

Interactive comment on “Aboveground biomass in Inner Mongolian temperate grasslands decreases under climate warming” by Guocheng Wang et al.

Anonymous Referee #1

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The work by Wang and co-authors viewed the above-ground biomass (AGB) over Inner Mongolian temperate grasslands, and analyzed the relationships of many climate, soils, grazing intensity, and grassland type variables to plants using combine biomass measurements from six long-term experiments and data in existing literatures. They found that under future climate warming, AGB in the study region could continue to decrease. On average, compared with the historical AGB (i.e., average of 1981-2019), the AGB at the end of this century (i.e., average of 2080-2100) would decrease by 14% under RCP4.5 and 28% under RCP8.5, respectively. The paper is of interests to the broad readership of Atmospheric Chemistry and Physics. The finding may also help advance our understanding how global climate change influence the temperate grass-

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lands. Yet there are several limitations in the current version that need to be addressed before the publication.

I. There are several concepts in the manuscript that are not easy to understand, including ‘temperate grasslands’, ‘meadow steppe’, ‘typical steppe’, and ‘desert steppe’.

II. Introduction. The novelty of your work should be emphasized and explained in a better way.

III. Materials and Methods. Lines 125-126, identifying the root mean square error (RMSE) is not clear here, please add its calculations (equations) and units (% or kg ha⁻¹?).

IV. Results. Lines 172-175, that is, Figure 4. Correlation matrix cannot indicate environmental drivers of Inner Mongolian grassland biomass. Thus, maybe you could employ that correlation matrix combined with structural equation modelling analysis of the environmental factors effect on AGB.

V. In that way, in Supplementary Figures S2-S4, AGB in Inner Mongolian temperate grasslands decreases, who is major driver? Climate change (e.g., temperature) or human activities (e.g., grazing intensity)?

VI. Lines 182-184, i.e., Figure 6. You need to increase the segmentation fitting lines to ensure the description more clearly in Figure 6s.

VII. Discussion. Lines 219-223, I do not understand the argument that’s being made here. I think, a better work could be finished to set up the questions here in the rest of the introduction-talking more about how climate warming (major driver?) linked to soil conditions and livestock (positive feedback?) might affect AGB, and so on?

Minor comments:

1. P2, L41-42, L49, L57, in many cases, citations of references are not arranged systematically. Either it should be chronologically or alphabetically arranged.

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2. P14, L364-367, model calibration (80% samples) does not need to enumerate R2 and RMSE? Why the proportion for model calibration and validation is 80%:20%? Why not 50%:50%?

I wish the above suggestions or comments can help improve the quality of this manuscript. Thanks in advance.

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