We thank the reviewers who helped us up to the end to improve the submitted paper. We have considered all the questions and comments in the last version. We hope that this fulfills all the expected requirements.

Thank you very much.

Review: Evaluation of mass measurement techniques for soot with different size distributions and OC/TC contents

After a long process, including several exchanges of comments between the authors and the reviewers, I believe that the manuscript has reached a sufficiently high level to be accepted after minor revision. My specific comments are as follows:

General:

I agree that the gravimetric measurement on filters is important in order to comply with Standard 16450. However, in the description of the experiment as well as in Figure 5, it should be clearly stated why the comparison between the gravimetric method and the TEOM is performed at all (i.e., the standard method as the reference, and on the other hand the verification of the diluter performance and the determination of losses along the different branches). It should also be clearly explained why, in your opinion, heating the sampling line to 180 °C does not significantly influence the mass measurements in either branch of the experiment. I did not find this explanation anywhere in the manuscript.

ANSWER: this point has been addressed.

The sampling system was designed and operated in accordance with ISO 8178 requirements, which specify standardized procedures for measuring exhaust emissions from internal combustion engines with a target temperature of 180 °C for the sampling line and a maximum residence time of 3s. With a sampling flow rate of 7.7 L/min, a line length of 1 m (inner diameter of 6 mm), the aerosol residence time is approximately 0.22 s. The following sections detail the operating principles and implementation conditions of each component of this test setup.

Later:

This shows that the measurement protocol, including the 180 °C sampling line for the standard filter method and the dilution upstream of the tested instruments, does not significantly affect the mass measurements in either branch of the experiment.

Abstract:

The abstract contains many abbreviations; some are explained in brackets, while others are not. Please minimize the use of abbreviations in the abstract, and provide their definitions in the Introduction.

Instead of listing the names of all instruments, I suggest using a more general sentence such as:

"...we assessed the mass concentration using four different online instruments, including the gravimetric method, the aerosol electrical charging method, the filter photometry method, and the aerosol mobility method."

The full names of the instruments should be presented in the Introduction.

Line 8:

Replace “OC/TC” with “organic-to-total-carbon (OC/TC) ratios ”

Line 10:

Replace “The OC/TC ratio was also determined” with “The OC/TC ratio was determined by the thermal-optical method.”

ANSWER: the abstract has been updated to account for all these requests.

Figures:

Figure 2 is not referenced anywhere in the manuscript text. Please add an explicit in-text reference.

ANSWER: a reference has been added.

Figure 3 presents a schematic illustration of the operating principle of a filter photometer. However, it does not depict the dual-spot loading compensation principle, although the text states that “the MA300 aethalometer employs the dual-spot technology.”

This inconsistency should be resolved in one of the following ways:

Update the figure caption: Modify the caption to explicitly state that the figure shows only the general operating principle and not the dual-spot technology.

Update the schematic: Adapt Figure 3 so that it correctly illustrates the dual-spot concept, ensuring consistency between the explanation in the main text and the visual representation.

ANSWER: we modified the figure and its caption.

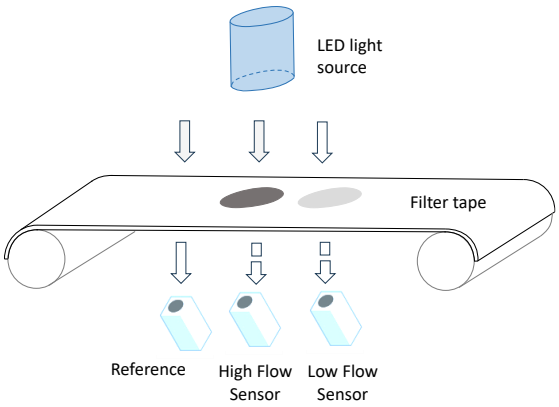

Figure 8 should be split into panels (a) and (b).

Both subfigures must be referenced individually in the main text. In Figure 8(b), the grey triangles representing PPS corrected data are not visible at lower mass concentrations. The symbol style should be adjusted.

ANSWER: the figure caption has been updated. And the symbol style has been adjusted to improve the figure.

Lines: 308-311:

The paragraph 308–311 is written imprecisely, as the phrase “becomes reliable” is misleading. What you are referring to in this paragraph is that the σATN correction becomes linear in the UV range below 1.3 L/min (you should propose a correction factor for σATN (UV, <1.3 L/min)), and in the IR range between 1.3-1.5 L/min (correction factor for σATN (IR, 1.3-1.5 L/min). The deviation from linearity may be a consequence of changes in the MAC value as well as the multiple-scattering parameter.

ANSWER: We updated the comment to account for this remark. However, due to the limited number of measurement points, it was not possible to propose a correction for the linearity as suggested by the reviewer.

The equivalent Black Carbon eBC mass concentration evaluated by the MA300 with equ. (1) is based on a constant value of the mass absorption coefficient σ_{MAC} correction. We observe a good linearity of the measured mass concentration in the UV range for an oxidation air flow rate below 1.25 L/min, so corresponding to OC/TC ratios above 38%. In the same way, the IR mass concentration determination is linear for oxidation air flow rate above 1.3 L/min, corresponding to OC/TC ratios below 24.3%, which are soot particles predominantly made up of elemental carbon. In both UV and IR cases, the deviation from linearity may be a consequence of changes in the MAC value as well as the multiple-scattering parameter.