

## Supporting information

### Chemistry of urban grime: Inorganic ion composition of grime vs. particles in Leipzig, Germany

*Alyson M. Baergen,<sup>1</sup> Sarah A. Styler,<sup>2</sup> Dominik van Pinxteren,<sup>2</sup> Konrad Müller,<sup>2</sup> Hartmut Herrmann<sup>2</sup> and D.James Donaldson<sup>\* 1,3</sup>*

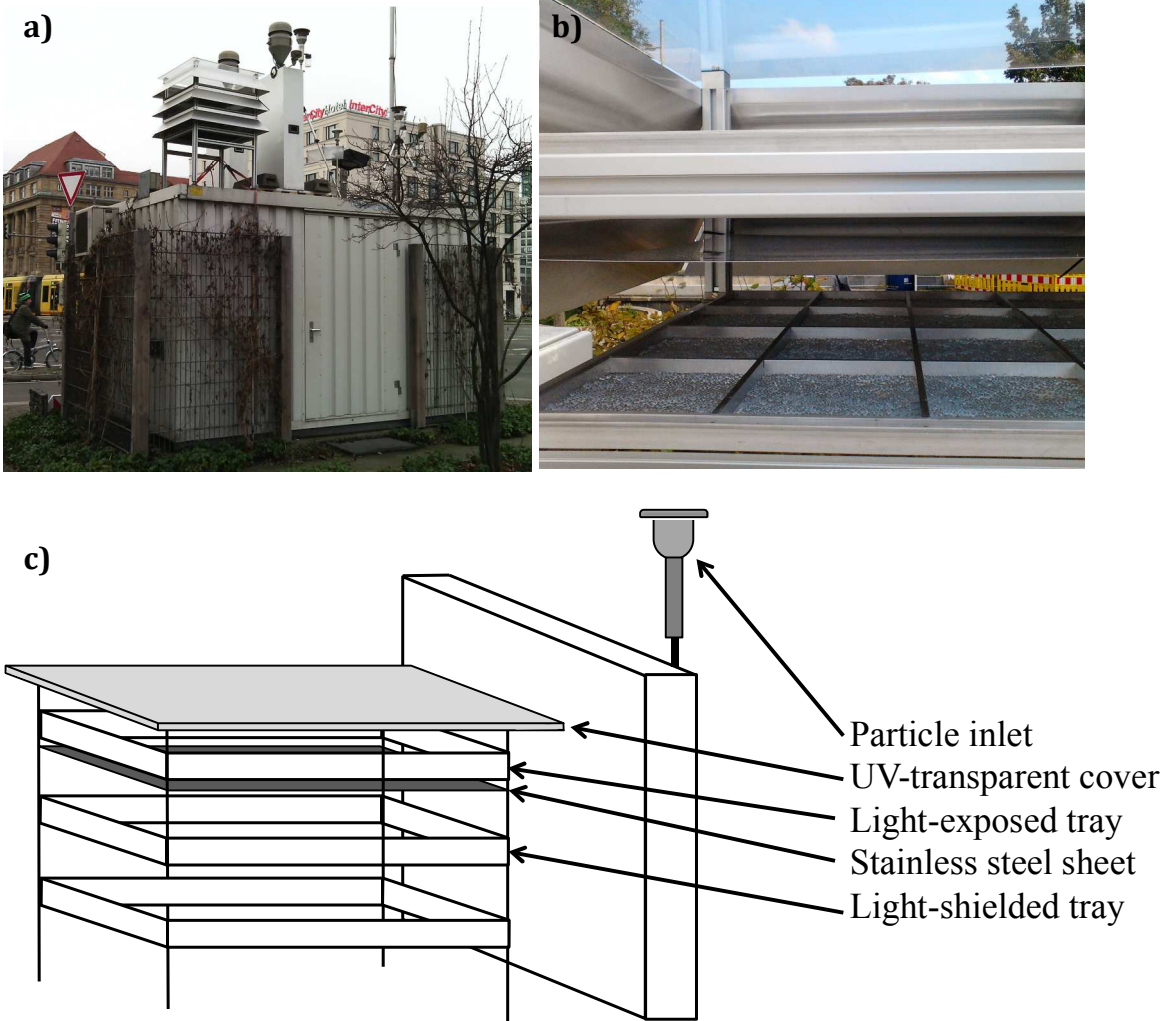
*1. Department of Chemistry, University of Toronto, 80 St George St. Toronto, ON, CANADA M5S 3H6*

*2. Leibniz-Institut für Troposphärenforschung (TROPOS), Atmospheric Chemistry Dept.(ACD), Permoserstr. 15, 04318 Leipzig, Germany.*

*3. Department of Physical and Environmental Sciences, University of Toronto Scarborough, 1265 Military Trail, Toronto, ON M1C 1A4*

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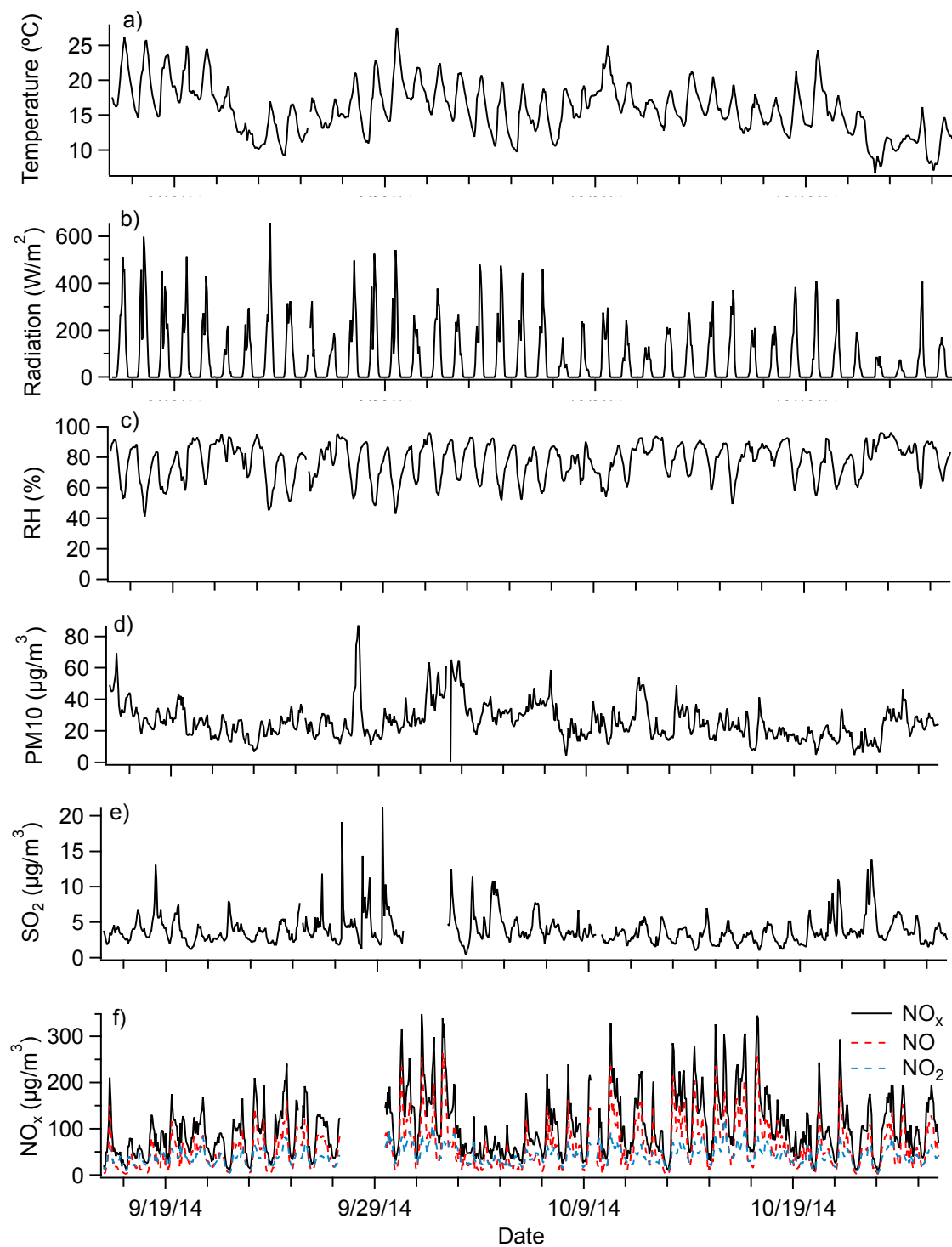
6 Supporting Figures



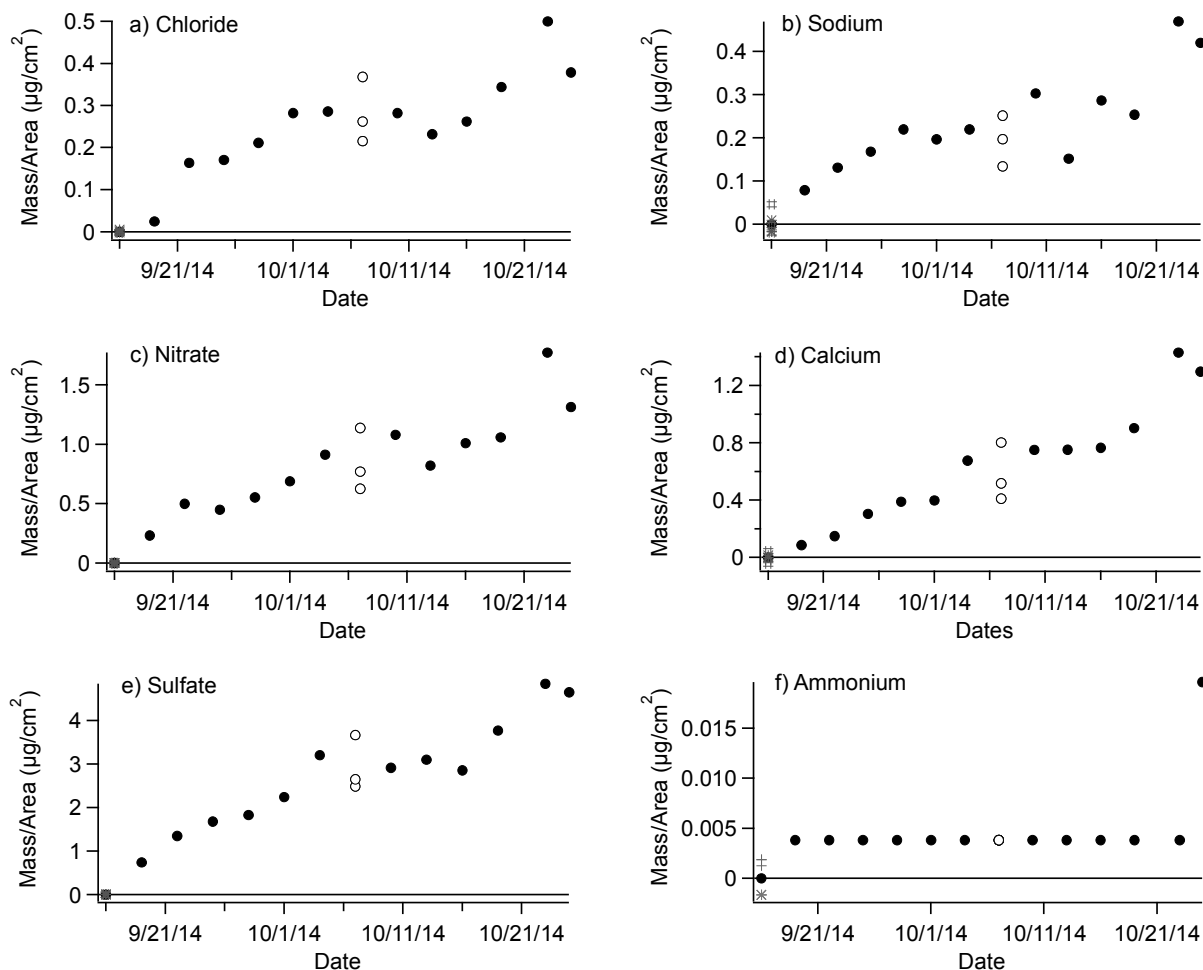
**Figure S1a** shows a photograph of the sampling container positioned in downtown Leipzig, with the film sampler on the roof at the left, next to the inlet for particle samples.

**Figure S1b** shows a close up of the upper two layers of the sampler, without the side flaps mounted on one side. The UV-transparent cover over the top layer of beads is shown at the top above the first tray of beads. Beneath this is a sheet of stainless steel that shields the second layer of glass beads from sunlight. The separate bead compartments in the second layer can also be seen.

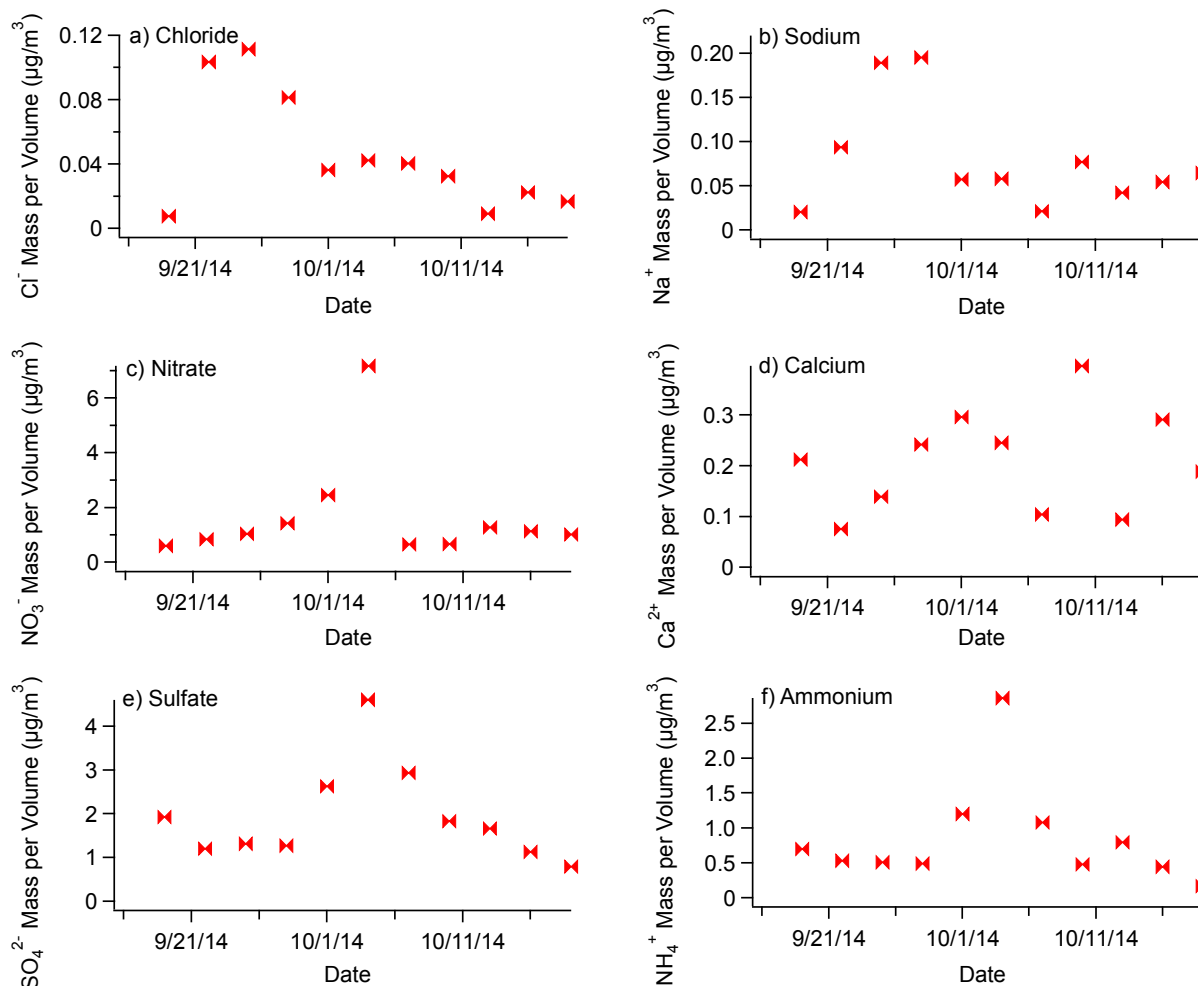
**Figure S1c** shows a schematic of the film sampler, indicating the location of the UV-transparent cover; the stainless steel sheet as well as both the light-exposed and light-shielded trays. The location of the particle inlet in relation to the sampler is also indicated.



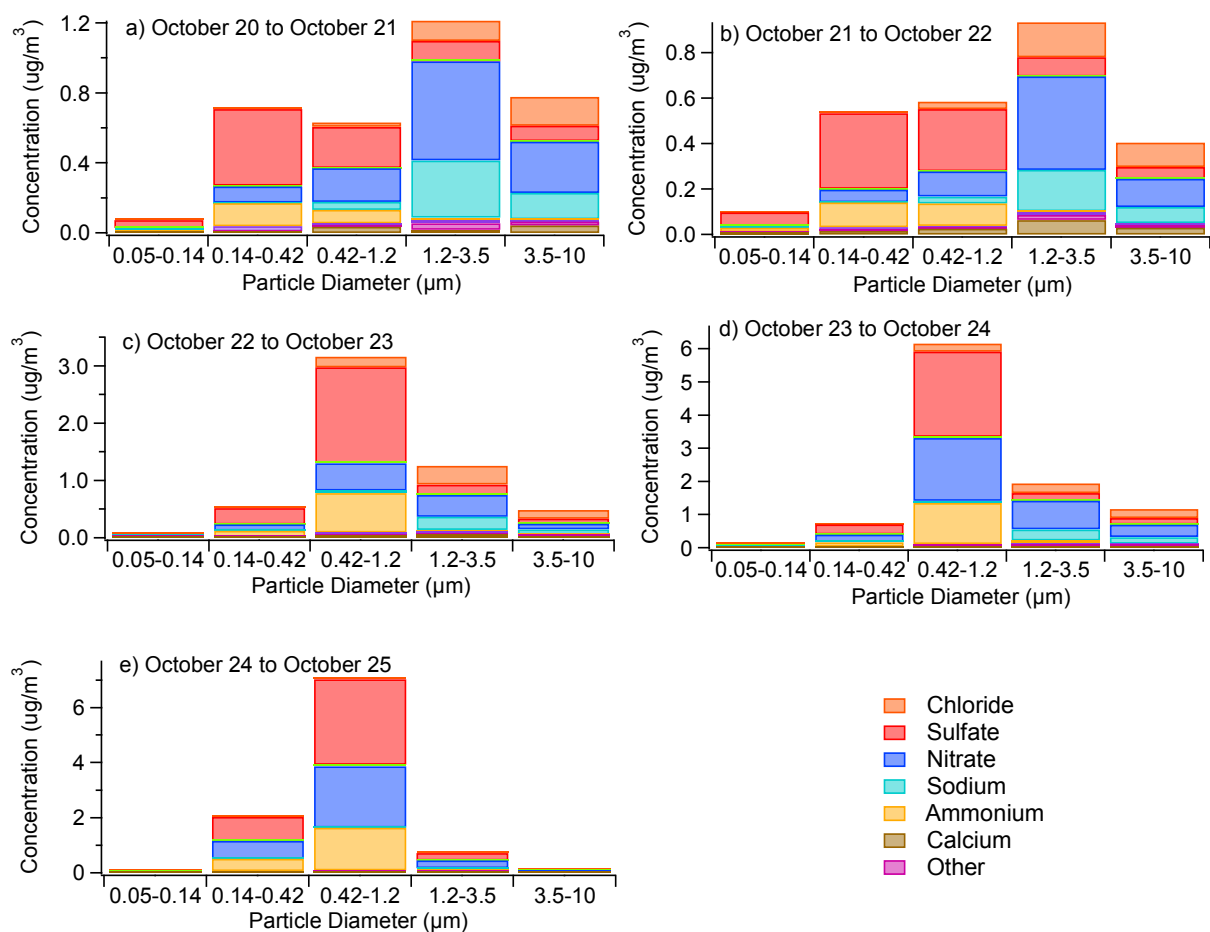
**Figure S2** shows gas phase concentration and meteorological data that were collected over the course of the campaign from the same sampling location as the grime and particles were sampled.



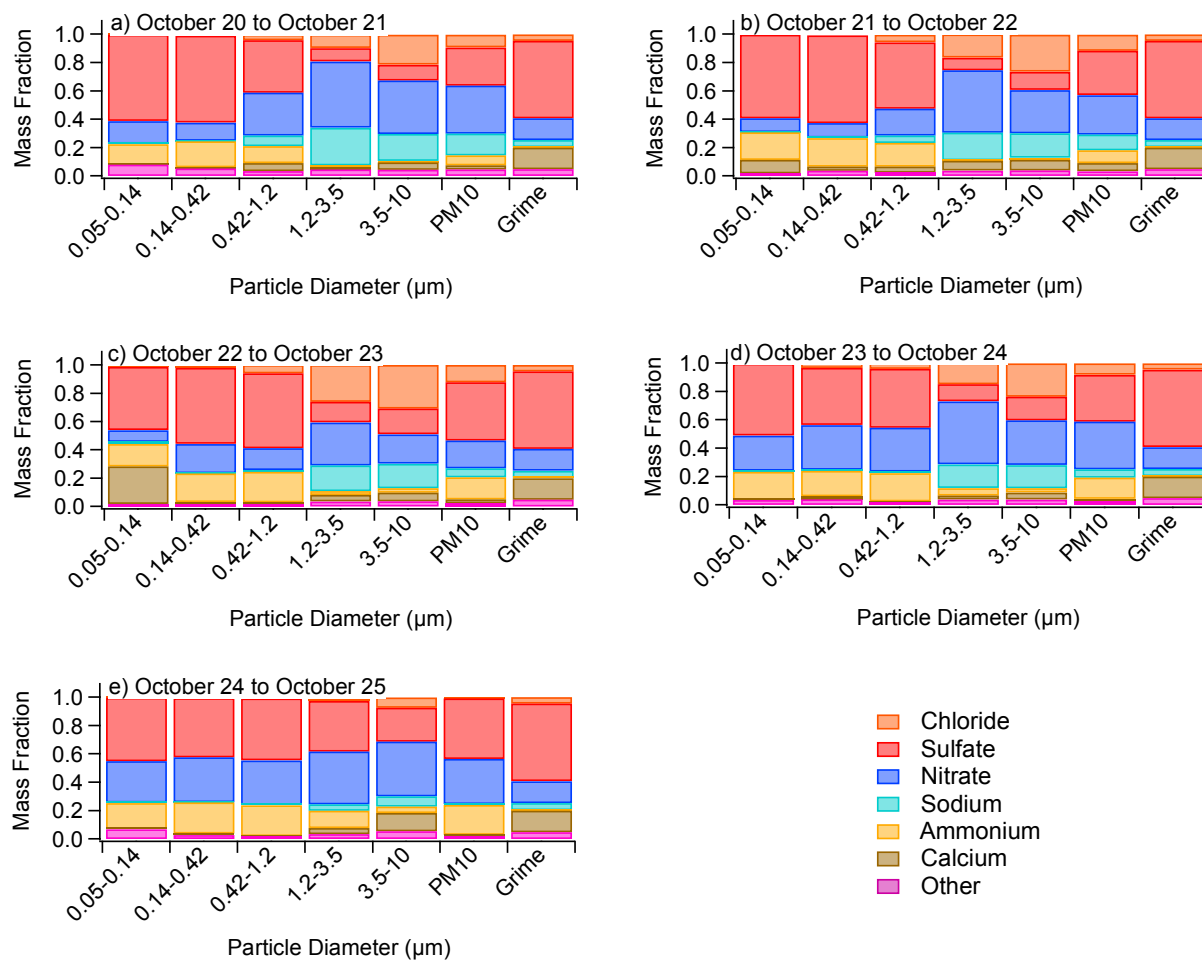
**Figure S3** shows the blank-subtracted mass of ions contained within the film over time, normalized to the geometric surface area of the glass beads. All of the ions show a monotonic increase in concentration over the 6-week period, with the exception of ammonium, which is below detection limits for most of the campaign. The upper limit ammonium is displayed as the detection limit of ammonium. This uniform growth in ion concentration is consistent with previous studies which showed steady growth in total ion content, even after more than two years of collection.<sup>1</sup> To examine the degree of variability in the data, three samples were collected on October 7; the analysis shows at most a 35 percent difference from the mean value.



**Figure S4** shows the mass concentrations of ions within the sampled  $\text{PM}_{10}$ . An event showing elevated sodium and chloride is seen at the beginning of the campaign, as discussed in the text. As well, elevated levels of nitrate, sulfate and ammonium were observed for the samples collected from October 1 until October 4; this is also reflected in the  $\text{PM}_{10}$  mass loadings displayed in Figure S2. The lack of elevated levels of calcium, sodium and chloride during this period suggests the presence of an additional source of fine particulate matter.



**Figure S5** shows size-resolved particle ion mass concentrations collected daily from October 20 until October 25. Measured values were blank corrected to calculate the values reported herein. As discussed in the methods section, the foils contained a calcium contamination that contributed up to 89% of the measured values.



**Figure S6** show size resolved particle mass normalized to total inorganic ion mass collected daily from October 20 until October 25. For comparison PM10 composition, calculated from the sum of the mass collected from all stages, and final grime composition from October 25 are also displayed.

## References

- (1) Favez, O.; Cachier, H.; Chabas, A.; Ausset, P.; Lefevre, R. *Atmos Environ* **2006**, *40*, 7192–7204.