Biogeosciences

Discussions

Open Access

EGU

BGD

Interactive
comment

Interactive comment on "Carbon and nitrogen stocks in particle-size fractions of topsoil along a 3000 km aridity gradient in northern China" *by* X. G. Wang et al.

X. G. Wang et al.

lvxiaotao@iae.ac.cn

Received and published: 5 May 2016

Thank you for your comments on our manuscript entitled 'Carbon and nitrogen stocks in particle-size fractions of topsoil along a 3000 km aridity gradient in northern China'. We found the reviews are very useful, and we hope you will agree that our revised manuscript is substantially improved. Please find below our specific revisions in response to each comment.

Comments to the Author

This study analyzed the relationship between soil C and N, soil particle-size fractions and aridity in northern China. These authors found a negative relationship between

soil C and N and aridity in both in bulk soils and fraction soils. It was also detected that sand fraction increased while silt and clay fraction decreased with increasing aridity. This study revealed that the diminishing effect of aridity on soil C and N was due to loss of fine soil particles as well as decrease of C and N in all soil particle-size fractions. The research had appropriate rational and study method which can provide helpful information on understanding C and N sequestration in drylands. Introduction and discussion needs to be improved to strengthen the significance of this study and data interpretation.

Pertaining to introduction, it is not clear on the importance of conducting research in this studying area. It would be useful to give more details regarding to environmental issues or concerns. For example, was this area experiencing increased aridity in recent years? Would local policy makers need suggestions on land or environmental management to mitigate the impacts of aridity? Introduction and discussion need to be expanded on the mechanism of soil C and N decrease due to aridity. Besides wind erosion and lower productivity, other aspects should also be considered, such as decline of soil water availability, soil microbial activity and diversity, aggregates formation, etc. Also, the paper focuses on particle-size fractions but doesn't have discussion on soil texture. Since large range of data was detected for sand (21.62-90.65%), silt (4.19-49.29%) and clay (1.36-33.7%) fraction, it would be good to discuss the changes in soil texture and corresponding soil characteristics.

Response: Thank you for your positive comments. Following your suggestions, we added more details about this study area (please see lines 112-116, 128-130); we agreed with that besides wind erosion and lower productivity, other aspects that can influence soil C and N should also be considered. Please see our changes in lines 75-78, 290-294. We discussed the changes of soil texture (sand, silt and clay) with increasing aridity, please see lines 245-258.

Below are some specific comments on the paper:

Title: Consider to include "grasslands" in the title Response: Changed as suggested (the title, Line 2).

Abstract:

L16 "Soil composition" refers to soil water, air, minerals and organic matter. Should use "soil texture". Response: Changed as suggested (Line 14).

L19 Change "or" to "and/or" Response: Changed as suggested (Line 17).

Introduction:

L41- 44 Not clear why it is important to study C in grassland soils. Add a sentence indicating high percentage (∼90%) of C in grassland ecosystems is stored in soil. Literature is also needed. Response: Rewritten as suggested (Lines 40-42).

L62- 64 Reasons for less C and N in dryland other than decreased productivity is not stated here. Response: Please see our changes in Lines 75-78.

Materials and Methods:

L123-125 Are soil types the same along this transect? Response: Please see our changes in Lines 126-128.

L126-128 Can 50m × 50m plot represent soils from each sampling area? Information regarding to soil homogeneity is needed. Response: We do not have information regarding soil homogeneity in our research sites. As you can see from our results, the variation of soil characters in each site was relatively low, indicating that soil heterogeneity would not be high. Furthermore, we obtained samples from five different quadrats for each site. We believe the soil samples would well represent local soils from each sampling site.

Results:

L184- 192 Use a table to show the data for C and N concentration and stocks in bulk

soil and soil fractions Response: Thanks for your suggestion. Changed as suggested, please see Lines 521-534 and table 1 and table 2.

L208- 223 Don't see discussion for these results. Response: We added more contents in the discussion section. Please see Lines 324-345 in the discussion section.

Discussion

L231-232 Results for soil texture obtained from this study are missing. Would be good to include this data in discussion. Response: Thanks for your suggestion. Please see our changes in Lines 245-248.

L235-238 Decreased microbial activity and diversity should also be discussed. Response: Please see our changes in Lines 290-294.

L246-248 How did land use affect soil type? Response: Please see our changes in Lines 264-265

L268-271 Again, the discussion is not completed. Response: We added additional detail in this section. Please see these changes in Lines 290-294.

L278-290 Any citations to support this claim/result? Response: We did not find any document literatures related to this result and we discussed according to the data of this study.

Conclusions:

Conclusions are missing in this paper. Response: We added conclusions in the end of this manuscript. Please see Lines 360-371.

Many thanks for your constructive comments and suggestions, which have greatly helped us to improve this manuscript.

Please also note the supplement to this comment:
http://www.biogeosciences-discuss.net/bg-2015-651/bg-2015-651-AC1-

supplement.pdf

Interactive comment on Biogeosciences Discuss., doi:10.5194/bg-2015-651, 2016.