

Interactive comment on “Determination of water-insoluble light absorbing matter in rainwater using polycarbonate membrane filters and photometric detection” by J. E. Engström and C. Leck

Anonymous Referee #2

Received and published: 22 March 2009

The method described in the manuscript is not particularly new though indeed there were only very few such applications in atmospheric science. It is relatively straightforward to concentrate insoluble particles on a substrate than measure absorption by photometry. In terms of analytical methodology, the authors carefully evaluate the applicability of the method using both standard soot solutions and ambient samples. The basic question, however, is how effectively colloidal particles can be filtered out from a solution. Nucleation mode pure soot particles or those which had attached to water-soluble particles (which dissolve in precipitation) are unlikely to be captured by the filter

[Full Screen / Esc](#)

[Printer-friendly Version](#)

[Interactive Discussion](#)

[Discussion Paper](#)



substrate or only with low efficiency. Soot attached to larger insoluble particles, on the other hand, more likely ends up on the filter. Thus the amount of soot detected depends on the state of mixing of soot particles in the precipitation which could be highly uncertain. Another issue that should be discussed how the authors managed to disperse the synthetic soot in MilliQ water: were there flocks on the surface, or deposition on the walls of the vial, etc.? How well synthetic soot represents absorption properties of the atmospherically aged and possibly more hydrophilic soot particles in rainwater? Soot analysis in precipitation is very difficult if not impossible due to the fact that soot particles likely deposit on any surface they are allowed to contact with for prolonged time - which is often the case in wet only samplers. If we combine all uncertainties that the authors considered, that is multiply sample collection and storage efficiency (cca. 0.7) with filtration efficiency (0.85), we end up with an overall efficiency around 50 % only. If we add that soot concentrations are expressed in mass of synthetic soot (whose absorption efficiency was likely different from that of aged soot in precipitation), the results of soot analysis will be highly uncertain. Furthermore, the suggestion by the authors that one should brush the funnel and measure sample loss for each sample is highly impractical for any routine application. Of course, it is likely that the signal will be somehow proportional to the degree of 'pollution' in rainwater, but would add little if any to our understanding of wet scavenging processes of atmospheric soot.

Interactive comment on Atmos. Meas. Tech. Discuss., 2, 237, 2009.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

