

# ***Interactive comment on “Retrieval of aerosols over Asia from the Advanced Himawari Imager: Expansion of temporal coverage of the global Dark Target aerosol product” by Pawan Gupta et al.***

## **Anonymous Referee #2**

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In this paper, the authors ran MODIS Dark Target aerosol algorithm on Himawari-8 Advanced Himawari Imager (AHI) for two months and analyzed the retrievals for accuracy. Analysis of bias based on comparisons to AERONET and MODIS and characterizing the retrievals as a function of time of the day is presented. The AHI reflectances were averaged into a 20 x 20 square km grid to do aerosol optical depth retrieval. Matchups were done by further aggregating AHI retrievals to 0.25 x 0.25 degree grid space. The authors conclude that the performance of AHI AOD retrieval is similar to that of MODIS with some large significant biases that are not fully understood. The authors also conclude, by raising several questions in the end, that this work is preliminary and much more work needs to be done to fully transform the MODIS DT AOD algorithm to AHI

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and resolve issues that arise from the differences in sun-satellite geometries.

Given the preliminary nature of this work, I encourage the reviewers to complete the work and re-submit the paper. Some chief concerns I have are: (1) A lot of spatial and temporal averaging is done rendering the advantages of a geostationary satellite useless. When the goal of a satellite in a geostationary satellite is to make frequent observations at high spatial resolution, why not demonstrate the usability of products at those resolutions? (2) Some large biases in AHI AOD vs. AERONET at some stations not explained (3) The AHI AOD artifacts near the terminator as well as sunglint region are noted. However, analysis of the bias between AHI and AERONET AOD as a function of various parameters (surface reflectance, view angle, solar angle, etc.) not carried out. The science in this paper is not new to rush towards a publication. The authors can take time to process additional data to cover different seasons and atmospheric conditions and conduct a more thorough investigations (4) An important concern that I have is that the authors do not bring in the discussion of spectral surface reflectance ratios and how the ones adapted from MODIS are suitable or not for a geostationary satellite. The viewing conditions (geometries) are quite different for geostationary satellite compared to a polar-orbiting satellite and the surface characterization need to be understood from this perspective (5) Processing data from other time periods will also provide insights into cirrus cloud contamination, pixel screening for snow/ice etc.

I applaud the work done by the authors in adapting MODIS AOD algorithm to AHI. There is no depth in the work, however. There are many groups doing similar work with much advanced state of understanding and maturity. For example, similar work done more thoroughly by other groups such as the GOCI aerosol retrievals is not mentioned in the paper (Evaluation of VIIRS, GOCI, and MODIS Collection 6 AOD retrievals against ground sunphotometer observations over East Asia by Q. Xiao, H. Zhang, M. Choi, S. Li, S. Kondragunta, J. Kim, B. Holben, R.C. Levy, and Y. Liu, Atmospheric Chemistry and Physics, 2017). I find the work to be incomplete and only in a very

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preliminary state. I recommend the authors to complete the processing to cover all four seasons and re-analyze the data to fully understand the retrievals at their native resolution and various sources of uncertainties, chief among them contributions from an inadequate characterization of surface. My recommendation, therefore, is for the paper to be resubmitted after additional work is completed.

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