

Interactive comment on “Combined deep sampling and mass-based approaches to assess soil carbon and nitrogen losses due to land-use changes in karst area of Southwestern China” by Yecui Hu et al.

Anonymous Referee #2

Received and published: 3 June 2016

The authors report results from measuring the C and N stocks on different land uses to assess the changes after the conversion from natural vegetation to managed ecosystems. Furthermore, they evaluated the importance of deep sampling and compared the results using fixed depth and equivalent soil mass approaches. The C and N losses were higher as the sampling depth increased, meaning that shallow sampling underestimated C and N losses. They found that converting the natural vegetation to other land uses significantly reduced the C and N stocks. They conclude that the magnitude of the C and N losses depend on sampling depth and calculation methods.

C1

The following comments are based on the revised version after the comments of the Referee 1 and uploaded by the authors on the 6th of May (File: se-2016-57-AC1-supplement.pdf).

General comments:

The study is clear and well structured. There is a correspondence between the stated objectives and the results. However, the study should be improved because there are some scientific defects.

Specific comments:

Soil information, characterization and sampling depth

There is not any soil profile information. Not any described profile nor soil classification. Why did you choose 100 cm deep? Was it based on soil information? Did you sampled solid rock at any sampling site? Please explain what was the criteria to select 100 cm.

Experimental design

For one the experimental design is not clear. I cannot understand how many sampling sites are. From Figure 1 it is possible to count up to 49 sites, but this Figure is not described in the following text. What statistical N did you use? The statistical N of the statistics should be noted in the figures and tables. This information must be clarify.

Texture and its influence in this study

Table 2 showed the results after performing an analyses of variance. In this table the texture results was included but I understand without statistical analyses. Was the texture analyzed for every sample that was taken? or this results are just a characterization. In the second case, please create a new table and put it in Material and Methods since it will be a soil characterization. In the first case. Why the texture was not statistically analyzed? In this sense the results of the texture are not explained in the discussion. The authors just mentioned the texture to refer to Liu et al. (2015a)

C2

who found that texture played an important role in SOC accumulation. It is well known that texture affects SOC accumulation (Liu et al. 2015a; Kiem, R., Knicker, H., Kögel-Knabner, I., 2002. Refractory organic carbon in particle-size fractions of arable soils I: distribution of refractory carbon between the size fractions. *Org. Geochem.* 33, 1683–1697; Andong Cai, Wenting Feng, Wenju Zhang, Minggang Xu, 2016, Climate, soil texture, and soil types affect the contributions of fine-fraction-stabilized carbon to total soil organic carbon in different land uses across China, *Journal of Environmental Management*, Volume 172, Pages 2-9) and, thus, this could affect the interpretation of the results. My thought is that writing a paragraph addressing the influence of the texture and study its differences in the results will improve this study making it more complete.

Lines 195-202 and Figures 2 and 3. First, I suggest to delete the error bars because could be confusing. For the other hand it seems that an analysis of variance was performed to compare the variables at each depth, but this differences (statistically significant differences) are not noted in the Figures or in the text. If an analysis was performed, please insert the letters properly in the Figure and describe it relating the results to statistically significant differences and trends. If the work is done, show its value in the figure.

Technical corrections:

Figure 1. Insert a scale bar in the map of the sampling sites.

Line 124. Add “an” before auger.

Lines 127-128. How did you sample the core samples? It is likely to find solid rock at certain depth.

Table 2. In the first column AP (mg g⁻¹) insert the “a” or the appropriate letter after 0.129 . I suggest to include a measure of dispersion together with the average value. This could help with your interpretation of the results. Insert the statistical N.

C3

Lines 163-167. Please write if the normality was properly analyzed before performing an analysis of variance. Were all the variables normal? Were they transformed?

Line 182. There was differences between land uses but not among the six vegetation types. Please correct it.

Lines 267-268. The authors are using a result that was not included in the Results. Please delete it or include it in the Results.

Lines 350-351. Did the soil C and N stocks differ with statistical significance? If not, consider change it for “tend to differ”.

Interactive comment on *Solid Earth Discuss.*, doi:10.5194/se-2016-57, 2016.

C4