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Soil carbon and nitrogen erosion in forested catchments: implications for erosion-induced terrestrial carbon sequestration

Author responses

Please modify author affiliation for C.T. Hunsaker to indicate “Albany, CA”, or preferably, “Fresno, CA” [Pacific Southwest Research Station, US Forest Service, Fresno, CA, USA]

Response to: Biogeosciences Discuss., 12, comment C505–C506, 2015; Received and published March 4, 2015 www.biogeosciences-discuss.net/12/C505/2015/

Comments on the manuscript are followed by a response and pertinent changes

Comment 2494 L14-15: It is not clear what the mechanisms are that are responsible for the apparent stability of buried organic matter. See VandenBygaart et al. 2015 cited in manuscript.

Author response: We are not clear on the reference to this part of the manuscript – perhaps the line numbers were not correct? In any case, we have revised the text to clarify discussion on the important mechanisms responsible for apparent stability of buried organic matter (L30-34).

Comment 2494 L27-28 "...compared to agriculture and rangeland systems" This statement requires a citation.

Author response: The differences between erosion in forested and in agricultural or rangeland ecosystems was expanded (L59-70).

Comment 2494 L1-3: This statement also needs a citation.

Author response: This statement on surface roughness was removed from the text in lieu of the discussion on vegetative cover and organic matter coverage in forests (L64-68).

Comment 2495 L21-25: Since you are stating the answering of questions the listed should be stated as questions with question marks.

Author response: This was also mentioned by the other reviewer. The objectives were changed to questions (102-106), and additional modifications were made to the section for clarity (L87-110).

Comment 2497 L3: "in three of the low elevation Providence catchments"

Author response: Corrected in the revised manuscript to simply “in the Providence catchments” (L141).

Comment 2500 L18-19: Should it be Table 1 referred to here or Table 3? L18-22: It is not clear where these data are demonstrated. Is it not Table 3?

Author response: The relevant data are presented in Figure 4, and coefficients of variation for these groups are in Table 3. Both references were added to the Results text in the revised manuscript (L225).

Comment 2510 L3: should read "though these features are not common" Frequency implies a temporal context.

Author response: Agreed. We have changed the text in this section in revised manuscript as suggested. (L398)

Comment 2510 L24 "Also could cite VandenBygaart et al. 2015 here.

Author response: Reference added L428.

Comment 2512 L12: delete "materials. L13: "and that they are likely transported..."

Author response: Found on page 2511: The discussion of erosion processes and the material they transport was simplified and rewritten. (L392-398 in the revised manuscript)

Comment 2512 L19 ""in flow for any given year (Fig. 4)."

Author response: Figure reference added (L322), and removed reference to Figure 2.

Comment [same page] L18: ..., 2015), and sorption of..."

Author response: Agreed that it needed clarification. The altered wording of the revised manuscript now reads: "If sediment trapping efficiency of the basins was in deed low, fines and light particles would have been preferentially lost. The consistent C:N ratios support trapping efficiency as the primary driver of the inverse relationship between C and N concentrations and sediment yield; potentially more material of the same composition was lost in suspension during high flows. Total OM export may thus have been higher than reported." (L414-419)

Comment 2513 L8 "free light fraction OM". In cropland, our study found that buried C had a high proportion of light fraction SOM yet the rate of decomposition was still much lower than the surface soils, suggesting that perhaps the LF was also stabilized more than the LF at the surface. Also dating by ¹³⁷Cs and ¹⁴C indicated that the LF had been stabilized for decades since its deposition.

Author response: Additional results on stabilization mechanisms are in preparation for publication. We will take your points into consideration when evaluating that data. In this manuscript we limit the discussion to L427-432.

Comment 2415 L14 : do you mean "carbonaceous"?

Author response: Yes, that is what was meant; based on input from another review, this section was removed. A separate portion of the study evaluated C fractions and stabilization mechanisms, but that was not part of the data presented here. (just before Conclusions, L431)

We appreciate the thoughtful comments from the reviewer. The manuscript is better because of these constructive comments. Thank you!

~Erin Stacy (on behalf of all co-authors)