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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Inferring absorbing organic carbon content from AERONET data" *by* A. Arola et al.

Anonymous Referee #2

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General/Specific comments:

This paper applies the technique of Schuster et al. (2009) to retrieve not only columnar BC concentrations, but also absorbing organic carbon (OC) concentrations. The basis of these retrievals is data from the AERONET sun photometers.

The paper is easy to understand. However, I am somewhat concerned about the uncertainties in the retrievals, as depicted in Figure 4, which shows very large uncertainties depending on what assumptions are used for the refractive indices of OC. I realize that there is not sufficient information to constrain the values of the refractive indices to achieve smaller uncertainties: the authors are doing the best they can given the available information. Because of this and the generally good overall quality of the paper, I am recommending publication, with these suggestions:

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(1) Many estimates of the mass absorption efficiency (MAE) of OC have been published, including Kirchstetter et al. (2004), Barnard et al. (ACP, 2008), and Sun et al. (Geophysical Research Letters, 2007). For a wavelength of 440 nm, the MAE seems to lie in a range of 1-2 mˆ2/g. It would be interesting to derive MAE for the OC retrievals and see how it compares with these previously published values. This could be done using the same data to construct Figure 4. I don't think this would be a difficult task. I am therefore asking to authors to implement this suggestion, or argue against it. This task might help constrain the uncertainty.

(2) The fact that these estimates are quite uncertain should be stated more strongly in the conclusions (maybe by adding a point number 4). There are many other sources of uncertainty aside of the assumption of refractive indicies (such as the assumption of OC density). I think a lot of these uncertainties are discussed in Schuster et al. (2009), at least for BC retrievals. If applicable, the authors might refer (again) to this paper.

(3) The authors should provide a table and some discussion in the text about the locations of the sites. For example, and number of locations are listed in Table 2, but it's not obvious to me where some of these sites are located. Where is Alta Floresta?

Technical comments:

(1) page 18371, line 7. Remove the "greater than" sign

(2) page 18375, line 18. What is "alpha" in the "alpha/rho" ratio?

(3) page 18376, line 11-12. "when the dust influence is attempted to exclude" should be changed to "when we attempt to exclude the dust absorption".

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 18365, 2010.