

Interactive comment on “Estimating ground-level PM_{2.5} in Eastern China using aerosol optical depth determined from the GOCI Satellite Instrument” by J. Xu et al.

Anonymous Referee #3

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The manuscript presented a first attempt to derive surface PM_{2.5} concentrations using the aerosol optical depth (AOD) measurements from the Korean Geostationary Ocean Color Imager (GOCI) instrument. A chemical transport model (GEOS-Chem) was evaluated and then used to provide the PM_{2.5} over AOD ratios over the eastern China. The methodology of this study has been well established in previous studies by the authors, and its application to a geostationary satellite instrument provides support for future satellite missions. I recommend publish on ACP after the following comments are well addressed.

C7162

Specific Comments:

1) Page 17254, Introduction:

Suggest have one paragraph describing why using the Korean Geostationary Ocean Color Imager (GOCI) to quantify surface PM_{2.5} concentrations in the eastern China. As the authors mentioned, this approach has been applied to a number of satellite instruments: MODIS, MISR, and SeaWiFS. What are the advantages to use the GOCI instrument?

2) Page 17256, Section 2.1:

In the manuscript, the authors emphasized the importance of cloud filters at a number of places. How sensitive are the conclusions to the three cloud filters? For example, the first filter set a minimum number of 15 retrievals per 30km x 30km grid, how would the results change if using the number of 10 retrievals?

4) Page 17258, Line 5:

It appears that Heald et al. (2012) has tested a few ways to correct the HNO₃ overestimates over the United States. Can you describe which ones you have implemented in your study? And does the HNO₃ overestimation also apply over the eastern China?

5) Page 17262, Line 1-4:

It would be helpful to explain the comparisons with GEOS-Chem and MODIS-derived PM_{2.5} concentrations. Are these your results or from previous studies?

6) Page 17262, Section 3.3:

This section discussed the chemical speciation of satellite-derived PM_{2.5}. I suggest add a few more sentences describing how you derived the chemical composition of satellite-derived PM_{2.5} and a new figure showing their spatial distribution (like the panel of Figure 3). These would help to support the discussion here.

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7) Page 17263, Section 3.3:
Is there any difference between Organic Matter (OM) and Organic Carbon (OC)?
Please clarify.

8) Page 17265, Line 9-14:
Please tell us how you estimated the health impact. By summing up the population over areas with PM_{2.5} concentration above 35 $\mu\text{g m}^{-3}$? From Figure 3, it did not seem to me that all regions of eastern China exceed 35 $\mu\text{g m}^{-3}$ (with the color scale goes to zero).

9) Page 17275, Table 1:
Please clarify whether the concentrations of different chemical speciation are population-weighted or area-weighted.

Technical Comments:

1) Page 17253, Line 2:
East China or the eastern China? Please be consistent. The term East China represents a specific geographic domain.

2) Page 17254, Line 27:
Please define the domain of the eastern China in the study, the domain of Figure 3 or by longitude and latitude?

3) Page 17256, Line 7:
Please define mathematically the coefficient of variation, probably in Section 2.5.

4) Page 17260, Line 19:
Suggest change the forecast value to the model simulated value.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 17251, 2015.