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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Seasonal and spatial variability of the organic matter-to-organic carbon mass ratios in Chinese urban organic aerosols and a first report of high correlations between aerosol oxalic acid and zinc" *by* L. Xing et al.

Anonymous Referee #1

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This study examined PM2.5 samples from 14 Chinese cities during the winter and summer and focused on OM:OC ratios and correlations between oxalate, zinc, and other species. The main contribution of this work includes: (a) reporting a broad set of data in an important region of the world and speculate as to the reasons for seasonal and spatial differences in their results, (b) speculating about the causes of a significant correlation between zinc and a series of organic acids including oxalate. While the results of (a) repeat what is known at a process-level understanding, the data still are of good value to report in terms of extending an inventory globally of highly-relevant parame-

ters such as the OM:OC ratio. The results of (b) are interesting but the explanation of why such a correlation exists is not very clear and highly speculative. The evidence supporting aqueous production of oxalic acid was also weak as it relied simply on correlations without any consideration of meteorological data. Thus, Section 3.3 needs to be improved to increase the strength of this manuscript. The topic of this work is of interest to this journal. The measurements are of good quality. The manuscript is written well, but could use improvement. I believe the data are of sufficient quality that they should be published, but the authors need to consider the issues above in a revision to make the link between the data and their conclusions stronger. In light of the title, I would urge the authors to consider whether the Furukawa and Takahashi paper already implied a relationship between zinc and oxalate. The manuscripts requires appropriate revisions to address issues above and below prior to my recommendation for publication.

Other comments: Section 2: I was confused as to whether the purpose of this section was to strictly report data collection methods or to combine this also with some results. It would be ideal to keep this strictly as an introduction of methods and avoiding introducing results such as those in Figure 1 until the subsequent sections. In my opinion, it is distracting to mix methods with results in a section.

Pg 1249: Line 15: “matter”

Pg 1249, Line 23: “properties”

Pg 1258, Line 12: here and other places: how is outlier defined?

Section 3.3: The authors use correlations to suggest aqueous processing generated SOA in the summer. But this is based on only correlations without much other support. To help improve their case, the authors should more deeply investigate meteorological parameters across the study region to relate moisture/clouds to their high OM/OC ratios and the production of oxalic acid. More discussion of meteorology is needed in connection with the chemical data to make a more convincing link.

ACPD
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Table 3: the second column appears to be incorrectly labeled with Zn instead of oxalic acid.

Table 3: While Section 3.4 and Table 4 do a good job of this, results in Section 3.3 and

Table 3 should be compared to data in other regions to put these measurements into greater context. Examples include:

Yu et al. (2005), Environ. Sci. Technol., 39, 128–133.

Sorooshian et al.(2007), J. Geophys. Res., 112, D13201.

Table 5: Last column has typo for “concentration”

Page 1260, Line 18: replace “acids” with “acid”

Pg 1260, Line 20-22: The evidence was rather weak. I would prefer the authors not make such a confident claim here until they provide more substantial evidence. It is curious as to why a focus of the title and the discussion is on the oxalate acid-zinc correlation when that correlation is not much different than several other species in Table 5. Have correlations between the other species been documented already, and that is why the focus is mainly on zinc? Some clarification would be useful.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 1247, 2013.