

Response to comments by Anonymous Referee #1

This study describes a year-round observation of the size distributions of inorganic ions and oxalate in atmospheric aerosols at a coastal site in HK. A total of 43 sets of size-segregated samples were collected from March 2011 to February 2012 using a 10-stage MOUDI sampler. Although the topic on the size distributions of inorganic ions is not new, some interesting and valuable findings are presented in this study. For example, the authors provide evidence that sea salt plays an important role in modulating the amount of nitrate residing in the fine-mode particles. In addition, sulfate was successfully used to estimate the importance of local formation and regional transport to the coastal aerosols in HK through PMF analysis. In general, the methods and interpretation in the manuscript are acceptable, and the topic is certainly relevant within the scope of ACP. I recommend this paper to be published in ACP after some minor revisions listed below.

1. P1447, L21-22: The authors mentioned, “One quarter of each filter substrate was extracted with 3 mL of double de-ionized water...”. The extraction of a relatively large quartz fibre filter with such a small amount of water (3 mL) may result in high uncertainties of the reported species. The authors should report the QA/QC in this section.

Response:

The filter substrate used in the MOUDI sampler is 47 mm in diameter. One-quarter of this filter can be submerged in 3 mL of water. The good agreement between MOUDI measurements (<3.2 µm) and PM2.5 measurements by SASS sampler as shown in Figure 1 demonstrates that the amount of water used for extraction of MOUDI samples was not a problem. The following text is added to provide more QA/QC information on the analytical methods.

“Full calibrations were carried out in every batch of the ionic analysis. The species concentrations were field-blank corrected”

“The analytical details of gravimetric measurements, ionic and XRF analysis of the PM2.5 samples were given in the paper by Huang et al. (2014a).”

2. P1451, Section 3.2.1: As appeared in the title of the manuscript, a little bit more information on the sources of oxalate in the atmosphere is needed in this section.

Response:

The following text is added to elaborate more about the sources of oxalate.

“Several sources are known to contribute the atmospheric presence of oxalate, including secondary formation through the oxidation of oxygenated VOCs (e.g. glyoxal) (Warneck, 2003; Carlton et al., 2007); biomass burning (Allen et al., 2004; Kundu et al., 2010), and meat charbroiling (Rogge et al., 1991).”

3. P1453, L24: I suggest the authors provide the analytical method of Si in Section 2.

Response:

Suggestion taken. The following text is added to the revised manuscript:

“PM2.5 element data (i.e. Silicon) used in this study was obtained from the Teflon filters through analysis using an energy dispersive X-ray fluorescence spectrometer (ED-XRF, Epsilon 5, PANalytical, The Netherlands). The analytical details of gravimetric measurements, ionic and XRF analysis of the PM2.5 samples were given in the paper by Huang et al. (2014a).”

4. P1456, L18: (Zhuang et al., 199b)?

Corrected.

5. P1460, L20: “.... sulfate mainly exist as....” should be “.... sulfate mainly exists as....”

Corrected.

6. P1460, Section 3.3.2: The authors mentioned that the regional pollutant transport plays an important role in sulfate formation. Are there any correlations between the oxidative capacity/oxidant potential and the concentrations of sulfate in different seasons (especially in winter/spring when the impact of regional pollutant transport is significant)?

Response:

As mentioned in section 3.3.1, oxidant potential ($O_x=NO_2+O_3$) was used an indicator for local formation in this study. The correlation coefficient (R) between oxidant potential and fine mode sulfate was 0.53, 0.90, 0.77 and 0.23 for spring, summer, fall and winter, respectively, suggesting the relatively strong local formation in summertime. The authors note that the sample size was relatively small in each season (~10 data points) in this study. More data are needed in order to further explore the seasonal variation in the relationship between Ox and sulfate.

7. P1461, L13: “.... characterized by abundant presence of....” should be “.... characterized by the abundant presence of....”

Corrected.