

Interactive comment on “A Dark Target research aerosol algorithm for MODIS observations over eastern China: Increasing coverage while maintaining accuracy at high aerosol loading” by Yingxi R. Shi et al.

Anonymous Referee #2

Received and published: 31 December 2020

I support the publishing of the paper after taking the following aspects into account.

I am a little bit surprised to see which papers are used to support the goal of this study, since the authors belong to the official product team, I believe they should be more careful of this issue. For instance, the authors mainly used Yan et al., 2016, Bilal et al., 2014, 2015, Wei et al., 2019, as the most important starting point of this work, the work of Yan et al., 2016 somehow fits the goal of this study, Wei et al., 2019 mainly raised that Dark-Target cannot provide aerosol product over the bright surfaces, which, to my understanding, does not fit to support why we need a new mask. The work of

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Bilal et al., 2014, 2015 are using a single scattering assumption for the aerosol model to support the retrieval of haze conditions, if the authors cite these papers, does it mean the authors support the idea of using a single scattering assumption for aerosol retrieval? I will strongly suggest the authors re-check the published papers carefully.

Eq (1) and (4) should be re-format

Section 4.1, I believe that the paper from Yang et al., (2020) is some early test of this mask issue, however, the paper is in Chinese and I can only read the abstract part, how the heritage of new mask from MERSI has been adapted to MODIS, taking potential problems of instrument differences.

Section 4.2, I think it makes not much sense to compare the operational aerosol models, which to my understanding, were derived from other sites compared to the new regional model, which is specifically derived for China, the issues are how they define the region in which the “regional type” can be used? Or they define the whole of China, or the Eastern part, as regions with a “regional type”? A geographic figure to show regions assigned to “regional type” is helpful. Is the “regional type” a single-model or also a mixture of fine and coarse modes, if so, why there is only one mode presented in Table 1?

Is there any problem with Fig 9 (b), the correlation coefficient is so low? There is quite a large reduction of values fall into EE, can the author explain a bit more about this? We can also see that in Fig 9 (d), the performance of the additional points seems to be worse than the operational products, why?

Fig 12 should be updated, it is better to have some transparency for the overlap regions.

Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2020-450, 2020.

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