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Discussions

Interactive comment on "The influence of C_3 and C_4 vegetation on soil organic matter dynamics in contrasting semi-natural tropical ecosystems" *by* G. Saiz et al.

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General comments The presented study is aimed on novel research topic which is important for understanding the carbon cycle and will contribute to climate change studies. This study demonstrated that 13C stable isotope is a valuable tracer for identification of changes in vegetation and soil quality controlled by climate, land use and soil properties (particularly soil texture). Replacement of savanna vegetation with high portion of C4 grasses by forest vegetation dominated by C3 plants or vice versa, can be identified by the 13C tracer and thus the changes in vegetation cover caused either by climate or by human activities (grazing, timber harvesting, etc.) can be detected.

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The overall scientific level of the study approach and the added value of its results should be assessed very positively. Another important contribution of presented study is the geographical focus and the spatial scale of the study area. The studies investigating the distribution of environmental phenomena and their dynamics across the major horizontal bioclimatic zones are very rare. These large scale environmental issues are seldom studied. The investigated area extends over two zones - the savanna and the tropical forest. Moreover, the geographical focus to Western Africa is valuable also as source of primary environmental data. Such data from West Africa are scarce (as it is for many large regions of the world) so each gained data set contributes to building the overall geographical coverage of information on environmental factors and conditions. Specific comments The added value of the paper can be increased if some of the following questions and remarks would be considered. They are listed as bullet points successively from the beginning to the end of the paper and attributed to line numbering of the manuscript. âĂć The first objective item of the study is formulated as follows: "1) Delineate the spatial patterns of SOM ...". The collected data do not have such spatial distribution and density of observations to allow delineation of spatial patterns of SOM. They can only characterize different types of SOM and their links to different geographical conditions, but not the spatial patterns. It would be better to reformulate this objective item (Chapter 1. Introduction, lines 140-141). âĂć There are mentioned three objectives of the study. It would be useful to formulate some general overall objective and eventually to explain how these three objectives are interconnected or mutually related (Chapter 1. Introduction, lines 140-145). âĂć It is written that the site characteristics were provided in three former papers. It is not very convenient for the readers. If this paper should be red, three another papers should be gained. To get a picture on the site characteristics information from three sources should be combined. The site data are not so negligible information to be skipped by the reader and searching for them would require additional work. It would be better to introduce the site characterization also into this paper. At least some brief overview, may be in tabular format should be involved (Chapter 2.1. Characteristics of the sites,

lines 149-151). âĂć There is no table providing an overview of measured 13C data. Such table is missing. Some 13C data are in Table 1 but this table is focused to 14C data and not all sites are there (in Chapter 2.1. it is mentioned that 14 sites were sampled). It would be good to have full basic information and it would help very much to reader to follow the discussion. If only discussion without an overview of basic data is provided, the reader is depending fully on the particular statements of the authors. If an overview of data would be available the reader would be much more free in his own thinking and interpretation of the ideas presented (Chapter 3. Results, lines 239-240). âĂć The discussion is rather complex and it is not easy to follow it. It is separated to 4 subchapters which are aimed on specific subtopics and these subtopics do not match entirely or directly to the three items of objectives or to the four sub-chapter of results. The link between the discussion subtopics is also not so easy to see. It would be useful to link these subchapters by some short introductory general paragraph which would explain why those items were selected for the discussion and how they fit together to make a whole. (Chapter 4. Discussion, lines 316-567). âĂć It is surprising that at the wet sites of transect the woody vegetation is increasing. According to present investigations there is advancing desertification so the diminishing of forests and spread of savanna should be expected. Can the opposite trend be explained or discussed (Chapter 4.3. Stable carbon isotopic composition of SOM with depth across the transect, lines 451-452)? âĂć It is mentioned that the trend in isotope composition along the depth is influenced by soil properties and even that the vegetation is influenced by soil properties. This statement call out a question to which extend the vegetation dynamics and climate impacts can be investigated with the use of 13C stable isotope. Can be the impact of different soils and the climate change impact on the vegetation distinguished (Chapter 4.3. Stable carbon isotopic composition of SOM with depth across the transect, lines 452-455)? âĂć There is no conclusion. Some short chapter on conclusions would be very helpful especially because of the complexity of the discussion. It should summarize all finding with respect to the paper objectives (Line 568). Technical comments Lines 910-912: Figure 1 should be split to two figures: 1) Map with

the study sites location and 2) photos of soil profiles. Lines 918-922: The figure titles are long and descriptive. It would be better if the styles of point data and trend lines are explained directly within the figure in graphical form. It means that there should be a legend window aside the graph area where the graphical symbols (all different point styles and trend line styles) would be depicted and described by short titles. Lines 922-929 and Lines 940-947: These parts of the explanations involved in the figure titles do not fit very well into figure titles. They should fit more into the discussion chapter.

Final comment Despite of the listed comments the paper should be considered as valuable contribution to the research at the studied field. All presented comments are trying only to provide some advances how the paper may be improved, but their consideration should be left fully to the willingness of the authors. Finally I would like to answer the questions of review criteria as they are listed at journal website: http://www.biogeosciences.net/peer_review/review_criteria.html

Aspects to be taken into account in the full review and interactive discussion, the referees and other interested members of the scientific community are asked to take all of the following: 1. Does the paper address relevant scientific questions within the scope of BG? Yes 2. Does the paper present novel concepts, ideas, tools, or data? Yes 3. Are substantial conclusions reached? Yes 4. Are the scientific methods and assumptions valid and clearly outlined? Yes 5. Are the results sufficient to support the interpretations and conclusions? Yes 6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? Yes 7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? Yes 8. Does the title clearly reflect the contents of the paper? Yes 9. Does the abstract provide a concise and complete summary? Yes 10. Is the overall presentation well structured and clear? Yes, but the suggestions what can be improved are explained above under the General Comment and Specific Comments. 11. Is the language fluent and precise? Yes 12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? Yes

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? Several suggestions for changes are explained under the General Comment and Specific Comments. However, I prefer the authors to consider, which suggestions they would like to consider or not. 14. Are the number and quality of references appropriate? Yes 15. Is the amount and quality of supplementary material appropriate? Yes

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