

***Interactive comment on “Impacts of increasing water and nitrogen availability on ecosystem CO<sub>2</sub> fluxes in a temperate steppe of Northern China” by L. Yan et al.***

**Anonymous Referee #2**

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**GENERAL COMMENTS**

The manuscript reports on a study of impacts of increasing water and nitrogen availability on ecosystem CO<sub>2</sub> fluxes in a temperate steppe of northern China. It contains original research applicable to understanding the consequences of water and N fertilization on ecosystem CO<sub>2</sub> fluxes. As such it is within the scope of BG. Even if this is not an innovative approach, the obtained information on ecosystem CO<sub>2</sub> fluxes under global change is important to the scientific community. The result section can be strengthened to have the data better presented. I suggest moderate modifications to become acceptable for this journal. I have some suggestions and comments to improve

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the presentation. They are detailed below

**SPECIFIC COMMENTS**

Abstract L30-33: “The potential contribution. . . .changes of precipitation amount”. These sentences are unclear, please rephrase. L36-37: Revise sentence to read: “Soil moisture regulated seasonal and inter-annual variability in GEP and RE subsequently changed NEE.” L38: delete “strength of”.

Introduction Introduction is quite well written. L46: delete “with” before associated. L59-63: add more references, not just a study case, suggest to read “For example, some studies. . . . , whereas others. . . .”

Materials and methods L121-122: were the fertilization rates in this study analogous to “grazing and N fertilization and/or atmospheric deposition”? In Result and Discussion sections, you mentioned Q10, but you did not how calculate Q10 in this section.

Results L215-217: This sentence is vague, please rephrase. L217-220: “leading. . . .”, repeat the front. Please re-write. L223-225: Change to “Effects of water and N addition on ecosystem CO<sub>2</sub> fluxes had distinct year-to-year variations (Table 2). L232-233: remove “Regression analysis, with NEE, ER and GEP as the dependent variables and ANPP, BNPP as the independent variables, respectively, showed that”. L242: should be “Table 4”?

Discussion In general, “Discussion” section was a neatly written presentation. It was good to see (finally) some concluding statements which give a broader take-home message. L288-301: ANPP and BNPP did not significantly change in 2007. Do you have plant N contents data? Increased plant N content may increase GEP and ER. L347-349: rephrase this sentence.

References The number of references cited to support the author’s comments is appropriate.

Figs and Tables Table 3 title is the same as Table 2, I think is should be “Results (P-

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values) of two-way ANOVA on the effects of water addition (W), N addition (N) and their interactions on soil temperature ( $T_{\text{soil}}$ , °C), soil moisture ( $\theta_v$ , %), net primary productivity (ANPP and BNPP, g m<sup>-2</sup>) and ecosystem CO<sub>2</sub> fluxes (NEE, ER and GEP;  $\mu\text{mol m}^{-2} \text{s}^{-1}$ ).

Figure 5: In title you mentioned NEE, but no NEE in fig.5.

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