



## Comment on amt-2021-273

Anonymous Referee #2

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Referee comment on "Continuous mapping of fine particulate matter (PM<sub>2.5</sub>) air quality in East Asia at daily 6x6 km<sup>2</sup> resolution by application of a random forest algorithm to 2011–2019 GOCI geostationary satellite data" by Drew C. Pendergrass et al., Atmos. Meas. Tech. Discuss., <https://doi.org/10.5194/amt-2021-273-RC2>, 2021

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Reviewer's comments on manuscript titled "Continuous mapping of fine particulate matter (PM<sub>2.5</sub>) air quality in East Asia at daily 6x6 km<sup>2</sup> resolution by application of a random forest algorithm to 2011–2019 GOCI geostationary satellite data" by **Drew C. Pendergrass et al.**

In this paper, the authors presented results of estimating PM<sub>2.5</sub> by using RF from the gap-filled GOCI AOD product. The objective of this paper is very clear, which intends to demonstrate the ability and also obstacles of deriving PM<sub>2.5</sub> from satellite-derived AOD products by using machine-learning techniques. In general, the presentation of this paper is very clear and sound, however, the technique and approach used in this study have been widely used. In addition, an important aspect of this study, i.e., the gap-filled GOCI AOD, is not discussed in detail. The contents of this paper are of great importance, especially due to the crucial role of deriving surface PM<sub>2.5</sub> concentration with continuous spatial coverage in air quality monitoring, the method used is not innovative but the results are significant and sound enough.

Comments/suggestions:

- Line 263–265. This statement seems does not have data to backup. it is strongly suggested to include the data/figures. And, the gap-filled GOCI AOD is a crucial base for deriving a continuous map of PM<sub>5</sub> concentration in this study. It really deserves a paragraph to describe how well the gap-filled GOCI AOD performed.
- Line 270. The labels in these figures need to be redone. It is suggested to add "a" and "b" respectively for each figure.
- Line 350. The labels in these figures are confusing. Labels are added only in the third figure, but lines in the other two figures have different colors, it is suggested to add

labels to other figures as well, Also, explain them in the caption.

- Line 290-310. The challenge in predicting NAAQS exceedances is well presented in this paragraph. And the authors mentioned that several attempts were made but no improvement was seen. Part of the problem could be non-equal sampling in the different PM2.5 ranges, it is suggested to try to train RF in training datasets that have a roughly equal- number of samples in different PM2.5 ranges. Secondly, GOCI AOD performance has been well documented in the validation studies. What about carrying out bias correction for GOCI AOD for different ranges of AOD before training?

Please also note the supplement to this comment:

<https://amt.copernicus.org/preprints/amt-2021-273/amt-2021-273-RC2-supplement.pdf>