

January 28, 2018

Journal of Visualized Experiments  
Lyndsay Troyer, Ph.D.  
Science Editor  
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Dear Dr. Troyer:

Further to our discussion in the fall we are excited to submit our uploaded original manuscript entitled *"Calibration Protocol and Software for Split Point Analysis and Uncertainty Quantification of Thermal-Optical Organic / Elemental Carbon Measurements"* for consideration as a research article in JoVE.

Measurements of elemental and organic carbon in aerosol samples are vitally important to many researchers, where accurate classification and quantification of carbonaceous aerosols have important impacts on climate and health. This paper first presents a detailed protocol for precisely calibrating a thermal-optical OCEC analyzer within defined uncertainty ranges. The resulting video protocol of this complicated procedure should be highly-valued by a range of researchers and labs, both as a teaching tool and as a means to better document and standardize calibration procedures.

More importantly, along with the calibration protocol we are including an open-source software tool *"OCECgo"* that enhances calibration and data analysis and enables rigorous Monte Carlo quantification of uncertainties. Notably, the software tool includes novel means to correct for instrument drift and identify and quantify the uncertainty when discriminating between OC and EC in a sample. This is a significant improvement on the uncertainty estimation in the instrument manufacturer's software, which ignores this uncertainty and otherwise uses fixed equations for relative and absolute errors (generally leading to underestimated uncertainties and often yielding non-physical results as demonstrated in several example data sets). The demonstrated calibration protocol and new software tool enabling accurate quantification of combined uncertainties from calibration, repeatability, and OC/EC discrimination are shared with the intent of assisting other researchers in achieving better measurements of OC, EC, and total carbon mass in aerosol samples. We are excited to have this work released through JoVE.

Sincerely,



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