

Interactive comment on “SOM dynamics and erosion in an agricultural test field of the Clear Creek, IA watershed” by C. G. Wilson et al.

Anonymous Referee #2

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Overall: The ultimate fate of soil eroded from agricultural uplands is a very important research topic, and it is difficult to study. Usually, all eroded material has been considered lost from the soil system, potentially skewing estimates of soil carbon budgets at field, regional, and global scales. This research has the potential to make an important contribution by linking field and modeling approaches in a single agricultural field, but the results are explained poorly and the conclusions are weak. The manuscript should be completely rewritten, with a focus on describing the main results and the specific implications of the results.

Specifics:

Because the manuscript needs so much work, I cannot provide line edits. The same vague phrases are repeated throughout the manuscript, obscuring important concepts.

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For example, deposition is not defined clearly—this is a general word that could mean a lot of different things. What does it mean that deposition “muted” SOM loss due to erosion?

The methods section is much, much too long. Details about USLE, WEPP, and CENTURY are widely-available in the scientific literature.

The three modeling scenarios are set up well, but it is no surprise that dividing the field into an erosional upland and depositional floodplain worked the best. What is actually novel or surprising about these results? How did the study advance our understanding of the consequences of erosion?

The changes in SOC quality (labile and recalcitrant) are not explained clearly. Could it really be true that eroded material that is subsequently deposited is all light fraction? What about mineral-bound organic matter?

The results raised several doubts about the model that were not adequately addressed. 1) The monthly timestep of CENTURY is too long? 2) The depth of soil considered with CENTURY is too shallow? 3) Why was there no net increase in SOM? And 4) Figure 5, showing the “spin-up period” is not necessary. Similarly, Figure 1 does not add much and does not directly relate to the work described in the manuscript.

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