## **Supplementary Information**

# Development and Evaluation of an Improved Off-Line Aerosol Mass Spectrometry Technique

## S1. TEI 2020 winter campaign

#### S1.1 On-line



Figure S1: Organic mass spectra of the on-line PMF solution for the TEI 2020 winter campaign.



Figure S2: Time series of the on-line PMF solution for the TEI 2020 winter campaign.



**Figure S3:** Average diurnal profile of the factors derived from the on-line PMF analysis during the winter of 2020 campaign in Patra.

## S1.2 Off-line



Figure S4: Off-line bootstrap analysis for the TEI 2020 winter campaign.



**Figure S5:** Comparison of the daily contribution of each factor between the on-line and the off-line PMF results for the TEI 2020 winter campaign.



Figure S6: Comparison of off-line and on-line spectra of the PMF solution for the TEI 2020 winter campaign.



Figure S7: Off-line to on-line ratio for specific UMR HOA markers.



**Figure S8:** 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.



**Figure S9:** Atomic oxygen to carbon ratio (O:C) comparison between the off-line and the on-line results.

## S2. Summer campaign Patras 2019

#### S2.1 On-line



Figure S10: Organic mass spectra of the on-line PMF solution for the summer 2019 campaign.



**Figure S11:** Diurnal profiles of the three factors derived from the on-line PMF analysis for the summer 2019 campaign.



S2.2 Off-line

Figure S12: Off-line bootstrap analysis for the summer 2019 campaign.



Figure S13: Organic mass spectra of the off-line PMF results for the summer 2019 campaign.



**Figure S14:** Spectra comparison between the on-line and the off-line PMF solution for the summer 2019 campaign.



Figure S15: Comparison of off-line and on-line AMS spectra for the summer 2019 Patras campaign.



## S3. Thissio campaign 2019

### S3.1 On-line

Figure S16: On-line bootstrap analysis of the Thissio 2019 winter campaign.



**Figure S17:** Time series of the 5 factors derived from the unconstrained on-line PMF solution for the Thissio 2019 winter campaign.



**Figure S18:** Organic mass spectra of the 5 factors derived from the unconstrained on-line PMF solution for the Thissio 2019 winter campaign.

#### S3.2 Off-line



**Figure S19:** Comparison between the average on-line and the average off-line organic mass spectrum for the Thissio 2019 winter campaign.



**Figure S20:** Spectra comparison between the on-line and the off-line PMF solution for the Thissio 2019 winter campaign.



Figure S21: Off-line bootstrap analysis of the Thissio 2019 winter campaign.



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

**Figure S22:** Organic mass spectra of the 5 factors derived from off-line UMR PMF solution for the Thissio 2019 winter campaign.



**Figure S23:** 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 Thissio 2019 winter campaign.



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

Figure S24: Derived count rate for the samples and the blank measured with the Z-Sizer.



Figure S25: Calibration curve for the 100 nm PSL.