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Atmospheric Chemistry and Physics Discussions

Interactive comment on "An online aerosol retrieval algorithm using OMI near-UV observations based on the optimal estimation method" *by* U. Jeong et al.

Anonymous Referee #1

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General comments

The authors developed an online version of OMI near-UV aerosol retrieval algorithm using the optimal estimation method. The results provide useful information on retrieval algorithm of aerosol and uncertainty evaluation of inversion products. Overall this is an interesting piece of work and appropriate for the journal. However, some minor revisions along the lines suggested below are requested. I would suggest this paper be published with revisions.

(1) In order to emphasize the merit of OE-based algorithm, the AOT and SSA from

the operational OMI and OE-based products are compared and validated against AERONET data during the DRAGON-NE Asia 2012 campaign. As shown in Fig. 6, the Q values for two algorithms are comparable while the OE-based inversion method indicates higher correlation coefficient. The authors should explain the improvement of OE-based AOT retrievals specifically. Also, it is needed to show the correlation coefficient with statistical significance because the sampling numbers are different. Furthermore, the SSA values from OMI operational products and OE-based inversion products show the similar correlation and the Q values from the operational algorithm are rather higher than those from the OE-based algorithm. Authors should explain the merit of OE-based algorithm to make the readers clearly understand this point.

(2) In my opinion, the other merit of OE-based algorithm is to provide the information on forward model parameter errors in determining the accuracy of AOT and SSA retrievals. As shown in Fig. 9, the average and standard deviation of forward model parameter errors are suggested and their importance on the retrieval accuracy of AOT and SSA are evaluated. I wonder whether these points are the originality of this study or the factors well-known from previous studies are quantitatively confirmed. If the latter, authors should suggest the references. If the former, it is needed to emphasize this point as the other merit of OE-based algorithm in the Abstract and Results.

Specific comments

(1) P14: In this study, the dust event on 28 April 2012 was selected. During the DRAGON-NE Asia 2012 campaign, do authors apply for other dust events? In OMI AI shown in Fig. 3, what do the negative values of AI mean?

(2) P14 L19-20: Authors mentioned “affected by snow and cloud contaminated pixels”. On 28 April, is it possible to be contaminated by snow?

(3) P14 L25-26: Authors should check the latitude and longitude, “East Mongolia (36°N, 138°E)”

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(4) P15 L18: Add “i.e.,” within parenthesis.

(5) P17 L5-6: “Thus the further error analysis in Torres et al. (2002b) was not performed in this study” is confusing.

(6) P17 L13: Check the “AERONET climatology during the campaign period”.

(7) P18 L1: Replace “surface albedo” to “surface reflectance” shown in caption of Fig. 9.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 16615, 2015.