



*Supplement of*

## **Development and evaluation of an improved offline aerosol mass spectrometry technique**

**Christina N. Vasilakopoulou et al.**

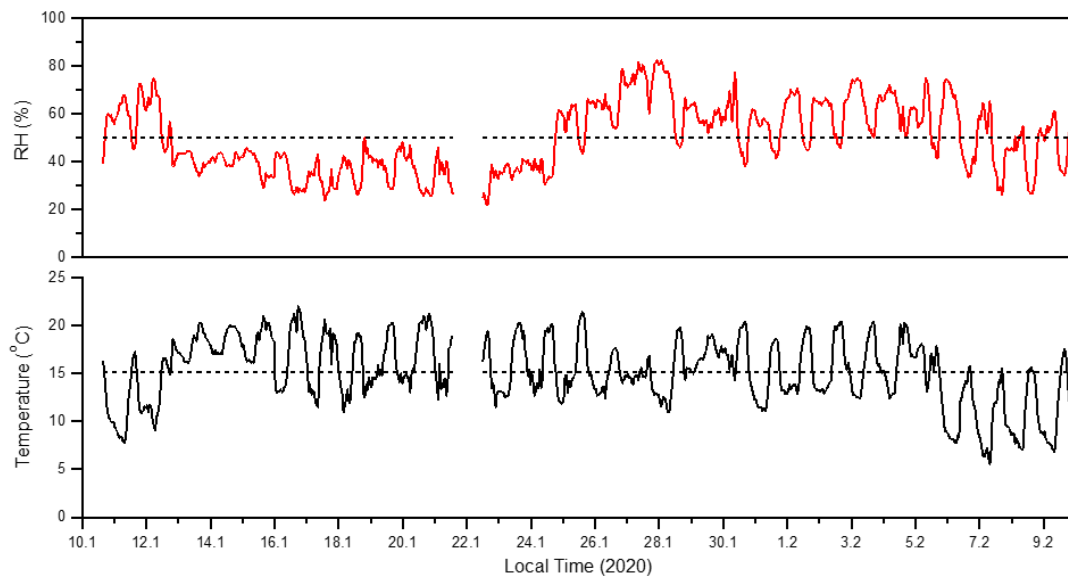
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## S1. Patras 2020 winter campaign

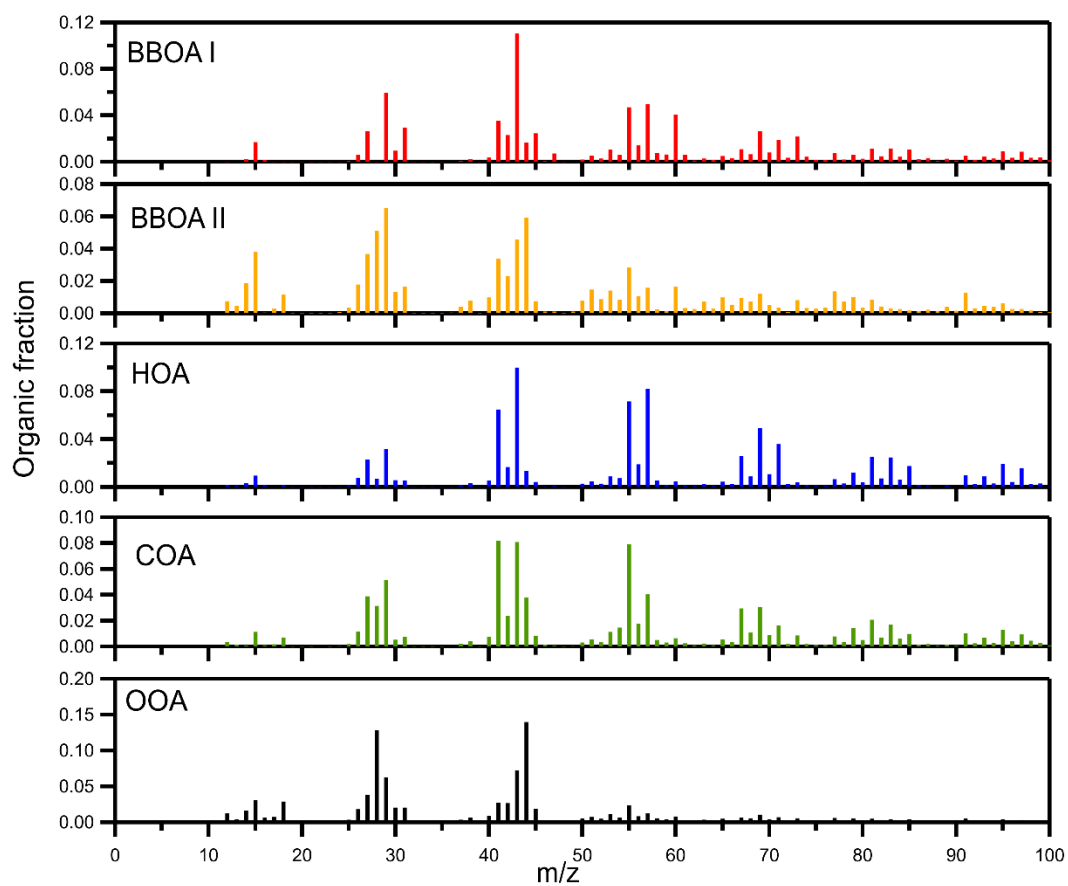


**Figure S1:** Map of the sampling site for the Patras campaign. The map was obtained by Google maps.

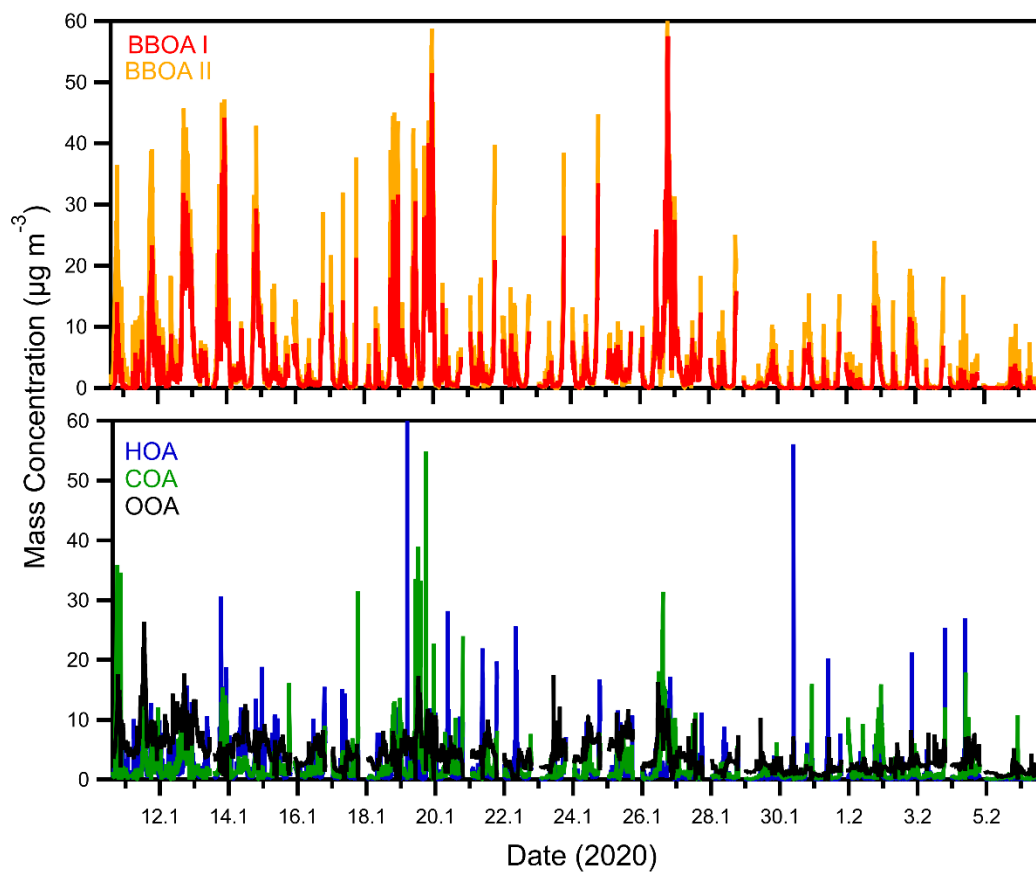


**Figure S2:** Ambient temperature and relative humidity time series for the Patras 2020 campaign.

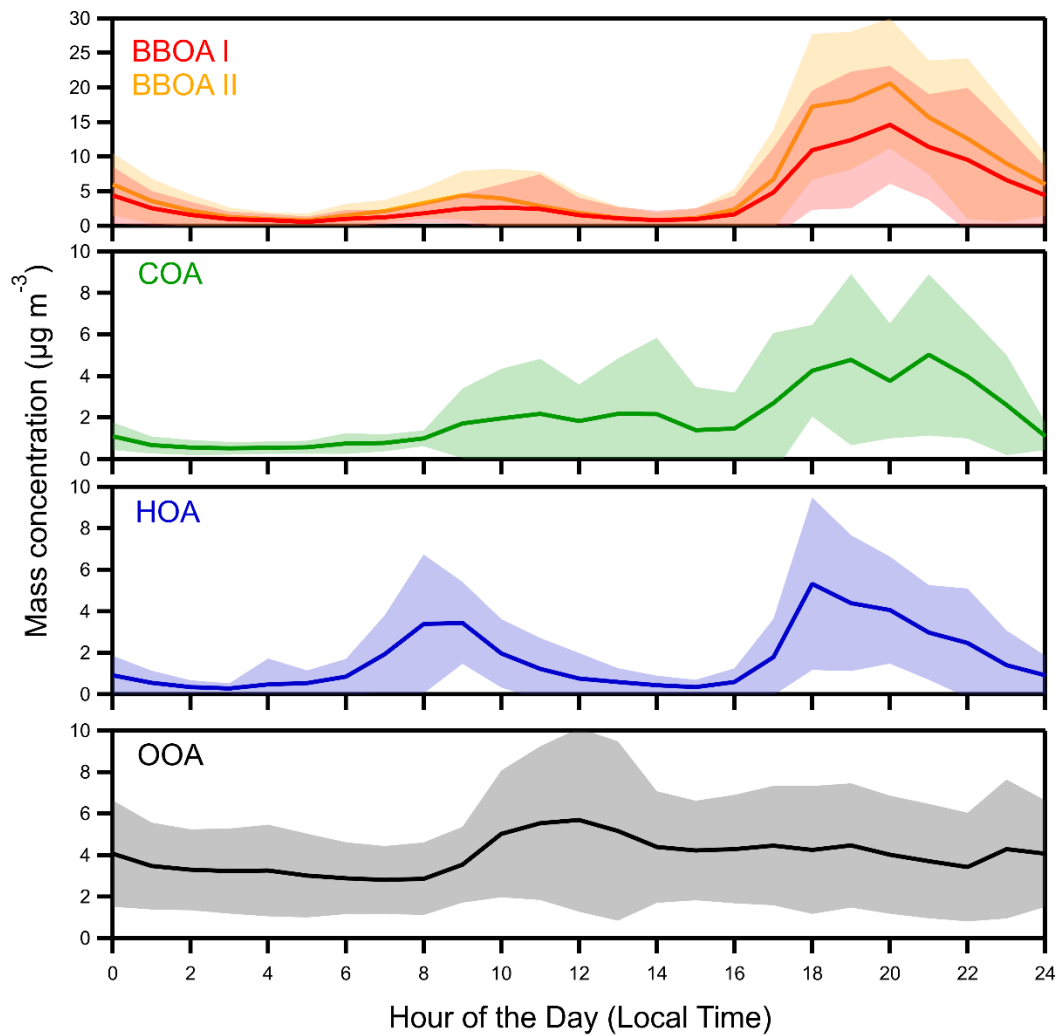
## S1.1 On-line



**Figure S3:** Organic mass spectra of the on-line PMF solution for the Patras 2020 winter campaign.

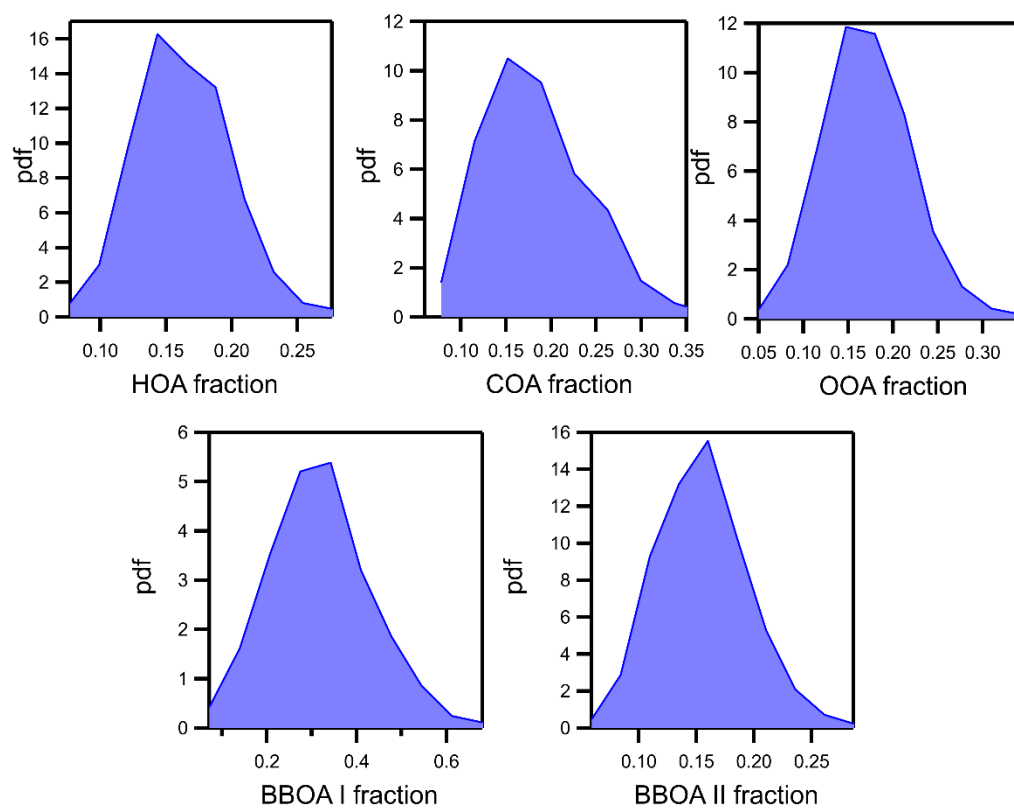


**Figure S4:** Time series of the on-line PMF solution for the Patras 2020 winter campaign.

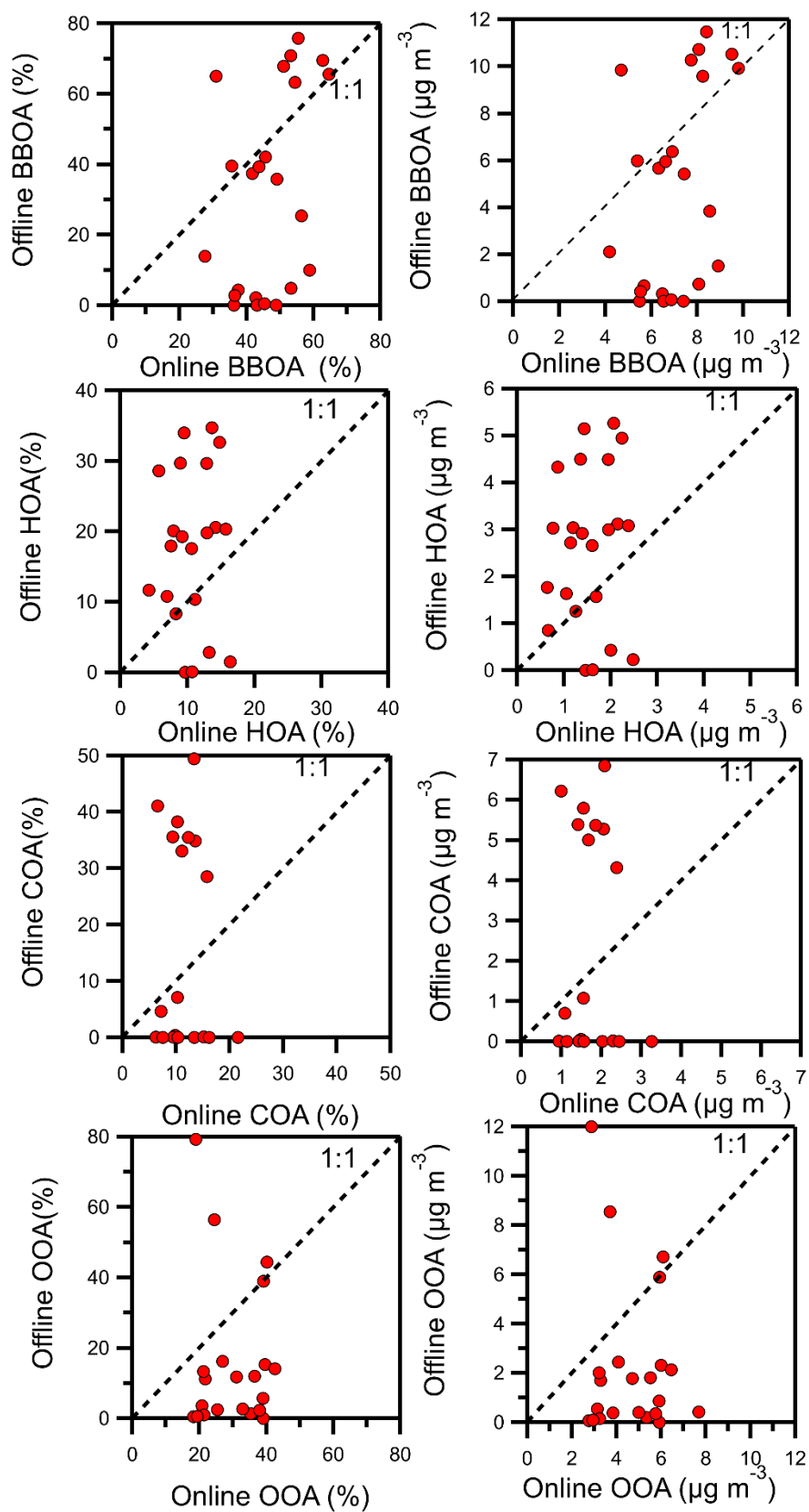


**Figure S5:** Average diurnal profile of the factors derived from the on-line PMF analysis during the winter of 2020 campaign in Patra. The shaded regions show the standard deviation of the mean.

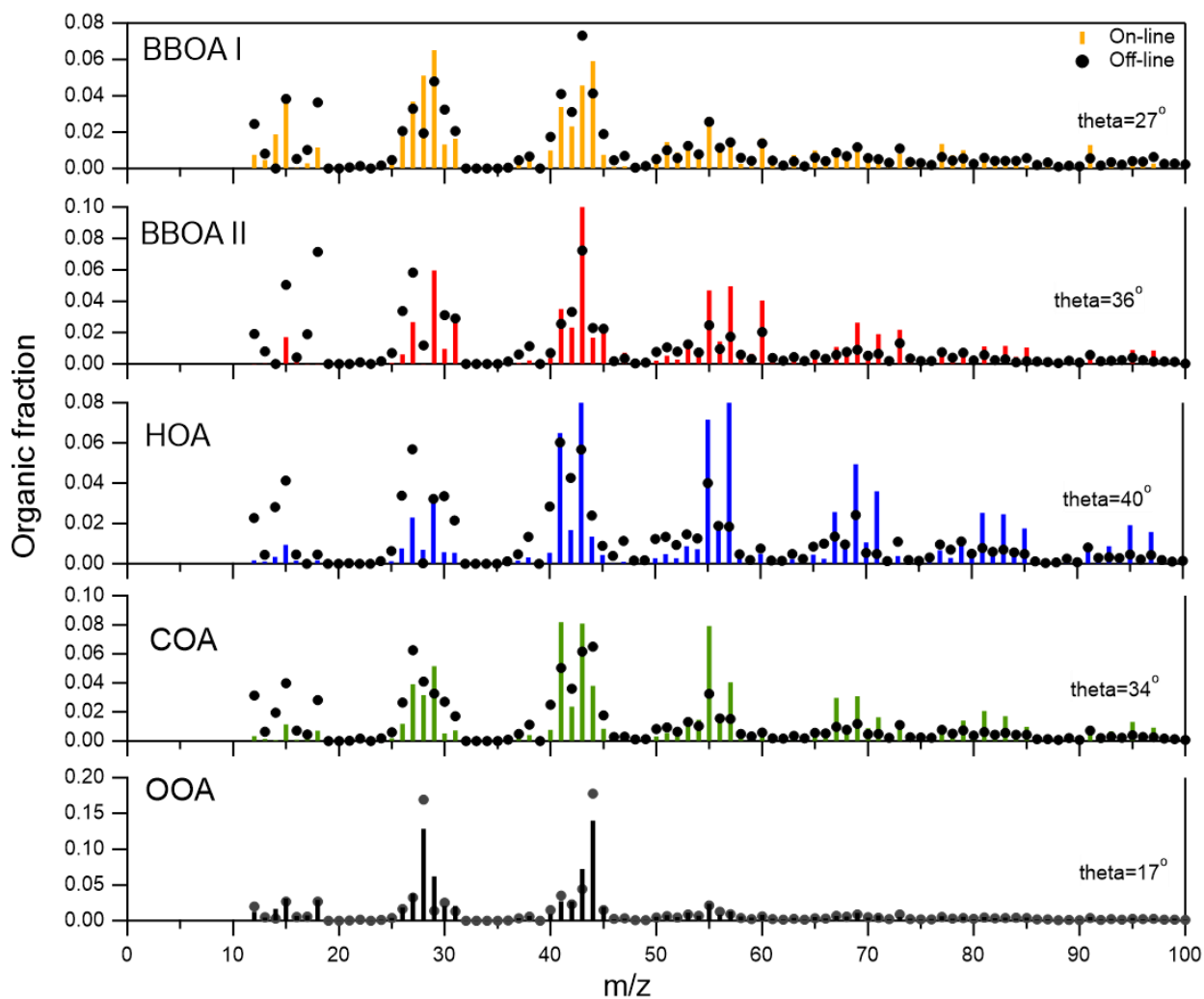
## S1.2 Off-line



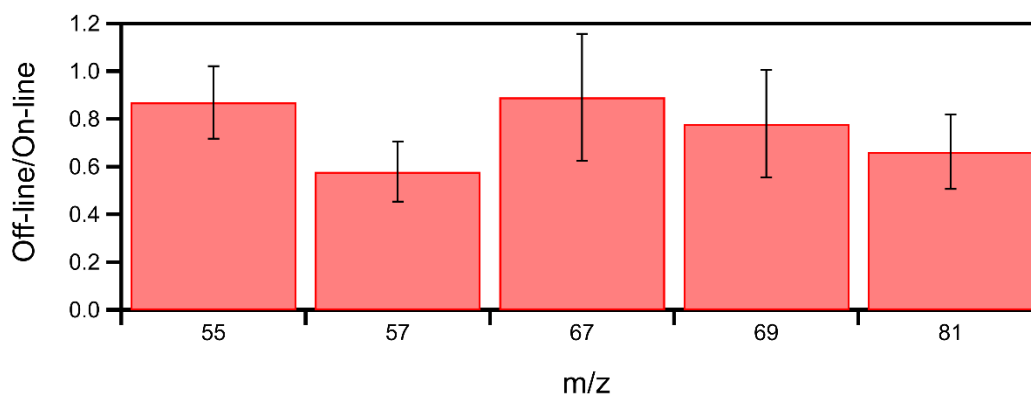
**Figure S6:** Off-line bootstrap analysis for the Patras 2020 winter campaign.



**Figure S7:** Comparison of the daily contribution of each factor between the on-line and the off-line PMF results for the Patras 2020 winter campaign.

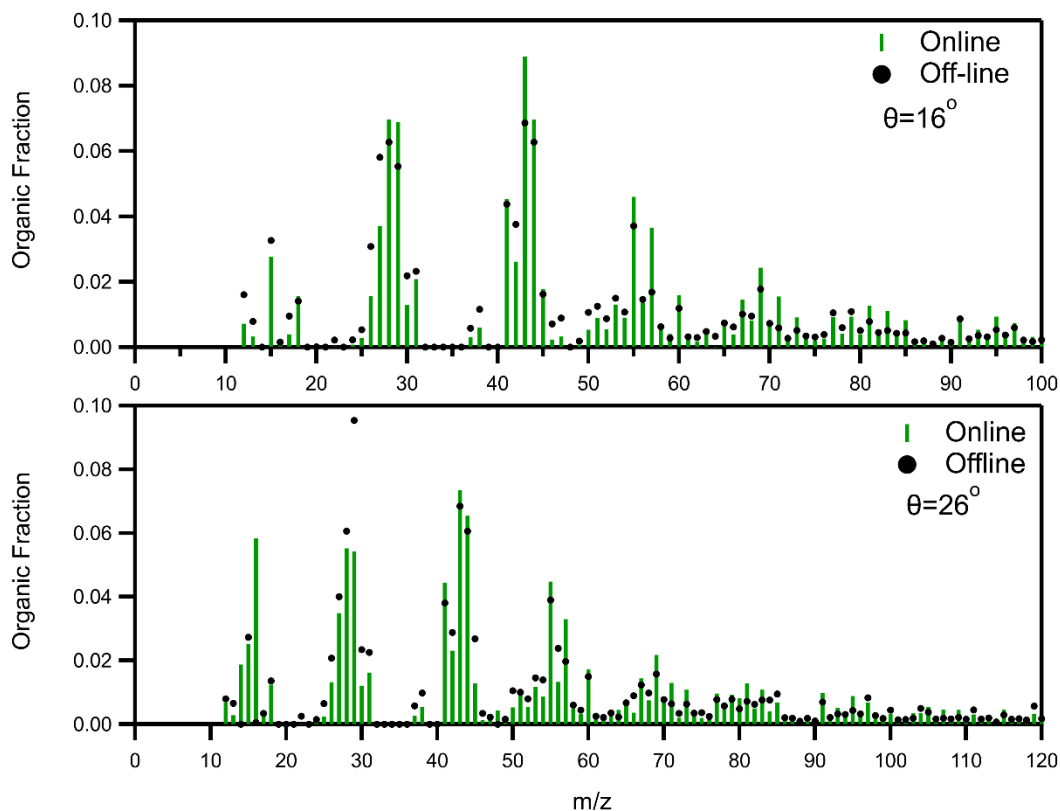


**Figure S8:** Comparison of off-line and on-line spectra of the PMF solution for the Patras 2020 winter campaign.

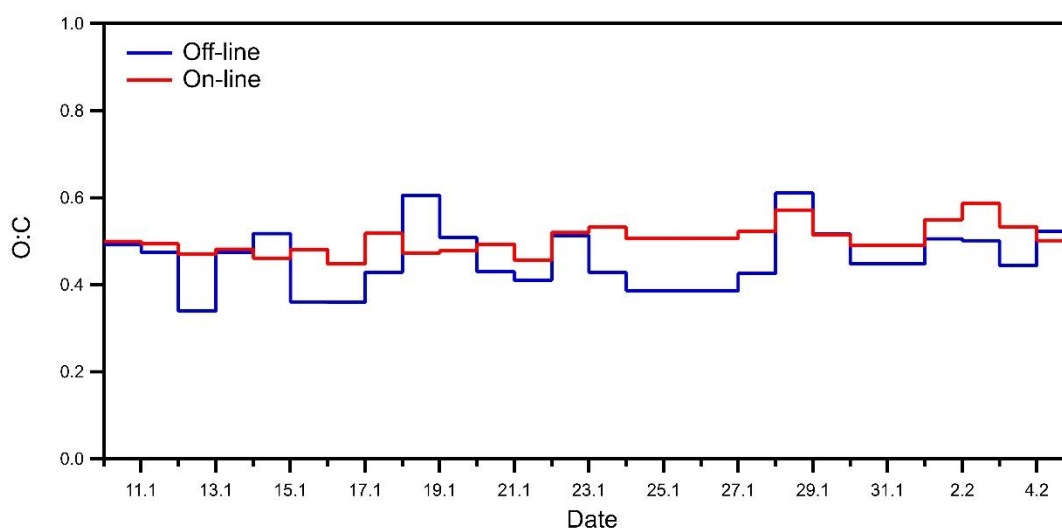


**Figure S9:** Off-line to on-line ratio for specific UMR HOA markers.





**Figure S10:** Comparison between the off-line and the on-line organic mass spectra for the day with the best and the worst agreement. The theta angle is also depicted. The ambient OA mass concentration was  $7 \mu\text{g m}^{-3}$  during the first day case (best correlation between on-line and off-line) and  $3 \mu\text{g m}^{-3}$  for the second (worst correlation between on-line and off-line).



**Figure S11:** Atomic oxygen to carbon ratio (O:C) comparison between the off-line and the on-line results.

## S2. Summer campaign Patras 2019

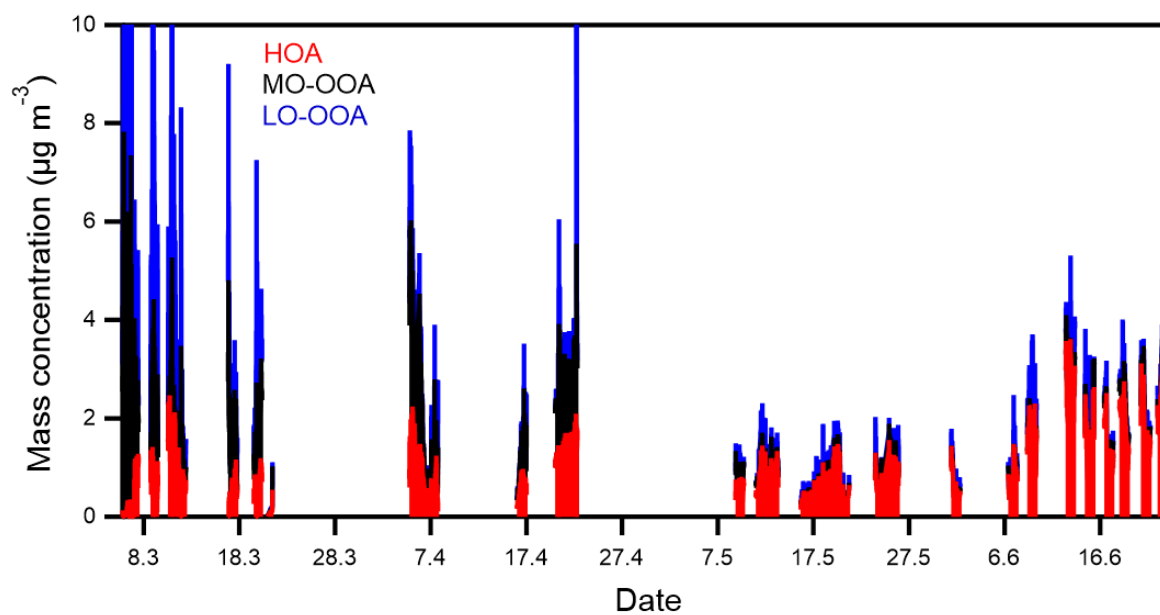


**Figure S12:** Map of the sampling site for the Patras 2019 summer campaign. The map was obtained by Google maps.

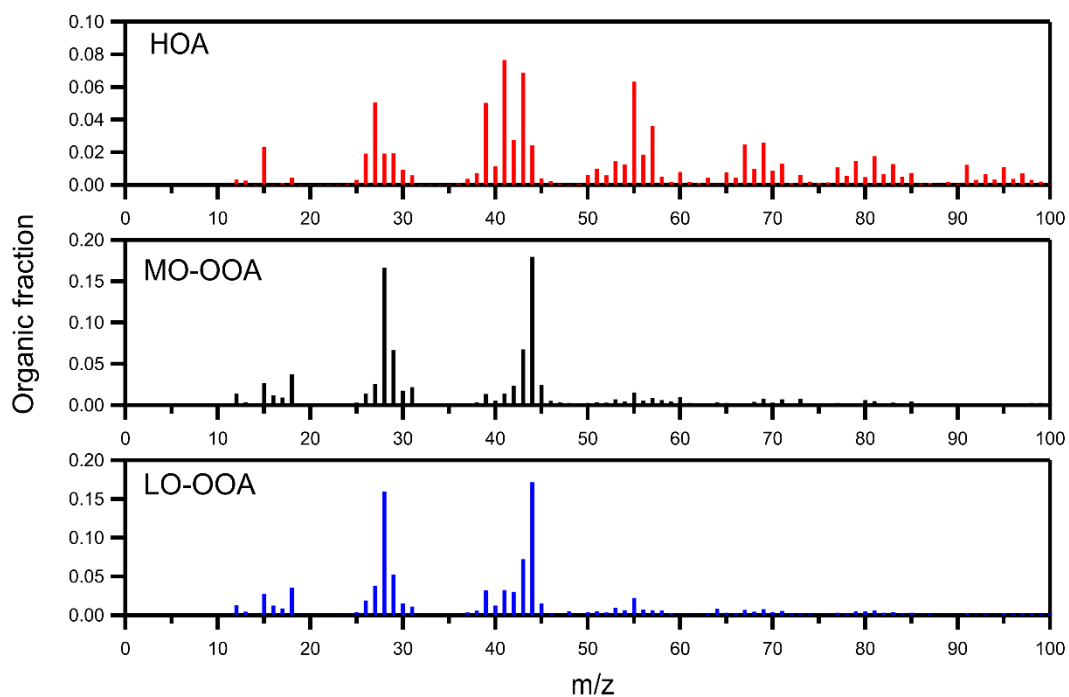
**Table S1:** Average Temperature per month for the Patras 2019 summer campaign

Month	Average Temperature (°C)
March	16
April	18
May	18
June	26

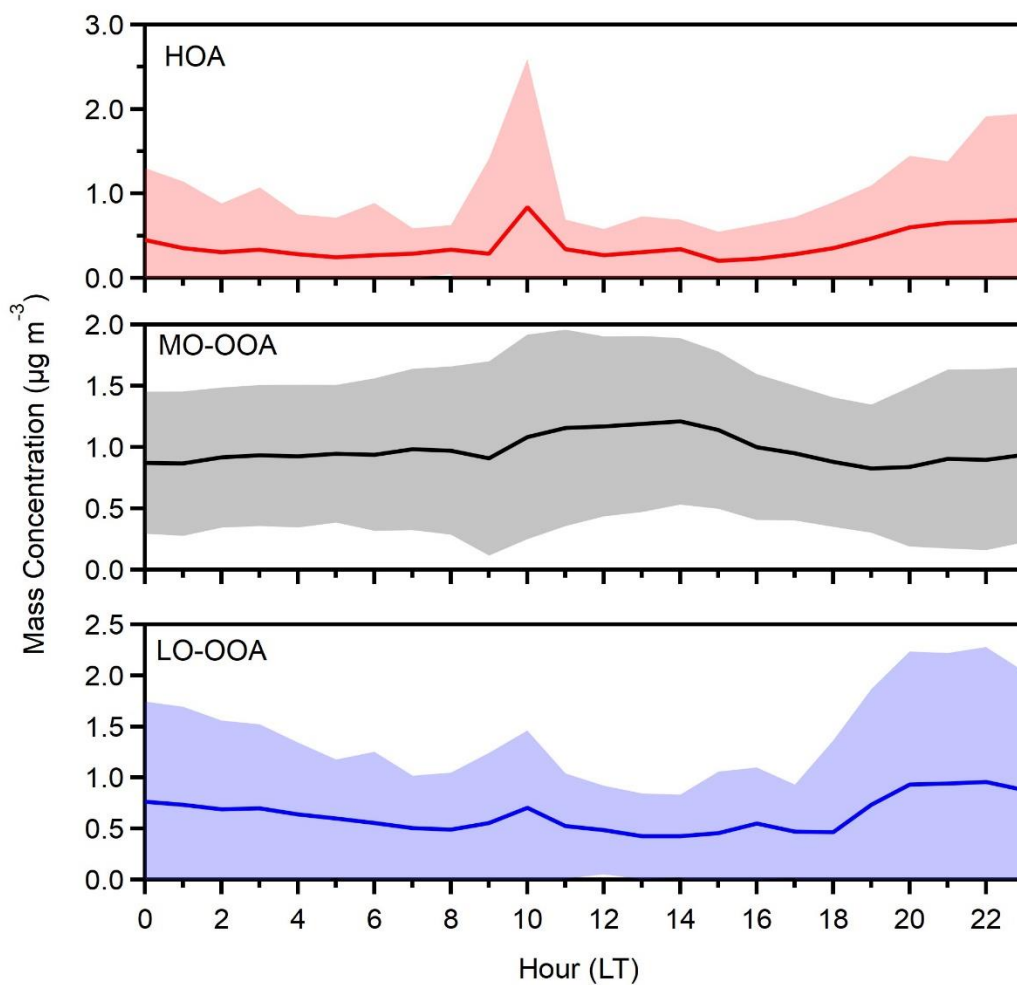
## S2.1 On-line



**Figure S13:** Time series of the three factors derived from the PMF analysis of the on-line measurements.

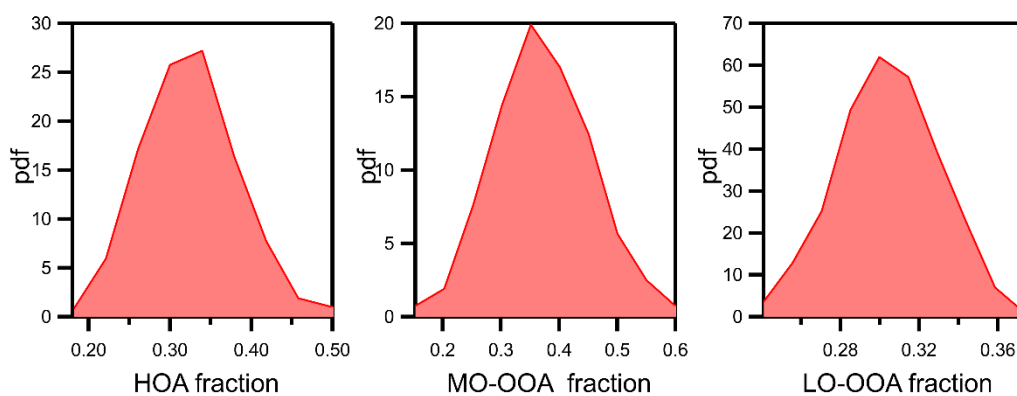


**Figure S14:** Organic mass spectra of the on-line PMF solution for the summer 2019 campaign.

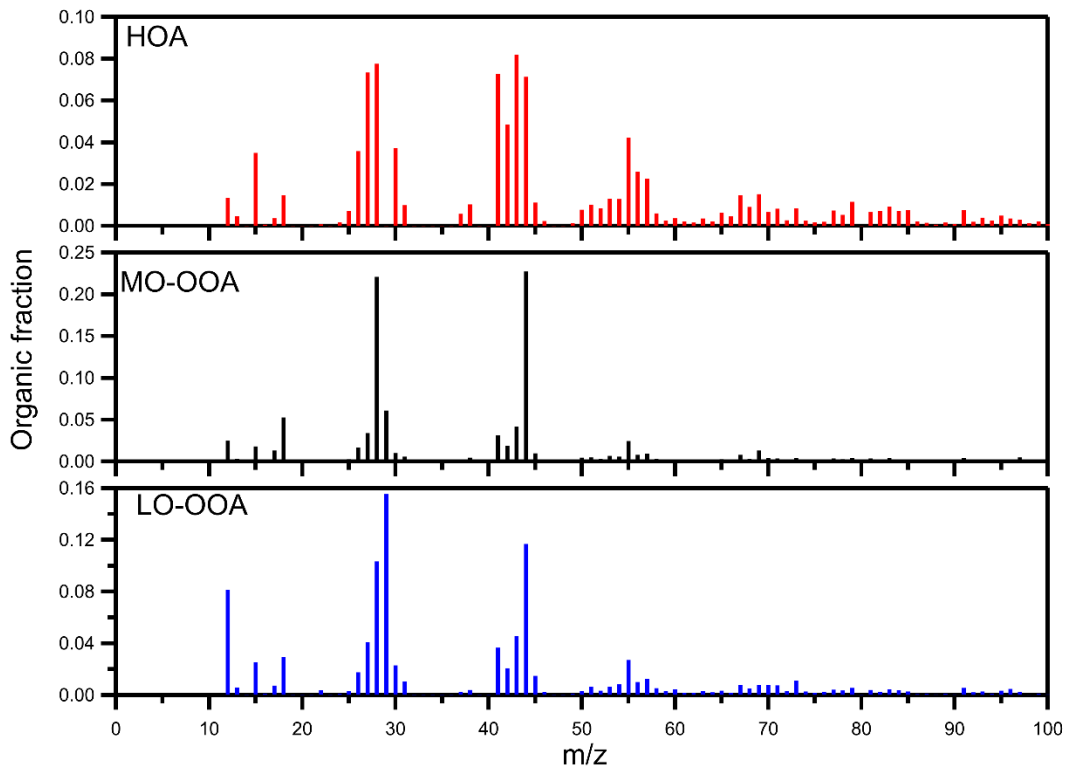


**Figure S15:** Diurnal profiles of the three factors derived from the on-line PMF analysis for the summer 2019 campaign.

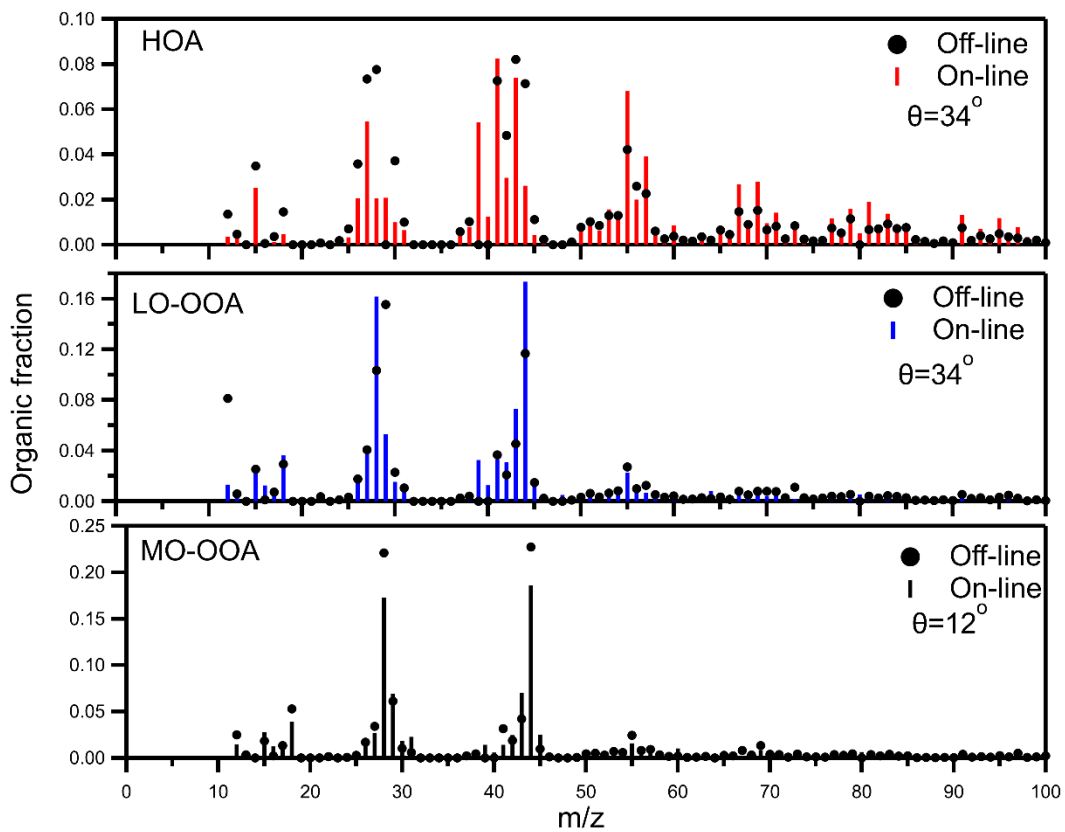
## S2.2 Off-line



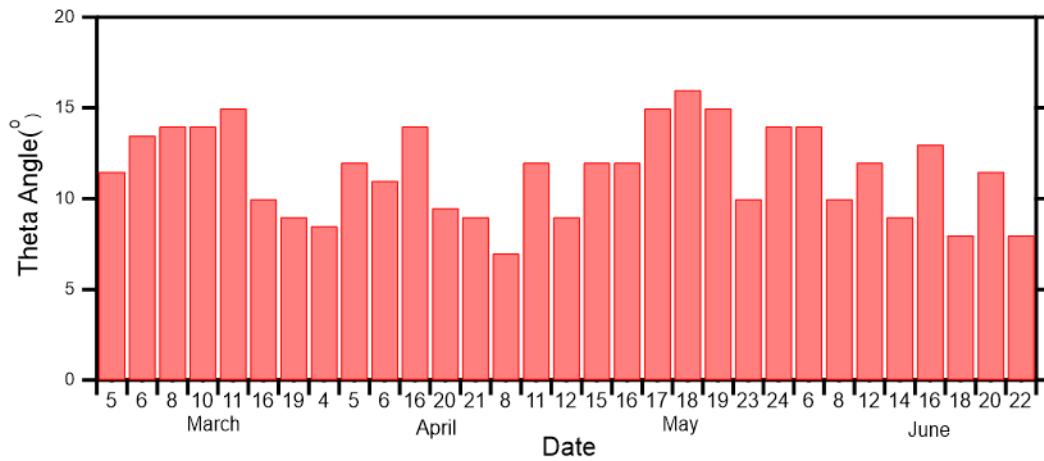
**Figure S16:** Off-line bootstrap analysis for the summer 2019 campaign.



**Figure S17:** Organic mass spectra of the off-line PMF results for the summer 2019 campaign.



**Figure S18:** Spectra comparison between the on-line and the off-line PMF solution for the summer 2019 campaign.



**Figure S19:** Comparison of off-line and on-line AMS spectra for the summer 2019 Patras campaign.

### S3. Athens campaign 2019



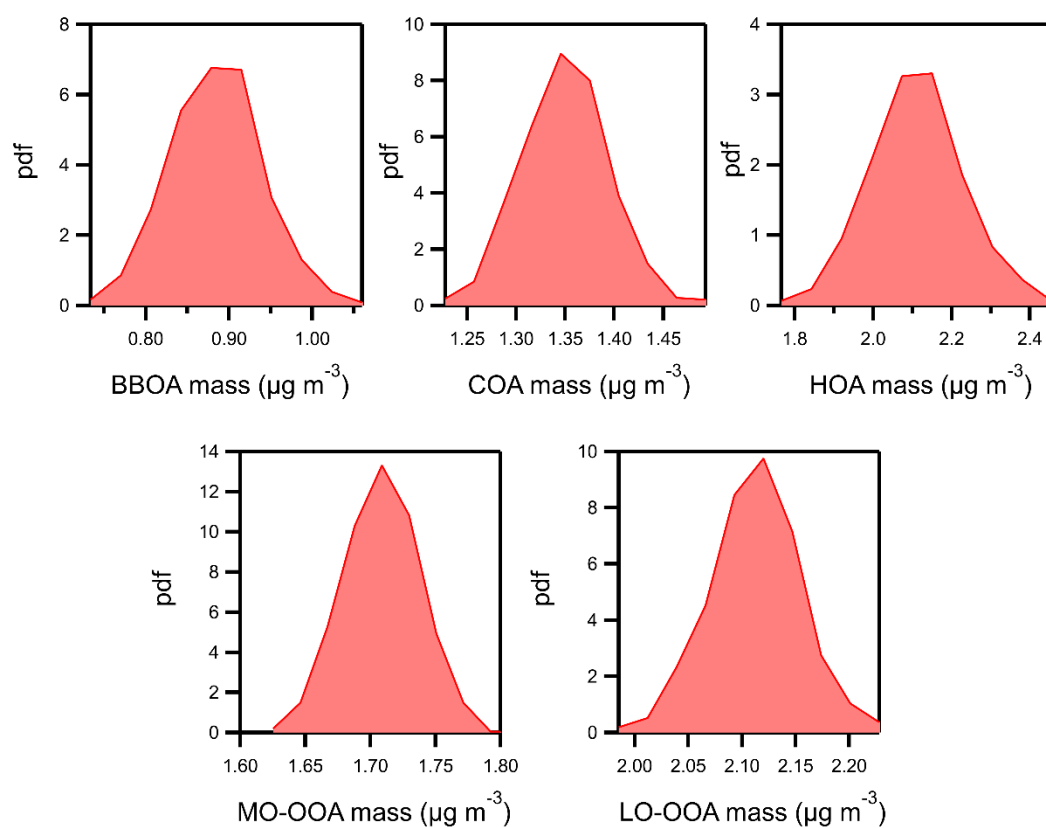
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**Figure S20:** Map of the sampling site for the Athens 2019 winter campaign. The map was obtained by Google maps.

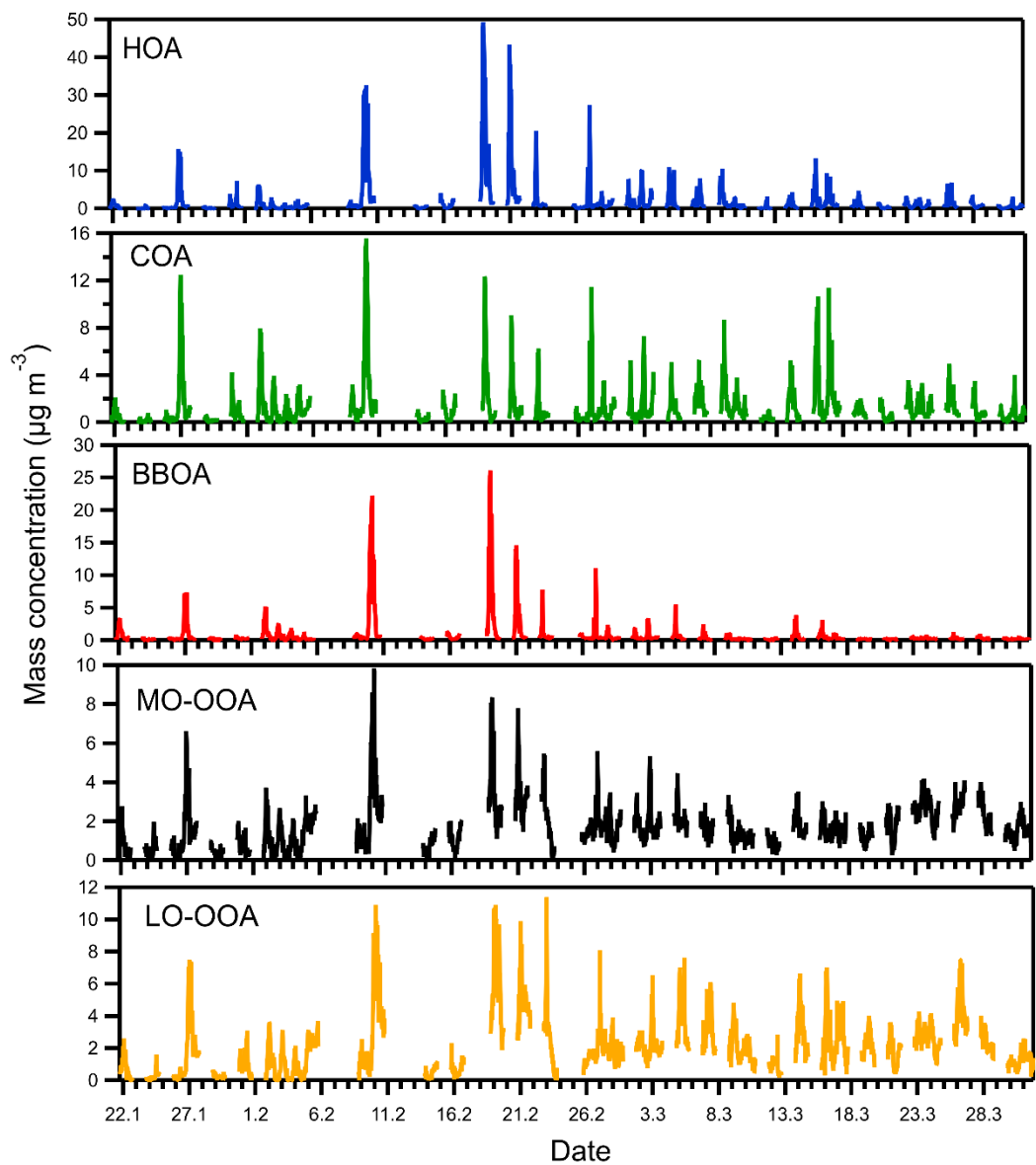
**Table S2:** Average temperature per month for the Athens 2019 winter campaign

Month	Average Temperature (°C)
January	9
February	9
March	13

### S3.1 On-line

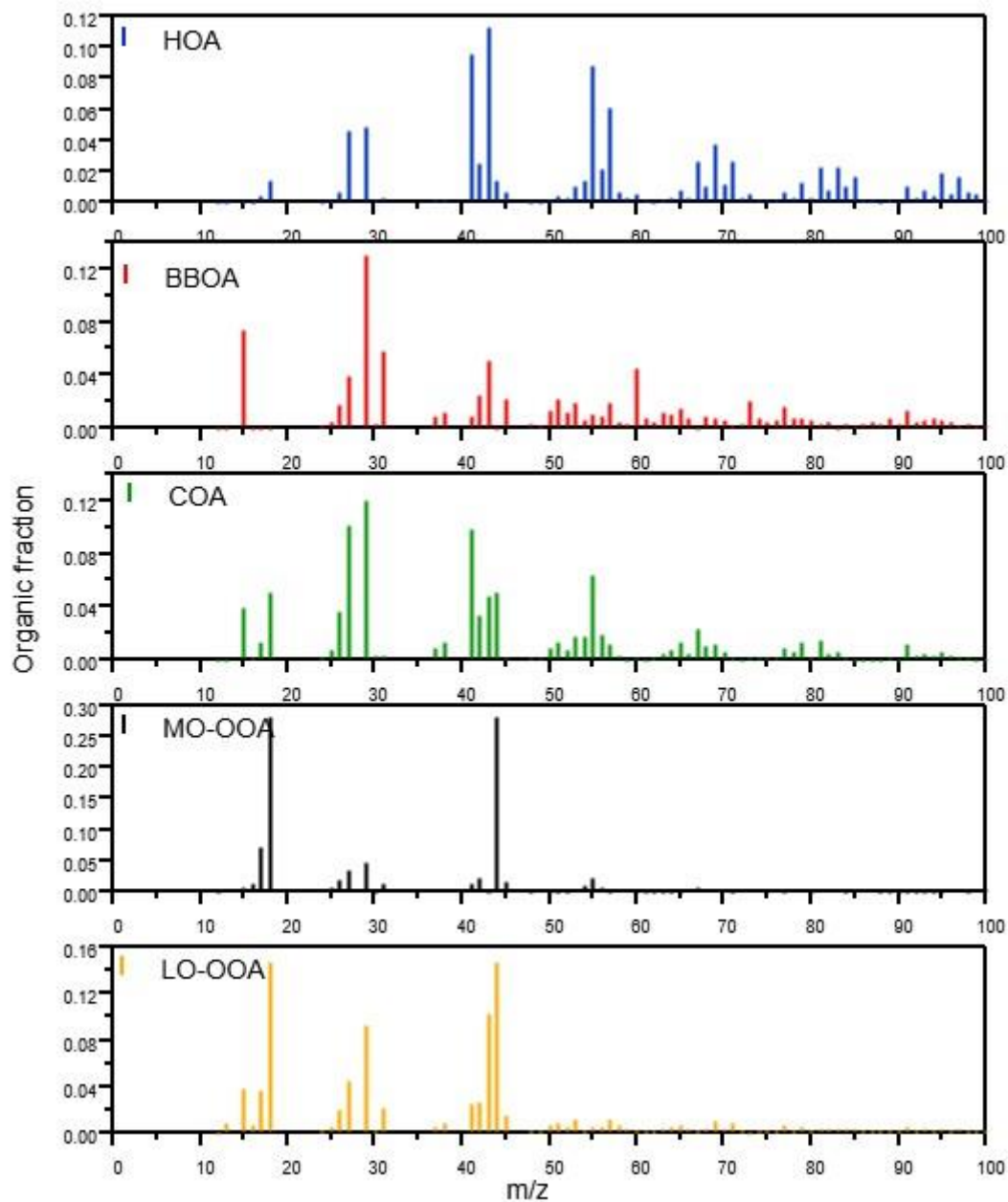


**Figure S21:** On-line bootstrap analysis of the Athens 2019 winter campaign.



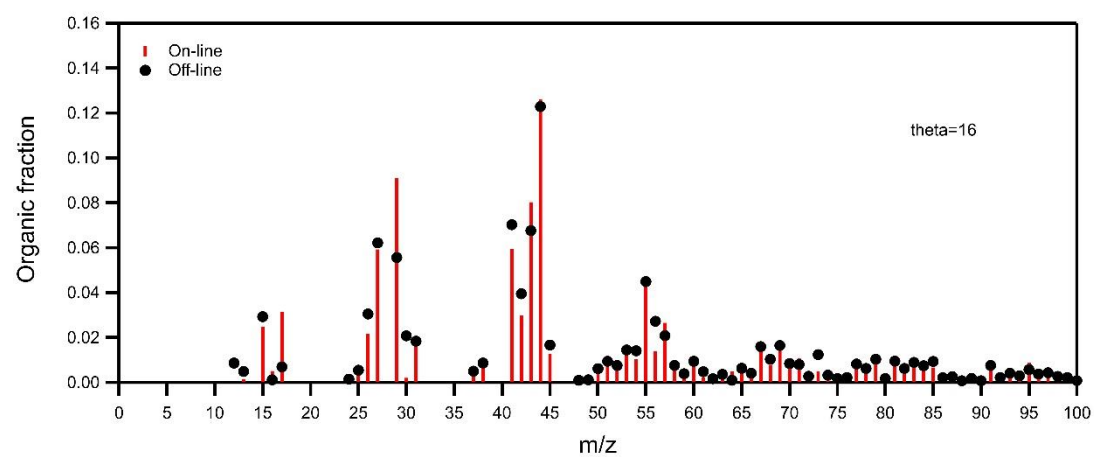
**Figure S22:** Time series of the 5 factors derived from the unconstrained on-line PMF solution for the Athens 2019 winter campaign.



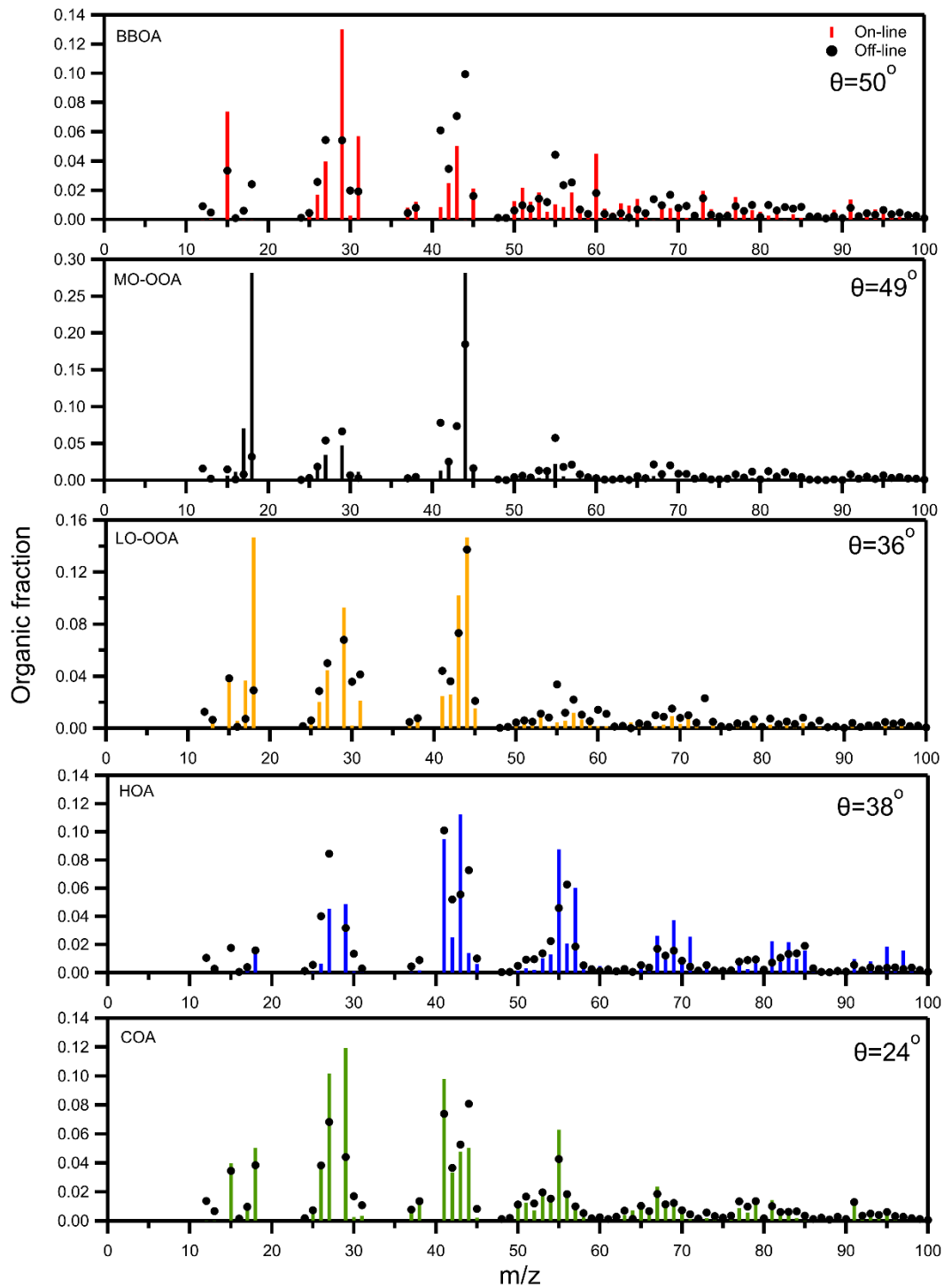


**Figure S23:** Organic mass spectra of the 5 factors derived from the unconstrained on-line PMF solution for the Athens 2019 winter campaign.

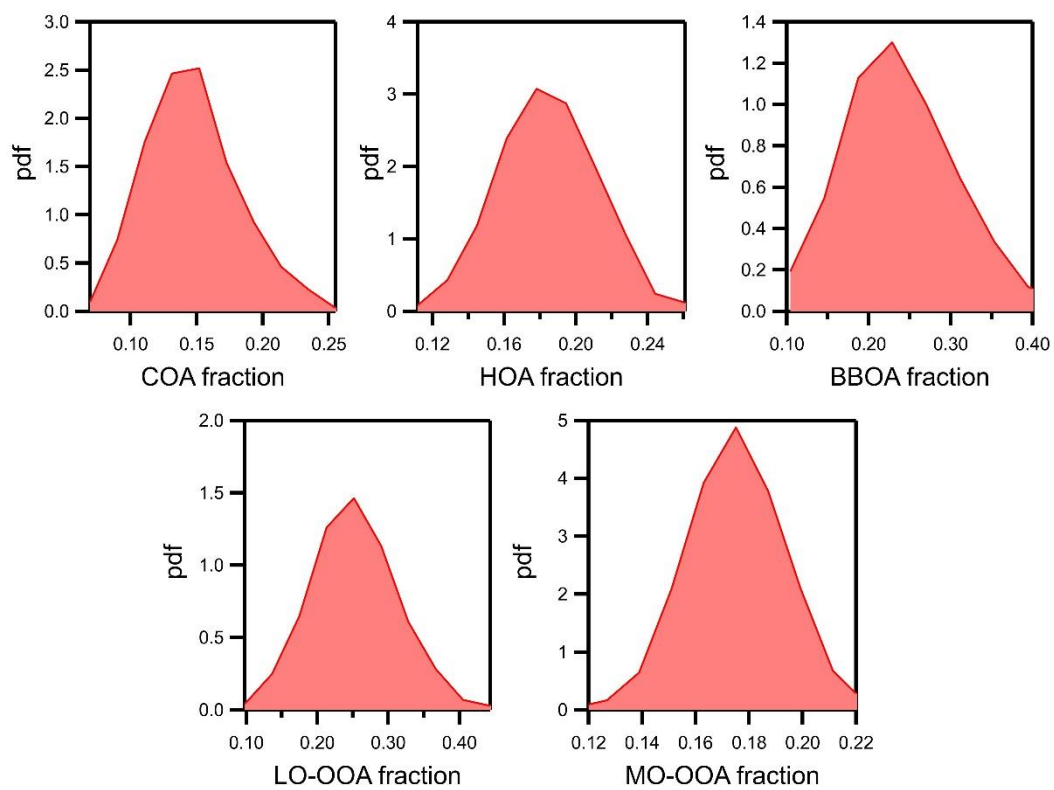
## S3.2 Off-line



**Figure S24:** Comparison between the average on-line and the average off-line organic mass spectrum for the Athens 2019 winter campaign.

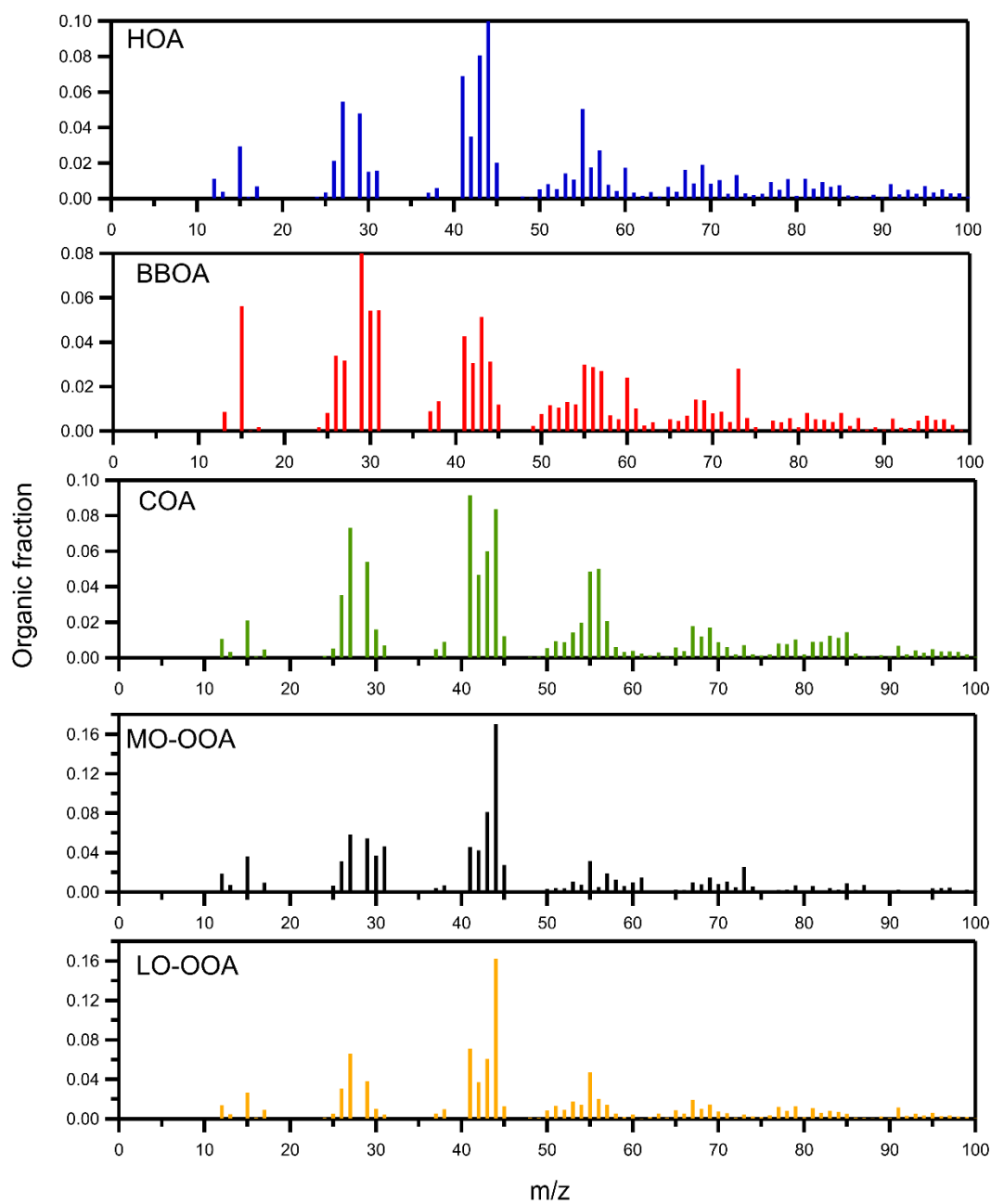


**Figure S25:** Spectra comparison between the on-line and the off-line PMF solution for the Athens 2019 winter campaign.

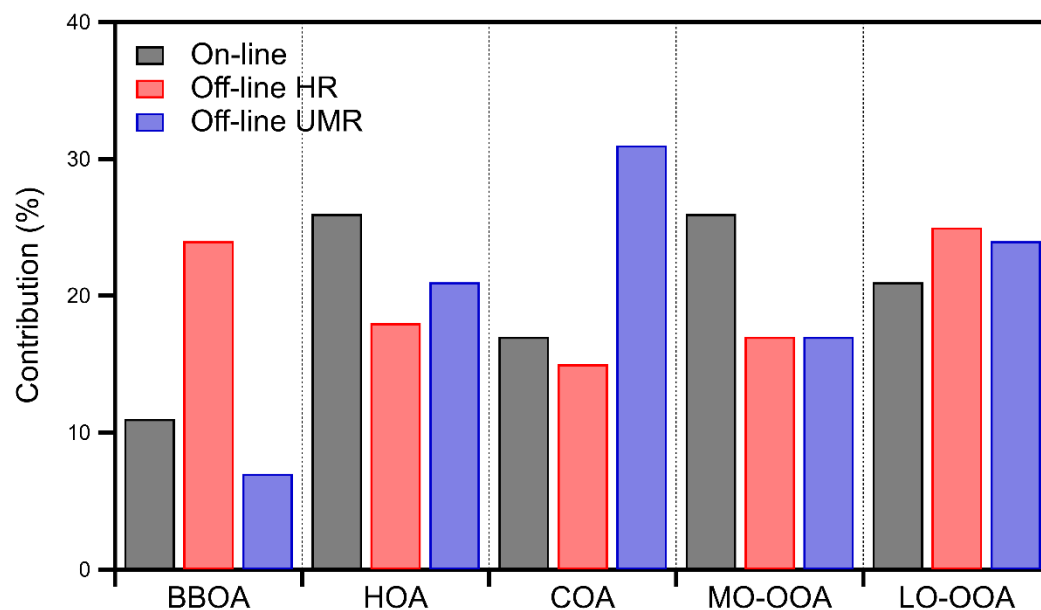


**Figure S26:** Off-line bootstrap analysis of the Athens 2019 winter campaign.

## S4. Sensitivity analysis HR to UMR off-line

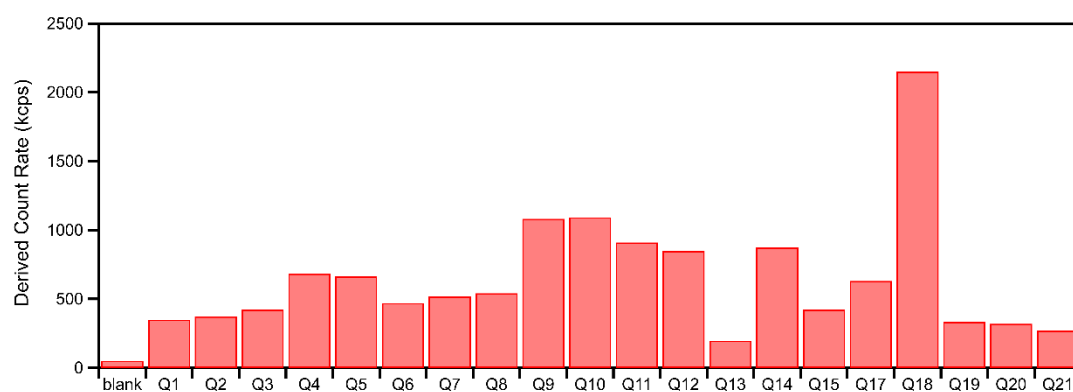


**Figure S27:** Organic mass spectra of the 5 factors derived from off-line UMR PMF solution for the Athens 2019 winter campaign.



**Figure S28:** Comparison of the contribution of each factor to the total OA between the on-line the HR off-line and the UMR- on-line PMF analysis for the Athens 2019 winter campaign.

## S5. Measurements of suspended particles in the water extract



**Figure S29:** Derived count rate for the samples and the blank measured with the Zetasizer.

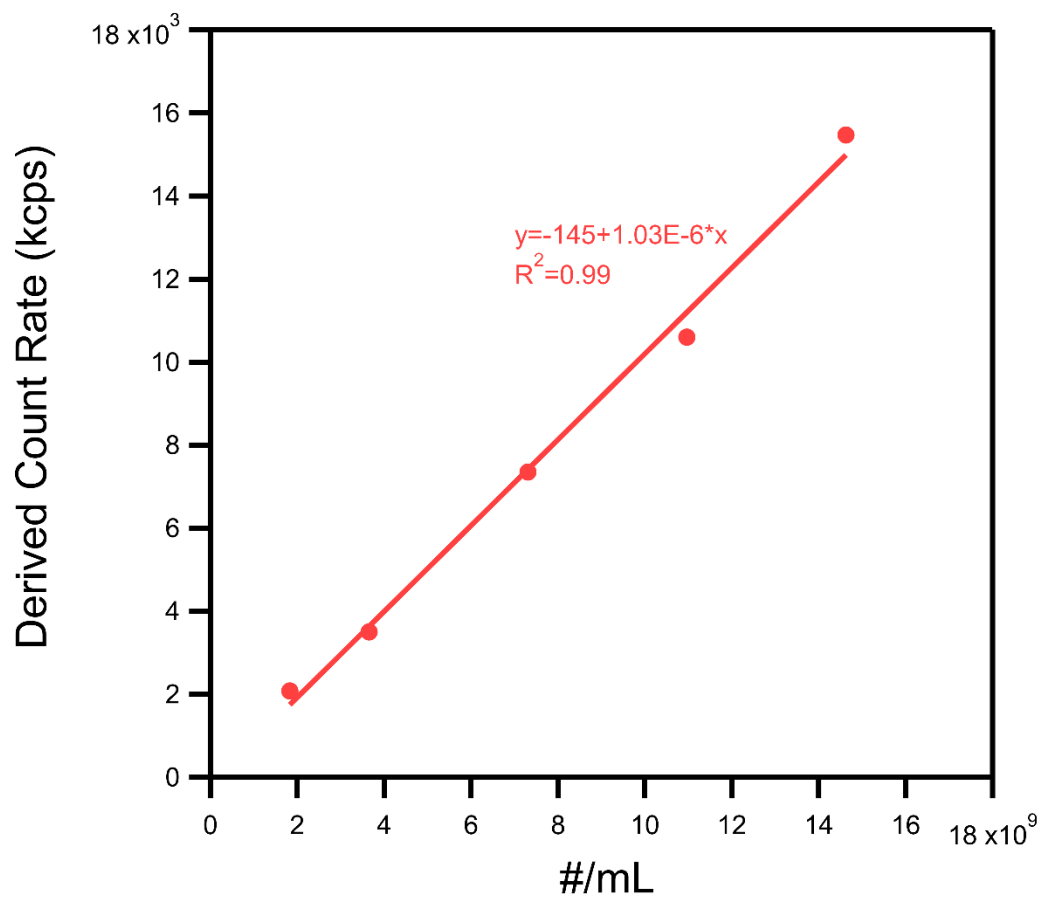


Figure S30: Calibration curve for the 100 nm PSL.