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Atmospheric Measurement Techniques Discussions

Interactive comment on "Aerosol retrieval experiments in the ESA Aerosol_cci project" *by* T. Holzer-Popp et al.

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We thank the second reviewer for his helpful comments.

Anonymous Referee #2

This is an important paper that should appear in a journal-of-record in this field, such as AMT. It describes the first of three satellite aerosol retrieval algorithm comparison experiments, covering eight major algorithms. They examine in detail aerosol type and cloud masking assumptions. My "quick" review before posting was fairly detailed, and the authors already addressed most of the suggestions. So here are just a few additional notes and suggestions.

1. Section 3.3, P2364, line 15. Might reword: “highly conservative experiment to minimize cloud contamination.” – we will reword 2. Section 3.3, P2365, line 5. So what was used for the PARASOL cloud mask? (I now see you mention in Section 4.8 that the standard PARASOL mask is used, but it might be worth stating that here.) – we will add here 3. Section 4, P2365, lines 8-10. Is there a reference for the ENVISAT instrument cross-calibration? – we will add such 4. Section 4, P2365, line 13, Table 2. Table 2 might be augmented to include some additional, abbreviated information about each algorithm, such as the particles assumed, parameters retrieved, cloud mask used, etc. Section 4 describing the algorithms is nearly half the entire text; a tabular summary of key attributes would make it easier to grasp the algorithm differences, and if possible, might allow for shortening Section 4 in places. – we will place part of the information in such a table (but keep ourselves limited to AOD, since we do not assess further parameters in this paper) 5. Section 4.1, P2366, line 20. Might read: “determined by propagating the measurement error: ” – we will reword 6. Section 4.7, P2375, lines 15-16. Is there a reference for the ALAMO algorithm? – we will add a technical report (ATBD) and one peer reviewed paper (focusing on ALAMO altitude retrieval) here 7. Section 5.1, P2377, line 24. You might provide a reference for the AeroCom tools. – we will add 8. Section 5.1, P2378, lines 2-6. Although the sun photometer AOD retrievals are not very sensitive to background radiance (see, however, Sinyuk et al., Remt. Sens. Env. 2007) or aerosol absorption, particle property retrievals do require significant assumptions; for example, AERONET assumes the same refractive indices apply to both the fine and coarse modes. – we will add 9. Section 5.2, P2379, line 23-25. Did the algorithms that improve in the biomass burning regions assume less absorbing particles before adopting the Aerosol_cci particle types? 10. Section 5.2, P2379, line 27. “although the features still do not agree everywhere.” – we will reword 11. Section 5.2, P2381, lines 2-3. “the wider swath of MERIS provides larger numbers” – we will reword 12. Section 6, P2383, lines 19-22. Could issues with the common climatology contribute to the reduction in performance, rather than just issues with the algorithms? 13. Section 6, P2384, lines 24-26. This seems important, but

AMTD
6, C1160–C1162, 2013

I did not notice a critical discussion of the surface parameterization in Section 5. If this is covered in another paper, it would be worth referencing, and if not, it might be worth including an overview in Section 5. – We will extend the current discussion of this aspect in the second and third last paragraph of the conclusions.

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 2353, 2013.