

Interactive
Comment

Interactive comment on “Characteristics of atmospheric ammonia over Beijing, China” by Z. Y. Meng et al.

Anonymous Referee #2

Received and published: 4 March 2011

As the authors suggest, there are few observations of ammonia available and that much more monitoring is called for. And following from this, I think the authors have done a wonderful job by assembling this data set. Further, I think that passives are a good way to proceed, given today’s limited budgets and the ability to locate passives at highly diverse locations with or without electricity.

In my opinion, the most important problem with this paper is with the discussion of sampling and laboratory methods. Ammonia is a notoriously difficult gas to deal with (contamination in particular), therefore you must go to extreme lengths to ensure that no contamination occurred. I don’t think there is near enough discussion on these particular points. For example:

“ You need to show your blank results. Contamination is constantly a problem with

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



passive samplers and with ammonia. How large were your blanks? How many of your concentrations were negative after subtracting blanks? Any contamination problems?

â€” Did you run any duplicate analyses to determine your internal variability of your observations? How accurate are your observations? How precise?

â€” Define what you call a field blank; what you call a travel blank. Did you take lab blanks? Did you do filter blanks? What were your results of all of this.

â€” Did you assemble the samplers in a clean bench; if so, what kind? Did you track ammonia contamination in your lab? In your bench? What were the results?

â€” How were samples stored in the field? How were they stored in the labs? Shipping times back and forth? Were they shipped cold? Exactly how were they shipped?

â€” How were samples packed going back and forth? Pictures? Did you use a filter to trap ammonia? Did you double bag? Did your citric acid degrade in the heat over time? Did you soak/sonicate the samplers between use? Again blanks should be shown. Lab blanks would have been a good idea? Where these done?

â€” I think much more of the laboratory methods could be added, and are important to add. For example, give specifics of the IC method that you used, blanks, standards, cleaning routines for the housings, etc.

â€” Automated Ammonia sampler: For this analyzer, what method does it use, how does it work? Has it been shown to be correct? Has it been tested against known systems?

â€” How did you collect PM 2.5 filters for your analysis? Ammonia filled air flowing through a particulate filter I would think would allow gaseous NH₃ to collect on to the particulate and onto the filter. How do you know that the particulate NH₄ value didn't change? Did you lose any particulate ammonia during the time the sample sat on the filter sampler (decomposition of ammonium nitrate), or absorb NH₃ from the atmosphere?

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)

• SDZ sampler. I think it is very important to discuss precisely how the sampler was sited; how high off the ground, surrounding landscape (farm field, forest, etc), what crops are nearby, what fertilizers are used, CAFOs present? All is necessary so that the reader knows what the local conditions were exactly.

• The sample collection schedule is somewhat unclear. Additionally, what does your sampler housing look like? Airflow around it, through it?

• Were sample concentrations and mass flow rates corrected for temperature, particularly in the winter?

My general point is that with ammonia, you have to prove that you didn't collect contamination because it is so very easy to do.

The authors tend to repeat the table results (e.g. annual means, correlations in season) when discussing specific points. I think it would be clearer to only bring the numbers out of the table when important. For example, the only strong correlation with season is for winter. I would focus on that one.

I would expect the authors, when discussing seasonality, would address why the average NH₃ concentration is high in April in Beijing. After you remove the expected seasonality, that is very interesting; why is it there?

The authors do not discuss the likely condition of wintertime inversions (and low mixing depth) and large summertime mixing depth. I think this is a very important concept generally missing from the discussion.

Other Page 3043, 20; I do not understand "and the largest columns are observed".

Page 3044, 1-4; very complicated sentences beginning "Cao et al" and ending with respectively. It ends up being very unclear and difficult to read/understand.

Page 3044, 14: English "Recent the measurements".

Page 3045, 4: Elevation of the monitor (50 meters) is pretty high. Are there any impli-

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)

cations for the measurements, vs. 2 meters?

Table 2: you will need to add the state names to the USA entries for Walker et al.

Page 3048, 1-19: here again, the authors repeat all the values from the table. I would recommend just discussing the general findings, etc.

Page 3048, 24: “therefore...Beijing” I don’t think we know enough to say that air masses changes are responsible for the observations. This next sentence is true and contradictory to this sentence.

Page 3049, 11-14: I agree that water removal is an important part of the understanding, but I don’t think you have enough information to say that June and August are reduced due to heavy rain. Your urban July is high I agree, but on average, does it not rain in June at the rural site (Figure 4)?

Seasonality: I would seem to me that an important part of your observations could be due to vertical mixing, inversions, etc., and it therefore should be addressed more fully. i.e., your observation of a high correlation in the winter, and traffic source not being important in summer.

Page 3054, 5: you also have increased photochemistry in the summer, and higher NOx emissions.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 3041, 2011.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

