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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

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Associate Editor comments following peer review of "Geomorphic regulation of floodplain soil organic carbon concentration in watersheds of the Rocky and Cascade Mountains, USA", by Scott & Wohl

I have now had the opportunity to read your manuscript in detail, before examining the comments made by the two referees. I concur with their reports, there are novel and interesting elements to this research and the paper is clearly suitable for ESurf.

I agree with all of the reviewers' recommendations. The replies you have posted sug-

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gest a revised version can address these comments. Please take this opportunity again to reflect on revisions (the conceptual diagram is still somewhat hard to link to the study).

My own reading of the manuscript has raised an important additional point. Organic carbon (%OC) concentration was quantified using measurements of loss on ignition (LOI). While this is still relatively common in some fields, it does have known (and potentially large, up to several 10s of %) biases for measurement of %OC. If the study had quantified organic carbon stocks (e.g. gC m-2) and/or fluxes (gC / yr) this would have been an issue: the results would not be comparable to methods which analyse %OC using combustion and elemental analyser methods. Here, the study focuses on a comparison of %OC between two study sites. Therefore, broadly speaking the %LOI approach should allow patterns and differences to be delineated. However, I would encourage future work that employs a more direct quantification of %OC in sediments and soils.

With this in mind, the manuscript needs more details on the resultant uncertainties that derive from using the %LOI method to get %OC. These are:

1) Structural clay water content is accounted for using a published approach. Can you add a sentence or two to explain the size of this correction (i.e. was the average proportion of the LOI weight loss attributed to this factor)?

2) Because this study focuses on site comparison, can you please specify how much this clay water correction factor varied between samples, and between locations. It is important to establish whether the LOI method introduces biases into the %OC estimates and subsequent analysis.

3) There are 10 measurements of %OC from CHN analysis (following carbonate removal). It would be useful to explain how these measurements differed from the %LOI approach on the same samples, and feed this into the analysis of uncertainty derived from the LOI method.

Other comments:

Pg1, L8 – I think you need to add "in floodplain soils" or similar to the end of the first sentence.

Pg1, L15 – 'differences' instead of 'trends'

Pg2, L31 – "...concentration of soil"

Pg3, L3 – its coming later, but it would be useful to briefly explain how these two locations differ. Indeed, a summary table would be a useful way to contrast the main sites shown in Figure 2.

Pg3, L18 – For the review article citation, please specify here that all relevant details are provided in this manuscript (and make sure they are). Or if the paper is on a pre-print server those details can be provided.

Pg6 – I appreciate the careful discussion of the LOI method for calculating %OC. However, there needs to be a little bit more detail on the uncertainties associated with the LOI method. 1) Can you add some more information on the clay content corrections (outline the degree of the correction, and assess whether they are systematic in any way between different locations, or across environmental gradients). 2) Please provide an estimate of uncertainty (precision and accuracy) for the %OC derived from LOI. 3) use the CHN %OC analyses to assess the accuracy of the LOI proxy for the small sample set where you have both measurements (n = 10).

Pg7, L2 – 'likely still be accurate' – this phrase can be qualified using the measurements of %OC from CHN versus %OC from LOI. Please do so (see comment above).

Pg12, L21 – it would be useful somewhere here to summarise some of the available geochemical approaches which may be used to examine in more detail the provenance and processing of organic matter (e.g. stable isotopes, radiocarbon activity, biomarkers, isotope composition of plant wax biomarkers) in the floodplain sediments.

Figure 1 – shows hillshade not topography, please edit the caption

Interactive comment

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