

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

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General:

This manuscript presents an analysis of black carbon (BC) data from Neumayer Station in coastal Antarctica from 1999-2011. The authors have found no long-term trend in BC which is interesting and surprising because of the increase in maritime activity in this area. This is a unique data set and I recommend that the manuscript be published in ACP. The literature is replete with studies on the difficulty of measurement of aerosol light absorption. This study presents time series of BC measured with the Aethalometer and MAAP instruments. Proper calibration of both instruments is tenuous at best,

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however, the authors acknowledge and discuss this in detail. I strongly believe that these issues should not prevent publication of this manuscript in ACP.

Specific:

With respect to the AE10, I'm confused about how it was operated. The typical AE uses a moving tape with a sample spot and a reference spot. Attenuation is taken as a difference. Here, they used a filter. Was there also a reference spot? On the bottom of p. 25362, they refer to Q_{bc} as pertaining to the filter material as opposed to BC on or within the filter. To my knowledge, the original value of $19 \text{ m}^2/\text{g}$ for the AE assumed a MAC of $10 \text{ m}^2/\text{g}$ for BC with the additional absorption caused by multiple scattering artifacts. So whatever value is used is an “effective” MAC for BC and includes filter artifacts.

The discussion about source regions is a bit unconvincing. South America is likely because it's closest and yes, there is plenty of biomass burning. Long range transport is likely to occur at higher altitudes but how it gets to the surface at NM may be more complex than simple vertical mixing above the site. Air from the north no doubt impacts the plateau further south at higher elevation and becomes entrained in downslope flow.

Typos:

(page, line)

25359, 12: “prone” 25367,1: “assumption” 25369, 9: change “mid” to “middle” 25371,7: change “respecting” to “respective” Figure 6 caption: add after La, “(red line)”

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