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Interactive comment on "Measurement report: Exploring the NH_3 behaviours at urban and suburban Beijing: Comparison and implications" *by* Ziru Lan et al.

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Response to Interactive comment on "Measurement report: Exploring the NH3 behaviours at urban and suburban Beijing: Comparison and implications" by Ziru Lan et al.

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Discussion paper

101507, China

— We thank for the constructive comment and we revised our manuscript according to the suggestions.

The paper presents the continuous measurement of mixing ratio of ambient NH3 at an urban site and a suburban site of Beijing, China from January 13, 2018, to January 13, 2019 along with its interaction with meteorology (temperature, relative humidity, wind speed and wind direction). It is also reported that the same temperature (relative humidity) at the urban and suburban sites, the NH3 mixing ratios increased with the relative humidity (temperature), whereas a high wind speed promoted a reduction in the NH3 mixing ratio. There are a number of studies on ambient NH3 and its interaction with other trace gases (NO, NO2, CO, SO2, and VOCs etc,) and meteorology have been carried out over the China, other Asian region and around the globe. Some of the papers published in Asian regions are highlighted in the Introduction section, however, some of recent publications/studies are mission which is need to be updated. The present paper is not adding much more new scientific information, except location specific information along with meteorology. Response: We add more information about NH3 in the revised introduction. Some of the suggestions are - The "mixing ratio" and "concentration" are two different term. Hence, use only mixing ratio of NH3 in entire text.

Response: Agreed. But, in context, sometimes the word of concentration is needed.

- The NH3 mixing ratio increased with the relative humidity (temperature), whereas a high wind speed promoted a reduction in the NH3 mixing ratio" for this statement provide the more appropriate references/support. Apart from the influence of meteorological condition, the source strength of the observational sites are also important, which is not explained in the text.

Response: The statement is based on the analysis between the NH3 mixing ratio and meteorological factors. There are no direct local sources influencing the observational

sites. The source strengths in Beijing can found in those researches on emission inventory. We add some information in the revised version.

- In the present study, authors have reported only mixing ratio of NH3 and meteorology. The observations of other precursors gases (NO, NO2, CO, and SO2 etc,) of NH3 is missing in the present study. These precursors gases (NO, NO2, CO, and SO2 etc,) are more important to estimate the mixing ratio of NH3 for a particular loaction.

Response: In this paper, we report one-year measurements of NH3 simultaneously at the urban and suburban areas in Beijing with high temporal resolution analyzers. There are much more data and analysis for the routine measurement of NO, NO2, CO, and SO2 than NH3 in Beijing. Since NO, NO2, CO, and SO2 are not precursors gases of NH3, we think the comment may concern the NH3 variations related with other gases. We would carry out the research later but not in this paper.

- Table 1 need to be updated with more study of various megacities of the world. A lot of informations are available for China and Indian region. Authors may be go through the following review paper for the comparisons of Table 1 "Sharma, S.K., Kotnala, G., and Mandal, T.K., (2020). Spatial variability and sources of atmospheric ammonia in India: a review. Aerosol Science & Engineering, Vol. 4(1),1-8".

Response: Thank you for your suggestion, we add some data in mega cities of the world.

- Some of the explanations are mentioned in terms of "concentration (μg/m3)". Line No. 260: "In 2018, the concentrations of PM2.5, SO2 and NO2 were 50μg/m3, 5μg/m3, 43μg/m3 in Haidian, and 46μg/m3, 6μg/m3, 35μg/m3". Use either mixing ratios or concentration and convert the values accordingly to make them more informative not confusing term.

Response: Sorry. Not all pollutants can be described in term of ppb, for example of PM. There are no necessary to convert concentration (μg/m3) to mixing ratios because

we just compare the different pollution levels here.

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