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Interactive comment on “Continuous measurements at the urban roadside in an Asian Megacity by Aerosol Chemical Speciation Monitor (ACSM): particulate matter characteristics during fall and winter seasons in Hong Kong” by C. Sun et al.

Anonymous Referee #1

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The manuscript by Sun et al. reported a long-term (4 months) measurement of aerosol particle composition at a roadside in Hong Kong. The composition and sources of organic aerosol were investigated in detail with positive matrix factorization, and the diurnal patterns, weekend effects, and the roles of different aerosol species in PM pollution, particularly between clean and hazy periods, were elucidated. This study was conducted in fall and winter, which is an important complement of the previous

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work by the same group (Lee et al., JGR, 2015, accepted). The manuscript is overall good, but needs to address the following comments before publication.

Major comments:

1. The introduction should be expanded, particularly the major conclusions and findings in previous work from the same group, and then the unique of this study can be highlighted.
2. Concerning ACSM calibration, did the authors use ammonium sulfate to calibrate RIE(SO₄)? Or did the authors have a period of simultaneous measurements between HR-ToF-AMS and ACSM for the intercomparison? The interpretation of ACSM nitrate and sulfate needs to be cautious, particularly sulfate.
3. Fig. 9 and Fig. 10 were repeated. It's not necessary to use two figures (hourly and daily) to demonstrate the variations and roles of COA. In fact, the time series of Fig. 1b clearly shows that high NR-PM₁ peaks were corresponding to high COA. In addition, when plotting Fig. 9, please be careful with the number of points for each bin. Interpreting the data above 60 ug m⁻³ in Fig. 9 should be careful because Fig. 1b shows a few points above 60 ug m⁻³.

Minor comments:

1. Fig. 1b appears to be stacked plot, please describe it in the caption.
2. Table 4. "four chosen periods" should be "five chosen periods".
3. Page 19411 Line 22-27: this paragraph can be revised and moved to "experimental" section, e.g., after line 3 in page 19409.
4. Page 19413 Line 11-15: It's not consistent with Figure 5 that shows diesel-fueled vehicles are the major means during this time range.
5. Page 19415 Line 1-10: Interpreting the f₄₄ in the spectra need to be very careful. ACSM has large uncertainties in determining f₄₄, and often presents significantly

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higher value than HR-ToF-AMS (see Crenn et al., AMTD, 8, 9239-7302, 2015 and Frohlich et al. AMT, 8, 2555-2576, 2015). Therefore, higher f44 in SV-OOA than “standard SV-OOA” might be simply due to the ACSM uncertainties.

6. Figure 9, Figure 10 and Figure 11, add “(

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