Interactive comment on "Atmospheric reactive nitrogen concentrations at ten sites with contrasting land use in an arid region of Central Asia" *by* K. H. Li et al.

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By Z. Xiong (Referee #1), zqxiong@njau.edu.cn Received and published: 2 July 2012 General Comments: "Atmospheric reactive nitrogen concentrations at ten sites with contrasting land use in an arid region of Central Asia" by Li et al. determined the spatial and seasonal characteristics of atmospheric Nr pollution in different ecosystems within the arid Xinjiang region of Northwest China as a typical region for central Asia. This study provided important data and results on atmospheric reactive nitrogen concentrations in arid region. Analysis of spatial and seasonal variations indicated their probable sources and was of high use for local air quality and pollution controls.

Response: The authors appreciate your high evaluation on our paper. Thanks for your overall comments.

Specific comments: 1. Reorganize the ten sites at certain order such as land use type (section 2.1 and Table 1) and focus on the different ecosystems as emphasized in this study. Then describe the results according to this sequence and analyze the difference for several sites within the same category, particularly for the farmland sites.

Response: Good suggestion. We have re-organized the ten monitoring sites in the order of alpine grassland (BYB), desert-based land use (TZZ, CLZ, TLF), farmland (FKZ, YPH, AKS, BTH), suburban (TFS) and urban (SDS) in Table 1 and Section 2.1.

2. As for the "effect of environmental factors on atmospheric Nr concentrations" in Section 3.3 and Figure 6, results should be re-analyzed according to different ecosystems since the environmental factors are secondary to the ecosystem type. Such kind of analysis might be misleading authors for conclusion.

Response: Agree and revised accordingly. To avoid misunderstanding, we delete Fig. 6 in the revision. Meanwhile, we have analyzed the correlations between different reactive nitrogen species in Section 3.3.

3. Explain the reason for sampling from two weeks in one month for passive samplers and 7-10 days for PM10 collection and the criteria for such period selection.

Response: There are no strict criteria for the length of sampling period each month. For passive samplers, exposure up to 15 days is feasible and representative in our arid region of central Asia because the relative humidity (the main restricting factor for the exposure period of passive samplers) in the region is much lower than 70% for the entire sampling duration, indicating that the relative humidity will not affect the sampling efficiency of passive samplers (www.radiello.com). Therefore both 'NH3' and 'NO2' passive samplers were sampled for two weeks per month. For PM10 sampling, our previous study (Shen et al., 2009. Environmental Pollution 157, 3106-3113) showed

that 5-7 daily samplings (referring that each PM10 sample will last 24-hr) are enough to get representative monthly average data on PM10 in the North China Plain. Even considering the spatial and temporal variations in arid region of Xinjiang, we randomly collected 7-10 daily samples per month for each site (covering different weather conditions including sandstorms) and the results should be representative for the whole month.

Technical corrections: P6629 L9 Rewrite as ... "The increasing order of total concentrations: : :" Response: Agree and revised accordingly.

P6632 L21 ": : :concentrations each month at both sites: : :" need rewrite for clarity. Response: Agree and revised accordingly. The "both sites" were replaced by "all sites".

P6633L7,9 digital numbers for AKS and BTH are inconsistent among sites. Keep consistent for numbers. Response: Agree and revised accordingly.

Table 1 Provide information on average temperature and precipitation for each site and delete them from the text. Reorganize the ten sites at certain order (land use type?) and accordingly revise them in the manuscript for clarity.

Response: Agree and revised accordingly. Also see our earlier response (to Special comment 1).

Table 2 Put column of PM10 before NH4+ or revise the table title as "Concentrations of secondary particles in PM10 and PM10: : :"

Response: We put PM10 before NH4+ and NO3- and add NH3 and NO2 concentrations in the Table as comparison. We also give a brief note about the ratio in the last column (referring to the ratio of NO3- to NH4+ in PM10).

Fig. 4 Delete "in PM10" for figure caption Response: Agree and revised accordingly.

Figs. 4 and 5 can be combined into one figure Response: Figs. 4 and 5 have been merged into one figure (the new Fig. 4) in the revision.

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Fig. 6 Delete "precipitation" for figure caption Response: The 'precipitation' has been deleted in the caption of Fig. 6.

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