Review of Lee et al., 2018

This study tries to quantify the impact of biomass burning (fire) and other anthropogenic (non-fire) sources to the occurrence of low visibility days (LVDs due to PM2.5) in several cities across the Southeast Asia. This is an extension of their work in Lee et al., 2017 by improving the WRF-Chem model components. Regional air quality degradation is assessed using simulated PM2.5 and ozone, derived AQI, and mortality calculations. They identify that the inclusion of measured anthropogenic dust component to the model increases performance of the model. They also assessed the performance of some machine learning algorithms to predict the occurrence of LVDs.

Generally, the study is of importance, and relevance to ACP. It can be published with a major revision.

First, the novelty of the work (if any) should be mentioned in the manuscript, in the introduction.

Authors mention that the underestimation of particulate matter in the model could be due to horizontal resolution or missing anthropogenic dust. Have you considered any other aspects of the model before making such a statement? how about the simulated boundary layer mixing of tracers? why ozone is overestimated in the model?

Have you tried the simulations using any other emission inventories? This is very important.

Model evaluation should be conducted in a much better way before making conclusions. Spatiotemporal distribution of each species should be evaluated thoroughly, in the context of all the modeling components. PM2.5 (its components and extinction values) should be assessed, not just PM10 (there are some measurements available).

Have you assessed the importance of organic matter in PM2.5 over these regions? the 'residual matter' in Snider et al., 2016 is mainly organic, please refer to that paper; so, the statements such as "including the in situ anthropogenic dust improved the …" should be revised (since you are adding dust and organics).

Clearly quantify and describe the uncertainty in your estimates of LVDs etc. (for fire and non-fire related) derived using model values. An entire section should be devoted to uncertainty analysis.

Section 3 should be improved for a better reading, by excluding unnecessary statistical details, and by describing the figures and findings in a more clear and concise way. (abstract and conclusion sections should also be revised).

Separate section 3.2 into two; first, describe 4 selected cities and your conclusions; then, the entire region.

Section 3.4 is too vague, are you really assessing the impact of aerosols on regional climate? need a better analysis; descriptions are loose; need to cite relevant works throughout the discussion.

Provide a brief description of machine learning algorithms in the introduction itself (and your motivation for doing this); also, describe it in the method section. Section 4.2 should be described in an entirely separate section.

Line 501-503: vague arguments; Line 569-570: describe

Reducing the number of figures and tables in the main manuscript (without losing much information) would be helpful; even figure captions are too lengthy.