in the last column FNL_FINN for Bangkok since fire and other pollution contribution appear to be the same.

Table 4. Please rephrase the caption. “Annual mean and standard deviation contributed by each source” is not very clear. Line 813 needs to be changed with “Regions s1-s5 are defined in Fig 1.

Figures

Figure 2: This figure can be still improved. The labels on the x axis should be more frequent and regularly spaced, otherwise it is impossible to infer the months/years of any episode of interest. You could have labels such as mm/yy and regular ticks on the x axis (at least every 6 months or every year). It would be also better to have the same y axis at least for precipitation (0-25) for easier comparison. Although the y-axis for PM_{2.5} cannot be the same for all regions, I am wondering if it is possible to have at least panel b-e on the same scale (0-15) for better comparison and leave panel a up to 40 and mention this in the caption. It would be also easier for the reader to have direct reference the region associated with each panel by adding s1,s2...on top of each panel.

Figure 3: rephrase b by simplifying the sentence (e.g. visibility from GSO observations...and FNL_FINN simulations...)

Figure 4: Panel 4b is missing, so not sure what line 851 refers to. From “Data points marked with purple” please rephrase. How are those known fire events identified?

Figure 7: this figure can be improved by placing a frame around each panel and grid lines every month.

Figure 9: Panels h to j are not described in the caption. Please add details.

Supplementary Materials:

Figure S2: ERA-Interim is spelled wrong (also in Fig S3)

Figure S5: you should define “A-S-O-F-M-A” in the caption or refer better to the fire seasons.

Figure S6: panels a and b should be improved by placing a frame around each panel and grid lines regularly spaced. Since you are focusing on June-July 2013 the labels could include just the day and month.