

Interactive comment on “Impacts of East Asian Summer and Winter Monsoon on Interannual Variations of Mass Concentrations and Direct Radiative Forcing of Black Carbon over Eastern China” by Yu Hao Mao and Hong Liao

Anonymous Referee #1

Received and published: 3 July 2016

This is a nicely written manuscript. This study is useful to understand the linkage of climate circulation and Asia pollution. I only have a few minor comments:

- 1) The spatial resolution used in this study is relatively coarse, and some potential uncertainties related to it may be discussed.
- 2) How much confidence do the authors have in simulating surface BC using GEOS-Chem? How about vertical profiles? The authors intensively investigated the impact of monsoon on vertical changes of BCs, but the first question is whether GEOS-Chem is able to capture the vertical profile of BC? How many uncertainties can be inferred

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from the potential bias of GEOS-Chem? 3) In the abstract, Lines 17-18, whether the differences between the weakest EASM and strongest EASM years are significant. In another word, by looking at the entire simulation period, the authors can get the mean and the standard deviation of BC. How does this change magnitude (i.e., 0.04-0.09, 0.03-0.04) compare to the 20-year variance? If we look at the inter-season variability (either summer or winter), do the weaker EASM always corresponds to higher BC whereas stronger EASM corresponds to lower BC?

4) Page 13, Line 22: the authors mentioned the effect due to non-China emissions. Maybe I missed something, I am not sure how the authors claim this impact is from non-China emissions.

5) Did the authors consider biogenic emissions in this study? If so, please add it. If not, please add the possible uncertainty due to this missing source.

6) In the abstract (Line 14), the authors mentioned that the differences in BCs are mainly due to the circulation. I am wondering whether there are any way to quantify the effect from circulation change, wet deposition, etc.

7) The layouts of section 3 and 4 are interesting. These two parallel sections went through similar figures twice (one for summer and one for winter). Not sure whether this is the best way to discuss, but I think the figures showing summer and winter together look good.

8) Page 4, Line 17: L. Wang et al., 2014 Please remove "L."

9) Figure 3. Is the spatial correlation significant? One way is to use lines or markers to indicate statistical significance, or mask the areas insignificant.

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-328, 2016.

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