



Supplement of

Nighttime chemistry of biomass burning emissions in urban areas: A dual mobile chamber study

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20 **Calculation of organonitrates**

21 In order to calculate the fraction of nitrates attributed to organonitrates we used values of
22 the ratio $\text{NO}^+/\text{NO}_2^+$ (R) during a calibration of the AMS with ammonium nitrate. The fractional
23 contribution of the organonitrates ($ONit$) to total nitrates ($TotNit$) can be calculated as:

$$25 \quad \frac{ONit}{TotNit} = \frac{(R_{mea} - R_{cal})(1 + R_{ONit})}{(R_{ONit} - R_{cal})(1 + R_{mea})} \quad (S1)$$

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27 where R_{mea} is the measured R during the ambient sampling and R_{cal} is the ratio of m/z 30 to m/z 46
28 during NH_4NO_3 calibration. R_{ONit} is the R derived from organonitrates, which in our case was the
29 maximum R (equal to 4) we observed during the ambient sampling. Using a R_{mea} of 2.44 and R_{cal}
30 of 1.4, approximately 60% of the measured nitrates were organic nitrates based on the method of
31 Farmer et al. (2010).

34 **Correction for particle wall losses**

35 The size-dependent particle wall loss rate constants were measured in the end of each
36 experiment using ammonium sulfate seeds. The particles produced by an atomizer/dryer system
37 were introduced to the chamber directly, without passing through a neutralizer. Measurements of
38 the wall loss rate constants in our chambers with and without a neutralizer are the same for all
39 practical purposes. A typical profile is shown in Figure S3. The corresponding constants were
40 higher for the smaller particles, but they were practically size independent in the size range 170-
41 700 nm. With the mean diameter of the OA mass distribution being around 300 nm we used the
42 average wall loss rate constant in that size range. This approach was used to calculate the initial
43 concentration of OA in the perturbed chamber needed for the estimation of the mass spectrum of
44 the produced OA.

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50 **Table S1:** Injected amount of ozone, and maximum detected concentration of NO₃ in the perturbed
51 chamber.

Experiment	O₃ (ppb)	NO₃ (ppt)
1	240	NA
2	145	4
3	65	Not detected
4	220	NA
5	200	NA
6	65	13
7	85	NA
8	150	25
9	185	5
10	75	Not detected
11	130	3

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Table S2: Comparison of the produced OA mass spectra in the perturbed chamber for Exp. 1 and the ambient AMS OOA factors identified in different cities during wintertime.

Location	Produced OA (degrees)
Bologna, Italy	9
Xi'an/Beijing, China	11
Fresno, US	14
Barcelona, Spain	16
Athens, Greece	17
Paris, France	18

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Table S3: OA enhancement and initial and final O:C in the perturbed chamber.

Experiment	OA enhancement*	O:C_{initial}	O:C_{final}
1	1.75	0.4	0.62
2	1.31	0.36	0.51
3	1.16	0.25	0.32
4	1.74	0.33	0.52
5	1.34	0.4	0.56
6	1.35	0.36	0.49
7	1.61	0.36	0.53
8	1.67	0.45	0.59
9	1.21	0.44	0.59
10	1.27	0.33	0.48
11	1.23	0.41	0.55

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*OA enhancement= $OA_{\text{final}}/OA_{\text{initial}}$



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81 **Figure S1:** Location of sampling site, in the city of Patras, Greece (Google Maps 2021).

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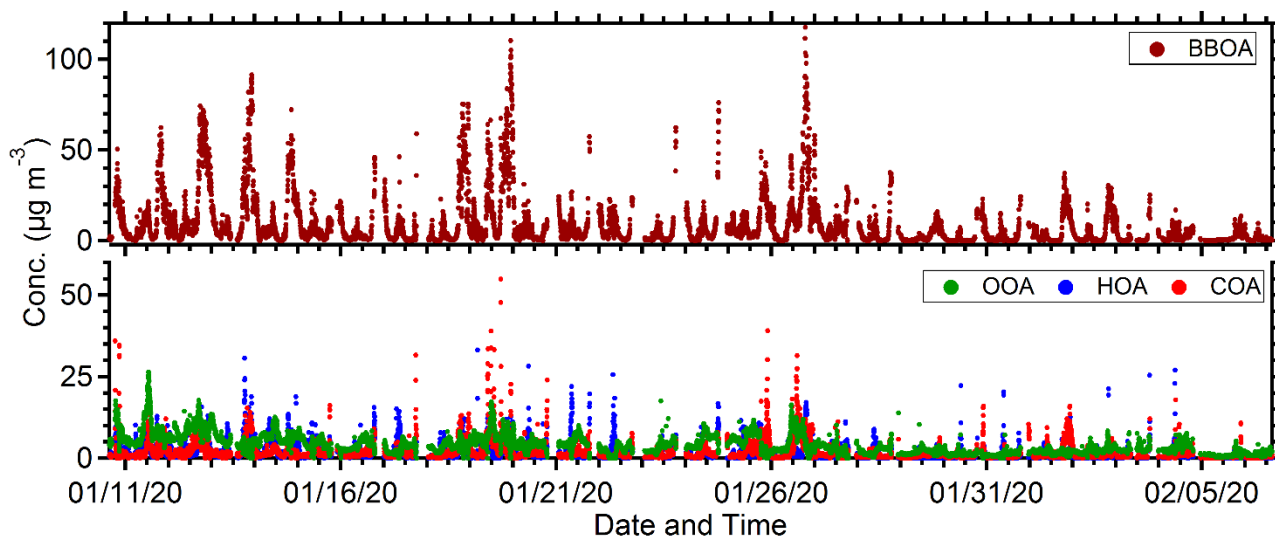
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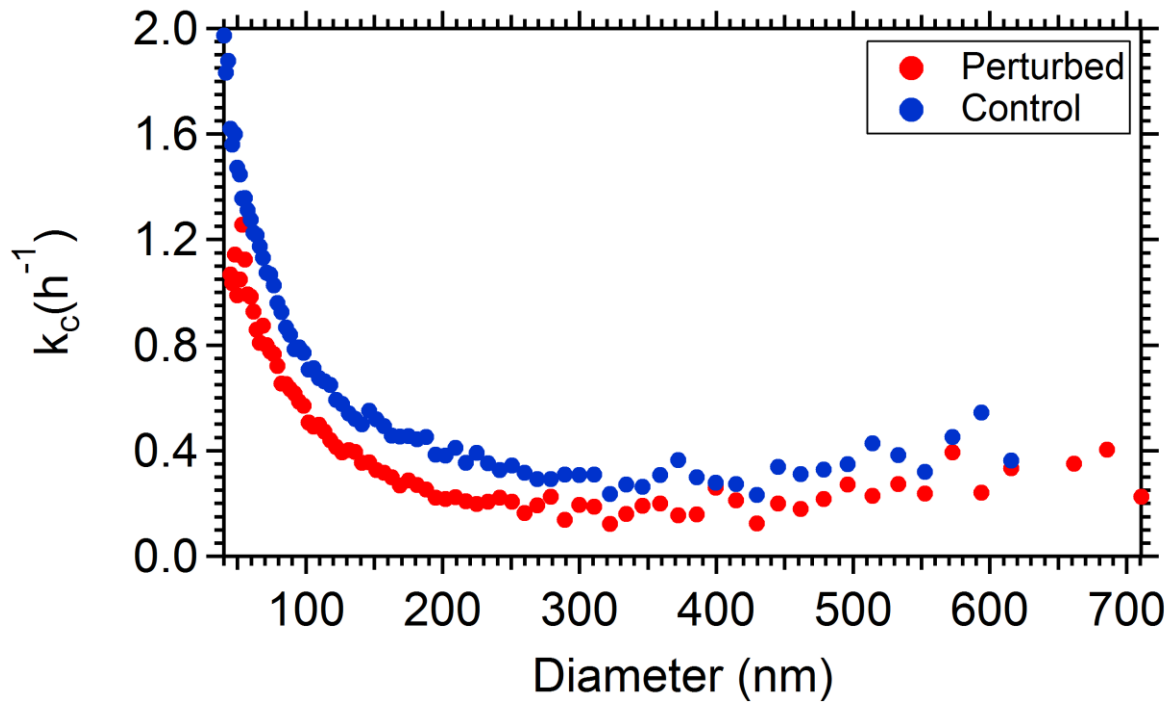
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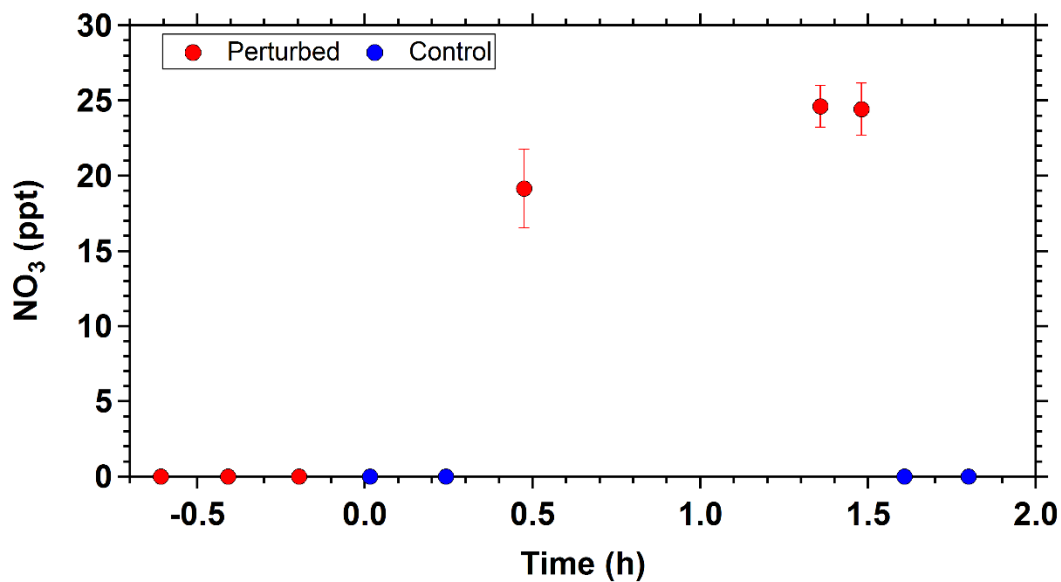
Figure S2: Time series of the four factors identified from the PMF analysis of the ambient data during the month long campaign.



110 **Figure S3:** Particle loss rate constant profile in the chambers during Exp. 1.

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135 **Figure S4:** Measured concentration of NO₃ radicals in the control (blue dots) and in the perturbed
136 chamber (red dots) during Exp. 8. The error bars represent one standard deviation.

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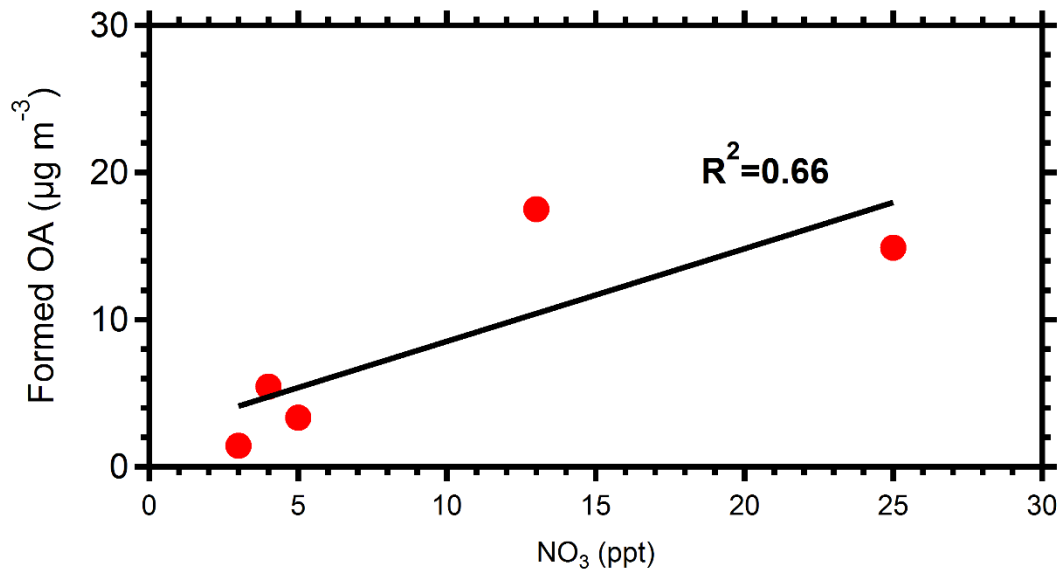


Figure S5: Correlation between NO₃ radicals with the organic aerosol formed in the perturbed chamber.