

## ***Interactive comment on “Response of plant community composition and productivity to warming and nitrogen deposition in a temperate meadow ecosystem” by T. Zhang et al.***

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Response to reviewer

Thank you for your comments and good suggestion on our manuscript. The following is the explanation how we complied with your suggestions. We hope that you will point out the errors that we can correct during further revision.

The MS has two critical defects as “poor novelty” and “inadequate consideration of the result”. In respect to the novelty, if the authors think that the novelty of the MS is the investigation at a specific ecosystem (i.e. temperate meadow ecosystem in China), the authors should clearly state the differences of the meteorological and soil condi-

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tions at the experimental site and the degree of the treatment from the previous study at any other ecosystem. Thanks for your good suggestion. We added the importance of our experiment site in introduction part “Songnen grassland is a typical temperate meadow steppe located east edge of Euroasian grassland belt, which is the most typical and the largest grassland type in China. Moreover, Songnen grassland is located in the world’s three largest soda saline concentrated distribution areas, and salinization is very serious.” The obtained results of this study are very complicated by the presence of interactions. I have to wonder whether the authors have appreciated the results because of the lack of uniformity in the explanations. There are some inconsistent descriptions; i.e., the effect of warming on the evenness is stated as positive in summary and discussions sections but it stated as no effect in the result section; and the effect of warming on belowground productivity is stated as no effect in discussions section but it stated as positive. It seems that the authors concluded the effects of each treatment subjectively. The presence of interaction between years and treatments indicates that the presence and extent of the effects of the treatments vary among years. The authors should first consider the reason for the variance in the effect among years, such as the difference of meteorological condition and long term effects of the treatments. Thank you very much, we revised those inconsistent descriptions in our manuscript. Taking into account the interannual variation of experimental treatment might be related to interannual temperature and precipitation changes, we added the precipitation and air temperature data during experimental years (Fig. 1). Moreover, the interaction between warming and nitrogen addition treatment should be considered more closely. When the interaction is found, the authors should describe not only about the presence itself but also about the consideration whether it is synergistic or antagonistic, because the study aim to understand the simultaneous effect of warming and N addition. Note that the presence of interaction does not mean that the warming plus N addition treatment plots significantly differ from control plots. The main effects of each treatment should also be discussed taking into account the presence of the interaction. Thanks, we accepted your good suggestion. We carefully considered and analysed

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interactions between warming and N addition. **Speciñ comments:** 1. Page 6651, Line 11: “*Rhizoma phragmitis*” is not listed in Table 1. In a related matter, Table 1 is not explained in the text. We are sorry to make an error, the species did not appear in our experiment plot, and which should be deleted. 2. Page 6652, Line 12: The time of sampling should be stated. We added the time of sampling in materials and method part “During the growing season (in mid August every year), the cover and frequency of each plant species was estimated using a modified point-frame method (Cook and Stubbendieck, 1986).”. 3. Page 6652, Line 20: Does “the proportion of species” mean “proportional abundance of species” ? Yes, we changed it according to your suggestion. 4. Page 6653, the first paragraph: I wonder whether a good estimation of biomass can be made using only ‘cover’. I suggest estimating using both cover and height, or state the regression equation and its coefficient of correlation or RMSE. We agreed with you, and the cover and height were used to estimate biomass. 5. Page 6653, the ‘Statistical analysis’ section: Duncan’s test has been criticized as being too liberal and seem to be unsuited for ecological research. It is preferable to test the results with more protective method against Type I error. Accepted, we revised the “statistical analysis” section as follow “All data analyses were performed using SPSS 16.0 (SPSS for Windows, Chicago, IL, USA), and all the data were tested for normal distribution before statistical analyses. Four-way ANOVAs with a blocked nested design were performed to test the main and interactive effects of block, year, warming and N addition on species composition (species diversity, richness, evenness and importance value) and productivity (aboveground and belowground biomass). Effects of blocks on these variables were tested together with the treatments, but which were not discussed in the current study. A General Linear Model (GLM) with a Duncan test was used to examine the statistical difference among different treatments, and specific comparisons between different treatments were performed using LSMEANS statement.” 6. Page 6653, the ‘Soil temperature and moisture content’ section: The soil moisture content is the lowest in the W+N plots. The authors need to describe the reason and discuss the influence of phenomenon on the result of this study. We discussed it in discus-

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sion part. 7. Page 6655, the ‘Importance value’ section: Do the importance value of gramineous and forbs mean the sum of the importance value of individual species categorized into each group? 8. Page 6668, Table 2: Please list the effect of blocks in the experimental design. Yes. We listed the effect of blocks in the Table 2. **Minor comments:** 1. Page 6653, Line 16: Replace “GLM following a Duncan test” with “GLM followed by a Duncan test”. Accepted. 2. Page 6655, Line 11: Replace “(Fig 4)” with “(Fig 3)”. We corrected it. 3. Page 6658, Line 1-6: This sentence is not clear. Accepted, and we revised it as follow “In Songnen grassland soil total N (2 g kg<sup>-1</sup>) and available N (40 mg kg<sup>-1</sup>) is much lower (Zhang et al., 2013), a small quantity or short-term of N deposition can not alter plant growth, but with N enrichment gradually the relative abundance of *L. chinensis* increased by 20% which significantly suppressed the survival of forb species and reduced species diversity.”

4. Page 6658, Line 7-8: Replace “2008 and 2009” with “2007 and 2008”. Thanks, we revised them in the revision. Moreover, we revised some other errors in manuscript.

Please also note the supplement to this comment:

<http://www.biogeosciences-discuss.net/11/C2731/2014/bgd-11-C2731-2014-supplement.pdf>

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