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Atmospheric Chemistry and Physics
Discussions

Interactive comment on “Particulate matter (PM) episodes at a suburban site in Hong Kong: evolution of PM characteristics and role of photochemistry in secondary aerosol formation” *by* Yi Ming Qin et al.

Anonymous Referee #2

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General comments: The authors showed scientific findings on role of photochemistry in the evolution of secondary PM characteristics base on analyses of measurement data with high temporal resolution. The manuscript is generally well written and constructed, and therefore may be suitable for future publication in Atmospheric Chemistry and Physics after revisions based on referees’ and other relevant comments. In addition, I recommend the authors to highlight the remarkable progress from their previous studies because they have already published several papers on the measurement data used in this study.

Specific comments: Page 6, Line 129-130: How can I find “no significant peaks of benzene and toluene after 10:00” from Fig. S3?

Page 7, Line 147: Is the quite low fraction of POA even in cool season common in and around the study region, or specific at the study site (period)?

Page p. Line 197-199: If organics and sulfate are internally mixed, diameters of organics and sulfate are strongly correlated. However, is the strong correlation sufficient evidence for the internal mixing?

Page 9, Line 199: Does the authors consider that fraction of sulfate was higher in LWC episodes (56%) than the other episodes because of efficient aqueous oxidation?

Page 10, Line 214-217: Please clarify how the percentages were estimated. In Fig. 5, the range of sulfate particle diameter seems to be smaller in IR episodes than LWC episodes.

Page 10, Line 235: Can discussion on the “typical” IR episode (E4) be generally applicable to the other four IR episodes in different season? Although temporal variation patterns in E4 may be similar to those in Fig. 2b, temporal variation patterns and ratio of LVOOA:SVOOA seems to be quite different from one IR episode to another (Fig. S4).

Page 10, Line 238-243: Does this mean that 72-h backward trajectory-based air mass origin could not explain the ground-level pollution, or the trajectories (at least for the first 24h) reflected a land-sea breeze pattern?

Page 11, Line 274-277: SOR was the maximum after 18:00 on the day. Is SOR appropriate indicator of the photochemical SO2 conversion?

Technical corrections: Page 6, Line 129: “benzenze” => “benzene”

Page 10, Line 224-232: “3.4. Frequency of high PM1 episodes” can be moved into “3.1. Meteorological conditions and classification of episodes”.

Page 13, Line 313: “corresonding" => “corresponding"

Fig. S4: Why pressure decreases with increasing mixing height? It is hard to believe that pressure was frequently less than 900 hPa at the ground-level of the study site. Air temperature in 05/14-05/16 episode seems to be quite low. Is it correct? Please provide time series of gaseous species other than OX (i.e., CO, SO2 and NOX).

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