

Interactive
Comment

***Interactive comment on* “Characterization of long-term and seasonal variations of black carbon (BC) concentrations at Neumayer, Antarctica” by R. Weller et al.**

R. Weller et al.

rolf.weller@awi.de

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First of all we thank the referee for his constructive comments and suggestions.

Clearly, the chemical identity (and morphology) of black carbon (BC) aerosol cannot be defined in a stringent, unequivocal way because it is a collective term (see e.g. recent publication by Buseck et al., 2012 and appendant interactive discussion). Consequently, as a matter of fact, any attempt to calibrate whatever instrument in order to quantify “BC” by whatever physical or chemical method will be inevitably equivocal and will remain operational defined. Even the most sophisticated and promising BC-measuring device presently available, the soot photometer SP2, does not meet

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a “golden standard” (see recent investigations by Gysel et al., 2012 and appendant interactive discussion).

Actually we used a single filter version of the Magee Scientific aethalometer model AE10. This type can only be operated with 47 mm diameter circular filters but not with a filter tape. There is also a reference spot and the evaluation of the raw signal is identical (calculation of the attenuation by difference). As for the meaning of the term “Qbc”, the mentioned passage in our manuscript seems to be somewhat unclear. Essentially, what we wanted to convey is equivalent to the referees comment.

Of course, vertical mixing from above is by no means a simple process. We found that higher BC concentrations tend to be associated with cyclonic activity (page 25368, lines 16-23). We agree that transport by downslope flow from the Antarctic plateau could be a significant transport mechanism and should be addressed. Actually, we could not find any indications that southerly winds (indicative for downslope or katabatic flow, König-Langlo et al., 1998) were associated with enhanced BC concentrations at Neumayer (the same is true for mineral dust tracers).

Buseck, P. R., Adachi, K., Gelencsér, A., Tompa, É., and Pósfai, M.: Are black carbon and soot the same?, *Atmos. Chem. Phys. Discuss.*, 12, 24821-24846, doi:10.5194/acpd-12-24821-2012, 2012

Gysel, M., Laborde, M., Corbin, J. C., Mensah, A. A., Keller, A., Kim, J., Petzold, A., and Sierau, B.: Technical Note: The single particle soot photometer fails to detect PALAS soot nanoparticles, *Atmos. Meas. Tech. Discuss.*, 5, 4905-4925, doi:10.5194/amtd-5-4905-2012, 2012.

König-Langlo, G., King, J.C., Pettré, P.: Climatology of the three coastal Antarctic stations Dumont d’Urville, Neumayer and Halley, *J. Geophys. Res.*, 103(D9), 10,935-10,946, 1998.

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