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Atmospheric Measurement Techniques Discussions

Interactive comment on "Soot Reference Materials for instrument calibration and intercomparisons: a workshop summary with recommendations" *by* D. Baumgardner et al.

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General comments

The paper is a very welcome summary of the current position regarding Reference Materials (and consequently comparability and quality assurance) for a range of techniques for monitoring airborne soot. This is an important topic in both the air quality and climate change areas, and the paper is very timely. The conclusions are generally sound; the main specific comments are on clarification.

Specific comments

The paper addresses four distinct techniques, which can be termed (as in Section 3.2): filter-based light transmission; photoacoustic light absorption; laser induced incandescence; and thermal optical analysis. It would be helpful if these terms were used consistently, and the measured quantity in each case was clearly distinguished, for example using terms such as Filter-based Black Carbon, Photoacoustic Black Carbon, Refractory Black Carbon, and Elemental Carbon respectively, for the soot-like metric. (It is understood that there is no standardised terminology, so these are suggestions.) If the first two techniques are seen as measuring only the light absorption coefficient, not Black Carbon, this needs to be explained – at the moment the Introduction (P2318 1st paragraph) implies that the paper is about measuring "Black Carbon".

Abstract l.17 - It would be helpful if the SP2 instrument was described as a laser induced incandescence instrument.

P2320 l.27 – the scope should be clarified either in terms of techniques or measured quantities, as above.

P2321 Section 2.1.1 – It would be helpful if the light transmission method was described as 2 distinct stages (both of which have their problems): (1) determining the absorption coefficient of the sampled air (with units m-1); and (2) converting this to a BC mass concentration using a mass extinction coefficient (which has units m2.g-1).

It would also be helpful to point out that instruments such as the Aethalometer operate by measuring the small changes in the attenuation through the filter over the measurement period (not the absolute attenuation). This makes it more difficult to have a simple Reference Material such as a filter with known attenuation, as an RM with stable attenuation does not give a direct test of the instrument's normal operation.

P2324 Section 2.1.2 – As with 2.1.1, it would be helpful to point out that while PAS is superior to light transmission methods for determining the absorption coefficient, conversion to BC is again a separate matter.

P2326 l.4 – the heading “EC and OC” is being used to include Refractory Black Carbon, which is confusing.

Technical corrections

P2318 l.13 – replace “the whole of particles” with “whole particles”.

P2320 l.22 – italics are used both for controversial statements and for the Recommendations. This is confusing (unless all the Recommendations are controversial).

P2324 l.8 – replace 2.12 with 2.1.2

P2325 l.24 – replace Virkula with Virkkula

P2328 l.20 – replace “only” with “even”

P2331 l.17 – replace PyC with PC.

P2333 l.8 – add “, previously the National Bureau of Standards,” after (NIST)

P2335 l22 - Insert (4) before “cloud”

P2337 l.7 – replace “don” with “do”

P2345 l.15 – Replace “Fig. 1” with “Fig. 2”

Interactive comment on Atmos. Meas. Tech. Discuss., 5, 2315, 2012.