

Interactive comment on “Recommendations for the interpretation of “black carbon” measurements” by A. Petzold et al.

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Received and published: 7 May 2013

These “recommendations” is good work which should be continuously done by BC specialists. In introduction BC is introduced quite clear as “one fraction of the carbonaceous aerosol which is characterized by its strong absorption of visible light and by its resistance to chemical transformation”. But further the authors try to introduce the problem as “all definitions used in the scientific literature refer to a specific property of the respective carbonaceous fraction, or to the method that is used for the measurement”. It is not clear “Which all?”. It should be clarified in more descriptions or references, if not, this statement is written for professionals who in any case know well the subject and not needed much in problem discussion. The same is about “there are numerous publications in the scientific literature that refer to the same property

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but with different terms”. Which different terms? It is difficult to clearly distinguish these terminologies about. Again not clear which “these”. I should recommend to introduce “soot” already in introduction as directly BC-related term because it is used very frequently and one instead the other one. Reading further, I see that in Historic and current terminology many points are addresses, I should recommend to replace them into Introduction. In Definition “BC is mostly formed in incomplete combustion”, it is probably needed to add combustion of “what”: of fossil fuel and biomass. There is definition for soot that it is a product of incomplete combustion of hydrocarbons. Still there is a question if BC and soot are the same? Obviously not, because soot always contains OC, it is very worth to discuss in a paper, in definition. Again, later, soot will be addressed but logically it seems to be done early. Moreover, it is needed to clarify here, in definition, that BC is formed in combustion together with OC, internally mixed. There is no combustion process where BC is emitted alone. Just in Bladt et al., 2012 it was shown that small fraction of elemental carbon particles may be originated during propane burning at controlled laboratory conditions. Since there is nothing in Definition about OC and inorganic which are always present in/on combustion aerosols together with BC in the atmosphere, the reader may think that Properties indicated in Table 1 as “Low chemical reactivity in the atmosphere; slow removal by chemical processes” are related directly to BC. That is needed to clarify that this property concerns only to some fraction of atmospheric aerosol. Surface area, S, for soot indicated in 4.2 as $>100 \text{ m}^2/\text{g}$ is questionable, many commercial soots have $S < 100 \text{ m}^2/\text{g}$, for example Thermal soot has $S = 10 \text{ m}^2/\text{g}$. Soot produced by laboratory burner using aviation kerosene has $S = 49 \text{ m}^2/\text{g}$, by CAST generator $\sim 20-50 \text{ m}^2/\text{g}$, by aircraft engine combustor $\sim 6-60 \text{ m}^2/\text{g}$ (Popovicheva et al., 2008). Soot surface area much depends on particle size, porosity, and morphology, being significantly decreasing with high organic fraction of the particles. Surface area, its measurements, and relations to morphology and porosity are described in Popovicheva et al., 2003). Therefore, the value of so well defined as 100 m^2/g is quite wrong and can not serve as BC property in Table 1. Bladt, H., Schmid, J., Kireeva, E., Popovicheva, O.B., Perseantseva, N.M., Timofeev, M.A., Heister, K.,

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Interactive comment on *Atmos. Chem. Phys. Discuss.*, 13, 9485, 2013.

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