

Interactive comment on “Characterization of urban amine-containing particles in Southwestern China: seasonal variation, source, and processing” by Yang Chen et al.

Anonymous Referee #1

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Overall, this paper describes the observed amine-containing atmospheric aerosol particles sampled with a single particle mass spectrometer in Chongqing. The authors make the case that amine-containing particles are different in various locations in which they have been sampled globally, and therefore that it is necessary to investigate the amine-containing particles in every possible location for potential new insights. This paper describes the amine-containing particle types observed, the dependence of the amine components on air-mass origin, the dependence on relative humidity, etc. Overall, the paper provides a good snapshot of amine chemistry in this location in two seasons. It needs to be thoroughly proofread and the grammar corrected throughout – the edits are mostly relatively minor and will not be enumerated here. Specific Comments:

C1

Line 75: The authors state that “how high relative humidity (RH) affects the atmospheric processing of amine-containing particles needs investigation.” They should elaborate about why this investigation is necessary – what does one learn from it? Section 2.1: A map would be helpful, especially in interpretation of the polar plots shown later. It could be in the SI. Line 90: The instrument needs to be described. If it is a commercial instrument, provide vendor and model. If it is laboratory-built, indicate this. I presume it is the former. Line 103 and subsequent uses: When m/z is written, both the m and the z should be italicized, but the $/$ should not be, to conform with mass spectrometry standards. Lines 118 – 120: This is a standard data plot format and does not need to be described in the methods section. Line 123: Is the percentage quoted here (12.7% and 8.3%) the percent of all particles observed in the respective season? This should be clarified. Line 131: “Digital mass spectrum” needs to be defined in the text, not just the caption of Figure 1. Line 137: When referring to “mixing ratio,” are the authors suggesting that 44% and 45% of particles in summer and winter, respectively, contained a peak at m/z 59? If so, just say that. Lines 147 – 150 and Figure S2: The description in the text doesn’t match the figure. It should say that the normalized ion intensity of the winter-time particles was subtracted from that of the summer-time particles, and that a positive value indicates the normalized ion intensity was greater in the summer, whereas a negative value indicates that the normalized ion intensity was greater in the winter. Also, the authors should specify how the peak area was normalized. Line 162: Was this aging occurring in both seasons? Line 167: Replace “suggested” with “indicates.” Table 1: This should go into the SI, as these ion assignments are common in the single-particle mass spectrometry literature. Line 176: Should “mostly” be “typically”? I am not certain the meaning of this sentence, otherwise. Line 188: “Amine” should have an e on the end. Figure 2: If there are specific times that the authors want to draw the readers’ attention to, highlighting the range of days would be helpful. Lines 220 – 225: This section is somewhat confusing. The authors seem to be saying that there are two sources for DPA-containing particles, but more evidence should be cited from the mass spectra, not just the direction from which the wind was blowing.

C2

Line 252: Isn't RPA usually defined on a per-particle basis, rather than within a time bin? How this is calculated should be clearly stated, earlier in the paper. Lines 262 – 264: The statement about DEA is confusing and should be reworded. Line 269: If the particles were sampled through a drier, as stated in the methods, then of course no information about particle water content will be available. Line 294: It should read "SPAMS" rather than "SPMAS." Lines 296 – 299: This section would make more sense before the discussion in lines 273 – 288. Line 309: Reword this, as it doesn't make a lot of sense. Line 311 and below, and Figure 6: The authors include A-ECOC as a particle type, but it is not obvious where the EC components are – the typical EC ions are not visible. This should be clarified. Line 325: The authors mixed up Na⁺ and K⁺ when they refer to "potassium (m/z 23)." It seems that either ion could be referred to here. Line 326: The Ca-containing particle that is described looks a lot like dust. Can the authors make a strong case that it is traffic and not dust? Line 341 and 346: The authors need to say more about how they are making the case that certain amines are both from vegetation and traffic. In the text, they refer to DPA being from both sources, and here in the conclusions they refer to DEA. Section 4: The conclusions do not summarize the conclusions made throughout the paper and should be expanded.

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