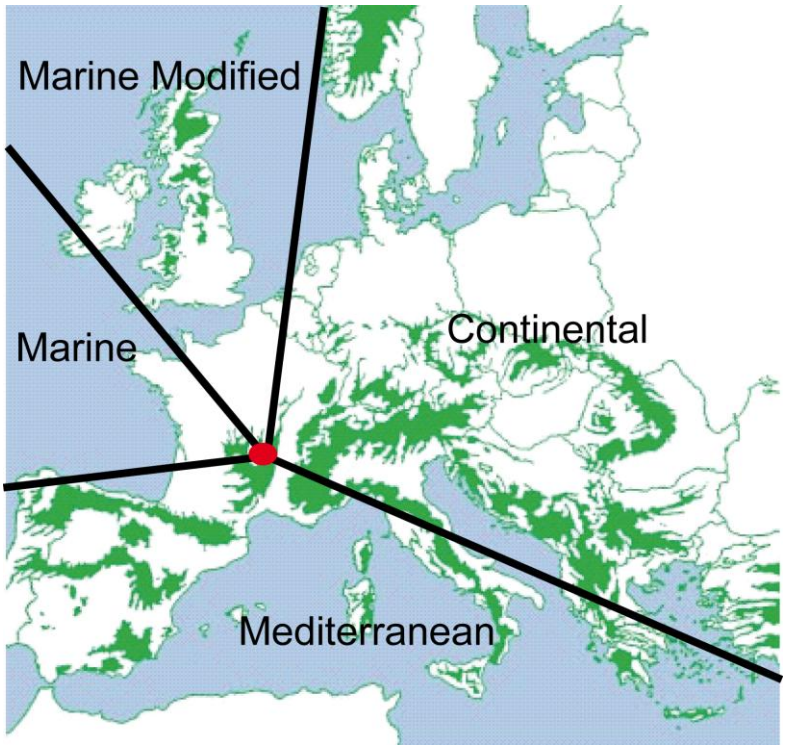


Figure S1. Sector definitions for different airmasses arriving at the pdD site

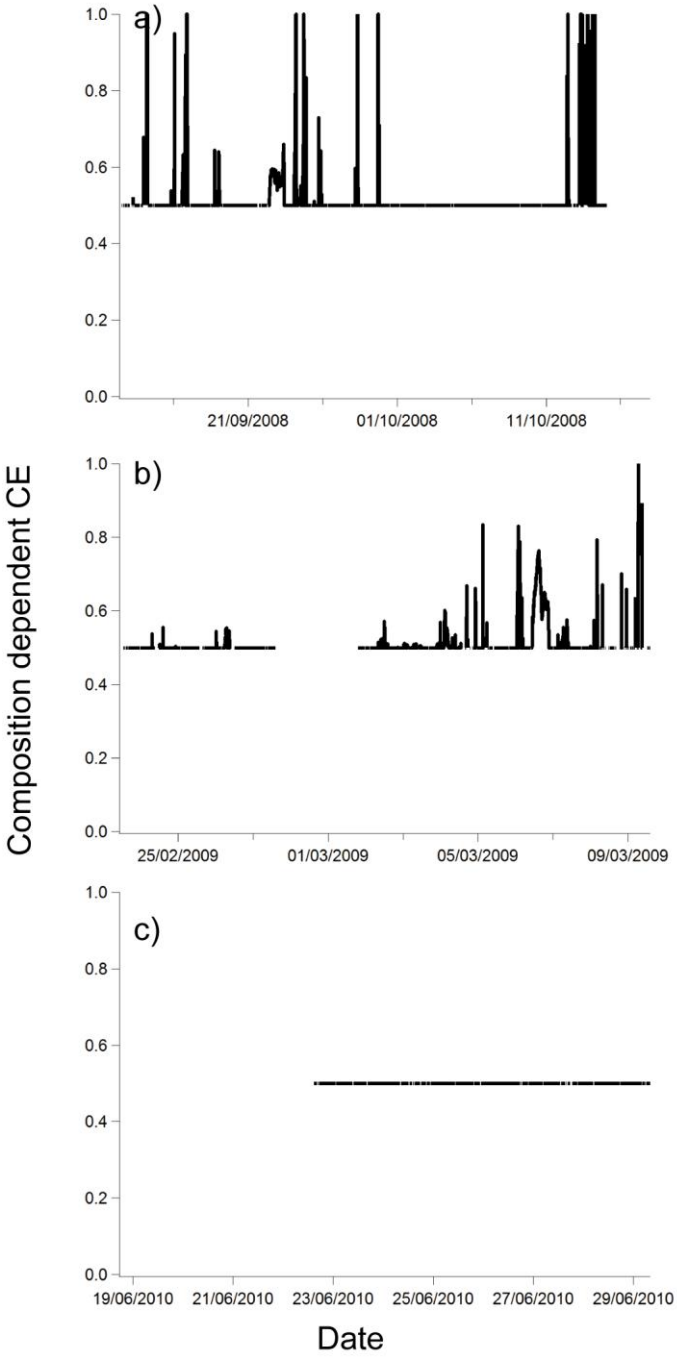


Figure S2. Composition dependent CE as a function of time measured during the a) Autumn 2008, b) Winter 2009, and c) Summer 2010.

Figure S3 Comparison between the particle concentration measured by the SMPS with that measured by the AMS for the autumn c) 2008 and b) winter 2009

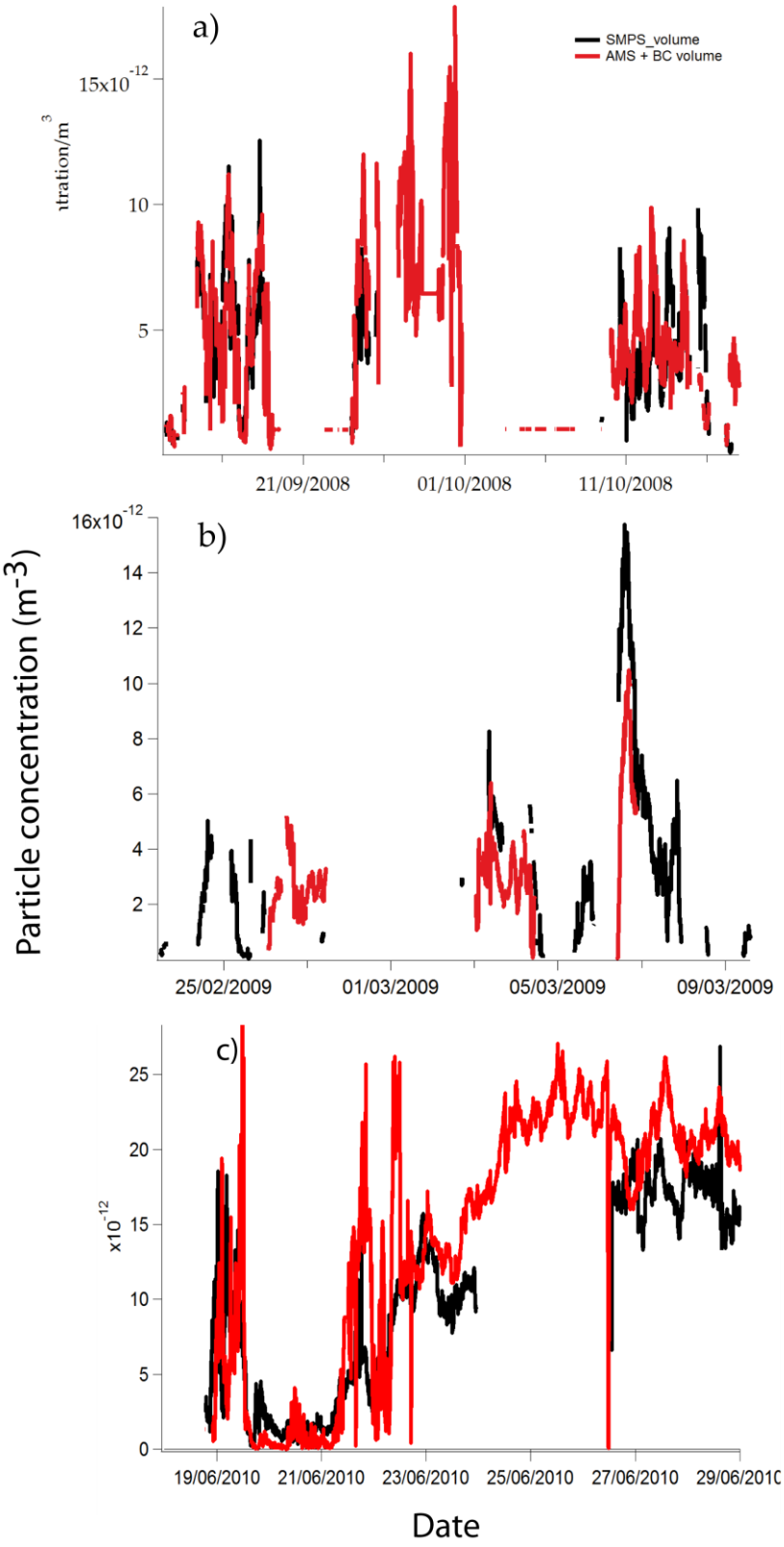
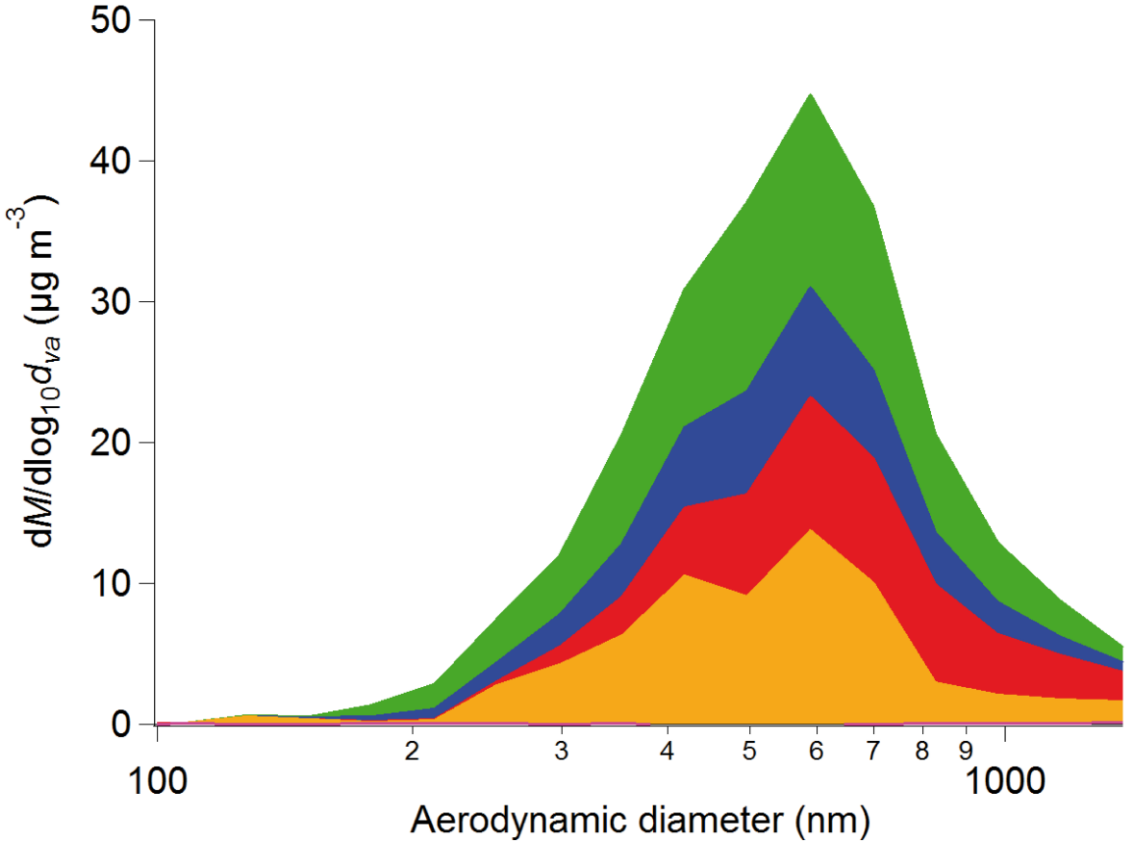


Figure S3 Comparison between the particle concentration measured by the SMPS with that measured by the AMS for the autumn c) 2008 and b) winter 2009



Figures S4. Typical size distribution of the aerosol particle species measured by the AMS at the pdD site.

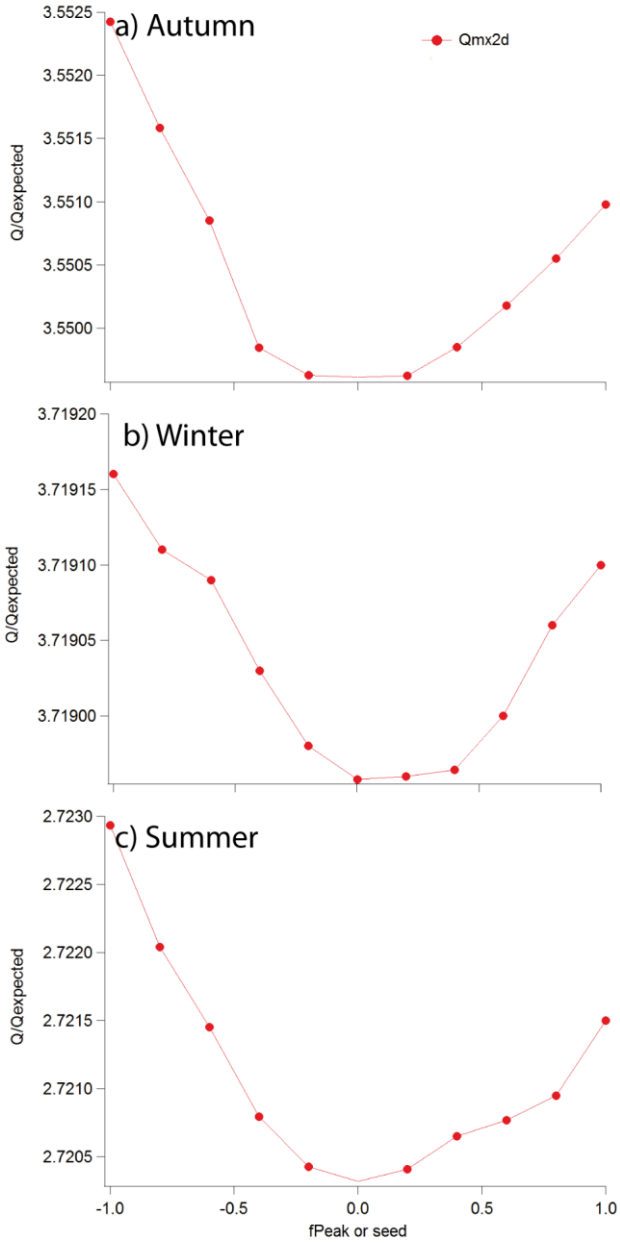


Figure S5. Q/Qexp versus the fpeak values for a) Autumn 2008, b) Winter 2009, and c) Summer 2010.

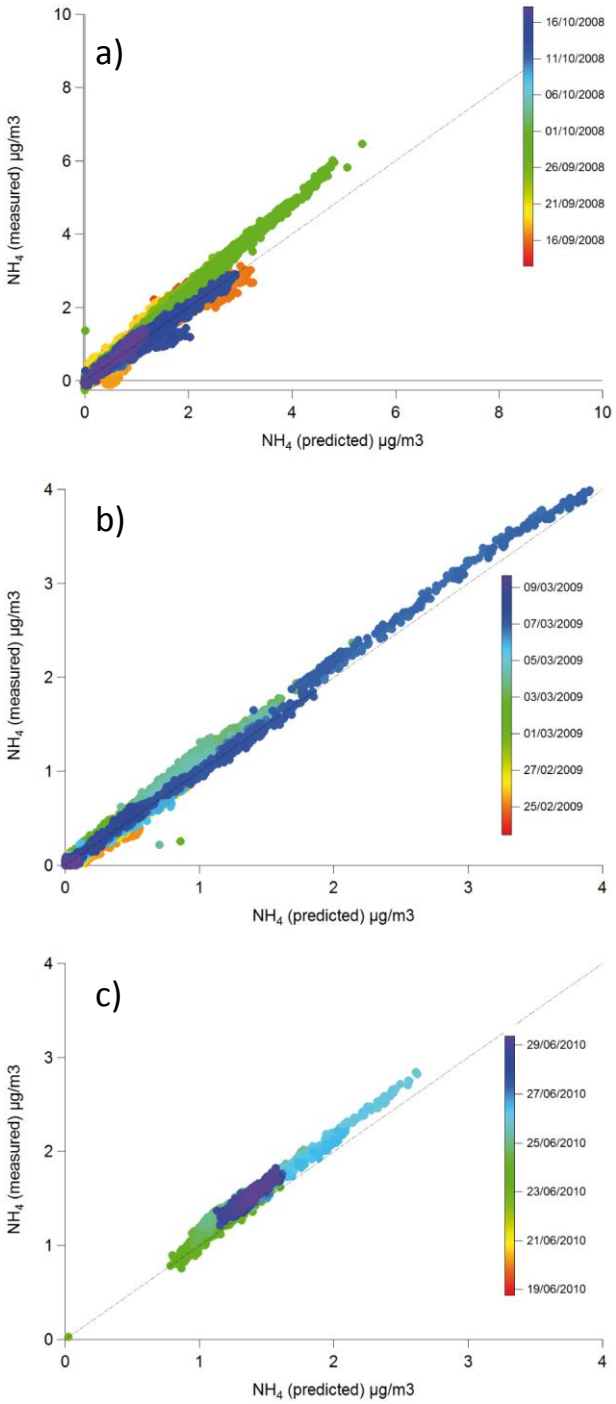


Figure S6. Measured NH_4 vs predicted NH_4 during a) Autumn 2008, b) Winter 2009, and c) Summer 2010.

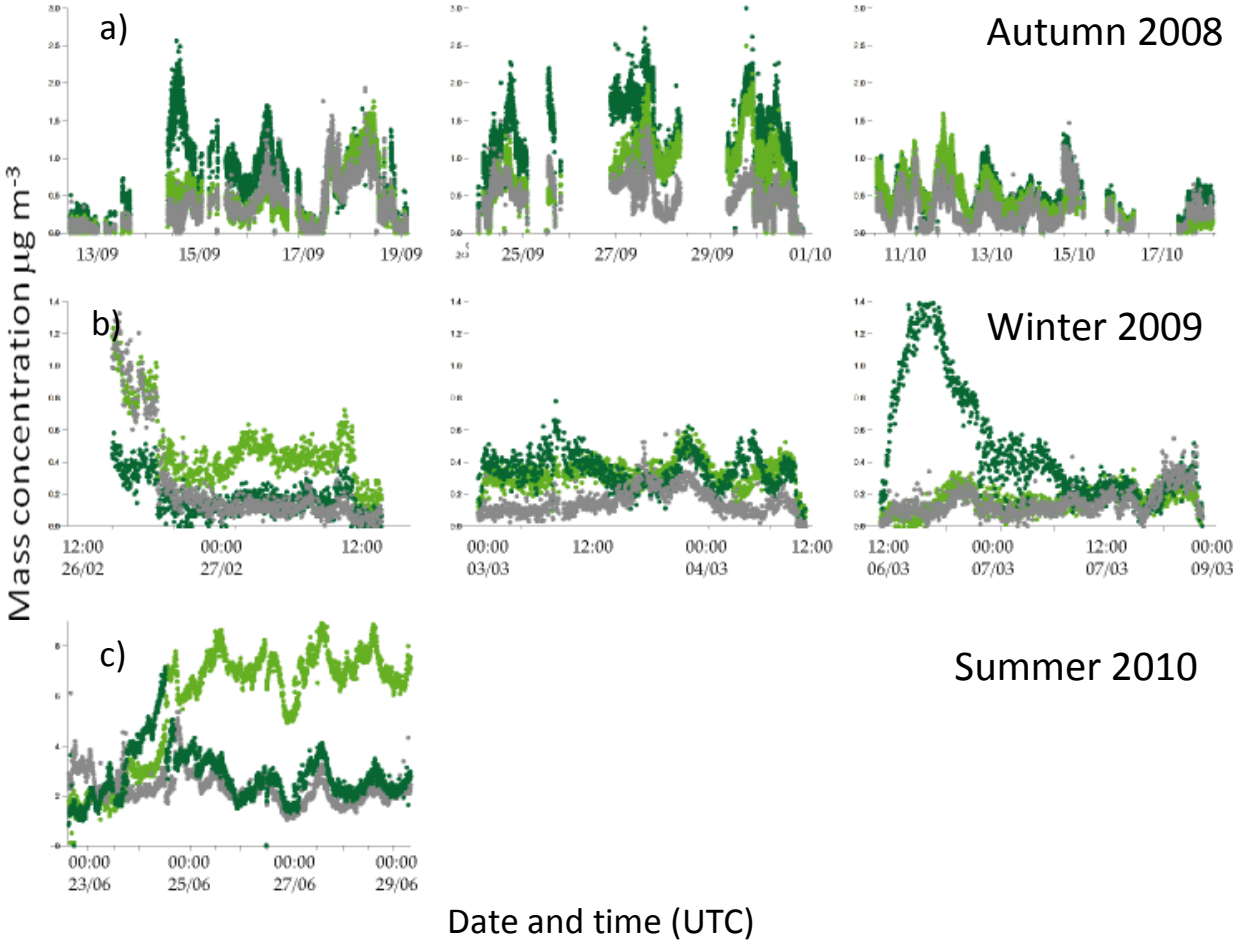


Figure S7. A three factor PMF solution showing the time series of three different secondary oxidised organic species for a) autumn 2008, b) spring 2009 , and c) the summer 2010.

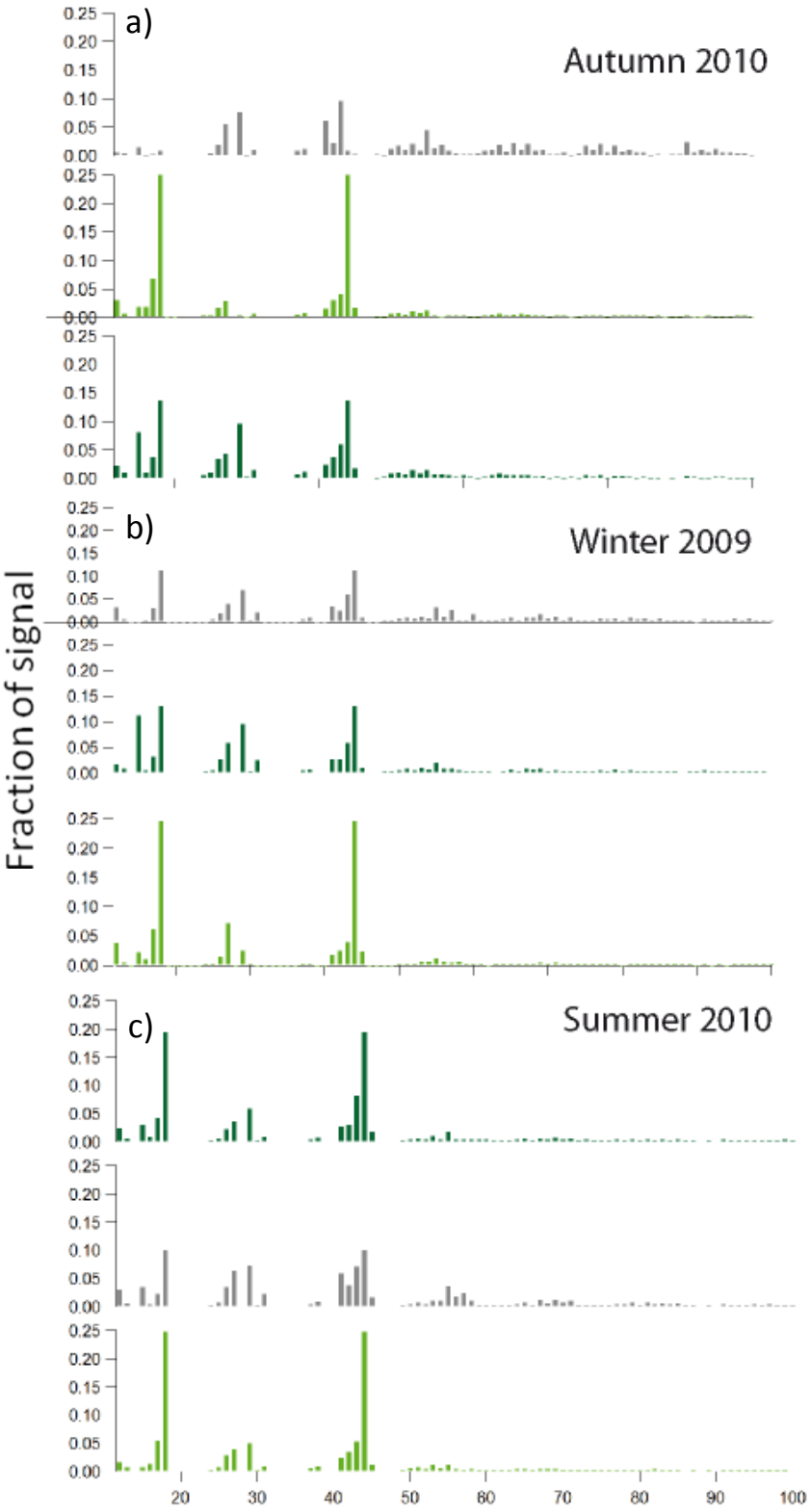


Figure S8. A three factor solution showing the mass spectra for three oxidised organic species measured during a) Autumn 2010, b) Winter 2009, and c) Summer 2010.

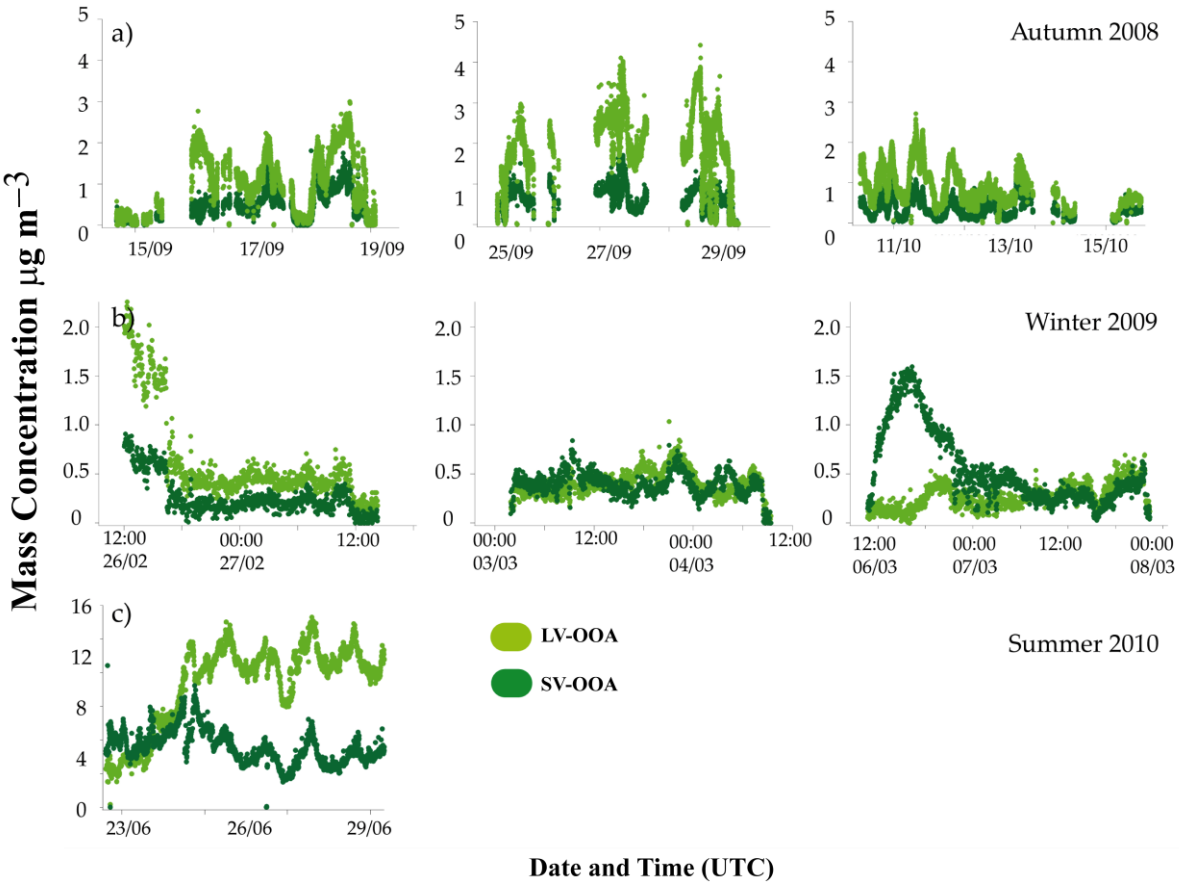


Figure S9. Time series of SV-OOA and LV-OOA sampled during the a) autumn, b) spring, and c) during the summer.

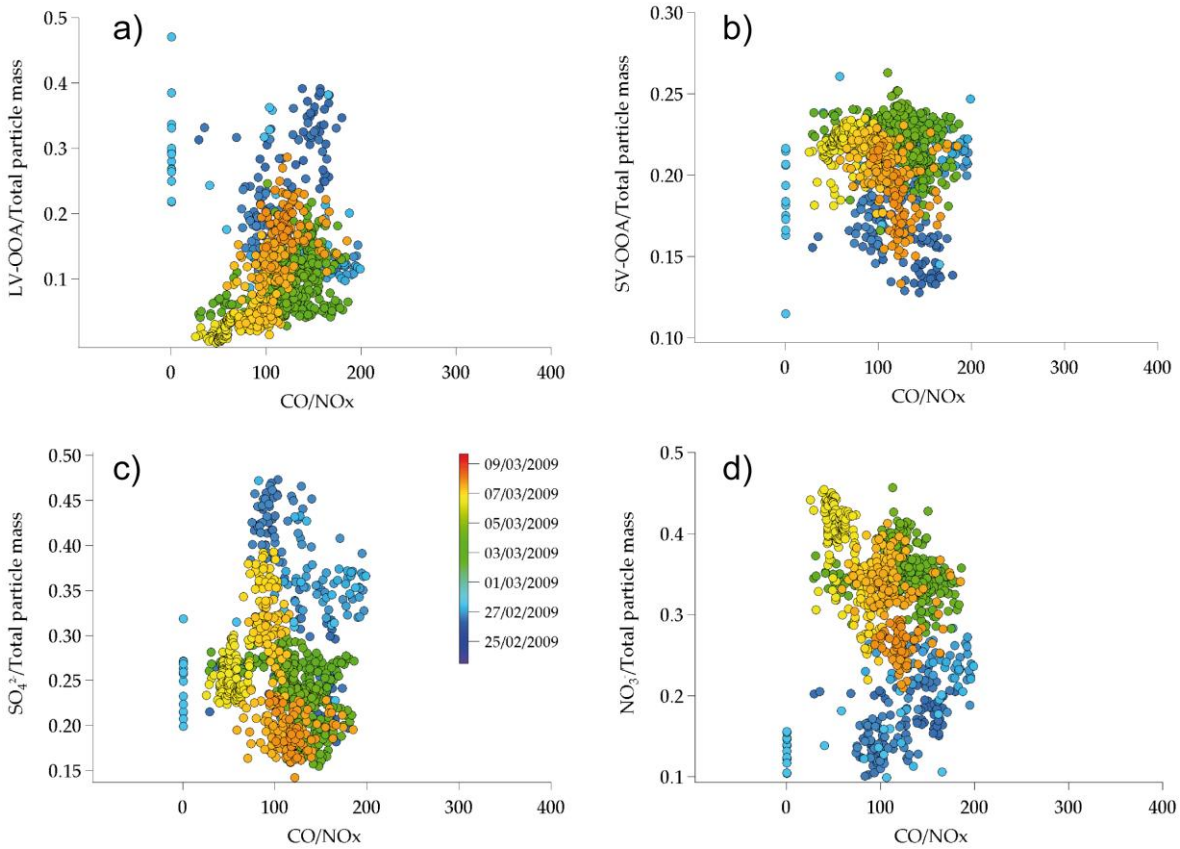


Figure S10 The fraction of a) LV-OOA, b)SV-OOA, c)SO_4, and d)NO_3 to the total aerosol mass against the measured CO/NO_X for cloud-free periods during the winter campaign coloured by date.

	Autumn 2008		Winter 2009		Summer 2010	
	LV-OOA	SV-OOA	LV-OOA	SV-OOA	LV-OOA	SV-OOA
HOA	0.044	0.659	0.066	0.114	0.0425	0.253
OOA	0.918	0.301	0.918	0.828	0.912	0.969
LV-OOA	0.953	0.249	0.934	0.857	0.942	0.952
SV-OOA	0.406	0.805	0.368	0.598	0.347	0.733
BB-OA	0.288	0.787	0.251	0.538	0.222	0.616
SOA from α-pinene					0.336	0.732
Org	0.962	0.828	0.563	0.466	0.851	0.072
NO_3	0.506	0.316	0.047	0.859	0.008	0.01
SO_4	0.338	0.149	0.027	0.742	0.299	0.249
NH_4	0.669	0.364	0.039	0.867	0.319	0.135
Chl	0.039	0.024	0.050	0.779	0.133	0.0832
O_3	0.002	0.004	0.155	0.104	0.518	0.0256
SO_2	0.012	0.015	0.013	0.017	0.117	0.018
CO_2	0.027	0.029	0.090	0.272		
CO	0.49	0.507	0.001	0.121	0.326	0.073
NO_2	0.001	0.028	0.064	0.483	0.035	0.011
NO	0.137	0.335	0.0524	0.134	$<$0.01	0.02
BC	$<$0.01	0.12	0.0075	0.311	0.445	0.0676

Table S1. Two factor solution: r^2 correlations of PMF components with reference mass spectra and with time series of gas and particle phase species