Supplementary material

Spatial and temporal variability of carbonaceous aerosol absorption in the Po Valley

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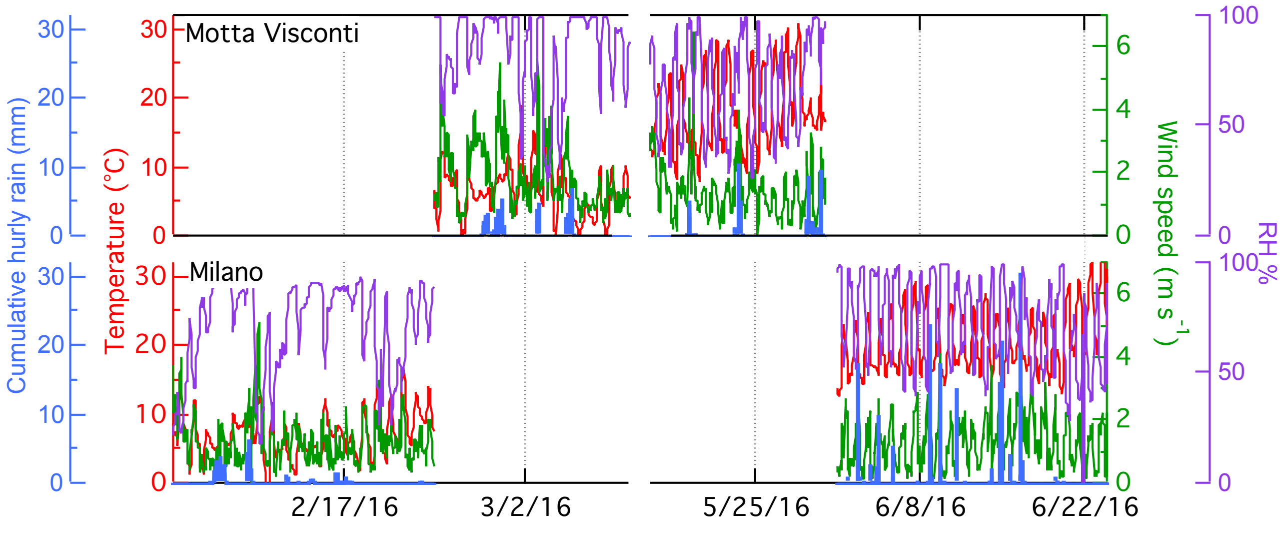

Figure S1. Cumulative rain (blue), temperature (red), wind speed, and relative humidity observed during the four field experiments.

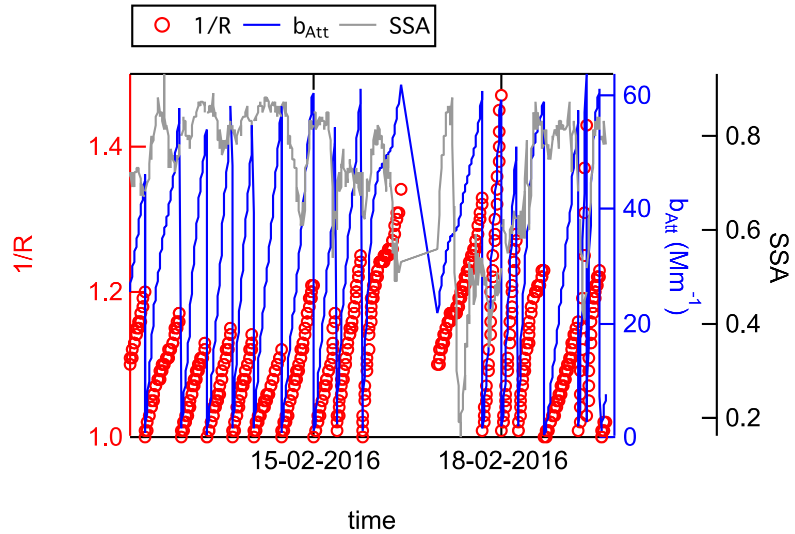

Figure S2. Time trend of the inverse of R correction coefficient (1/R - red open circles), attenuation coefficient (b_{Att} - blue line), and single scattering albedo (SSA - gray line) during the winter experiment at the Milan urban site. 1/R indicates the underestimation of light absorption due filter loading artifacts. 1/R varies between 1 and 1.4, corresponding to an underestimation up to 40%. The effect of loading (increasing bAtt) on 1/R is more prominent of when the contribution of aerosol light absorption to total extinction is significant (SSA lower than 0.6).

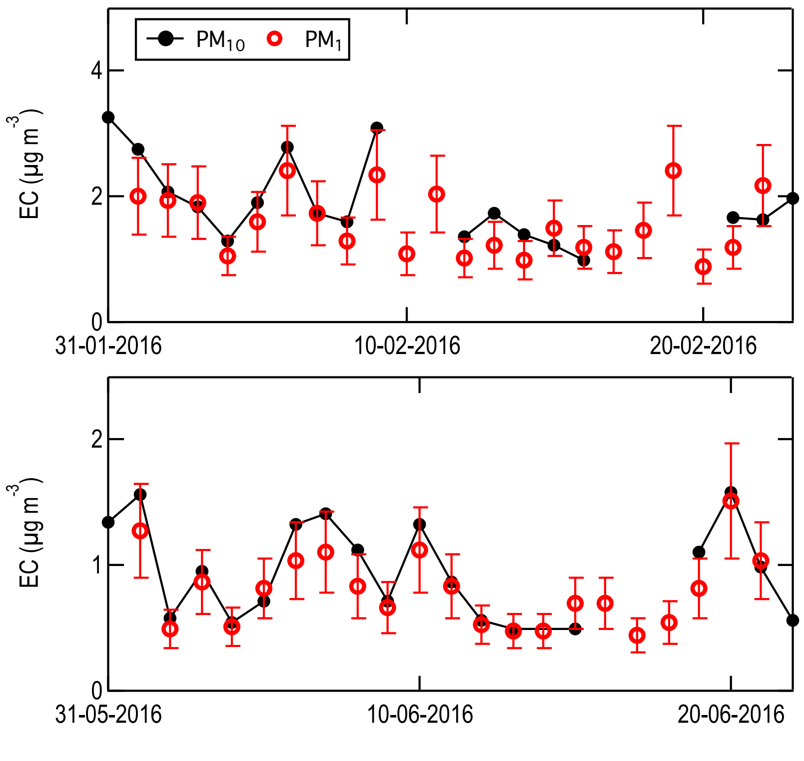

Figure S3. Comparison of EC concentrations in PM_1 (red open circles) and PM_{10} (black circles) at the Milan urban site during the two field experiments in winter (upper panel) and summer (lower panel). Most of the time PM_1 EC concentrations agree with the EC concentrations in PM10 size fraction within the accuracy of thermal optical method employed (30%), as defined by protocol intercomparison studies (Karanasiou et al., 2015). On average, PM_1 accounts for 90% of EC concentration observed in PM_{10} aerosol samples.

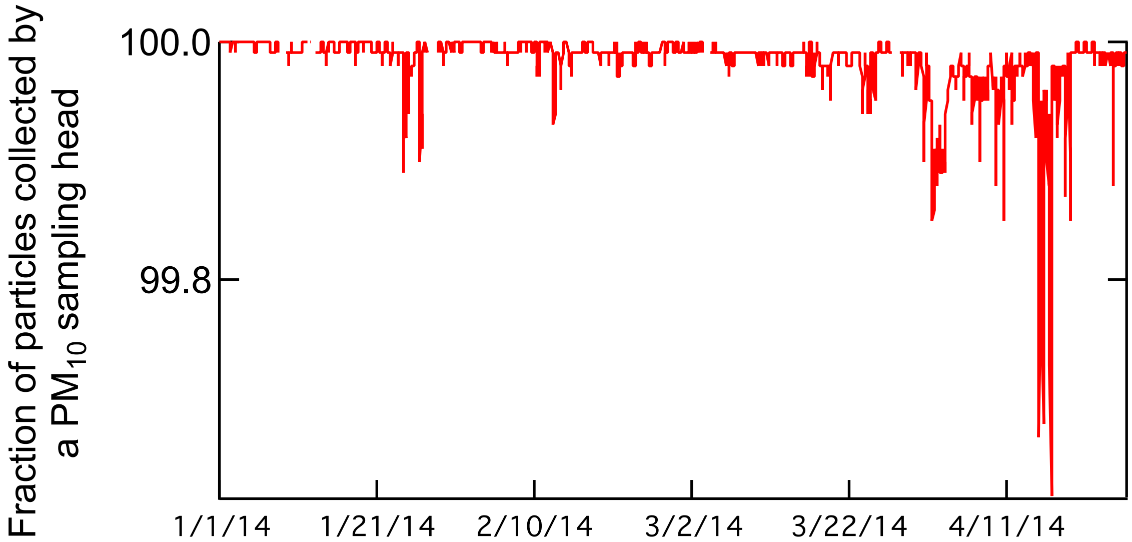

Figure S4. Fraction of particle number collected by a PM10 sampling head derived from particle size distribution measured with a GRIMM Optical Particle Number at the urban site of Milano over four months in 2014.

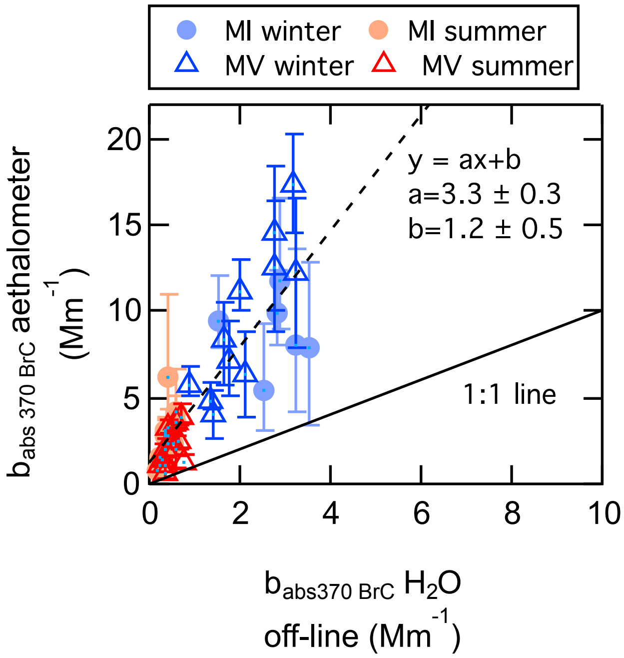

Figure S5. Scatter plot of BrC absorption coefficients at 370 nm from aethalometer and water - soluble BrC absorption coefficient measured off-line with daily resolution. The error bars indicate the variability ranges derived from assuming AAE_{BC} equal to 0.7 and 1.1, while the central values are estimated assuming AAE_{BC} equal to 0.9.