

## ***Interactive comment on “Modeling impacts of climate change and grazing effects on plant biomass and soil organic carbon in the Qinghai–Tibetan grasslands” by Wenjuan Zhang et al.***

### **Anonymous Referee #3**

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The comments on the manuscript entitled “Modeling impacts of climate change and grazing effects on plant biomass and soil organic carbon in the Qinghai–Tibetan grasslands” submitted to publish in Biogeosciences. The authors use an ecosystem model to study the changes in SOC and biomass in association with climate change and grazing intensity, which is interesting. The findings of the study are interesting and have important policy and management implications. As the paper is very well written and easy to follow in this revised version compare to the version submitted to the Biogeosciences Discussion. So, my comments are more general. This study seems like it has

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the potential to be an important finding, and of broader interest to many constituencies beyond the study areas where the modeling was conducted. So I recommend it can be published in Biogeosciences.

In light of this paper, in a very broad perspective, it is interesting to speculate what happened that results from increasing or decreasing the livestock storage, and it might mean for this region in terms of climate or environmental impacts. Firstly, if livestock increasing, it will raise incomes, lift herdsman out of poverty, but also maybe cause more industrialization in the area? Is the industrialization in this area will induce the grassland utilization method change? I am not sure at all, but there could be long-term environmental impacts of livestock farming development in this region. Secondly, as I know, The study area also the home of a lot of wild animals, whether the livestock numbers decreasing will induce an increasing trend of wild animal population, therefore it will keep the same or higher pressure on the grassland? All these questions are interesting and worth with more studies. But it is likely beyond the scope of the paper to include these in the paper’s commentary. Finally, I would like to recommend authors try the manure-DNDC model in the future’s work. The manure-DNDC have more detailed simulation process for the livestock system, and you may find more information in Li et al. (2012).

Li, C. et al., 2012. Manure-DNDC: a biogeochemical process model for quantifying greenhouse gas and ammonia emissions from livestock manure systems. *Nutrient Cycling in Agroecosystems*, 93(2): 163-200.

Some specify minor errors: Line 141 and line 244 with different replicates numbers, please double check. Line 148: Not the “Table s2” in here, please correct. Line 417-420 The sentence is confusing and need to rewrite.

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