

***Interactive comment on* “Size-resolved Composition and Morphology of Particulate Matter During the Southwest Monsoon in Metro Manila, Philippines” by Melliza Templonuevo Cruz et al.**

Melliza Templonuevo Cruz et al.

liz@observatory.ph

Received and published: 23 June 2019

Response: We thank the reviewer for thoughtful suggestions and constructive criticism that have helped us improve our manuscript. Below we provide responses to reviewer concerns and suggestions.

acp-2019-270 Size-resolved Composition and Morphology of Particulate Matter During the Southwest Monsoon in Metro Manila, Philippines Melliza Templonuevo Cruz, Paola Angela Bañaga, Grace Betito, Rachel A. Braun, Connor Stahl, Mojtaba Azadi Aghdam, Maria Obiminda Cambaliza, Hossein Dadashazar, Miguel Ricardo Hilario, Genevieve Rose Lorenzo, Lin Ma, Alexander B. MacDonald, Preciosa Corazon Pabroa,

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John Robin Yee, James Bernard Simpas, Armin Sorooshian

Reviewer #2:

This manuscript describes size-resolved aerosol particle composition information from the urban Manila center of the Philippines during a relatively time-limited observing campaign. The information presented represents a very useful summary of the observations and links to local and regional source production. The broad Southeast Asian archipelago is subject to significant air quality hazards and regional aerosol transport, making the region a hotbed for chemical and particulate aerosol study. The topic and manuscript are thus worthy of consideration by ACP. I found the paper to be relatively strong technically and the figures very clear and legible (my technical notes are attached).

My recommendation is that the paper be published after minor revisions.

My primary points of concern are:

1) The paper really lacks a hypothesis. As such, it reads more as a technical report, which is ultimately fine. I suspect that the impact of this paper will be found as a strong reference set of measurements to characterize a major urban center on the eastern side of the South China Sea. But, authors would be wise to reconsider motivation and establish some binding question that makes these measurements wholly unique. To that end, and as I'll point out again below, regional transport is something that the Taiwanese groups have been looking at for decades now. Perhaps this isn't technically SE Asia. But, there is a large body of work (start with N. C. Lin) showing transport from the mainland over the ocean, chemical morphology, size information, and vertical/radiative properties.

Response: We agree with the reviewer's comment that the results of this paper will serve as a strong reference measurement of PM characterization in the region. The size-resolved PM measurements, though initially done during the southwest monsoon

season only, are envisioned to shed light on why total PM_{2.5} levels in the study site are comparable during the dry and the wet seasons, in contrast to observations in other cities in the region. Moreover, to the authors' knowledge, the initial size-resolved BC measurements have not been done before in the study area and the results provide a valuable insight on why BC levels are very high. In addition, the PMF results also provide valuable insights on the sources of aerosol in Metro Manila. Recognizing that this work is not the first to report on long range transport of aerosol in the region, the paragraph in the Conclusions related to transport has been edited to:

"Although the current study focuses exclusively on the SWM season in Metro Manila, results of this study are applicable to the study of aerosol impacts on Southeast Asia and other regions. First, the detection of Aged aerosols not only from local but also from regional sources confirms previous studies that PM in the region has the ability to travel long distances during the SWM season. Characterization of aerosols in Metro Manila is therefore important for better understanding the impacts that local emissions will have on locations downwind of Metro Manila, including other populated cities in Southeast and East Asia. Transport of pollution and decreased wet scavenging during the SWM season may become increasingly important as studies have shown a decrease in SWM rainfall and increase in the number of no-rain days during the SWM season in the western Philippines in recent decades (e.g., Cruz et al., 2013)."

2) I found the discussion in P18/19 to be really clumsy. This simple premise that precipitation is enough to scavenge significant portions of the regional aerosol mass is very coarse. Sure, aerosol transport correlates most strongly with dry air mass movement. But, in SE Asia, particularly seasonally, the pall is immense and omnipresent. This discussion needs to be reconsidered complete. And, again, some consideration of Taiwanese experiments looking at transport from the mainland is surely relevant context to what is being seen in the Philippines.

Response: The authors recognize that previous Taiwanese studies have shown the transport of aerosols from the mainland and from the Indochinese peninsula. Thus,

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this section has been edited to:

"Even though the PM in a heavily populated urban region, such as Metro Manila, is typically thought to be dominated by local sources of aerosols, the current PMF results show that contribution from long range transport is still discernible. This finding is contrary to the expectation that the signal of transported aerosols would be lost in the noise of locally-produced aerosols."

3) Redefine your acronyms in the Conclusions, in the event that your reader only reads those summary points and nothing else.

Response: The authors have redefined all acronyms on the Conclusions.

I found the paper to be very well written, otherwise. Good luck. Please also note the supplement to this comment: <https://www.atmos-chem-phys-discuss.net/acp-2019-270/acp-2019-270-RC2-supplement.pdf>

Response: The authors have addressed the comments in the supplement by shortening the abstract and redefining all acronyms in the Conclusions. Grammar, punctuation, and style corrections suggested by the reviewer have also been made.

Please also note the supplement to this comment:

<https://www.atmos-chem-phys-discuss.net/acp-2019-270/acp-2019-270-AC2-supplement.pdf>

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2019-270, 2019>.

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