

## ***Interactive comment on* “Effective density of Aquadag and fullerene soot black carbon reference materials used for SP2 calibration” by M. Gysel et al.**

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Review of “Effective density of Aquadag and fullerene soot black carbon reference materials used for SP2 calibration”, Gysel, M., M. Laborde, J. S. Olfert, R. Subramanian, and A. J. Gröhn – AMTD 2011.

I believe that the manuscript is a valuable resource for experimentalists interested in convenient single-particle black carbon mass standards for calibration and measurements (not only for users of the SP2), and is close to the form it can be published in. I have some suggestions to expand discussion and interpretation of the results to

improve the impact and value of the paper:

1) The impact of the differences between this work and Moteki and Kondo 2010 (for effective material density at larger mobility diameters) should be put in context for typical ambient BC measurements with the SP2, where the center of the mass distribution is typically below 10fg. This will help the typical SP2 user better understand the impact of that discrepancy on their results.

2) The paper does not touch upon the very fundamental question of SP2 response as a function of mass (other than in discussion of OC/EC/non-C fraction in the two materials). It's clear that the data is there to make at least a basic statement about the relative SP2 response per unit mass of the two materials. This discussion, too, will inform the SP2 community about the level of discrepancy that they can expect for ambient BC measurements due to their choice of calibration material, as typically used.

Specific comments:

1) Line 13 page 4939: I do not believe that the differences in SP2 response to different BC materials are “subtle”. It is effectively a factor 2! Please specify the “ways” in which fullerene soot has been found to behave like ambient soot (i.e. SP2 response per unit mass, index of refraction, and effective density).

2) Please change the sentence at line 19 on page 4941 to read “. . .relating the properties of BC calibration materials to those of ambient BC denuded at 400 degrees C in Tokyo (Moteki. . . . .” or similar.

3) Line 5 of page 4942 – is “Collison type” meant here rather than “collision type”?

4) Line 9-11 page 4945: please weaken this statement by commenting on the additional uncertainty due differing SP2 response to different BC materials (per unit mass) from Moteki and Kondo 2010, or specify that the SP2 calibration need be valid for the particular material in question.

5) In figure 3 it appears that the spread of Aquadag effective density from different

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bottles at some mobility diameters is on order  $\pm 10\%$ . Why does the text describe this as “insignificant” when the level of agreement between the two laboratories, based on fullerene soot, appears better than this?

6) Thanks for a nice paper with easy-to-use results: I am already planning on citing it - Shuka

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Interactive comment on Atmos. Meas. Tech. Discuss., 4, 4937, 2011.

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