

Response to Comments Round 2 for Chartrand et al – esurf_2022_040:

Coupling between downstream variations of channel width and local pool-riffle bed topography

Dear Associate Editor Sjöberg,

Thank you very much for your careful read of our revised manuscript, and for your helpful suggestions to improve the presentation of our research. Below we review the revisions made based on your comments, and we note that we made a few other very minor editorial changes (insertion of a few commas, etc.). We hope you find the changes acceptable. We also thank you again for your time, and handling of our work.

Response to AE Comments Esurf 2022-40:

L46-47: Confusing sentence. Some more punctuation or supporting phrases are needed to clarify.

Response: We added a comma about half way through the sentence. We believe this makes the sentence easier to understand:

“Here, we make progress using scaling theory understood through an analog experiment, the results of which are in line with an extensive data set drawn from the literature.”

L51: This should not be a question mark. Change to a period.

Response: Thanks for this suggestion. We went a bit further to clarify and simplify the sentence in question and broke the sentence into three sentences, and broke the question out into two clear questions:

“We address two research questions through our analysis. First, how does a pool-riffle channel segment respond to local temporal changes of channel width? Second, do resultant topographic adjustments conform to expectations of an inverse correlation between the local dimensionless downstream width gradient $\Delta w(x)$ and bed slope $S_{\text{local}}(x)$:(Fig. 1)?

L64-75: Here I agree with Reviewer #2, that a summary of the results does not belong in the Introduction. I would suggest that you can add a sentence to the end of the paragraph describing the objectives (currently the second to last paragraph) that explains that you explore implications of your results in light of dam removal and related sequences of hydrograph events.

Response: We appreciate your point of view, and that of Reviewer 2, and we thank you for following up to this original comment and making your suggested modification. After careful consideration, we would like to keep the summary of the results at the end of the Introduction. However, we have made one change to make it clear that the field-based data sets provides an important finding in relation to our scaling theory, and motivated the evaluation of the dam related data set in particular. The added sentence with a small edit (added commas to set off phrase) to the following sentence now reads:

“The expanded field-based data sets motivated a more careful consideration of profile responses to associated width variations. We find that actions such as dam removal, which impulsively increases the supply of bed load sediment to downstream river reaches, can cause...”

We also would like to point out that a summary of the main findings at the end of an Introductory section is somewhat common in the literature, and also reflects a stylistic choice on our part to give the reader a

preview of our main findings. This helps to set reader expectations on what follows, and helps to reinforce the main findings of our research. We hope you find this acceptable.

L157: add 'is' to phrase: and a riffle feature is that which occurs above

Response: Change made.

L165-184 (and perhaps elsewhere): It is unclear why values are in parentheses (ranges, amplitudes, etc...). I realized that this was perhaps done to make the negative values and ranges clearer; however, it is better to be consistent throughout the manuscript and with ESurf style and remove the parentheses.

Response: We have removed all parentheses used in the prior manuscript versions to enclose positive and negative numbers representing local width gradients and bed slopes. To make the presentation of ranges more clear, we have removed use of the endash “–” in favor of “:”. We did this so that negative signs are not misinterpreted as an endash.

Line 275: Change it's to its

Response: Change made.

Line 275-277: Clarify what 'it' refers to in sentence. Unclear phrase with two 'it's': 'whereas it occurred downstream of it'

Response: Thanks for this suggestion. The revised sentence reads:

“During Phase 1 the point of maximum amplitude in the pool occurred upstream of the location of minimum width at Station 8.2 m, whereas it occurred downstream of the minimum width location during Phase 2 at Station 7.8 m (Figs. 3 and 4).

Line 306: Change 'appreciable' to 'appreciably'

Response: Change made.

Line 360-1: This sentence needs to be edited for clarity. At the least, remove 'it' ('what matters it is not simply')

Response: Thanks for this suggestion. We went a bit further to clarify this sentence more so than suggested. The revised sentence was broken into two sentences:

“A critical implication of these results is not simply that width varies along a river reach. Topographic responses are strongly conditioned by *how* width specifically varies. In particular, what matters is the magnitude of width variation relative to the length scale over which width differences occur.