

Overall

This paper reports size distribution data for major inorganic ions and oxalate sampled for one year in Hong Kong. Special attention is given to nitrate and sulfate, the two most abundant inorganic ions that were observed to partition largely into coarse and fine particle modes, respectively. Factor analysis of size-resolved sulfate concentration is performed to identify the likely sources of sulfate. The major conclusion is that nitrate is inversely correlated to the sum of sodium and calcium, and sulfate at the HKUST sampling site is largely from regional transport. The paper is generally well written and well constructed. I have the following comments that need to be addressed before publication in ACP.

Specific comments

1. Page 1448, lines 23-26 and Page 1449 lines 1-3. These interpretations are not necessary, as the comparison for these ions are probably well within the uncertainties for each sampling technique.
2. In Figure 1, is ODR fitting used? The ODR fitting method should be used here since both x- and y-axis measurements have uncertainties. In addition, it would be better to label the slope and intercept values on the plot.
3. The interpretation of summer high MMAD of oxalate: "Oxalate had a slightly larger MMAD than sulfate...as a result of volatilization and repartitioning." This statement is speculative and not justified in the discussion (P1451). Oxalic acid has low volatility and is soluble in water. Therefore, under the summer temperature of ~30 degree C, oxalate likely remains in the particle phase. Perhaps the in-cloud formation of oxalic acid can explain the large MMAD of summer oxalate?
4. Section 3.2.3 (P1454-1455), the interpretation of coarse mode nitrate. One more factor that may affect the partitioning of nitrate is the amount of sulfate. In ammonia-poor system, ammonia preferentially reacts with sulfuric acid to form sulfate, which drives nitrate into the gas phase. In this study, the molar ratio of $2x[SO_4^{2-}]$ to $[NH_4^+]$ is 1.0, indicating that sulfate is likely in the form of $(NH_4)_2SO_4$ and there is no excess ammonium to neutralize nitrate. The influence of sulfate on the partitioning of nitrate needs to be taken into account. A plot of sulfate vs. the mass fraction of nitrate will justify this argument. In addition, as noted by the authors, nitrate is likely under-sampled

by MOUDI, so Equation 1 is subject to errors and thus highly qualitative. Also the relationship of P_{n_fine} and $[Na^+] + [Ca^{2+}]$ only works for high P_{n_fine} values as shown in Figure 5a, which should be clearly noted in the text and abstract.

5. P1458, “30% of the corresponding concentration for CO, SO₂ and Ox” is used as uncertainty. This seems arbitrary and is not justified. How is this criterion derived? Typically the uncertainty of these gases can be obtained by measuring the standard concentrations of the gases for a period of time and calculating their standard deviations.
6. Figure S7 shows that the theoretical Q value is 191. How is this value obtained? The theoretical Q value should be approximately $m \times n$, where m and n are number of rows and columns of the input data matrix, respectively. In this case, the theoretical Q is $43 \times 8 = 344$, which is much larger than 191. A Q vs FPEAK plot for the coarse mode sulfate PMF should also be shown. In addition, negative FPEAK values should also be examined.
7. P1458, the use of CO as a tracer for transport. It says there was not obvious combustion source found in the vicinity of the sampling site. But google map shows that there are several major roads within 2-3 kilometers to the west and southwest of the HKUST site. Therefore, it is expected that vehicular exhaust contributes to CO. Since CO is the key tracer to justify factor 2 as a transport factor that is a major conclusion, more evidence is needed to exclude the local source of CO. I suggest the authors to show the diurnal cycle of CO for the sampling days. Local contribution would be minor if no CO peaks show up during rush hours.
8. Figure 6, the profile of the transport factor. Why does transported sulfate have the largest contribution of sulfate in 1.0-3.2 μm ? I would expect the transported sulfate is dominated by submicron sulfate since submicron sulfate has longer lifetime.
9. Section 3.3.3, time series of the four factors of coarse sulfate need to be shown and discussed to confirm the identity of the four factors. For example, the fresh sea salt factor concentration is expected to be lower in summer and winter due to low salinity.
10. The coagulation factor of coarse mode sulfate. Heterogeneous reaction of ammonia, sulfuric acid, and nitric acid on sea salt or dust particles is also a likely formation mechanism for this factor.
11. P1461, Lines 13-15, I don't understand why the presence of nitrate, Ca^{2+} , and chloride-depleted sea salt species indicates aged sea salt aerosols? This factor should be compared

with CO to check if there is a correlation, since CO is used as a tracer for transport in this study.

Technological corrections

1. Page 1445, change “To understand” to “understanding”.
2. P1450, Line 17-18, change “mass distribution” to “fraction”.
3. Figure 1e, change legend “NH₄-“ to “NH₄+”
4. Figure 4, what is the red label “(0.2)”?
5. Figure 5b, the x-axis label is missing a “(“ before “[Na+].
6. Similar problem to 5 in the abstract.