Solid Earth
Discussions

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Interactive comment on "Grazing effects on soil characteristics and vegetation of grassland in northern China" *by* Z. Wang et al.

Anonymous Referee #1

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The paper presented by Wang et al. is interesting because deals with the impacts of different grazing intensity on aboveground biomass, species richness and species diversity. The topic of the research is not revolutionary, nor the methodology and conclusions obtained. However the paper brings interesting information about changes in spatial variability of soil properties which are under direct grazing influence. Despite the paper interest there are several aspects that should be revised previous to publication. The materials and methods should present a better description of the sample procedure and laboratory analysis procedures. Authors also should provide more information about studied soil. Other major thing that authors did not provided and described classical statistical procedure that was used for a comparison of presented results. This deficiency almost disabled any further quality monitoring of the paper. Furthermore, other aspect of concern is huge number of investigated param-

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Interactive Discussion

Discussion Paper

eters that is very hard to explain in one paper. For instance, authors produced 21 semivariogram. Lot of these data (phosphorus, C/N, C/P and N/P ratio) authors didn't even mention in the discussion section, which reduces the attractiveness and quality of paper. The results deserve a better discussion. I would therefore suggest a major review. Specific comments: Page 2284 Line 21. Should add "in most of investigated soil properties" after "soil heterogeneity" Line 22. No information is given in the review about spatial variation of soil P and SWC reported by earlier workers. Please provide some information and add literature sources. Page 2285 Line 13. Please put the full word instead of the abbreviation at their first appearance Line 21 – 23. Please specify this statement. Soil in general or just some specific soil property? Page 2287 Line 1-2. In which period? Line 2. Please provide years in brackets after "Long term mean annual". Line 6. Please put references after each classification. It is better to determine a soil type according a WRB. Line 8. Please provide information about texture in Table 1. Line 20. Please avoid writing in third face Page 2288 Line 6 – 9. Unclear. Clarify. How much soil samples were taken from each plot and how much in total? Line 12 – 13. Please provide information of surface area in brackets. If divide 10 m2 area on 25 parts then each of that 25 parts cannot have 2m2. Please clarify this. Line 14. Unclear. Did authors make sub-subgrids at each subgrid? Did subgrids were randomly taken? Line 18. Please provide source. Page 2289 Line 3. Authors should provide information about classical statistical operations. Which procedure they used? Which post-hoc test was used, ect...? Line 7. Please provide source as you do for 'Gamma Design Software' Line 11. Please provide information what authors mean under "best fit"? Please clarify. Page 2290 Line 7. Authors should provide statistics in Figure 3 to support their statement. Line 8. Define "small". Line 19. Paper has a focus on the chemical characteristics of soil and moisture content. Therefore consider that the chapter title is incorrect. It should write: Soil chemical properties and soil water content. Or even better is to merge this section with the lower one and call it: Soil properties and their spatial characteristics. Line 21 – 25. Please describe results according your CV values. CV value which is lower than 10% indicates low variability while CV above

90% shows extensive variability (Zhang, X. Y., Yue-Yu, S. U. I., Zhang, X. D., Kai, M. E. N. G., & Herbert, S. J. (2007). Spatial variability of nutrient properties in black soil of northeast China. Pedosphere, 17(1), 19-29). Use this for discussion section and for comparison purposes with other studies. Page 2291 Line 4. "O" is missing in "Kolmogorv" Line 8 – 9. This goes in Materials and Methods section. Line 13. Authors should define on what site and soil characteristics they observe large nugget value. Line 16 – 18. Provide source with explanation of "moderate and strong spatial dependence". If authors have values of nugget/sill ratio from 0.51 to 1.00 then they have weak and moderate spatial variability. Please consult study about this issue (Chien, Y.J., Lee, D.Y., Guo, H.Y., 1997. Geostatistical analysis of soil properties of mid-west Taiwan soils. Soil Sci. 162, 291–298.) and make adjustment in the whole paper including Table 3. Line 23. Please make a review in Discussion section about results of ranges in semivariogram (Table 3). Ranges are important for determining the proper spacing of sampling and can be usefully for future investigations. Line 26-27 Please rearrange this sentence. Ranges in semivariograms indicate the distance after which data are no longer correlated. Range in semivariogram can provide great information for assessment of present sampling design and for future investigations and therefore number of samples, but cannot be a certain factor for determination of degree "spatial variability". Page 2292 Line 18. Did authors observed changes in species composition in grazed plots? Please make discussion about that. Page 2293 Line 19. There is not even one word written and discussed about spatial distribution of phosphorus, C/N C/P and N/P. Do authors think that there were irrelevant for this study? Suggests that authors remove these parameters (P, C/N, C/P N/P) from their results and rather put maps of remained soil properties derived from ordinary kriging or some other interpolator. This paper has 21 different semivariogram which makes paper huge. It is better to focus on important parameters and remove those that are even not mentioned in discussion section. Instead this is better to provide spatial visualisation of remained parameters. Page 2295 Line 22. Conclusion section is at this moment more a summary of the study results than real conclusions. Suggest to rewriting and adding a most

important finding that will not be similar like a finding of others described in introduction section. Line 24. Please, avoid "We". Please write: Study results indicate that reducing livestock...... Page 2296 Line 15. Add a Bestelmeyer et al (2009) at the reference list Table 1. Provide texture of studied soil and write number of samples in table caption. Remove sufficient comma after abbreviation of total nitrogen. Table 2. Please make range more visible and add two rows with min and max values. Please provide results of Kologmorov-Smirnov test as separate row in Table 2. Also provide CV Skewness and Kurtosis of soil characteristics that have log transformation and show them in brackets near original results. Table 3. Please write in table caption which parameters are calculated from the transformed data and which from original. Apply that also for Figure 6. Authors should check a way how they calculate nugget to sill ratio. These values does not represent nugget divided with sill. For proper calculation and describing spatial dependence see paper: Cambardella, C. A., Moorman, T. B., Parkin, T. B., Karlen, D. L., Novak, J. M., Turco, R. F., & Konopka, A. E. (1994). Field-scale variability of soil properties in central Iowa soils. Soil science society of America journal, 58(5), 1501-1511. Fig 2 needs some corrections. Please make sampling point on intersection area. Lot of dots are marked above or below intersection area. Fig 3. Remodel this graph so you can add statistical analysis that can confirm your results from text. Fig 4. This figure should have explanation what these letters means. Also write what statistical test authors used. Also do the same for Figure 5. Fig5b should have a first uppercase letter that describe y-axis on graph

Interactive comment on Solid Earth Discuss., 7, 2283, 2015.