Supplementary materials for Evaluation of the absorption Ångström exponents for traffic and wood burning in the Aethalometer based source apportionment using radiocarbon measurements of ambient aerosol

P. Zotter[1,#], H. Herich[2], M. Gysel[1], I. El-Haddad[1], Y.L. Zhang[1,3,4,5,†], G. Močnik[6,7], C. Hüglin[2], U. Baltensperger[1], S. Szidat[3,4], A.S.H. Prévôt[1]

[1]Laboratory of Atmospheric Chemistry, Paul Scherrer Institute (PSI), 5232 Villigen PSI, Switzerland

[2]Laboratory for Air Pollution and Environmental Technology, Swiss Federal Laboratories for Materials Science and Technology (Empa), Überlandstrasse 129, 8600 Dübendorf, Switzerland

[3]Department of Chemistry and Biochemistry, University of Bern, Bern, Switzerland

[4]Oeschger Centre for Climate Change Research, University of Bern, Bern, Switzerland

[5]Laboratory of Radiochemistry and Environmental Chemistry, Paul Scherrer Institute (PSI), 5232 Villigen PSI, Switzerland

[6]Aerosol d.o.o., Research and Development Department., Ljubljana, Slovenia

[7]Condensed Matter Physics Department, Jožef Stefan Institute, Ljubljana, Slovenia

[#]now at: Lucerne University of Applied Sciences and Arts, School of Engineering and Architecture, Bioenergy Research, Technikumstrasse 21, CH-6048 Horw, Switzerland

[†]now at: Yale-NUIST Center on Atmospheric Environment, Nanjing University of Information Science and Technology, 210044, Nanjing, China

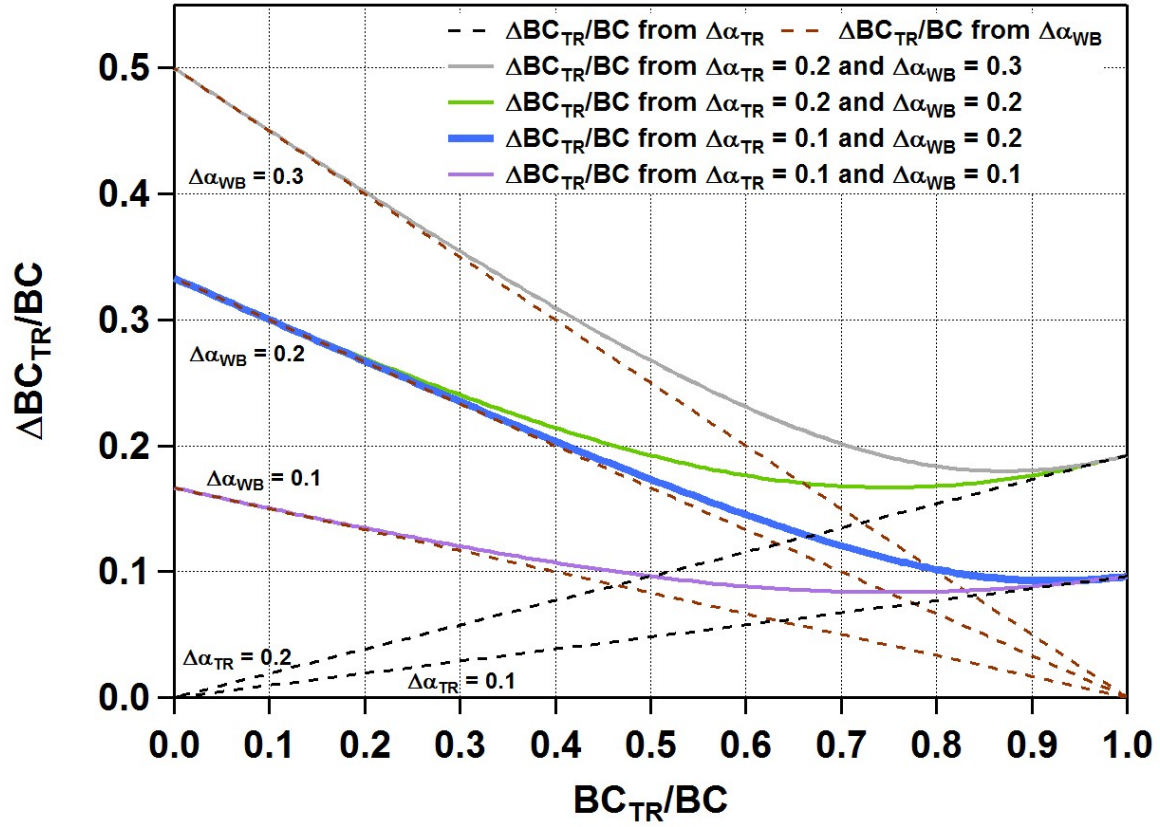*Correspondence to:* A.S.H. Prévôt (andre.prevot@psi.ch)

Figure S1: Residuals of BC_{TR}/BC compared to EC_F/EC ($\Delta BC_{TR}/BC$) as a function of BC_{TR}/BC calculated with $\alpha_{TR} = 0.90$ and $\alpha_{WB} = 1.68$ and using the wavelength pair 470 nm and 950 nm. The brown and black dashes lines denote the residuals of BC_{TR}/BC with respect to an error of α_{WB} and α_{TR} ($\Delta\alpha_{WB}$ and $\Delta\alpha_{TR}$), respectively, and the solid coloured lines represent the errors in BC_{TR}/BC with respect to errors in both, α_{WB} and α_{TR}.
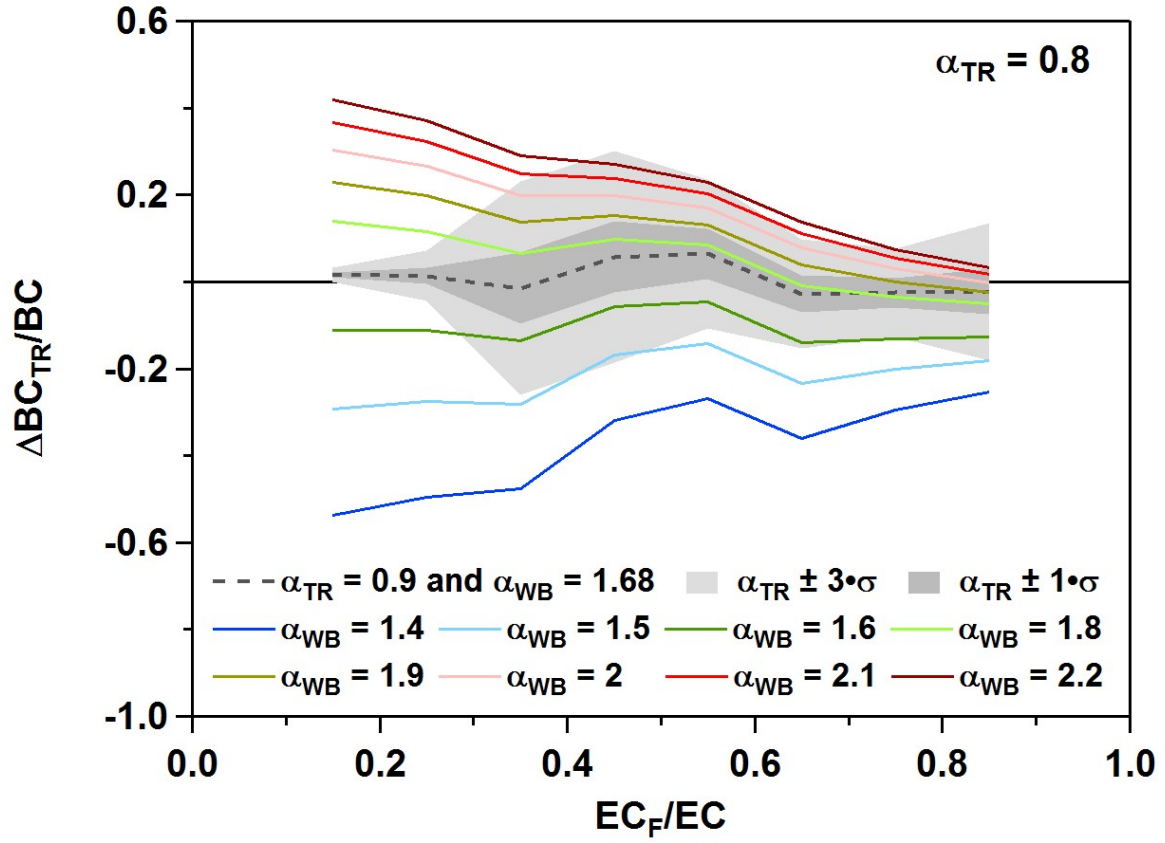
Figure S2: Residuals of BC_{TR}/BC compared to EC_F/EC ($\Delta BC_{TR}/BC$) as a function of EC_F/EC for $\alpha_{TR} = 0.8$ and $\alpha_{WB} = 1.4\text{-}2.2$ and using the wavelength pair 470 nm and 950 nm. Average $\Delta BC_{TR}/BC$ values for EC_F/EC bins of 0.1 are displayed. The dashed grey line denotes the best α pair ($\alpha_{TR} = 0.9$ and $\alpha_{WB} = 1.68$) as obtained in Sect. 3.2.1 and the dark and light grey shaded areas mark the 1σ (standard deviation) and 3σ of $\Delta BC_{TR}/BC$ per EC_F/EC bin for this best α pair.
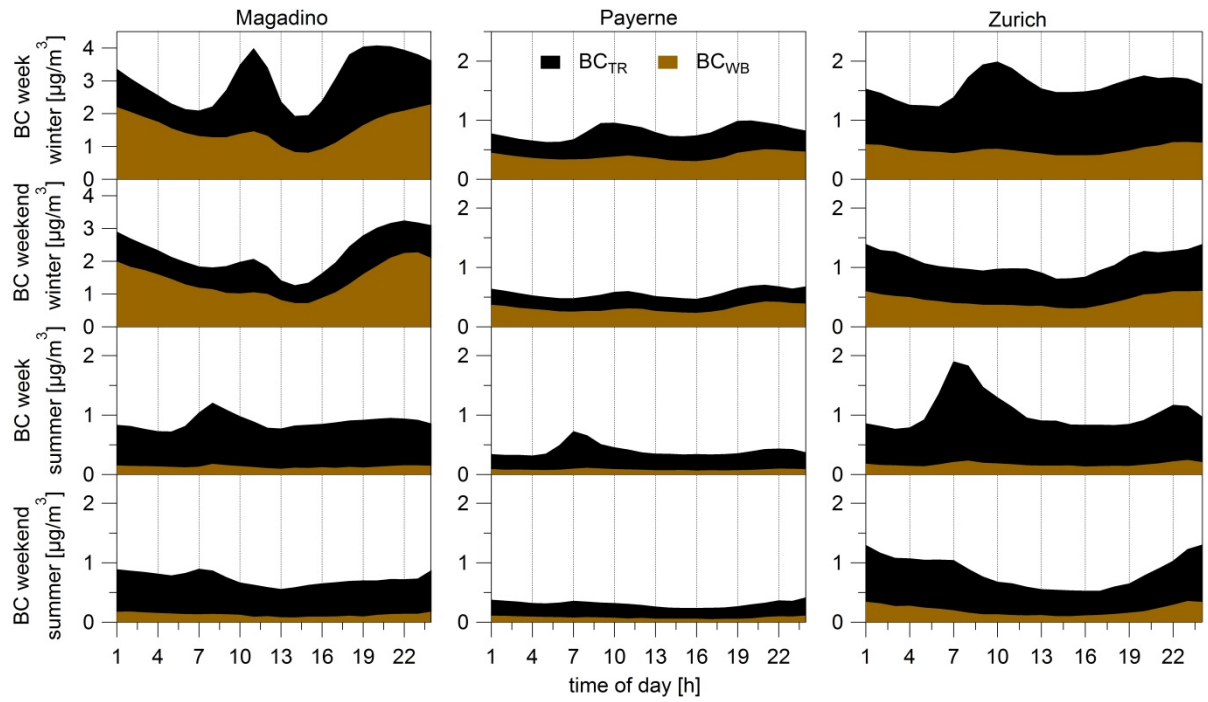
Figure S3: Diurnal cycles of BC for the stations MAG, PAY and ZUR - 1h averages from 2009 to 2012. BC_{WB} and BC_{TR} were calculated using the best α pair ($\alpha_{TR} = 0.9$ and $\alpha_{WB} = 1.68$) as obtained in Sect. 3.2.1 and using the wavelength pair 470 nm and 950 nm. The split uncertainty between BC_{WB} and BC_{TR} ($\Delta BC_{TR}/BC$) is max. 0.04 µg m^{-3}.
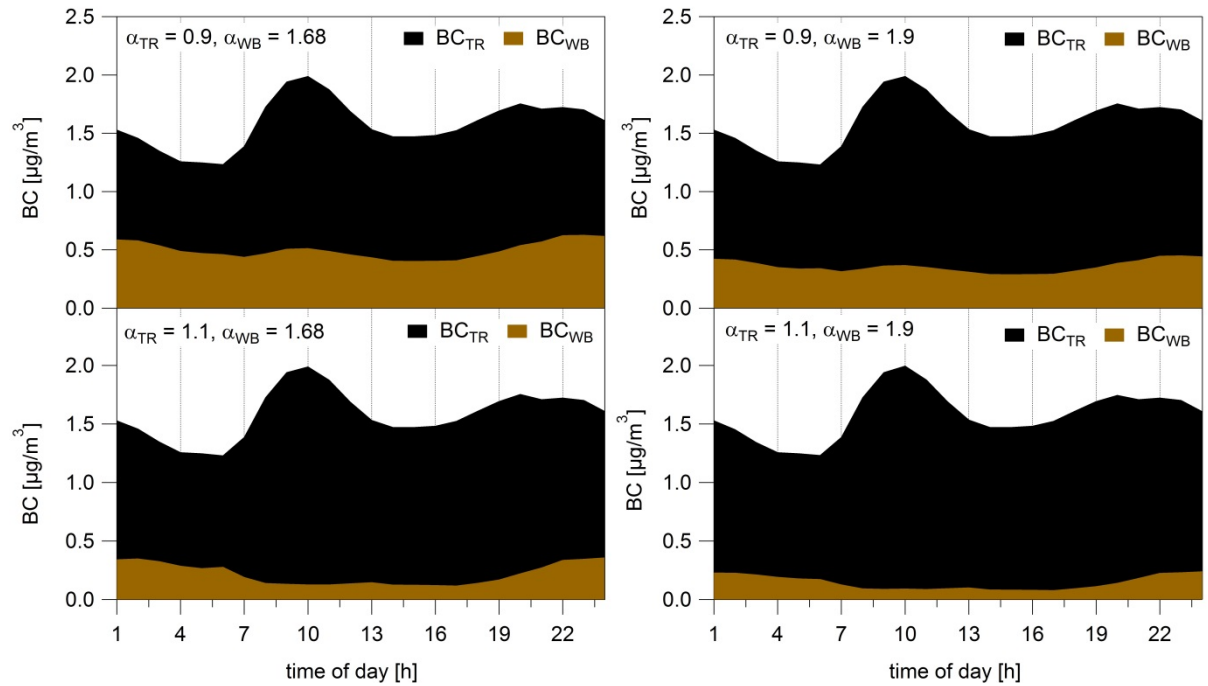

Figure S4: Diurnal cycles of BC for ZUR - 1h averages for winter week days from 2009 to 2012 calculated with different α combinations and using the wavelength pair 470 nm and 950 nm.