Interactive comment on “The vertical variability of ammonia in urban Beijing, China” by Yangyang Zhang et al.

Anonymous Referee #1

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Monitoring NH3 concentration in the air is an important step to validate the remote sensing data of NH3 column concentration and understand the emission sources for mitigation. Owing to the high cost of monitoring, long term monitoring data with a high vertical resolution is little. This paper provided such a dataset in Beijing where is suffering serious air pollution, and NH3 emission is believed having a significant contribution.

Generally speaking, although the innovation on scientific question is not strong in this paper, its contribution on the understanding of NH3 emission, transportation, mixture in the atmosphere is still significant through providing a long term dataset. From such a perspective, this paper is deserved publication with proper revision suggested as follow.
Specific comments:

Line 22-24 Seasonal variation of average NH3 concentration across the profile was described in the abstract; it is well-known in previous studies. Seasonal variation of vertical distribution of NH3 concentration should be the point of your study. It is also true for transport analyses. Please, revise it.


Line 141 “75th”, “th” is superscript

Line 153 Weekly NH3 concentration was low to 4.4 μg m-3, here you said almost NH3 concentrations were above 5 μg m-3, please give a detailed number (how many percentage).

Line 159-163 Move the “BAO tower” results to the discussion section, they are previous results, not yours.

Line 171 Does the first “autumn” should be “summer”? Check the whole manuscript and revise the relative expressions.

Line 193 NH3(g) + HNO3(g) → NH4NO3(p)

Line 233-234 The BAO study (1985) may be too old to compare with your study (2016).
Please find other comparable references.

Line 271 You say twice about the surfaces can be sources or sinks. Please rephrase the whole paragraph to give a clear statement.

Fig. 2 3 replicates were performed, but where is the S.D. for NH3 concentrations?

Others: please improve the quality (readability) of Figs. E.g. how do you get the results of NH3 emission distribution in fig. 1 left; do statistical analyses for all seasons in fig. 3; the heights (15, 63, 120, 180, 240 and 320 m) were selected in fig. 5, which are 2, 63, 180, and 320 m in fig. 6, and 8, 63, 120, 180, 240 and 320 m in fig. S6, it is good to select the same height. Fig S2.