Dear Kuzyakov:

Thanks for your valuable comments, we have made careful modifications to the manuscript following your suggesting. Moreover, we had cited more relative works implemented in this area and organized all references followed the journal's requirement. All changes made to the text were with the change tracking in the word. Please let us know if you have any questions.

Yours sincerely,

Wenjuan Zhang and Fujiang Hou

Dear Authors,

thank you for the response to the reviewers and incorporation of their suggestions.
I read the Abstract and looked on the Tables and Figures,
and to regret - the Conclusions and the main outcomes of the paper are not clear. So, despite a lot of work was done, the outcome / conclusions are not clear, or mainly described by general words, that can be written also without to do such a lot of work.
So, I request you to put in the abstract clear and quantitative conclusions to: 1) climate effects, 2) grazing effects and this on 3) plant biomass and 4) SOC. Your conclusions should be quantitative and all general words should be removed. Also the relevance of the conclusions should be presented.
Please add / improve this and your paper will get much more attraction of the readers.

Sincerely yours,
Yakov Kuzyakov

Agreed. The abstract and the conclusion paragraph was reorganized.

Abstract

The Qinghai Province supports over 40% of the human population but occupies about 29% of the land area, and thus it plays an important role in the entire Qinghai–Tibetan Plateau (QTP). The dominant land cover is grassland, which has been severely degraded over the last decade due to a combination of increased human activities and climate change. Numerous studies indicate that the plateau is sensitive to recent global climate change, but the drivers and consequences of grassland ecosystem change are controversial, especially the effects of climate change and grazing patterns on the grassland biomass and soil organic carbon (SOC) storage in this region. In this study, we used the DeNitrification-DeComposition (DNDC) model and two climate change scenarios (representative concentration pathways: RCP4.5 and RCP8.5) to understand how the grassland biomass and SOC pools might respond to different grazing intensities under future climate change scenarios. More than 1400 grassland biomass sampling points and 46 SOC points were used to validate the simulated results. The simulated

above ground biomass and SOC concentrations were in good agreement with the measured data (R^2 0.71 and 0.73 for above ground biomass and SOC, respectively). The results showed that climate change may be the major factor that leads to fluctuations in the grassland biomass and SOC, and it explained 26.4% and 47.7% of biomass and SOC variation, respectively. Meanwhile, the grazing intensity explained 6.4% and 2.3% variation in biomass and SOC, respectively. The project average biomass and SOC between 2015–2044 was significantly smaller than past 30 years (1985–2014), and it was 191.17 g C m^{-2}, 63.44 g C kg^{-1} and 183.62 g C m^{-2}, 63.37 g C kg^{-1} for biomass and SOC under RCP4.5 and RCP8.5, respectively. The RCP8.5 showed the more negative effect on the biomass and SOC compared with RCP4.5. Grazing intensity had a negative relationship with biomass and positive relationship with SOC. Compared with the baseline, the biomass and SOC changed 12.56% and –0.19%, 7.23% and 0.23%, –5.17% and 1.19% for the treatment G_0, G_{-50} and G_{+50}, respectively. In the future, more human activity and management practices should be coupled into the model simulation.

Conclusions

In this study, we used the DNDC model to study the grassland biomass and SOC dynamics under different climate change and grazing management scenarios. We found that climate change may be the major factor that leads to fluctuations in the grassland biomass and SOC compare to grazing intensity, and it could explain 26.4% and 47.7% of biomass and SOC variation, respectively. Meanwhile, the grazing intensity explained 6.4% and 2.3% variation in biomass and SOC, respectively. The total grassland biomass and average SOC in the study area were reduced significantly under both the RCP4.5 and RCP8.5 future climate change scenarios. Compared with 1985–2014, the simulated biomass and SOC decreased –6.29%, –4.14% and –9.99%, –4.25% under RCP4.5 and RCP8.5, respectively. There were significant differences in the spatial distribution of the changing trends in the biomass and SOC. In the eastern and northern regions of the study area, the biomass decreased, whereas it exhibited an increasing trend in the southwest part of the research area. Meanwhile, the SOC exhibited a decreasing trend in the whole study area, and SOC change rate decreased from the south to the north. The biomass had a negative relationship with the grazing intensity and it differed significantly under the four grazing intensities. Compared with the baseline, the biomass changed 12.56%, 7.23% and –5.17% for the treatment G_0, G_{-50} and G_{+50}, respectively. Grazing could increase the SOC storage. G_0 had the lowest SOC whereas G_{+50} had the highest SOC. Compared with the baseline, the SOC changed –0.19%, 0.23% and 1.19% for the treatment G_0, G_{-50} and G_{+50}, respectively. Overall, grassland management should be adapted to potential climate change to ensure sustainable grassland development in the study area.