Supplement of Atmos. Meas. Tech., 14, 5139–5151, 2021
https://doi.org/10.5194/amt-14-5139-2021-supplement

Atmospheric Measurement Techniques
Open Access
EGU

Supplement of

Analysis of mobile monitoring data from the microAeth® MA200 for measuring changes in black carbon on the roadside in Augsburg

Xiansheng Liu et al.

Correspondence to: Xun Zhang (zhangxun@btbu.edu.cn) and Jürgen Schnelle-Kreis (juergen.schnelle@helmholtz-muenchen.de)

Supporting information

Analysis of mobile monitoring data from the microAeth® MA200 for measuring changes in black carbon on the roadside in Augsburg

Table S1 Comparative measurements of different MA200 in the fixed monitoring station (unit: ng/m^3, total N=5040 for each MA200, each measurement 14 h).

	375 nm	470 nm	528 nm	625 nm	880 nm
MA200-0051	818	833	812	810	774
MA200-0053	827	838	814	815	783
MA200-0059	870	866	830	840	814
MA200-0060	872	881	857	857	822
MA200-0155	856	855	842	840	830
MA200-0153	846	850	822	832	795
MA200-0159	825	845	818	832	780
Mean	844.9	852.6	827.9	832.3	799.7
Stand deviation	22.1	16.6	16.5	15.9	22.2

Table S2 The comparison of average black carbon concentrations of raw unprocessed, ONA-processed, LPR-processed, and CMA-processed data （Measurements 1-10).

Measurement	Raw-average	ONA-processed average	LPR-processed average	CMA-processed average
T1	1562.14	1560.05	1561.76	1561.25
T2	1129.58	1127.72	1130.10	1129.99
T3	2303.14	2303.19	2302.43	2303.02
T4	1319.99	1319.79	1321.30	1320.73
T5	483.25	-	483.32	483.41
T6	241.30	240.67	242.84	243.16
T7	216.70	217.37	216.40	215.31
T8	698.61	689.29	697.06	698.32
T9	1027.91	1021.32	1027.82	1028.25
T10	1903.92	1882.81	1899.30	1904.65

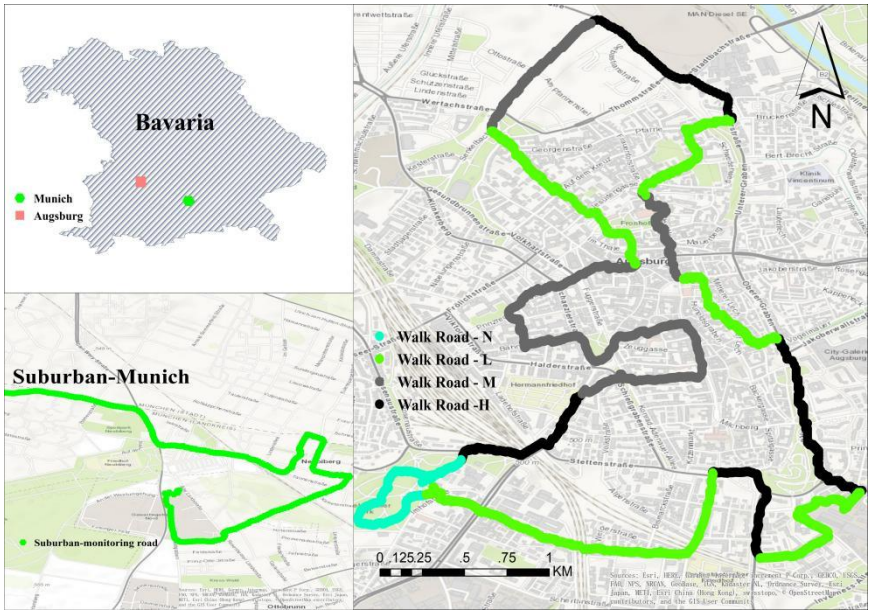

Figure S1 The mobile monitoring road in Augsburg and Munich, Germany. For Augsburg, the different colors represent different traffic densities in the micro-environments; black, high traffic roads (H_Traffic); grey, medium traffic roads (M_Traffic); green, low traffic roads (L_Traffic); blue, park area (N_Traffic). © OpenStreetMap contributors 2020. Distributed under the Open Data Commons Open Database License (ODbL) v1.0.

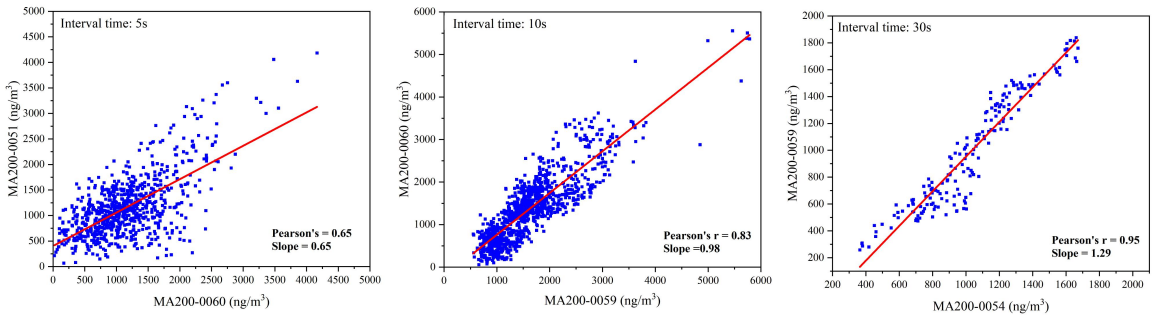

Figure S2 Comparative measurements of two MA200 in mobile monitoring under different time resolution (unit: ng/m^3, 2 h).

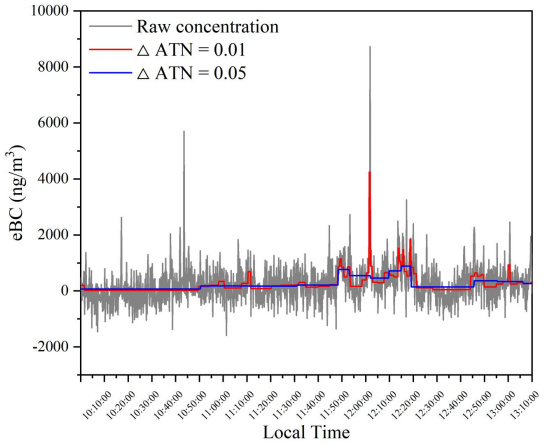

Figure S3 A sensitivity of optimized noise reduction averaging algorithm using different ΔATN values for mobile monitoring data (interval time, 10 s).

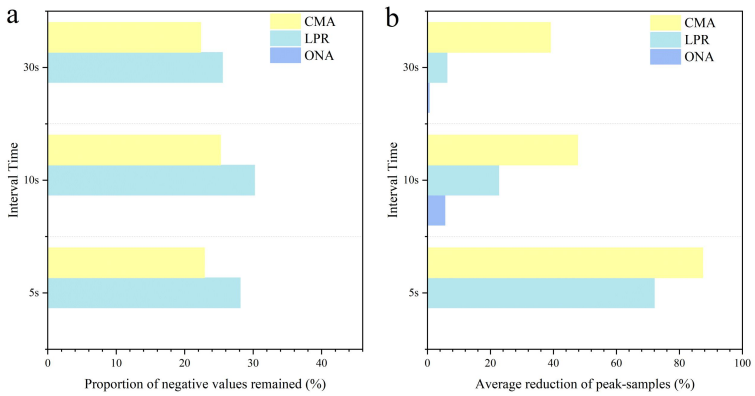

Figure S4 A bar graph of processed data under different post-processing methods: (a), proportion of negative values remained, (b), average reduction of peak samples.

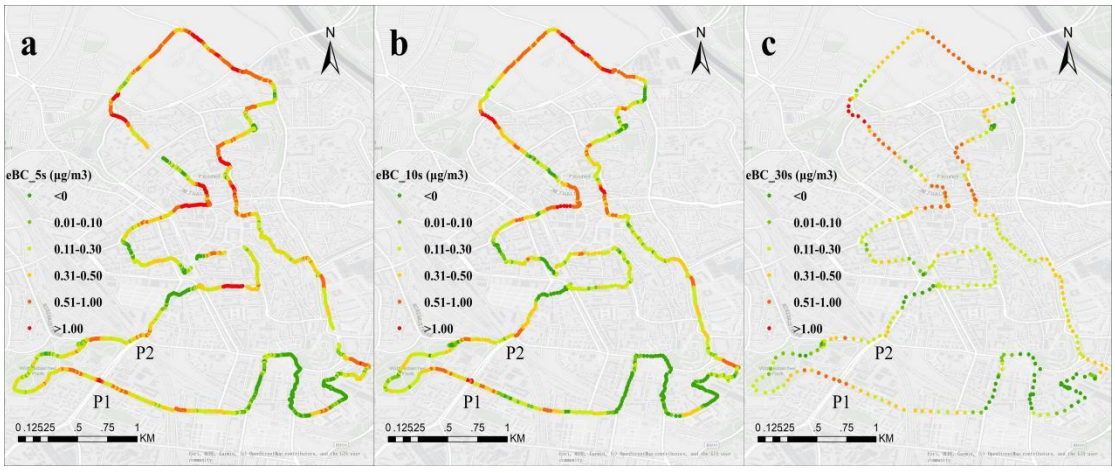

Figure S5 The spatial distribution characteristics of black carbon based on three different interval times (a) 5 s, measurement 5; (b) 10 s, measurement 6; (c) 30 s, measurement 7 at the same walk. © OpenStreetMap contributors 2020. Distributed under the Open Data Commons Open Database License (ODbL) v1.0.

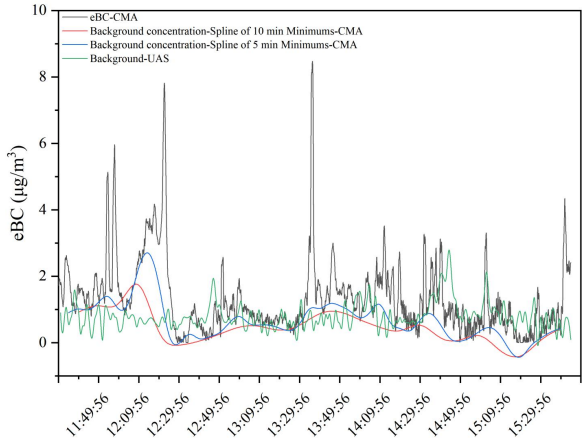

Figure S6 Time series methods: thin plate regression spline of 5 min minimums and spline of 10 min minimums, and the black carbon concentration in the fixed station (UAS) after the application of the centered moving average method centered moving average method (the analysis based on measurement 4).

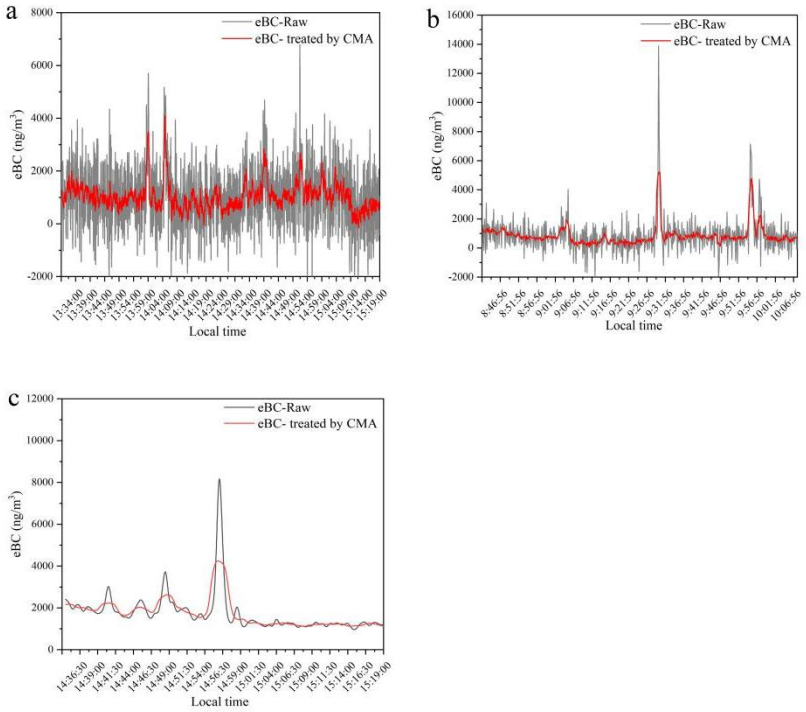

Figure S7 Comparison between original black carbon measurements and corrections treated by centered moving average with the MA200 at sampling time bases of 5 s (a), 10 s (b) and 30 s (c) in Munich (the analysis based on the measurement 8, 9, and 10).

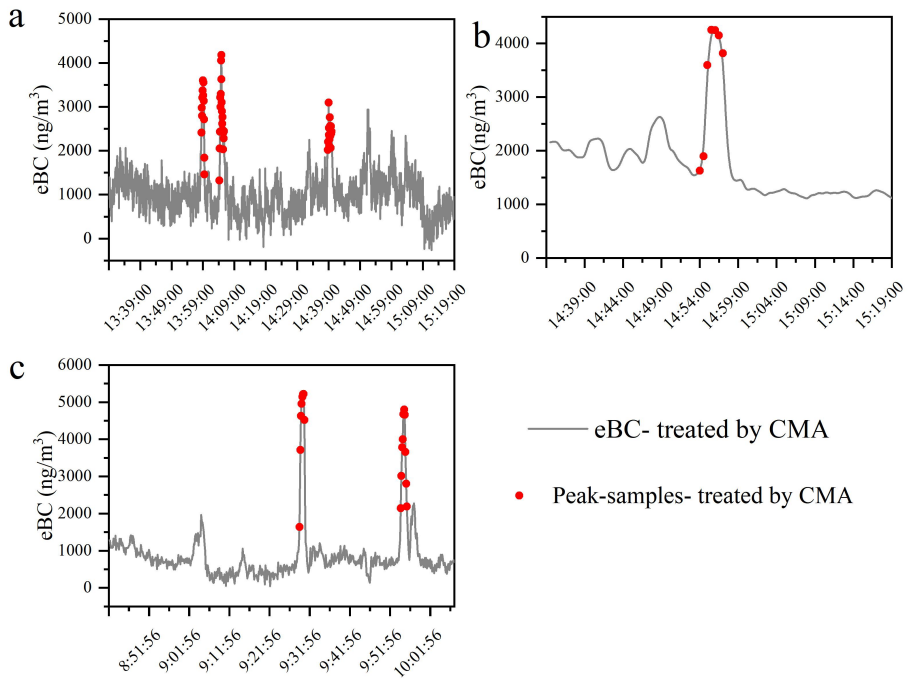

Figure S8 Temporal distribution characteristics of black carbon peak samples based on the coefficient of variation method at sampling time bases of a, 5 s , b, 10 s and c, 30 s in Munich (the analysis based on the measurement 8, 9, and 10).

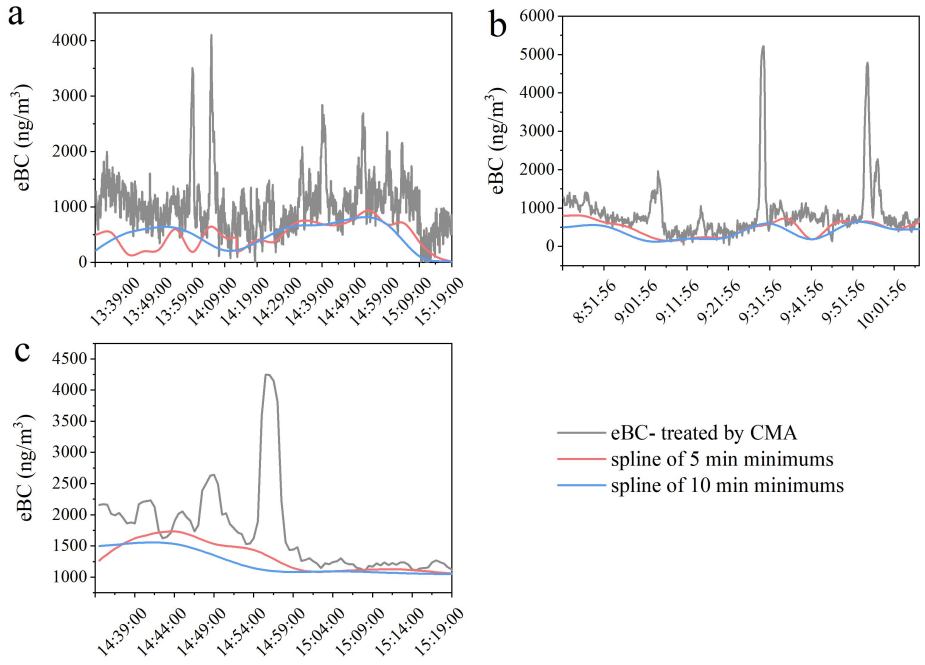

Figure S9 Time series methods: thin plate regression spline of 5 min minimums and spline of 10 min minimums after the centered moving average method was applied,at sampling time bases of 5 s (a), 10 s (b) and 30 s (c) in Munich (the analysis based on the measurement 8, 9, and 10).