

Interactive comment on “Geomorphic regulation of floodplain soil organic carbon concentration in watersheds of the Rocky and Cascade Mountains, USA” by Daniel N. Scott and Ellen E. Wohl

Anonymous Referee #2

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“Geomorphic regulation of floodplain soil organic carbon concentration in watersheds of the Rocky and Cascade Mountains, USA” by Scott and Wohl uses data from distinct basins to identify key drivers of inter- and intra-basin organic carbon (OC) storage in soils. While we often focus on rivers as exporters and transformers of carbon, we rarely acknowledge the potential for river corridors to store organic matter. This paper does a nice job of highlighting the different controls on this storage function, is presented clearly, and will be of great interest to a diverse group of researchers and managers. Below I offer a few major and minor comments to highlight the novelty and contributions of this work.

C1

Major comments

1. Highlight novelty. As written, the authors largely omit much-needed reminders of how and why this work is novel, and which key knowledge gaps this paper addresses. The abstract does a modest job of this, but the introduction and discussion do not sufficiently highlight the “unknowns”. While many of these controls on OC input and storage are intuitive, datasets like the one presented here are relatively rare, as are the studies that are able to tease apart the relative importance of expected controls across multiple sites.

2. Conceptual figure. I was very excited to see this, as I wrote “need for conceptual figure?” a page or two before Figure 3 was introduced in the text. However, the link between the findings in this paper and the take-home messages from the conceptual figure are unclear. If the authors find the Veg/Litter, Valley bottom morph, and Moisture (is “surface water dynamics” = “moisture” in the figure? Clarify) are dominant controls, why aren’t they highlighted in the figure? I realize this study, while very thorough, was only in 2 basins and the authors may not want to exclude the possibility of other primary controls in other places, but, related to #1 above, including this figure at the end of the discussion should highlight how this work has changed or improved our understanding.

3. Floodplains and the aquatic/terrestrial limbo. In 1.1, the authors acknowledge the uncertainty of “whether OC concentration follows a trend similar to uplands...” but do not revisit this. As someone who feels that river corridors/floodplains get left out of these discussions too often by surface water or upland studies, I urge the authors to come back to this point in the discussion. Is this assumption of a similar trend a reasonable one?

Minor comments as page,line

1,8 – Consider making this opening statement more active: “mountain rivers have the potential for high organic carbon (OC) storage by retaining...”

C2

1,10 – Here and elsewhere (e.g. 7,35 and other sections). Why present tense? The authors often switch back and forth in a single paragraph. Keep consistent. Past sense seems more appropriate for work already done.

2,35 – I enjoyed thinking about allochthonous/autochthonous from the floodplain perspective. Thanks for coming back to this in the discussion (14,5) as well!

4,1 – Access roads and trails here as well, no? I know the winds can be pretty remote, but it's nice to get a feeling for direct human impacts as mentioned for logging in the MF Snoqualmie basin (even if they are minimal).

9,3 – I really appreciated these summaries at the end of each paragraph. Great way to stay in results mode but not lose sight of overall trends.

10,6 – Respiration is a mechanism. Consider restating. Perhaps “stabilization and loss mechanisms”?

10,9 – Missing a space: “2018),which”

13,10 – As written, could be read as inputs are regulated by storage. Could restate as “the fate of OC inputs are regulated. . .”

19, Figure 1 – coordinates?

21, Figure 3 – see major comment #2 above.

Interactive comment on Earth Surf. Dynam. Discuss., <https://doi.org/10.5194/esurf-2018-26>, 2018.