

Interactive
Comment

Interactive comment on “Clues for a standardised thermal-optical protocol for the assessment of organic and elemental carbon within ambient air particulate matter” by L. Chiappini et al.

Anonymous Referee #3

Received and published: 10 January 2014

The aim of this paper is to provide information on some parameters influencing discrepancies between various thermal-optical methods for OC/EC determination in order to better understand the quality of data provided. Although some of the results are well known, results presented in this paper are of high interest and would help to define a standardized protocol for EC/OC determination. Nevertheless, as already stated by the authors in the text, the limited number of data available for the present study prevents making any definitive conclusions. Then, the need of more investigations, based on more detailed and complete studies, is demonstrated. The manuscript is structured in four blocks:

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1) The first shows an inter-comparison exercise for 5 laboratories in France analyzing OC/EC with thermo optical methods. A clear limitation of this section of the study is the small number of laboratories participating. Another important limitation is, as stated by the authors, was the lack of systematic temperature calibration before inter-comparison.

2) In the second block, the results obtained by TOT and TOR determinations are compared. Results confirmed the well-known underestimation of OC by TOR compared with TOT. This difference is higher for the NIOSH than for EUSAAR2 protocol. Differences between EC_{tot} and EC_{tor} seem to be independent of the protocol but are probably related to PM chemical composition. Of high relevance are differences evidenced for rural and urban sites (higher differences for EC_{tot} and EC_{tor} at rural sites than at urban sites). However, looking at the Figure 4, this difference is not so evident. The constant component of the regression equation is very different for the urban and semi-rural sites for EC (Figure 4). Probably, the slope will be very similar for a regression equation $y=ax$. Moreover, the similarity on concentration of EC and OC measured at the urban sites and at the semirural site is surprising. More information about sources affecting the semi-rural sites is needed; how much do represent the biomass combustion/traffic sources at the semi-rural site? The need of further investigation on the influence of chemical composition is concluded by the authors. Data from more urban/rural sites will be of high interest for futures investigations.

3) In the third block the influence of the laser signal intensity is evaluated. It is evidenced the effect of the soiling oven in the EC/TC ratios, resulting in the underestimation of EC. Discrepancies were higher for high EC loadings. However, as shown in Figure 7 b, the EC concentrations determined with the soiling oven are higher than with clean oven for samples with low EC+POC loadings. Have the authors any explanation for these high ratios? Again, the results are of high interest, but the low number of samples and the lack of temperature calibration prevent definite conclusions.

4) Finally, it is evaluated the effect of the EC loading. Low EC concentrations were de-

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terminated for high EC loadings. However, the causes are not clearly identified. Further experiments are needed to clarify this effect.

Minor corrections

P10235, L17. IMPROVE / IMROVE

P10236, L22. Color was not assigned to each protocol in Table1; please, delete

P10237, L17: “similar PM10 concentration” instead of “same PM10”

P10242, L9. “To go deeper. . . .” move to other paragraph

P10243, L6. 1 m63 h-1 / 1 m3 h-1

P102046, L 10-12. I couldn’t find this info in the supporting information.

P10247, L16-23. Fig 7a and /b; a and b are not indicated in Figure 7.

P10248, L10-13. This sentence can be shortened; the first part of the sentence could be eliminated.

P10249, L28. Ammonium sulfate is a non-refractory material

Figure 1. Please indicate that EC/TC ratios depicted for Lab 3 correspond to TOT correction

Figure 4. Urban and rural samples.

Figure 5. Please, revise figure caption, position of panels is opposite

Figure 7. Please, revise figure caption, position of panels is opposite

Table 1: Lab 3, charring corrections was by both Transmittance and reflectance

Table 2: Insert the OC, CE, and CT tags in the head in the front row

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 10231, 2013.

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