We are grateful for the comprehensive and constructive comments from the Referee#2, which affirmed the importance and value of this study. According to the reviewer's suggestions, we have polished the English style of the paper. The following revisions have been made according to the reviewer's suggestions

Comment 1:

p. 16845 l. 2: I wouldn't call NPP a "property", but rather a "process"

Response:

Thanks for the suggestion. We have corrected the corresponding expression in the revised version.

Comment 2:

l. 9: "weather" instead of "climate" – 4 years are too short to draw conclusions about climate variability – note that this applies throughout the paper!

Response:

Thanks for the referee's comment. As the Referee #2 pointed out, "climate" is classically used as a description of the average weather in a period of 30 years, which defined by WMO. However, according to the IPCC report, "climate" could be defined "as the average weather, or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years", and "climate variability" refers to "variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all spatial and temporal scales beyond that of individual weather events" (IPCC, 2007). Meanwhile, there are many studies used the term "climate" while they only focused on certain periods less than 5 years (e.g. Gibson and Hulbert, 1987; Chen et al., 1999; Hui and Jackson, 2006; Zhou et al., 2009; Fay et al., 2011). Considering the variables used in the current study are the description of the average weather conditions in one year or several months, we think it is appropriate to use the term "climate" in our manuscript.

Comment 3:

l. 18: "correlated "instead of "correlates" – use past tense throughout the ms

Response:

Corrected.

Comment 4:

l. 22: gross photosynthesis is the primary step of carbon acquisitions.

Response:

Thanks for pointing out the inappropriate expression. Although there are some paper taking net primary production as the initial step of carbon cycle (e.g. Szumigalski and Bayley, 1996; Zhao and Running, 2010), our representation is not very rigorous in the scientific regard. Thus, we modified the corresponding sentence as:

> "Net primary production (NPP) is the fundamental component and the most variable part of the carbon biogeochemical cycle (McNaughton et al., 1989; Field et al., 1998; Huston and Wolverton, 2009; Zhao and Running, 2010)."

Two references are also added in the list:

> Field, C. B., Behrenfeld, M. J., Randerson, J. T., and Falkowski, P.: Primary production of the biosphere: integrating terrestrial and oceanic components, Science, 281, 237-240, 1998.
>
> McNaughton, S. J., Oesterheld, M., Frank, D. A., and Williams, K.: Ecosystem-level patterns of primary productivity and herbivory in terrestrial habitats, 1989.

Comment 5:

p. 16847, l. 24: objective #3 is not introduced at all in the preceding introduction – this should be changed

Response:

We have revised the part of our objective in the Introduction section.

Comment 6:

p. 16848 l. 15-18: would it be possible to add two pictures of typical alpine steppe and meadow sites to the auxiliary material in order to give readers a better impression of these two vegetation types?

Response:

Good suggestion. Two pictures of typical alpine steppe and meadow were added in the Figure 1.

Comment 7:

l. 24-26: so three plots were established along the diagonal line within the 10x10m area; how large were these plots? Within each plot you randomly selected a 1x1m square for biomass and vegetation analysis – so the plots must be larger – right? That means that at each site you took three replicate measurements during any year? This section could be formulated a bit clearer.

Response:

It is correct that we took three replicate measurements at each site every year. The

average value of the three replications was used as the description of the site. For making sure the comparability of the data, we located the sampling square close to the previous one in the same plot but keep away from the previous ones to eliminate the influences of the harvest. However, due to the different vegetation type and the random effect, plot is a general area for setting up the sampling square and the exact size of plot varies among sites.

Comment 8:

p. 16849 l. 8: any data from the area that would support the use of July/August biomass as a proxy for above-ground NPP?

Response:
We have added two more reference on this issue in the paper.

Comment 9:

l. 12-13: MAT and MAP are more common acronyms for mean annual temperature and precipitation (and in fact are used in Table 1)

Response:
Thanks for the comments. This might be a misunderstanding. MAT and MAP are usually used to description the mean values of annual temperature and precipitation during a long period, e.g., 30 years. And we used there two indicator in Table 1 to present the general condition of our study region. However, the climate variables used in our analysis is the annual average temperatures and precipitation. To distinguish with MAT and MAP, we used AT and AP as the acronyms.

Comment 10:

l. 23: how large was the inter-annual variability in species richness?

Response:
Due to the absence of records, it is impossible to present the interannual variability of species richness during the same period. Considering that species richness is essentially affected by climate, we think it is not necessary to present here as the interannual variability of climate.

Comment 11:

p. 16858, l. 23-25: this raises the question why the authors did not investigate other metrics than species richness?!

Response:
Because of the large range of our study region, the extreme environment, and the limitation in people and funding, it is difficult for us to do very comprehensive survey including other metrics such as species abundance or evenness for each site.

Comment 12:
p. 16870, caption of Table 3: replace "extreme" with "highly"

Response:
Done.

Comment 12:
p. 16874: in the caption the range of the long-term climate data is 1979-2009, while in the figure 1980-2009 is given – which is correct?

Response:
Thanks for pointing out the mistake expression. We indicated the climate condition during the 30 years in the past, thus "1980-2009" is correct. We have corrected this error in the revise version.

Reference

Chen, W., Black, T., Yang, P., Barr, A., Neumann, H., Nesic, Z., Blanken, P., Novak, M., Eley, J., and Ketler, R.: Effects of climatic variability on the annual carbon sequestration by a boreal aspen forest, Global Change Biology, 5, 41-53, 1999.

Fay, P., Blair, J., Smith, M., Nippert, J., Carlisle, J., Knapp, A., and Zona, D.: Relative effects of precipitation variability and warming on tallgrass prairie ecosystem function, Biogeosciences, 8, 2011.

Gibson, D. J., and Hulbert, L. C.: Effects of fire, topography and year-to-year climatic variation on species composition in tallgrass prairie, Vegetatio, 72, 175-185, 1987.

Hui, D., and Jackson, R. B.: Geographical and interannual variability in biomass partitioning in grassland ecosystems: a synthesis of field data, New Phytologist, 169, 85-93, 10.1111/j.1469-8137.2005.01569.x, 2006.

Intergovernmental Panel on Climatic Change (IPCC): Climate change 2007: The physical science basis. Contribution of Working Group I to the fourth assessment report of the Intergovernmental Panel on Climate Change, edited by: Solomon, S., Qin, D., Manning, M., Chen, Z., Marquis, M., Averyt, K., Tignor, M., and Miller, H. L., Cambridge University Press, Cambridge, U. K., 2007.

Szumigalski, A. R., and Bayley, S. E.: Net above-ground primary production along a bog-rich fen gradient in central Alberta, Canada, Wetlands, 16, 467-476, 1996.

Zhou, L., Huang, J., Lü, F., and Han, X.: Effects of prescribed burning and seasonal and interannual climate variation on nitrogen mineralization in a typical steppe in Inner Mongolia, Soil Biology and Biochemistry, 41, 796-803, 2009.

Zhao, M., and Running, S. W.: Drought-induced reduction in global terrestrial net primary production from 2000 through 2009, science, 329, 940-943, 2010.