

## ***Interactive comment on “Variations in soil chemical and physical properties explain basin-wide variations in Amazon forest soil carbon densities” by Carlos Alberto Quesada et al.***

### **Anonymous Referee #1**

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The paper is the result of a comprehensive study on the soil organic carbon stabilization in Amazon forest soils; by examining the correlations between soil physico-chemical properties and carbon level in soils and their size fractions the authors attempted to understand the mechanisms behind the carbon stabilization under the ecosystem. The sample collection, lab analyses and data statistics employed in the investigation are appropriate, and the findings and conclusions made are well supported by the obtained data. Overall the work shows a positive contribution to our understanding of carbon dynamics in Amazon forests. However, it would increase the readability of the article if some texts can be shortened and simplified. The sentences are unusual long, repetitive and complexing reflecting the authors' personal writing habit, but not the benefit of

C1

broad readers. There are quite few of specific (lot of them are editorial) comments I would like to list in the following and hope they are beneficial to the authors. Line 83-92: kaolinite contains no “-charges; if any, they could be from impurities of 2:1 clays. Under the acidic pHs of the soils, variable charges are positive too. When you discuss soil minerals' role in chemical interaction, often the coatings of oxidic and hydroxidic components of metals on mineral particles should not be ignored since rarely, pure minerals or “clean” minerals are present in soils. Figure 4. add “a, b, c etc.” to the title? Line 402-409: use the mean, range of the variables instead of the graphic feature to make the comparisons. Figure 5 and 6: throughout the text and figures the word “association” and “correlation” are exchangeable. “association” may imply the presence of a physical relationship, but “correlation” is a statistical likeness and may not mean a physical relationship at all. It is expected they are used with discretion. Line 401:  $r^2 = 0.58$  in Fig. 5a. Line 433: [C];Ald should be [C]:Ald or [C] vs. Ald. There are other cases too. Table 5:  $p < 0.17$  should read  $p > 0.17$ ; and also  $p < 0.004$ ? Figure 9 (line 469-475): “a, b, c” on the graphics and title? Table 6: use “soil C/N ratio” or the symbol. Line 476-480: soil C/N should not be an index of litter quality though a good correction exists with liter quality. Also, C/N ratio is not quite independent variable in this equation, so a greater correlation is no surprising. C/N ratio is numerically related to C level in a sample. Line 493: If VIPF and AIC be used as criteria for evaluation, they should be explained in the Method section. Line 500: Table 6s, not Table 6v; Line 496, Table 6c? Line 546: “on the other hand” be deleted. Line 569: it should read “the C+S . . . . Line 613-615: check your sentence. Line 661: “as shown, Line 662: “that” deleted. Line 664: 0.05-0.89, what is the unit? Line 671: “Clay;C” reads “Clay-C or Clay:C or Clay vs. C”. Line 708: delete “also”, there are a lot of “also” used in these sentences. Line 745: “is”. Line 745-747: do you want to say “low or high”? to clarify, use “P levels” for “these”. Line 781-784: re-edit the sentence, I think you want “As . . . , they . . . .; and this . . . . So that MRT of . . . .”. Line 824: “hard”? Line 849: re-edit the sentence. It is unnecessarily long. Try to be simple and clear!

C2

