Supplement

Table S1. Correlation (R) of chemical species between the AMS and BLPI and the AMS and PM_1 filters with slopes, intercepts and number of samples (N).

	Species	**Slope**	**Intercept**	**R**	**N**
AMS vs. BLPI	Org vs. WSOC	2.22	0.93	0.85	32
	NO_3	1.02	-0.060	0.90	32
	SO_4	0.36	0.44	0.69	32
	NH_4	1.03	0.007	0.90	32
	Chl	0.73	0.015	0.83	32
AMS vs. PM_1	Org vs. OC	1.49	0.24	0.88	18
	NO_3	1.16	0.24	0.93	18
	SO_4	0.49	0.076	0.85	18
	NH_4	0.92	-0.16	0.92	18
	Chl	0.79	0.055	0.94	18

Table S2. Correlations (R) of the PMF factors with the HR-ToF-AMS species from the AMS, chemical species from the BLPI and PM_1 filter samples and inorganic gases. N=number of samples.

	BBOA	**HOA**	**OOA-a**	**OOA-b**	**OOA-c**	**N-OA**	**N**
AMS							
NO_3	0.420	0.531	0.497	0.571	0.415	0.874	
SO_4	0.398	0.261	0.662	0.369	0.335	0.602	
NH_4	0.466	0.535	0.536	0.560	0.500	0.884	
Chl	0.273	0.405	0.285	0.270	0.191	0.508	
Org	0.718	0.738	0.380	0.581	0.715	0.751	
BLPI							
MSA	0.381	0.164	0.745	0.538	0.268	0.817	26
Cl^-	0.325	0.249	0.608	0.427	0.108	0.517	27
NO_3^-	0.605	0.500	0.692	0.705	0.571	0.862	27
SO_4^{2-}	0.493	0.233	0.588	0.352	0.493	0.429	27
Oxalic acid	0.575	0.536	0.411	0.580	0.622	0.677	27
Na^+	0.309	0.163	0.083	0.053	0.440	0.031	27
NH_4^+	0.606	0.460	0.722	0.694	0.553	0.847	27
K^+	0.806	0.723	0.275	0.596	0.905	0.596	27
WSOC	0.830	0.695	0.314	0.668	0.869	0.616	27
PM_1							
OC	0.915	0.777	0.263	0.607	0.883	0.622	18
EC	0.759	0.890	0.202	0.606	0.751	0.685	18
WSOC	0.683	0.816	-0.067	0.351	0.782	0.421	18
Cl^-	0.393	0.242	0.724	0.606	0.165	0.836	18
NO_3^-	0.702	0.585	0.639	0.785	0.558	0.944	18
SO_4^{2-}	0.703	0.320	0.648	0.514	0.577	0.649	18
NH_4^+	0.670	0.442	0.711	0.749	0.508	0.932	18
K^+	0.853	0.800	0.394	0.734	0.793	0.838	18
Formic acid	0.785	0.664	0.389	0.670	0.766	0.717	18
MSA	0.456	0.113	0.728	0.469	0.286	0.724	18
Glyoxylic acid	0.826	0.564	0.512	0.686	0.775	0.771	18
Oxalic acid	0.763	0.534	0.361	0.534	0.876	0.713	18
Malonic acid	0.706	0.345	0.586	0.497	0.676	0.651	18
Maleic acid	0.488	0.155	0.579	0.510	0.354	0.727	18
Succinic acid	0.749	0.425	0.635	0.599	0.670	0.771	18

Malic acid	0.777	0.518	0.159	0.388	0.913	0.424	18
Azelaic acid	0.263	0.170	0.125	0.046	0.381	0.194	18
Levoglucosan	0.813	0.837	-0.168	0.518	0.820	0.367	18
Mannosan	0.775	0.877	-0.172	0.538	0.755	0.380	18
Galactosan	0.857	0.834	-0.081	0.600	0.821	0.452	18
Gases							
NO_x	0.265	0.539	-0.019	0.224	0.409	0.408	
NO	0.184	0.542	-0.100	0.134	0.409	0.407	
NO_2	0.261	0.463	-0.100	0.228	0.352	0.352	
O_3	-0.366	-0.593	0.005	-0.379	-0.393	-0.466	
NO_2+O_3	-0.213	-0.322	0.020	-0.261	-0.168	-0.262	
NH_3	0.199	0.314	0.020	0.252	0.285	0.486	
SO_2	0.145	0.284	0.241	0.095	0.287	0.257	

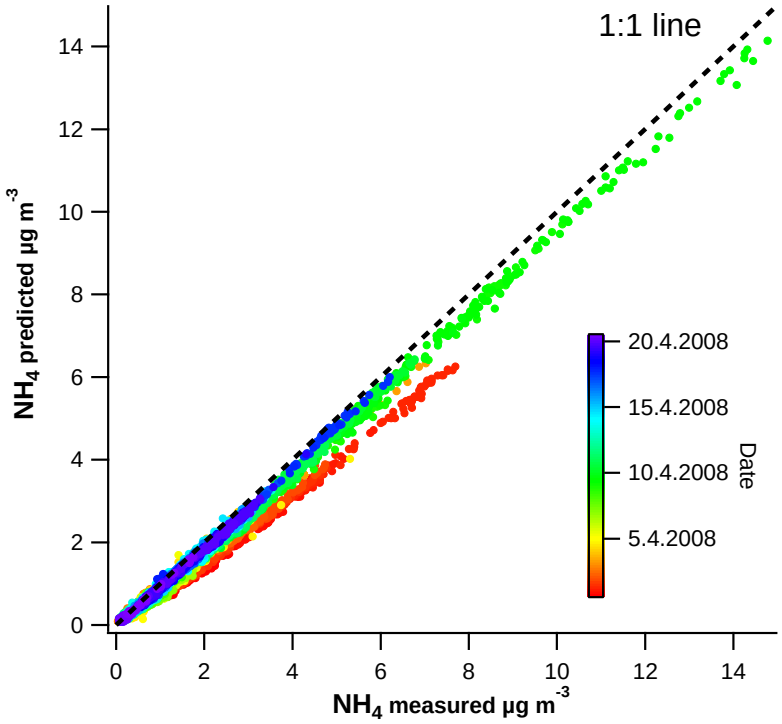


Fig. S1. The ratio of measured ammonium to predicted ammonium calculated by summing the ion equivalents of nitrate, sulfate and chloride.

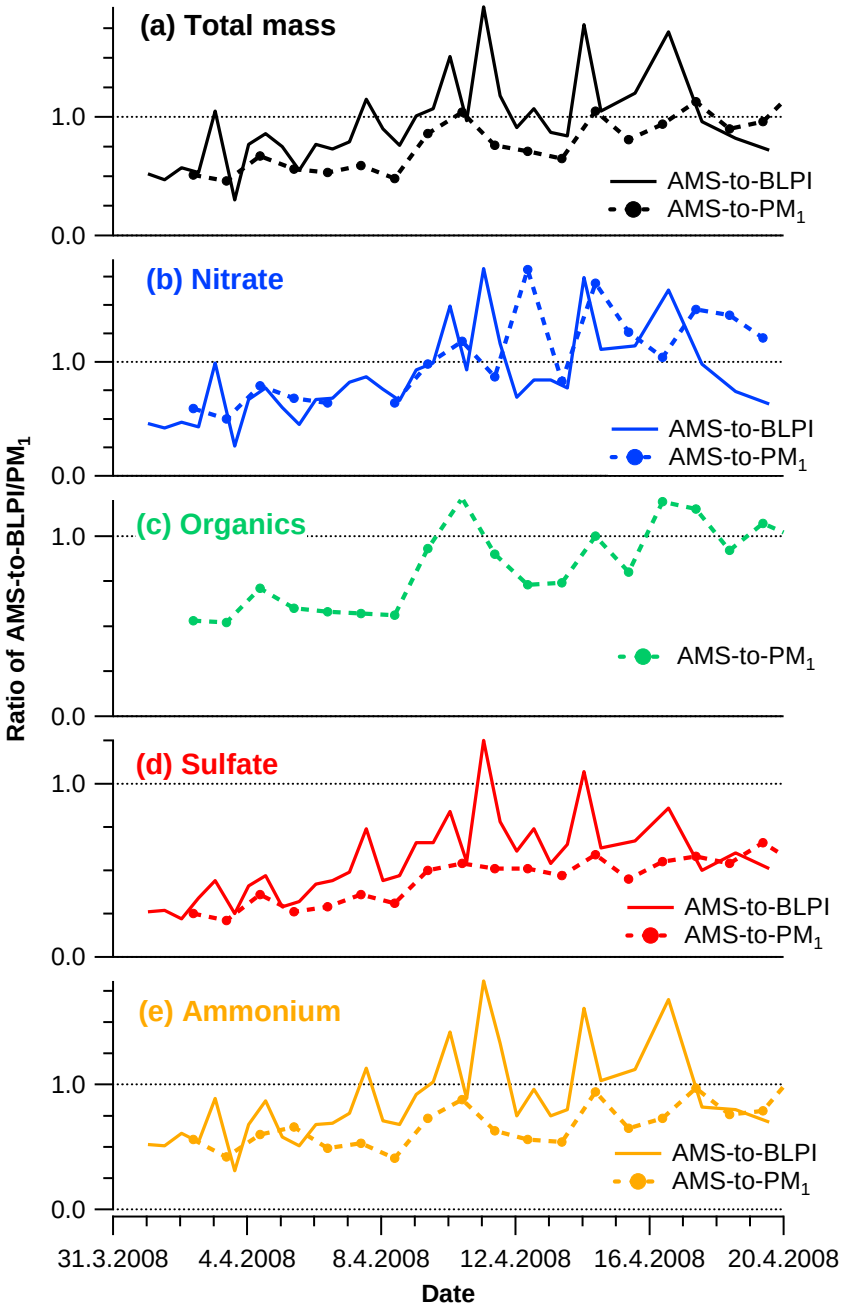


Fig. S2. The ratio of the AMS (CE=0.5) to the BLPI and PM_1 for the total mass (a), nitrate (b), organics (c), sulfate (d) and ammonium (e). The total mass for the AMS was calculated as the sum of organics, NO_3, SO_4, NH_4 and Chl, for the BLPI as the sum of WSPOM (WSOC*1.8), NO_3^-, SO_4^{2-}, NH_4^+, Cl^- on the three lowest stages of the BLPI and for the PM_1 filter as the sum of POM (OC*1.6), NO_3^-, SO_4^{2-}, NH_4^+ and Cl^-.

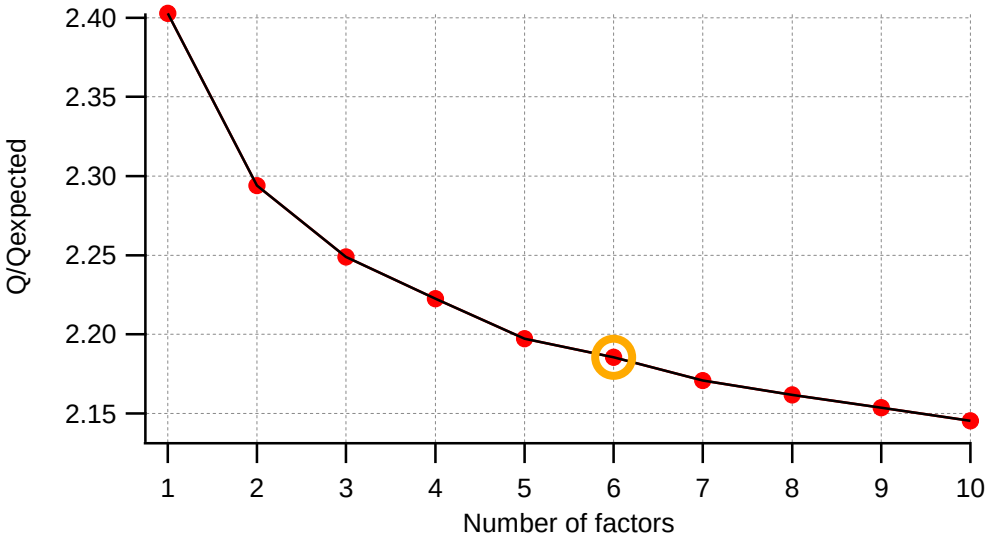


Fig. S3. Q/Qexpected for different number of factors (y-axis).

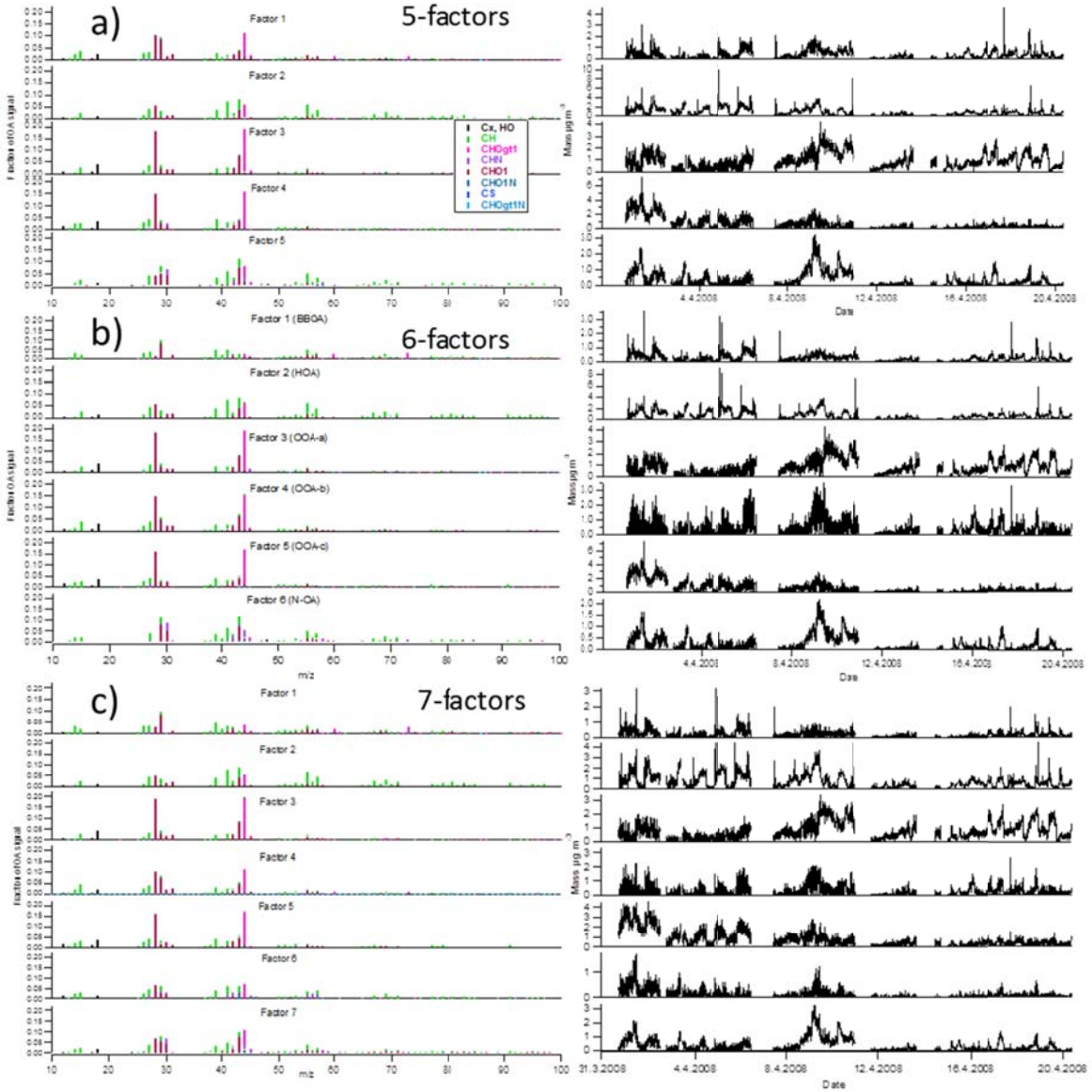
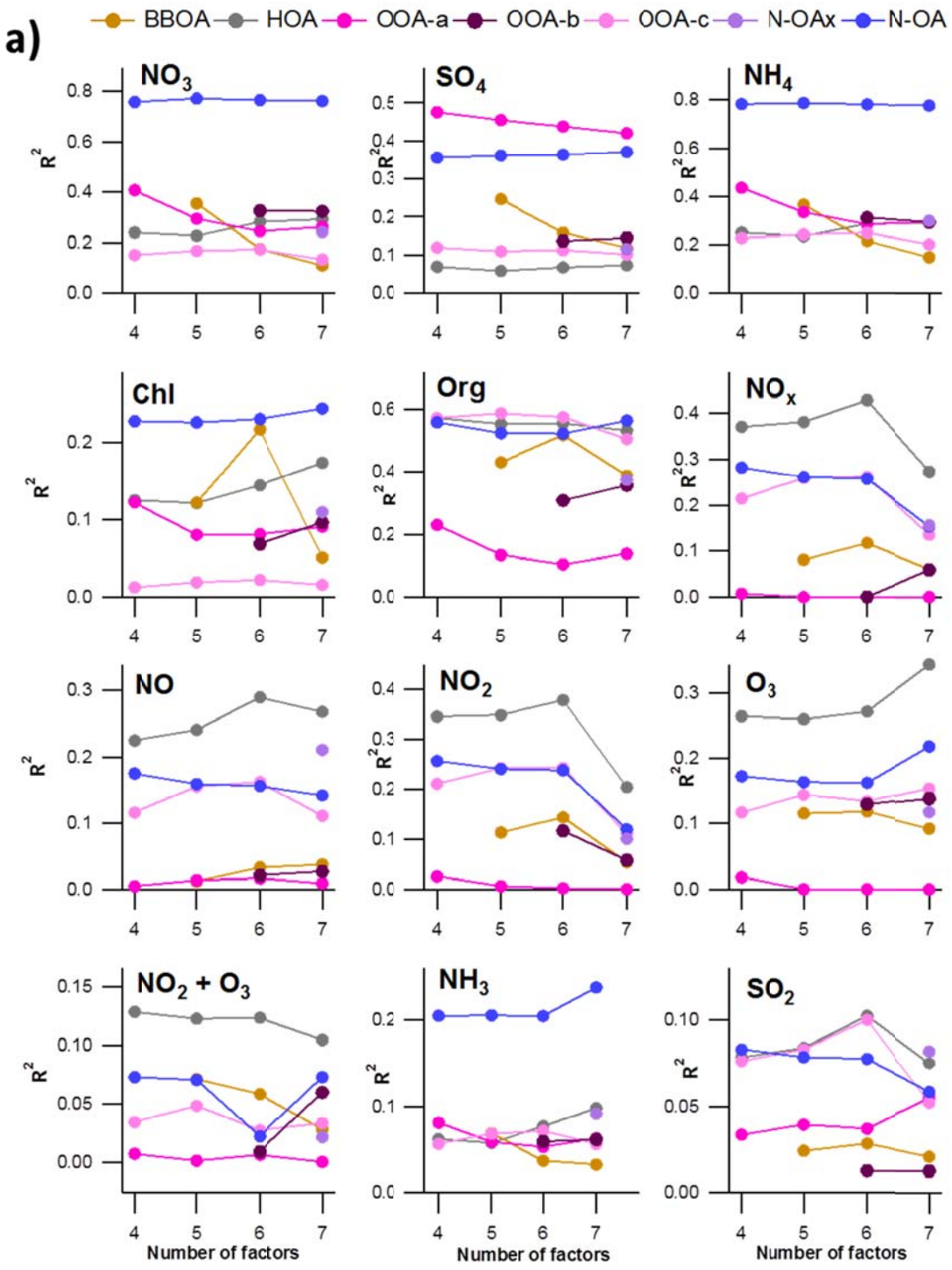


Fig. S4. PMF solution with five (a), six (b) and seven (c) factors.


a)
BBOA
HOA
OOA-a
OOA-b
OOA-c
N-OAx
N-OA
NO3
SO4
NH4
Chl
Org
NOx
NO
NO2
O3
NO2 + O3
NH3
SO2
R2
Number of factors

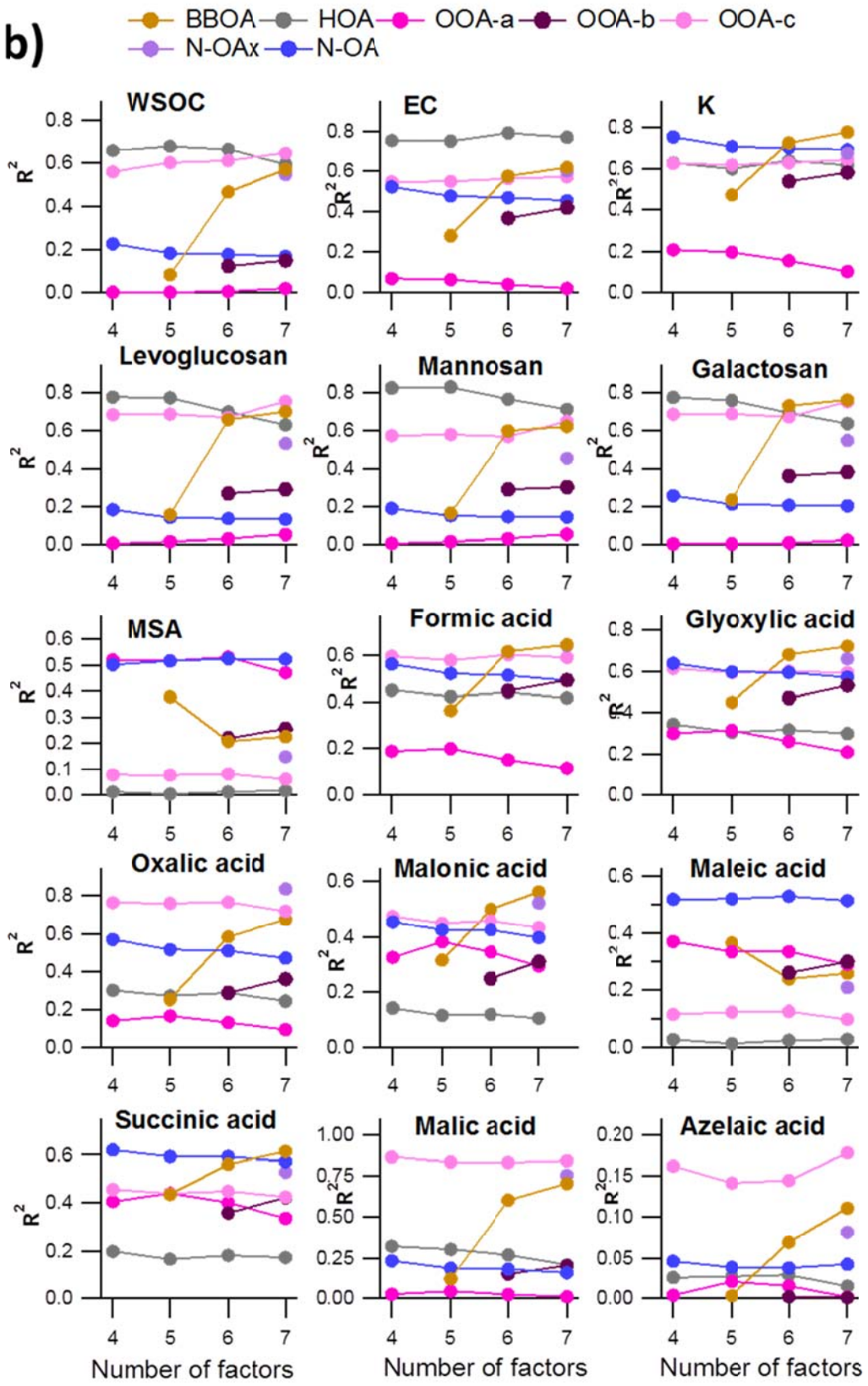


Fig. S5. Correlations of the time series of the PMF factors with the external tracers (R^2). HR-ToF-AMS species and gases (a) and PM_1 filters (b) from 4F- to 7F-solution.

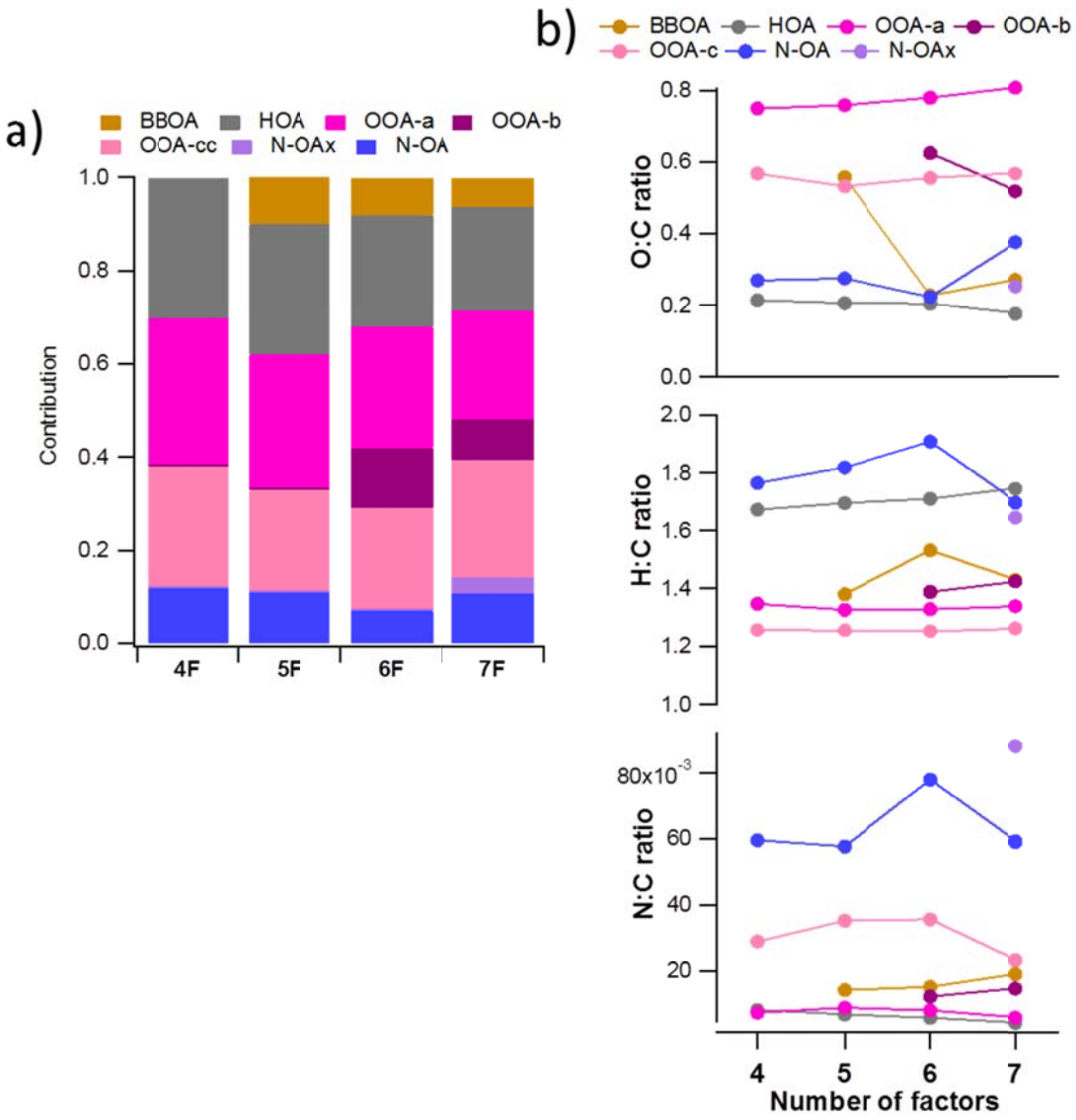


Fig. S6. The contributions (a) and the O:C, H:C and N:C ratios (b) for the PMF factors from 4F- to 7F-solution.

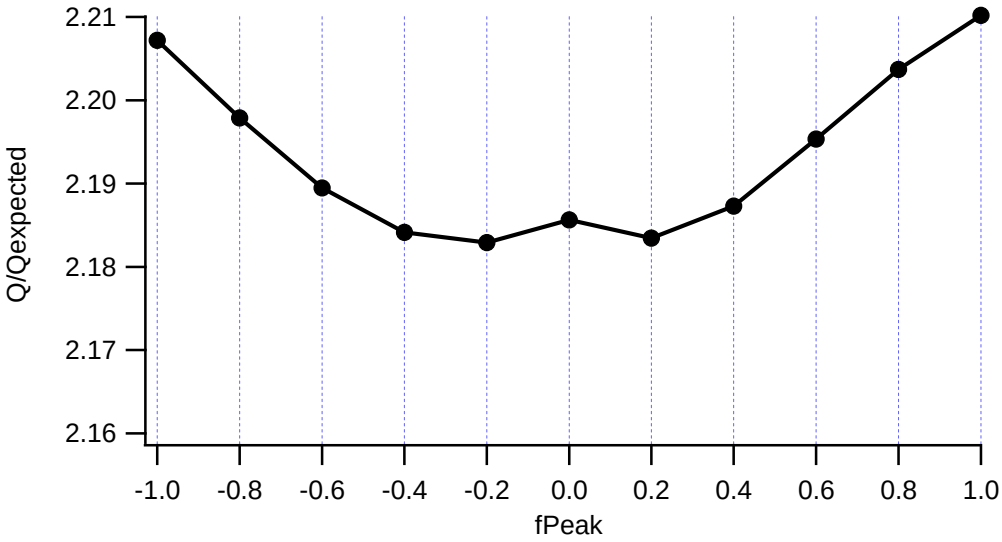


Fig. S7. Q/Qexpected vs. fPeak for 6F-solution.

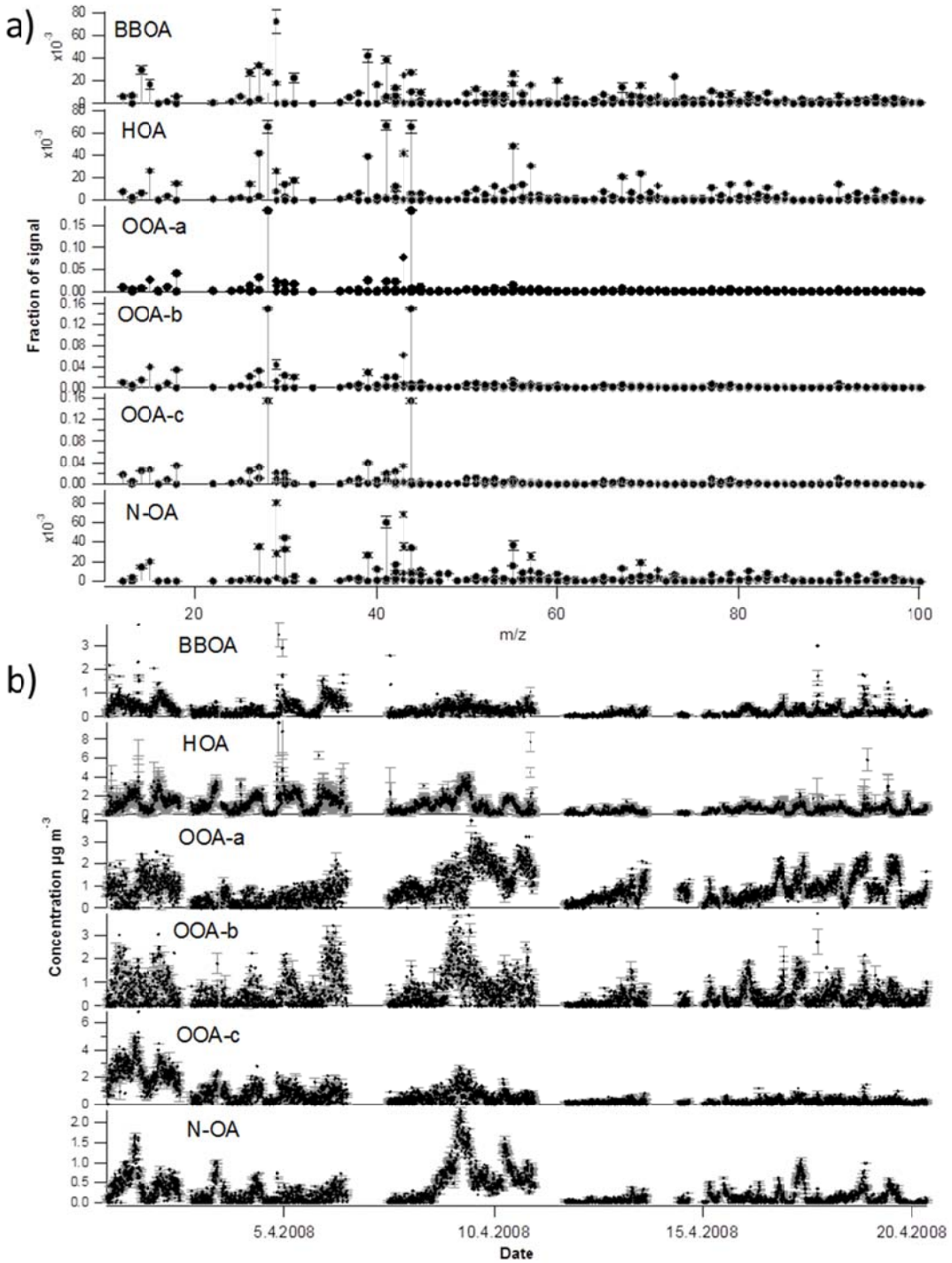


Fig. S8. Bootstrapping analysis for the 6F-solution. Average (black) with 1-σ error bars (grey) are shown for (a) MS and time series (b).

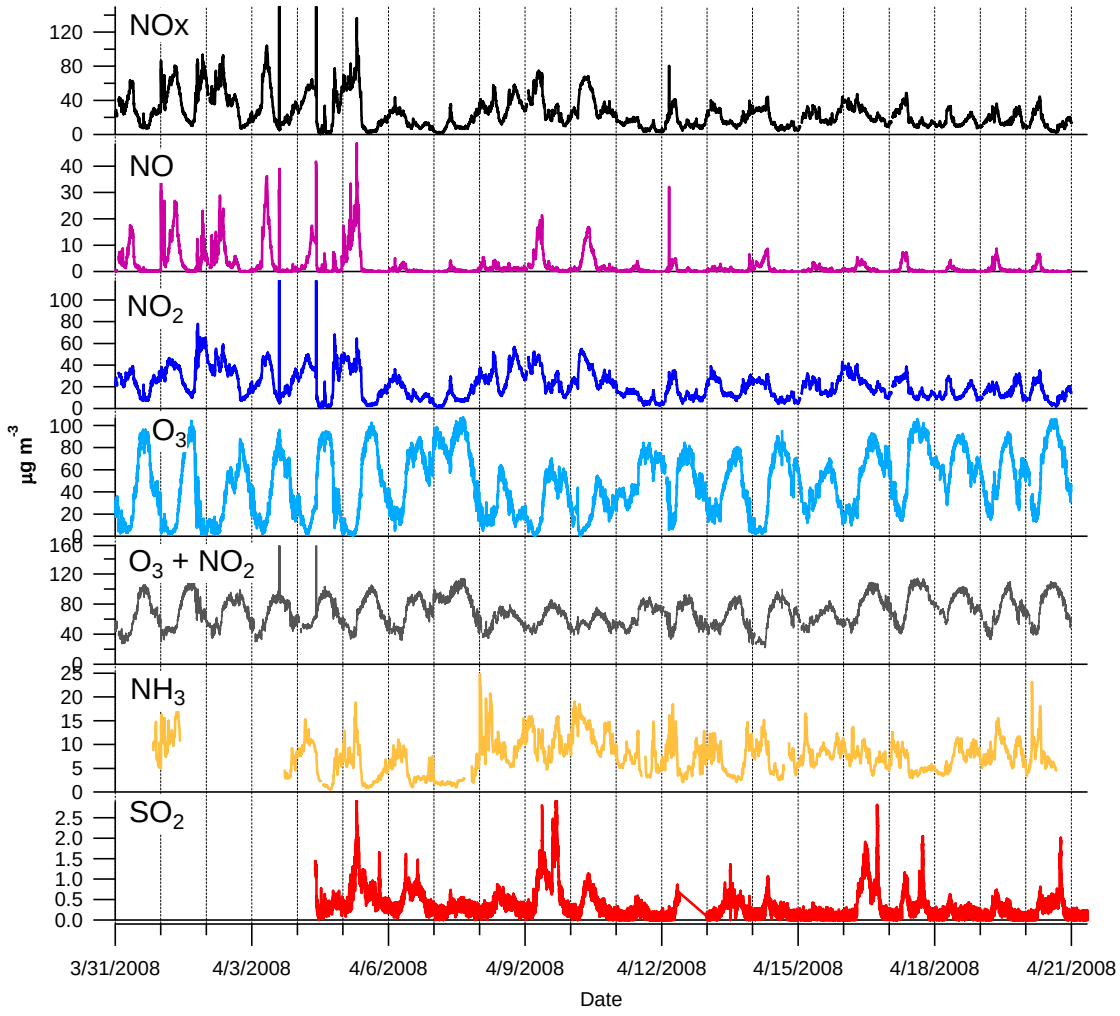


Fig. S9. The concentrations of inorganic gases and the sum of ozone and nitrogen dioxide.

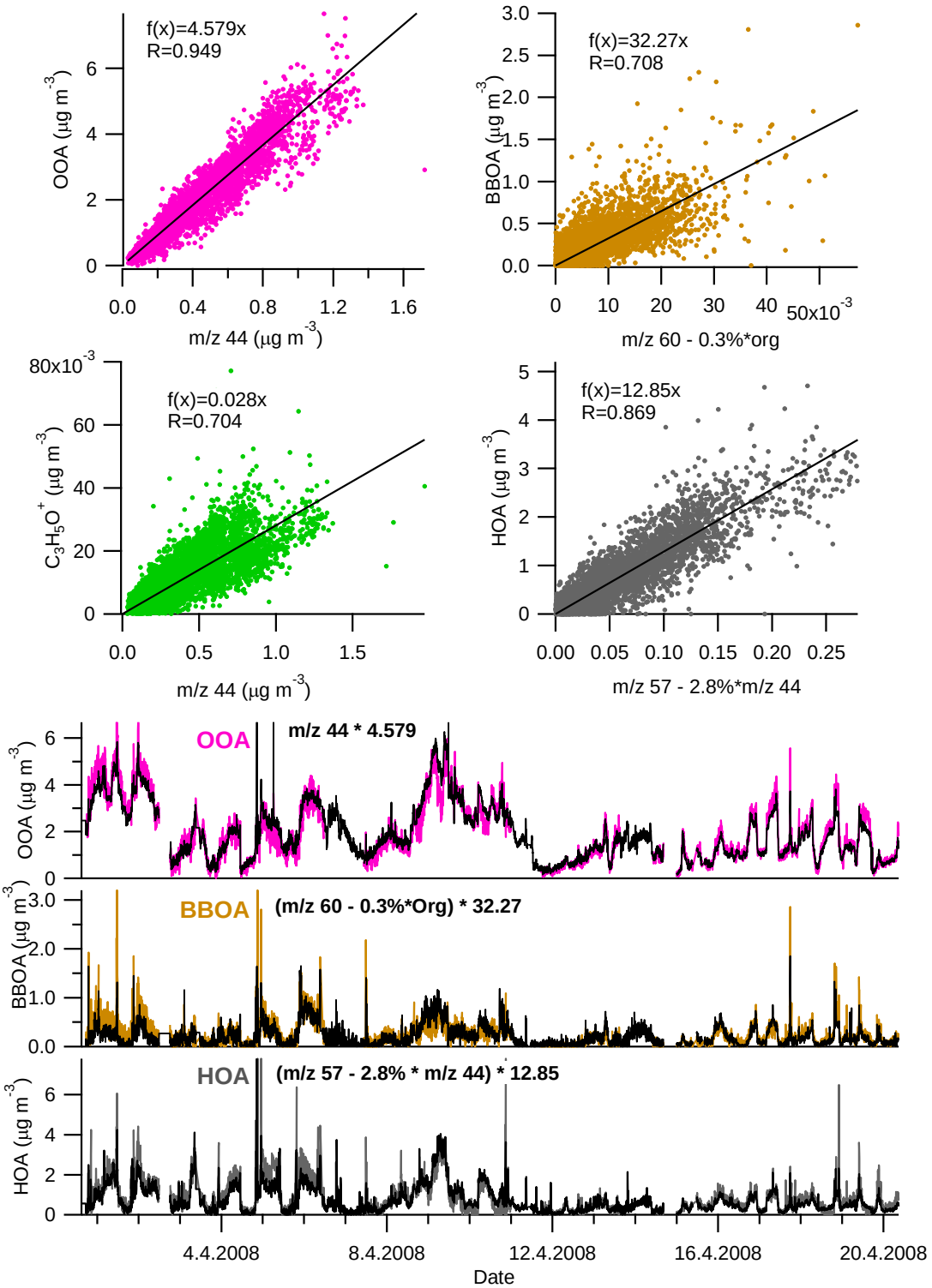


Figure S10. Rapid estimation of AMS-PMF components from the UMR tracer m/z's.

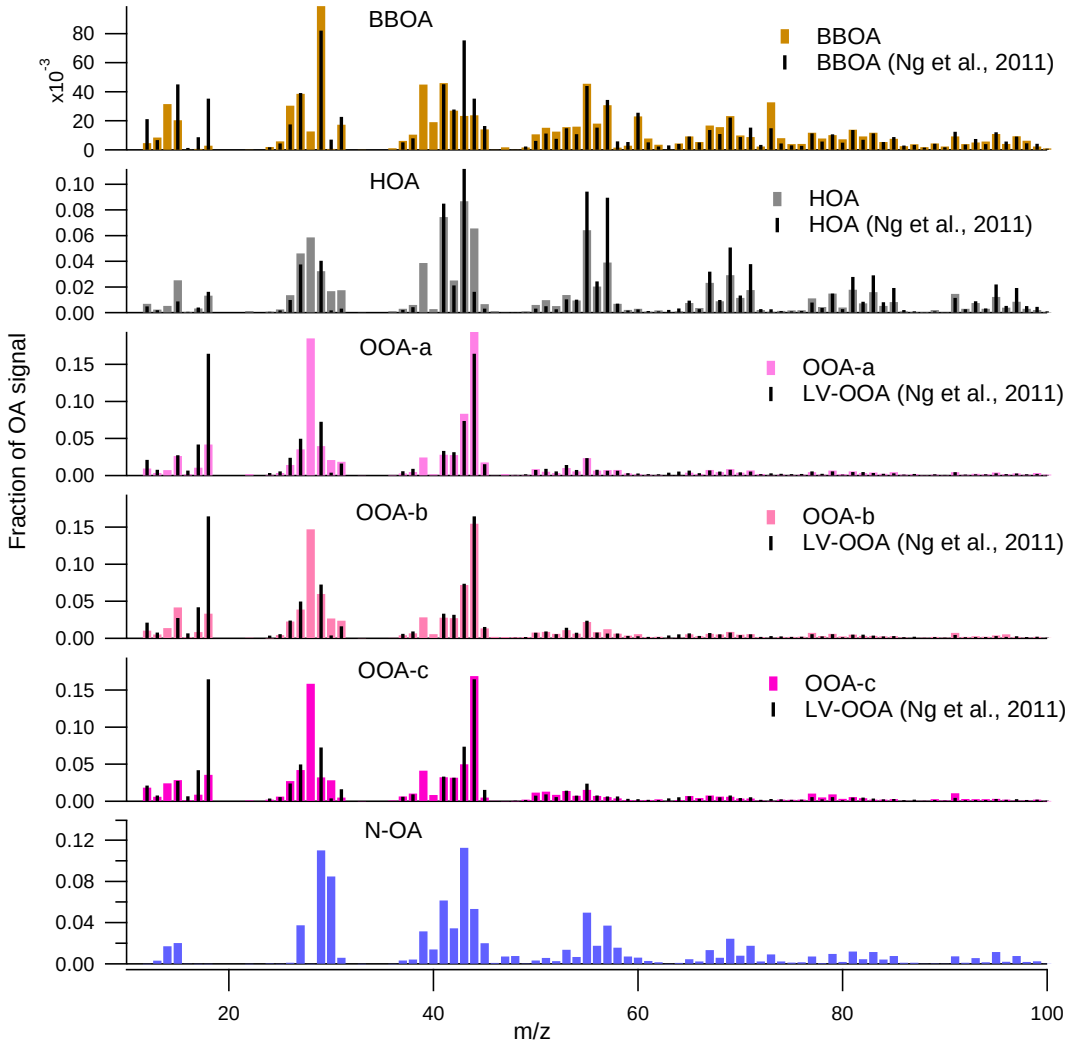


Figure S11. Comparison of the PMF factors obtained in this study with the standard UMR mass spectra profiles for urban sites (Ng et al., 2011) for m/z 10–100.

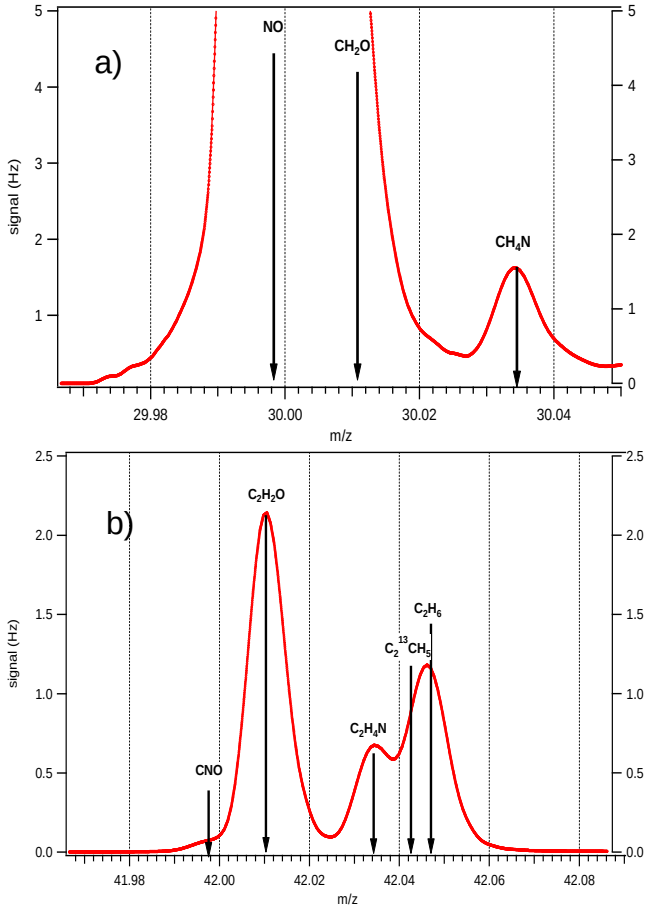


Figure S12. Nitrogen-containing ions detected at m/z 30.034 (a) and 42.034 (b) in PIKA.

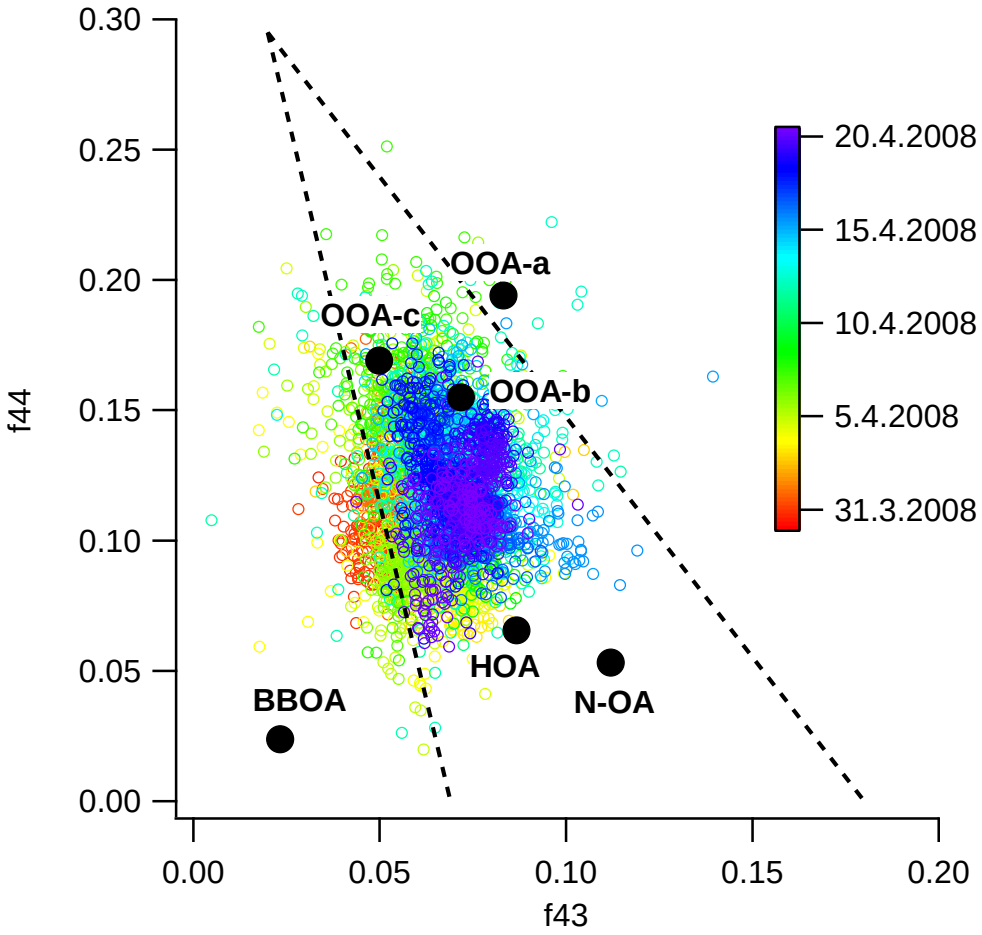


Fig. S13. f44 vs. f43 similar to Ng et al. (2010).