

Interactive comment on “Atmospheric dry and wet nitrogen deposition in agro-pastoral catchments of the China and Mongolia Altay” by Jin Ling Lv et al.

Anonymous Referee #2

Received and published: 5 May 2017

The study reports atmospheric dry and wet deposition in agro-pastoral catchments in the Chinese and Mongolian Altay, where such data are limited. Although the study is interesting and publishable, many issues exist in the current version of the manuscript. I suggest the authors to carefully check the manuscript and substantially improve it. Major issues include: (1) The introduction section is not very related to the topic of the manuscript. As mentioned by the authors, lots of studies have been conducted in both agricultural and pastoral areas. Why are studies in agro-pastoral zones needed considering lots of studies have been conducted in both agricultural and pastoral areas? What are the hypotheses of the current study? (2) There are still lots of language and punctuation issues which reduces the readability of the manuscript. Which should be

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resolved before it can be published. In addition, the style of the presentation leads to confusion. For example, “The Mongolian cropland (MC) had the highest $\text{NH}_4^+\text{-N}$ concentration in the wet deposition”. In my understanding, it should be “The $\text{NH}_4^+\text{-N}$ concentration in rainwater collected over Mongolian cropland was highest”. The authors should check such issues throughout the manuscript. (3) The site description and management of the agricultural/pastoral fields are not clear. Where are croplands or pasture distributed over the region, e.g., at what latitude range? What does “mountain grassland and plain grassland” mean? For both croplands and pastures, how many fertilizers are applied? How about the intensity of pasture management. And such on. (4) The discussion needs substantial improvement. Most of the section is only repeating the results or should be put into the result section. I suggest the authors focus on (1) comparison with other studies, (2) exploring the mechanisms underlying the difference in N deposition among the land use types, and (3) discussing the implications of the observations.

Other issues include: (1) Throughout the manuscript, “landuse” should be changed to “land use”. (2) What does “mountain grassland and plain grassland” mean? (3) Line 19: there should be a space between “)” and “at”. (4) Line 20: Should explain NW and SW in their first appearance. I don't think there is need to use abbreviation in these cases. Furthermore, (5) Line 26: delete “for wet deposition” since these data are for precipitation as mentioned before. (6) Lines 27-30: please make sure whether there is significant difference among these rates. If the difference is not significant, you can't say which is the highest, or higher than another. (7) Lines 31-33: It is hard to imagine that the location with the highest concentrations were not accompanied by the highest dry deposition. (8) Line 36: $\text{NH}_4^+\text{-N}$ concentration in the precipitation? Please specify. It should be was not were. (9) Line 39: Soil should be the major source of atmospheric NO_2 in such remote region. Normally soil emission of NO_2 increases with temperature until an optimum temperature (close to $30\text{ }^\circ\text{C}$?) is reached. So how to explain the negative relationship between temperature and atmospheric NO_2 here? Line 39: not “Over all”, but “Overall”. Line 41: ...N in... Line 70: “little research has”

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should be “few researches have”. Line 128: Only at croplands? Lines 127-142: There is confusing. You mentioned that rainwater samples were collected after every rainfall (lines 127-128). However, “the precipitation samples were collected manually once per month” (Line 141). Which is the truth. If the collectors were exposed in the field for one month, both wet and part dry deposition should be included, right? Line 177: Should be “Particulate ammonium and nitrate” Lines 209-210: Why not use one way analysis of variance? Line 215 and others: should be NH_4^+ -N concentration in the rainwater, not in the wet deposition. For deposition, the unit should be a rate, e.g., $\text{kg N ha}^{-1} \text{ yr}^{-1}$. Line 235: Similar to the above comment. I can’t understand what it means by saying “Net NH_3 deposition concentrations”. I suggest to use “Atmospheric NH_3 concentrations”. Line 246: Atmospheric NO_2 concentrations? Lines 292: Better change “established” to “deployed”. Lines 291-294: please check the sentence. Lines 289-314: For most of this section, you are only repeating the information which should be moved into the method section. Line 316: Dry deposition includes gas emissions? Lines 350-351: The compensation points between the NH_3 emission and deposition? Line 2: Chinese and Mongolian Altay Fig 8. The subscripts and superscripts are not normal. There are too many figures. I suggest to put some as the supplemental materials.

Interactive comment on Biogeosciences Discuss., doi:10.5194/bg-2017-55, 2017.