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Atmospheric Measurement Techniques Discussions

Interactive comment on "Inter-comparison of NIOSH and IMPROVE protocols for OC and EC determination: Implications for inter-protocol data conversion" *by* Cheng Wu et al.

Anonymous Referee #1

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This paper aims to assess the disagreement on EC results between the IMPROVE and the NIOSH thermal protocol and investigates the reasons for this discrepancy. The authors suggest various reconstruction methods to perform OC and EC inter-protocol data conversion with the purpose to further exploit the current OC and EC datasets. This work is certainly relevant to the scope of AMT and the methods presented are sound and in general well described. Although the manuscript is well structured some sections (section 3.2 and 3.3.2) are difficult to follow as too many figures are given both in the main manuscript and in the supplementary material. I recommend it for publication in AMT after the comments below are addressed.

Comments

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Introduction: The authors should mention that the there is no unique NIOSH protocol since many NIOSH-type protocols exist, with maximum temperatures in the inert mode found in the range 820âĂŘ900 °C.

Section 2.3 Please provide the exact number of valid data

Line 142: Also the residence time is different as the IMPROVE protocol advances from one temperature to the next one when a well-defined carbon peak has evolved

Line 154: This is not true: In the NIOSH protocol the carbon mass evolving from 550 °C to 870 °C represents part of the OC3 peak and the OC4 peak. Equation (1) should be corrected to include the manually integrated area from 550 to 870 °C and not only the OC4 peak. The authors should explain why they have included only the OC4 peak in the equation.

Line 172: What do you mean by thermal effect and laser effect? Both OC4 peak and PC formation depends on the aerosol chemical composition and the temperature steps and residence time in the inert mode. Correction for charring is achieved by monitoring of transmittance or reflectance.

Lines 201-226: I find this paragraph a bit difficult to follow. Could you please simplify it?

Line 255: What does RHS represent?

Section 3.3: As one of the objectives of this paper is to estimate the EC IMP_TOR from NIOSH TOT data it would better to include all reconstruction methods in the main manuscript

Conclusions: The authors should mention somewhere in the text that all NIOSH TOT analysis should have been done by the same analyzer otherwise other instrument specific parameters might influence the regression.

Table 1: Please include “mean” in the caption

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