

Interactive comment on “Refining temperature measures in thermal/optical carbon analysis” by J. C. Chow et al.

Anonymous Referee #2

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General Comments

This manuscript presents an original and accurate method for calibrating temperatures in OC+EC analysers. It shows that large differences between the temperature measured by a thermocouple probe and the temperature experienced by the sample can occur. It is shown that for the instrument / thermal methods tested in this study, correcting the temperatures based on this calibration does not change the OC / EC split, which is a very important result. In contrast, errors in temperature calibration would greatly affect the accuracy in OC / EC determination of methods based on the fact that EC oxidizes in an oxygen containing atmosphere at a temperature $>340^{\circ}\text{C}$. However, for methods in which OC evolves in an inert carrier gas (as presented here), the ad-

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vantage of performing such a calibration seems quite limited. The authors state that it would improve the accuracy in the determination of various OC classes, but they do not demonstrate this by comparing results from various instruments without and with a temperature calibration. Furthermore, the uncertainties of these OC fractions may also be due to other analytical artifacts, such as a bad separation of the peaks -due to too short plateaus-, and uncontrolled, poorly understood, and variable charring affecting differently each OC fraction, as a result of e.g. various sample load and matrix effects.

Specific Comments: Page 4, line 11: Table 3 does not show any data showing the consistency among analysers. Page 4487, line 1: the reproducibility is not always within $\pm 3^\circ\text{C}$ (e.g. DRI#10 at 704°C). Page 4488, line 27: it is not rigorously true that “Thermocouple sensors in all of the models underestimate the sample temperature”. DRI#9 at 253°C and Sunset at 510°C overestimate. Page 4489, line 7: is the difference between the regression coefficients of the temperature calibrations for the Sunset and the DRI2001 instruments so significant that it can be stated that the “Sunset analyzer [E] did not appear to be linearly related to the target temperatures” in contrast with DRIs ?

Interactive comment on Atmos. Chem. Phys. Discuss., 5, 4477, 2005.

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