Comment on amt-2022-91

Anonymous Referee #1

Referee comment on "Performance evaluation for retrieving aerosol optical depth from the Directional Polarimetric Camera (DPC) based on the GRASP algorithm" by Shikuan Jin et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2022-91-RC1, 2022

This study estimates the aerosol detect performance of DPC and verifies the accuracy of AOD retrieval with the GRASP Algorithm. It provides a complete set of DPC data pre-processing flow, and introduces the necessary information of the DPC and GRASP algorithms. In addition to the AERONET, the results of AOD were also compared with various MODIS standard aerosol products at spatial and temporal scales. Generally, the manuscript has been well organized and written. It is worthy for publication after some minor modifications. The comments were as follow.

Major Comments:

1) The DPC/Gaofen-5 is the first multiple angles and polarization satellite sensor developed by China. Thus, it is recommended to add a brief introduction to the DPC sensor in the Abstract section to help readers quickly understand the sensor.

2) For the Method section, I noticed an additional radiometric correction applied to the DPC data prior to AOD inversion. Is this necessary and does it have a big impact on the results?

3) As mentioned in Section 3.3, the setting of multi-pixel retrieval unit in the GRASP can help to improve result of AOD inversion. What is the basis for this setting? Does a larger inversion unit mean better inversion results?

4) In the result of AOD, the large absolute mean bias also appeared when the residual of polarized fitting is small (0.01). The reason of it should be explained in the text.

Minor Comments:

1) Line 25: Abbreviations should be given full names on their first occurrence.

2) Line 29-32: Please rephase the sentence.

3) Line 221: The reference related Fmask is missing.