

## ***Interactive comment on “Inter-comparison of three AATSR Level 2 (L2) AOD products over China” by Y. Che et al.***

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Dear Editor and Reviewers,

We highly appreciate the detailed valuable comments from the referees on our manuscript of “acp-2016-195”. The suggestions are quite helpful and we have incorporated them in the new version of manuscript. We have referred to literatures and papers and re-analyzed the collected data and reconstructed the paper to improve the quality of our paper.

As below, I would like to clarify some of the points raised by the Reviewers. And we hope that the reviewers and the editors will be satisfied with our responses to the ‘comments’ and the revisions for the original manuscript.

C1

Yours truly,

Yong Xue

ãŒ In this study, authors validate three AATSR AOD products (ADV, ORAC and SU algorithm) provided by Aerosol\_cci project over China in 2007, 2008 and 2010. It’s been widely validated (compared with AERONET AOD) that these three algorithms have ability in retrieving AOD over land with high precision till 3/23/2016. However, the AERONET data has limitations as reference data that there were not enough AERONET sites built and the distribution of AERONET sites were unevenly in mainland China in 2007, 2008 and 2010 caused by large territory of mainland China. Authors introduce CARSNET data to be combined with AERONET data, making up for these limitations and improving reliability of reference data. On this basis, authors not only select common evaluation metrics, but also introduce new metrics, for example, the improved KAPPA coefficient as comprehensive evaluation metric, the DR for determination of AOD retrieved “outliers”, the improved expected error envelope designed for characteristics of AATSR AOD products, etc. This study is a nice trial consisting many meaningful works and I would recommend publication if my following comments/suggestions can be adequately addressed.

Major comments: 1. The structure and composition of manuscript should follow the requests of official website of Atmospheric Chemistry and Physics (ACP). For example, keywords, team list, etc. should add to manuscript and team list exist in this manuscript. Response: All required structure and composition will be added in new version of manuscript.

2. Figures in the manuscript should be clear and easily understood. The main method of this study is to validate three AATSR AOD products year by year for reason of different reference data available for authors. Readers could distinguish which sites in the Fig. 1 is from AERONET or CARSNET, but may not pick out the space distribution of ground-based data sites in same year easily. I recommend authors replot Fig. 1 of “The

C2

distribution of selected AERONET&CARSNET sites in mainland China in 2007, 2008 and 2010”, using one same color or type for sites available in one year. Response: The figures have been replotted with clear and easy understood symbols and text, as Fig. 1 we have replotted the symbols of sites from different networks using different colors to make it clearer.

3. Also I suggest that the paper never use the word “good” to describe the results. The coefficient of correlation (CC) as one of main evaluation metric, which indicates whether there is any linear relationship among the points. Authors could not claim which performances of products is “good” or not “good” by any values of CC or other evaluation metrics. For example, when CC is high, the performances could be viewed as “good”, when CC is low, the performance is also viewed “good”. The word “good” may confuse readers, leading misunderstanding of conclusions in this study. Response: The “good” or “well” terms have been replaced by quantitative description or comparative words. For example, in section 4 to section 6, we have refined our analysis using more detailed quantitative description to present readers easy understood analysis.

Specific comments:

Page 2 line 9, the influences of aerosol particles on cloud should cited the paper of Twomey published in 1974. Response: This reference will be added.

Page 2 line 19, the word “because” should be replaced by other words like “including” Response: This sentence has been revised.

Page 3 line 10, the word “more” should be removed Response: This word has been removed.

Page 3 line 15-19, comparison of satellite retrievals with other high quality has limitations, could you illustrate it more clearly? Response: We have added necessary illustration and cross-validation with MODIS C6 DT&SB merged datasets.

C3

Page 3 lin26, is “Aerosol\_CCI” or “Aerosol\_cci” formal? Response: The CCI official website uses “Aerosol\_cci”, therefore, we’ll introduce “Aerosol\_cci” in the following or revised paper.

Page 4 Tab. 1 the bottom row are same with header row, what’s it useful? And in the title abbreviation “Tab.” should avoid. Response: Tab. 1 has been revised.

Page 9 Tab. 4 these statistics should be up to two decimal point. Response: Relative statistics have been kept two places of decimal.

Page 9 line 3, this sentence has syntax error. Response: This sentence has been revised in new version of manuscript.

Fig. 8 – Fig. 16, the places of titles should be same. Response: The places of title in figures have been adjusted to the same.

Page 19 Tab. 5 these statistics should be up to two decimal points. Response: Relative statistics have been kept two places of decimal as Tab. 4.

Page 24 line 29, in part of acknowledgements, the numbers of sites are inconsistent with mentioned as above. Response: The numbers of ground-based sites have been corrected in new version of manuscript.

Please also note the supplement to this comment:

<http://www.atmos-chem-phys-discuss.net/acp-2016-195/acp-2016-195-SC1-supplement.pdf>

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Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-195, 2016.

C4