

We thank the reviewer for the comments. Answers to specific issues are addressed below; the original comments are in italic and our answers are in normal font.

- Page 6558, line 6: *should be $t_i - t_{i-1}$ instead of $t_{i-1} - t_i$*

Corrected.

- Page 6559: *equations 4 and 5 are different to the correction proposed in Petzold et al. (2005) (See Table 2 in Petzold et al. (2005))*

Typographical errors were corrected.

- Page 6559, line 21: *what does bAP,METHOD refer to? Both bAP,TRANS and bAP,REFL of equations 4 and 5?*

This has been clarified as: "the absorption coefficients obtained with different methods (MAAP, TRANS and REFL)".

- Page 6560, equation 6: *The units of delta BC should be given.. if they are in $\mu\text{g}/\text{m}^3$, then A/V would be missing*

Eq. 6 has the unit of mass BC (μg or ng) per area in cm^2 . This has been included in the text.

- Page 6561, line 4: *I guess this should be bAP,TRANS*

Corrected.

- Page 6563, section 3.3: *It is not quite clear what BCsmooth is in detail. In line 8 it says that it could be the last few minutes before the next filter spot change. In equation 8 however BCini is the concentration before the spot change.*

This has been clarified as: "The smoothed concentrations, BC_{smooth} , could simply be the last few minutes before the next filter spot change, by removing the other data suffering from the artefact."

- Page 6563, overall correction: *maybe it could be interesting if you showed a graph with the correlation between the smoothed data and the reference ones.*

This has been shown in Figure 4 (old Figure 3).

- Page 6563, line 23: *why have you used the Hill function? Justify it.*

The natural shape of the Hill function resembles the artifact shape, and the parameters in the Hill function can be fitted with a satisfactory accuracy.

- Page 6563, line 24: Define what the 'apparent accumulated mass' is.

Word "apparent" has been removed.

- Page 6566, line 12: Is there any difference between the 'apparent accumulated mass' (m) and the 'accumulated mass'?

This is related to the previous comment; they refer to the same thing. Word "apparent" does not appear in the manuscript anymore.

- Page 6567, line 20: why do you assume an absorption Ångström exponent of 1? You should justify your choice.

We do not have wavelength-dependent absorption measurements at the location, and a thorough investigation of the Ångström exponent through e.g. chemistry is beyond the scope of this manuscript. We have chosen to adopt the most conventional value of the exponent. As the wavelength difference between the MAAP and the PAS is only about 100 nm, the choice of the Ångström exponent should not make a considerable difference.

- Page 6574, figure 2a. Is m the 'apparent accumulated mass'? Then you should define this parameter in the text before you present it in the graph.

The m is now defined in the text before figure 3 (old figure 2).

To better judge if there are any general filter artefacts of the MAAP and if they are improved by this method. I would like to see for the dataset in Gual Pahari the concentration of BC as a function of attenuation for the whole period before and after applying the procedure. The dataset is long enough to provide enough statistics. It would be interesting to see if for such a dataset all filter load dependencies are now taken care of.

The following figure illustrates the concentration of BC as a function of accumulated mass (corresponds to attenuation) for the Gual Pahari data set. The artefact should occur on the low filter loadings, and we see it for the original data set (most clearly: there is a distinctive stripe of points which are the first points after a filter spot change). This can be seen for the reflected signal as well (in the manuscript this is already identified in Paragraph 3.1), but not for the corrected results. A slight curvature can be observed for the original signal, because the highest concentrations cannot be reached for low filter loadings due to the artefact. The corrected dataset, and the reflected dataset seem to correct for this behavior.

Not related to the artifact described in this paper, for accumulated mass above $\sim 12 \mu\text{g}$, the highest concentrations are not present in the plot. We do not expect this to relate to any filter

loading artifact; a closer inspection of the data reveals that at higher concentrations, spot change is induced in the instrument at lower mass loadings.

As the proof of the correction scheme is illustrated already in Figures 4 and 5 (old Figures 3 and 4), we do not feel that adding this figure in the manuscript would substantially provide added value.

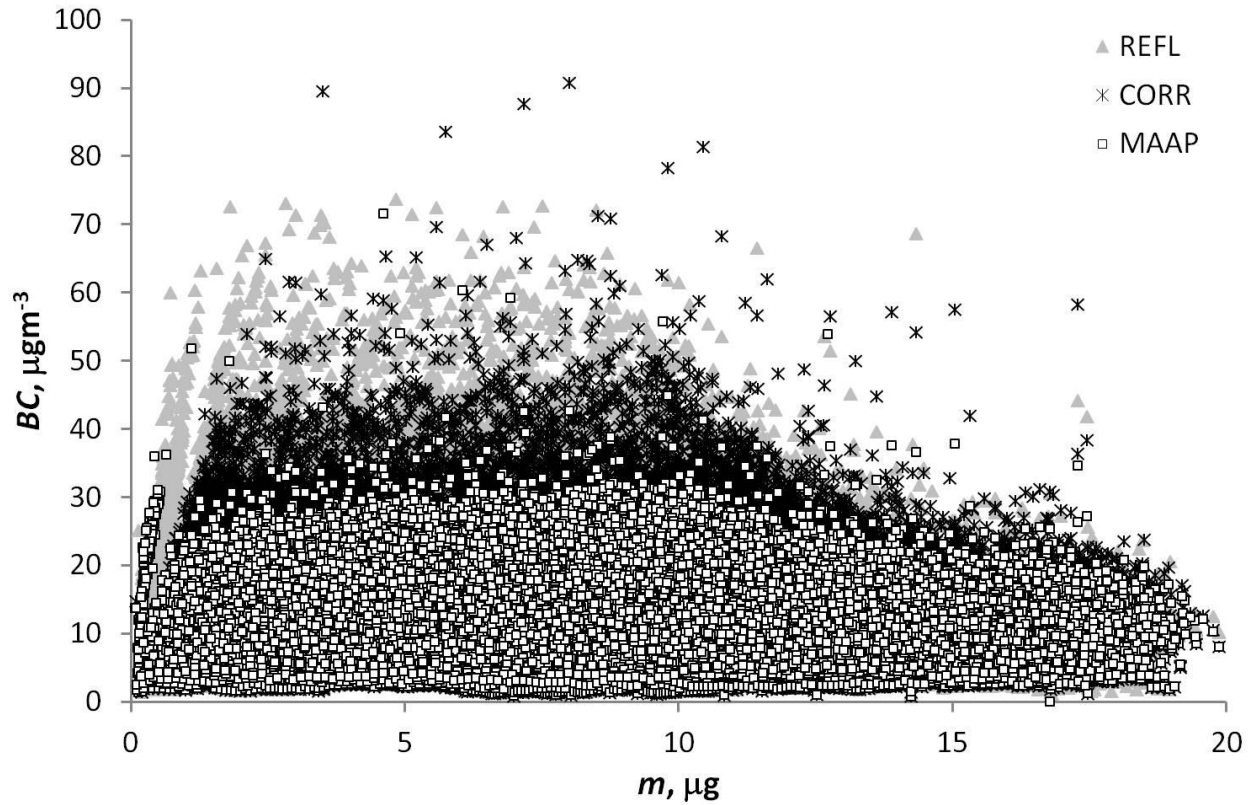


Fig. 1. BC concentrations in Gual Pahari as a function of mass loadings, m , on the filter spot. BC_{MAAP} is the original signal, BC_{CORR} is the smoothed signal with the overall concentration correction, and BC_{REFL} is the original signal determined with the reflectance method.