

## ***Interactive comment on “MODIS Collection 6 MAIAC Algorithm” by Alexei Lyapustin et al.***

### **Anonymous Referee #1**

Received and published: 21 July 2018

Dear Authors,

First, thank you for a well-written detailed manuscript. The MAIAC product you describe is a very significant addition to the Earth system monitoring capability enabled by the MODIS instruments. I have only a few clarifying areas and this manuscript can be ready for publication. I have numerous smaller suggested edits below, and then several typographic edits at the bottom.

1) You should be congratulated for the “Known Issues and Limitations” section, this is very valuable information to compile and include. No one knows this product better than the authors, and this information is very valuable to end users even though it is not fully digested (if it were fully digested it would probably be solved!)

2) The assumed background AOD seems very important. If the assumed background is too low by 0.01, what is the resulting error in the retrieved AOD?

3) If the “reference SRC” is updated before retrieval of AOD, this means it is impossible for MAIAC to retrieve an AOD lower than the assumed background. Does the two-stream method described for correcting the “reference SRC” upward mitigate the upward trend in AOD that would be expected from downward updates to the “reference SRC”?

MINOR notes and edits: Page-Line

19-20 How are cloud shadows flagged in the output product?

4-15 “with optimal combination of different cloud tests and smoke detection. . .” Please clarify if you mean A) MAIAC automatically determines the optimal combination of cloud tests and smoke detection; B) The authors have empirically determine the optimal combination and implemented this in MAIAC; C) Within the MAIAC framework, selection of an optimal combination is possible (similar to how the MISR research retrieval can be hand-tuned to obtain the best answer for a given scene)

13-26 “The land surface is considerably brighter at 2.13um compared to the Blue wavelength. This results in spectral dependence of the BRDF shape and in SRC dependence on the view geometry.” This demands an additional sentence of explanation.

6-17 This could be clearer. If I understand correctly, LUTs are generated for P=1 for all wavelengths. For wavelengths shorter than 660nm, a second calculation is done for P=0.7. Is this because the pressure correction is largely the signal of the molecular atmosphere, and thus diminishes at longer wavelengths?

5-11 Either here or at the beginning of Section 2, please enumerate the static data used by MAIAC, so that the reader clearly understands that all other values are dynamically updated by the MAIAC processing.

26-9 “seasonal variation in aerosol properties. . .” Do you mean like the variation diagnosed in Eck et al. 2013 (<https://doi.org/10.1002/jgrd.50500>)?

7-5 It would be nice to have a table tabulating the dimensions of the LUT. If you can do

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it in a sentence, that is also OK.

24-21 Give yourself some credit! “The QA structure may be updated in future releases to better accommodate the needs of end users.”

23-23 “Following the Sun-View Geometry suite at 5km. . .” I don’t know what you are referring to. Is this another MODIS product?

22-24 Is it the first 16 orbits, or is it the 16 orbits with the largest coverage of the tile?

TYPOS and very minor edits: Page-Line

26-23 Devadiga

25-22 Taklamakan

24-10 most pixels

14-7 Uses the LER surface model

13-31 linear interpolation. . . is used within 0.01 of bin boundaries

9-1 The test uses the shortest wavelength MODIS channel

9-24 Please be specific about what “neighboring” means here

8-6 This is a good place for a call-forward “See Section 6.2 and 6.3”

4-3 This is a good place for a call-forward (see Test C.4, Section 4.1)

4-15 for most smoke plumes

3-24 For every observation

2-13 we have significantly changed

1-9 “adapt to global processing” or “adopt global processing”

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