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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Long-Range Transport Mechanisms in East and Southeast Asia and Impacts on Size-Resolved Aerosol Composition: Contrasting High and Low Aerosol Loading Events" *by* Rachel A. Braun et al.

Anonymous Referee #3

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Comment:

The authors presented their efforts in analyzing local observations collected at the MOUDI sample site, and tried to attribute the observed changes of water-soluble aerosol to long-range transport from MC and north East Asia. This is an interest and innovative research as the air quality in Philippines hasn't been well documented in the published studies. The observations collected through this study also provided detailed description of the aerosol size distribution, chemical composition, and temporal changes. The coupling of satellite product, surface observations, HYSPLIT trajectories,

and NAAPS simulations is acceptable, but there are two major concerns regarding this method: first, the sampling study period is relatively too narrow to justify the description of "high" and "low" aerosol loading periods, as the concentrate ranges from 2.7 to 13.7 ug/m3, I didn't see there is significant difference especially considering the wash-out effect of precipitation during the "low" loading period. It will be better if the authors can present some data or cite from other studies to briefly describe the year-long trend of aerosol concentration at MOUDI site. Second, the title indicates the long-range transport mechanism will be discussed, but in the manuscript really only describes the influence of long-range transport in Quezon City. Please consider rephrase the title or include more discussion of the transport mechanism. Following are some detailed comments.

Detailed comments: (1). The "abstract" section was poorly organized, and it contained too many details about method and dataset while the innovative findings and conclusions were described in a style too general for scientific publication. It begins with a very clear statement of the research objective, as "analyzes mechanisms of long-range transport and chemical characteristics", but is followed by various types of information piece by piece. For example, line#28-29, what is the long-range transport mechanism found through this study? Is it driven by synoptic weather event, or large scale jet, or other typical or abnormal conditions? Line#30-31, the impacts of continental EA transport was identified, so what are they? Please reorganize the whole section.

(2) Line#58-60: this sentence is confusing, do you want to distinguish long-range transport from synoptic scale transport?

(3) Line#61: there are many these kind of general common sense statements that are not really helpful in this manuscript, please consider exclude them.

(4) Line#62: I didn't see any reason for starting with "however"

(5) Line#70: "urban mega-cities" emission? Do you mean residential emission?

(6) Line#82-86: These sentences commented the satellite-derived biomass burning emission inventory was underestimated, so the readers would expect to see further discussion about the underestimation, or how to improve it. But line#87-94 started to claim that transport mechanism of biomass burning is important. I didn't see any logistic connection between these two sections. As the importance of this study is described in line#87-94, line#82-86 is not helpful to demonstrate this importance.

(7) Line#119: when is the northeast monsoon season?

(8) Line#110-111: varies by season: smoke in Aug-Oct, dust in Feb-Apr, SWM for Jun-Sep, what about the other months? These introductions are important to justify your studying period Jul-Oct 2018 mentioned at line#138-139.

(9) Line#139-150: I like the way that objectives and aims are clearly listed, please consider reorganize the manuscript in such a straightforward manner.

(10) Line#141: Confusing, please rephrase this sentence: isolate characteristic aerosol physiochemical properties indicative of long-range transport

(11) Table1: please explain why the sampling period was 2-day, and why the starting time was different, some in the morning and some in the afternoon

(12) Line#245: water-soluble aerosol refers to the species shown in Fig.6? are these measurements for ambient air concentrations?

(13) Fig.2: why there are multiple blue lines for back-trajectories, did you trace back at different altitude?

(14) Line255-257: the NAAPS only shows the surface concentration, the MC smoke may not necessarily transport all the way to Quezon, this is why the altitude of HYSPLIT also need to be demonstrated to correlate the source and receptor

(15) Section3.2.3: the concentration of organic aerosol seems very low, can you show the total ambient air concentration of OA, other than the water-soluble aerosol?

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