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Atmospheric Measurement Techniques Discussions

Interactive comment on "An algorithm for retrieving black carbon optical parameters from thermal-optical (OC/EC) instruments" *by* A. Andersson et al.

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Editor's comment:

I received a response from referee #1 that pertains to the authors' response to the review of AMTD-2011-10 from May 19, 2011. The referee agreed to have the response posted in the discussion forum (attached below). Referee #1 recommended to reject the manuscript at this point (please see below specific reasons). I follow this recommendation, but encourage addressing the criticism brought forward and re-submit the manuscript at a later time.

Referee #1's response:

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Interactive Discussion

Discussion Paper

I have read the authors' response. I hope they pursue this topic, but the paper in its current form, or proposed revisions, does not yet meet a standard of rigor.

My main misgiving about the manuscript is that the authors don't seem to know the instrument very well. The instrument already has challenges in quantifying the analyte of interest (i.e. separation of EC from OC). The authors propose that one could extract additional information from it. If so, one should be very familiar with its existing limitations. The current paper does not demonstrate such an understanding. The author response says that they are well aware of the literature and have published on the topic themselves. But they don't address the basic question: some of the artifacts in the OC/EC instrument affect the determination of EC and they are related to the optical response. The relationship between absorption and EC is therefore spurious. The "suspicion that they might be studying an instrument artifact" is one reason that I criticized the MS, but more general is a lack of critical thinking regarding the EC measurement, the absorption measurement, and the relationship between them.

For example, my comment "This treatment assumes that the two substances could be separated." ... The authors state "It is a fact of observation that the carbon contributions and the laser-attenuating contributions do not evolve from the filter at the same time...." They claim that this indicates two separate states: carbon burns off and laser-attenuating material also burns off. What if carbon and other material burned off at the same time? A carbon signal would be detected, laser attenuation would be decreased due to loss of both the carbon and the other material, and there is no way to tell whether the two materials were lost at the same time. In fact, it's known that organic carbon and elemental carbon can be removed at the same time (see e.g. Subramanian et al 2006) so one could suspect ambiguity in the analysis. My misgiving about the paper is a general lack of critical thinking about complications that could invalidate the interpretation. If the authors have demonstrated this understanding in earlier papers, the results should be discussed here.

With the present paper, I am concerned that the authors are proposing an uncritical

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approach. Then they will apply it broadly (their statement "However, extensive field applications, which are now underway, are necessary to draw conclusions about the optical properties of EC at any particular site.") It seems that this paper is considered the 'validation' work. I miss the rigor needed for such a work. The approach and conclusions have not been carefully tested. If the authors propose the existence of an un known compound, they should try to find out what it is before making broad conclusions. There are few candidate compounds that attenuate light, and that also decompose at the temperatures of interest. The compound would remain on the filter if the temperature program were cut off after the carbon evolved, but before the unknownÂă compound evolved, and it could then be susceptible to analysis. I realize that such an endeavor would require extra work. I suggest that it is required to produce a solid analytical work. Otherwise it is just speculation based on a few samples. Speculation is OK if it is a small part of a larger study with many conclusions. As the main focus here the conclusions do need more justification.

Interactive comment on Atmos. Meas. Tech. Discuss., 4, 1233, 2011.