Authors' response to comments are highlighted in **red.**

Review of paper:

General comments:

This paper describes a pixel-level (up to 1 km) Multi-Angle Geostationary Aerosol Retrieval Algorithm that retrieves pixel-level aerosol loading and fine-mode fraction at up to the cadence of the measurements (10 minutes), fine-and-coarse mode aerosol particle properties at a daily cadence. Several case studies over the Desert Southwest, Pacific Northwest, and fire occurred regions are presented. The fine-mode AOD, coarse-mode AOD, and single-scattering albedo (SSA) of MAGARA are compared to the AERONET and NOAA GOES-16 and GOES-17 products, which shows acceptable agreements. Aerosol type and loading of MAGARA at temporal resolution of 10 minutes are helpful for the new insights of aerosol-cloud interactions, improvements of air-quality modeling and forecasting, and additional constraints on direct aerosol radiative forcing. Therefore, the efforts on retrieval of detailed aerosol optical properties with high temporal resolution in this study are commendable and the work is meaningful. However, I have some comments on the current manuscript.

The authors thank reviewer two for their comments. There have been many papers published on the retrieval of 550 nm AOD, so we hoped that offering a retrieval focusing on aerosol particle properties would be well-received.

Major comments:

1. The abstract is too long and it needs to be further summarized.

We have shortened the abstract a bit, but the paper details both a description of the algorithm and initial validation of both AOD and aerosol particle properties (rather than just 550 nm AOD), so we need to leave enough detail in for readers to determine relevancy.

2. Could you provide some comparisons of MAGARA products to geostationary Himawari-8/AHI products, at least for aerosol optical depth and angstrom exponent?

We provide initial comparison against the NOAA ABI bias corrected AOD in the paper. The additional validation suggested would be outside of the scope of this work. If there is sufficient interest from the community in this algorithm, it would be possible to work on a follow-on study involving either AHI or FCI.

3. Did you run the MAGARA algorithm with some artificial data? How about the uncertainty of MAGARA retrievals? Could you provide some quantitative assessment?

We did not run it with artificial data and the aerosol models were pulled from our previously published MISR work. The uncertainty information we can provide comes from the comparison with AERONET, the best available and most-commonly used validation dataset for satellite aerosol retrievals. We agree this might not be too meaningful for a much broader dataset (certainly not pixel-level). Again, if there is sufficient community interest in this algorithm, further theoretical uncertainty studies and comparison with field-campaign data would be possible in the future.

4. Could you provide the aerosol component retrievals in the MAGARA algorithm? I did not see any results about the component retrievals except fine and coarse mode AOD, FMF, and SSA. In my opinion, the Table 1 describes the climatology of aerosol types, not aerosol component. So, if yes, I strongly recommend using "aerosol types" to replace "aerosol component" throughout the texts including the texts in the figures (Figure 2)

The full dataset is available at https://doi.org/10.5281/zenodo.8164566. This dataset includes AOD, aerosol component fraction, cost function, modeled BRF, surface BRF, and a detailed description of each aerosol component. SSA, FMF, effective radius, etc. can all be calculated from the component fractions, extinctions, and particle properties. Aerosol type and aerosol component are used somewhat interchangeably in this manuscript and others that we and others have authored. We used aerosol component fraction, as this represents what the algorithm retrieves using the NNLS algorithm.

Minor comments:

1. The texts in the maps are too small. Please improve it.

We have increased the size of the text.

2. I think two digits are enough for the statistics.

Considering the variability in the measurements can be pretty small for some parameters such as SSA, we think 3 digits is appropriate here. We tried to make sure we didn't over interpret our results.

3. Please provide the full name of the abbreviation when mentioned at the first time. For example, MAIAC in line 23, AOD in line 28, GRASP in line 101

Corrected, thanks.