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Atmospheric Measurement Techniques Discussions

Interactive comment on "Post-processing to remove residual clouds from aerosol optical depth retrieved using the Advanced Along Track Scanning Radiometer" *by* Larisa Sogacheva et al.

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Dear Referee #1,

Thank you very much for the attention to our manuscript and pointing the significance of that work. We considered your minor comments. The corresponded corrections improved the quality of the manuscript.

Interactive comment on "Post-processing to remove residual clouds from aerosol optical depth retrieved using the Advanced Along Track Scanning Radiometer" by Larisa Sogacheva et al. Anonymous Referee #1 Received and published: 16 September 2016 The paper deals with the improvement of a detection scheme (CPP) for resid-

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Discussion paper

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ual clouds in AOD maps from ATSR-2 and AATSR, thus increasing AOD retrievals by 10-15% along with improvements when comparing AOD products with AERONET. The original method is based on four tests T1 to T4 which are shortly described. The need for an improvement is discussed as aerosols in the vicinity of clouds as well as high aerosol loading events (plumes) are partially excluded by the old CPP scheme. Main reason for misclassification of aerosol cases as clouds is the spatial homogeneity test which appears to be too strict under plume conditions. Additional tests are included to retain pixels contained in aerosol plumes which were formerly discarded. This results in a better agreement of the AOD product with ground truth from AERONET, as well as changes in climatologies and time series. Changes are most pronounced for cases with expected high aerosol loadings like for regions Asia and China. For aggregated products, changes are in the order of +/- 0.2 and significant. The work is significant and ready for publication since an important global aerosol product shows non-negligible changes when the described method is used. I recommend to publish this paper with with minor changes:

Minor: - p.7,l.3: Maybe change to: “spatially smooth”. changed - Figure 2, caption: Maybe mention that this is the same scene as shown in Figure 1. Caption has been changed as proposed - p.7,l.23: Please clarify which tests are used here (old or improved?) Clarification is added: “as recognized with the four ADV cloud tests” - Figure 3, caption: Maybe mention that this is the same scene as shown in Figure 1. Caption has been changed as proposed - Figure 6: The figure is hard to decipher. I propose to not connect the different groups of points. I.e. when N increases, don’t connect the following dots. Here, effectively, a two-dimensional case is linearized to a 1D case and lines only make sense within one “slice” to the data. Also, the plot markers are hard to distinguish.

We checked how the plot looks if points are not connected. In that case, the plot is less readable (figure attached) To make the plot more clear, we changed the line width and marker sizes

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Why wasn't the highest ADV vs. Aeronet R (N>2,A<0.2 ! 0.84 R value?) value chosen as parameters for the scheme? For the N>2 and A<0.2 combination, the correlation between ADV and AERONET is the same (∼0.84 for the Globe) as for the combination chosen (N>2 and A<0.2). However, we want to be more strict at the cloud edges, thus we use the N>3 as one of the thresholds.

- Figure 8: All scatter show the same AOD range up to 4 which makes them very hard to interpret for the Globe and Europe. We made figure 8 less heavy by deleting areas, where the ImCPP has not changed the AOD value much. I propose to use proper scaling such that one can see what actually happens. E.g. the most representative range for Europe is almost impossible to see. I also propose to use vector graphics such that one could zoom in. The was no significant changes in Europe, where AOD is much lower, compared to polluted China or biomass-burning areas in the South America and Africa. In low-AOD areas, the changes in AOD value after the ImCPP implementation (which is focused on high-AOD areas), compared to ExCPP, were negligible. We changed the color scale and the figure is more readable now.

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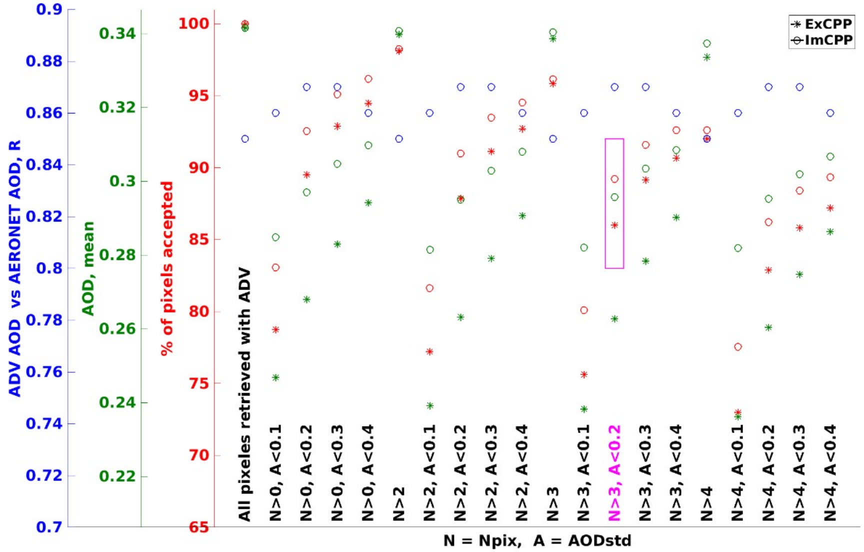
ADV AOD vs AERONET AOD, R
AOD, mean
% of pixels accepted
ExCPP
ImCPP
All pixeles retrieved with ADV
N>0, A<0.1
N>0, A<0.2
N>0, A<0.3
N>0, A<0.4
N>2
N>2, A<0.1
N>2, A<0.2
N>2, A<0.3
N>2, A<0.4
N>3
N>3, A<0.1
N>3, A<0.2
N>3, A<0.3
N>3, A<0.4
N>4
N>4, A<0.1
N>4, A<0.2
N>4, A<0.3
N>4, A<0.4
N = Npix, A = AODstd

Fig. 1.

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