Review of Yao et al., Detection of atmospheric gaseous amines and amides by a high resolution time-of-flight chemical ionization mass spectrometer with protonated ethanol reagent ions

The manuscript presents a method for the quantitative measurement of various amines and amides in the ppt range by Chemical Ionization using a High-Resolution Time-of-Flight mass spectrometer with protonated ethanol reagent ions. Calibrations are presented and the influence of humidity is characterized in the laboratory. Several weeks of ambient measurements in Shanghai are presented. 85 nitrogen-containing species with m/z < 163 Th are identified in the ambient air including numerous amines and amides. Amines reach mixing ratios up to more than 100 pptv. Amides reach maximum mixing ratios of several ppbv. Diurnal variations of specific amines and amides are studied.

The paper is well written, concise and well structured. Measurements are made with ethanol as reagent ions, a reagent ion that had not been tested in detail before. Atmospheric measurements of amides with CIMS have not been presented before. The paper is suitable for publication in ACP. Some minor comments should be taken into account.

Minor comments:

l. 86: some important earlier references are missing: Murphy et al., ACP, 7, 2313–2337, 2007; Kurten et al., ACP, 8, 4095–4103, 2008; Berndt et al., ACP, 10, 7101–7116, 2010.

l. 88: also Bzdek et al., ACP, 10, 3495–3503,-2010 and Kupianinen et al., ACP, 12, 3591–3599, 2012, should be cited.

l. 103-105: compare also with the much lower amine concentrations measured with CIMS in Hyyttiälä as presented by Sipilä et al., AMT, 8, 4001–4011, 2015.

l. 122-123: Also Sipilä et al. 2015, and Simon et al., AMT, 9, 2135-2145, 2016, should be cited.

l 139-140. Avoid exact repetition of sentences from the abstract.

l. 366-367: compare also with the results of Sipilä et al., AMT, 2015.

Table 2: include also Sipilä et al., AMT, 8, 4001–4011, 2015, and Kürten et al., ACPD, doi:10.5194/acp-2016-294, 2016 in the inter-comparison.

Figure 3, upper right hand panel: some discussion of the “isotopes and other compounds” peaks needs to be given. Some more discussion of the uncertainties of the peak separation is necessary. Please discuss why the main peak needs to be separated into the two peaks as indicated. How large are the uncertainties in mass and signal intensity for the “isotopes and other compounds” peak?

Technical corrections

l. 5: omit comma between Yi-Jun and Liu

l. 158: …was THE protonated ethanol…

l. 159: … with the SECOND MOST dominant ions being THE protonated ethanol monomer…

l. 160: … and THE protonated ethanol trimer

l. 163: … the ratios of THE oxygen…

l. 168: (…NR_3, with R BEING EITHER A HYDROGEN ATOM or an alkyl group)

l. 169: (… WITH R` BEING EITHER A HYDROGEN or …)

l. 169-170: … can be REPRESENTED BY THE FOLLOWING REACTIONS (Yue…

l. 209: mixed WITH the amine/amide…

l. 359: …each DATA point…

l. 421: A Lagrangian…

l. 425: … are SHOWN for air masses