

Interactive comment on “A flume experiment on the effect of constriction shape on the formation of forced pools” by D. M. Thompson and C. R. McCarrick

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The reviewer provided many excellent comments and suggestions, and we appreciate the time and effort invested by Bruce MacVicar. We tried to address all the comments raised.

The suggestion to use the second derivative is an interesting one. However, the ultimate goal of the project was to try to replicate natural obstructions that will be more complex than can be represented with simple mathematical formulations. Obviously, the obstructions used in this study were highly simplified models of natural boulders

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and bedrock outcrops that could themselves be modeled mathematically, but that would not ultimately help with the application of the results to field settings.

We agree that the lateral adjustments are very interesting, and we did try to qualitatively describe these trends. Unfortunately, we did not conduct full topographic surveys for each flume run. We just did the profiles for each run, and a single topographic survey from each set. Therefore, we are limited to qualitative observations because we have no repeat data for statistical analysis beyond the stream centerline. We did expand the qualitative discussion of the scour patterns as requested.

We calculated the volume of scour and deposition and reported that in a new table.

Specific Comments

Abstract - The final sentence of the abstract was deleted.

Introduction – we believe we have a fairly smooth transition from the introduction to section 1.1, but perhaps we misunderstand the reviewers comment?

Methods - The wording was added to clarify that the surveyed pool-riffle topography are assumed to represent equilibrium dimensions.

We reworded the sentences to clarify the methods and definition of maximum constriction.

The idea is fairly simple and can be adequately explained in the text, but was poorly worded in the earlier version.

Results Paragraph 1 – I agree that it would be great to have data on the flow field, but the bed evolves so rapidly it does not seem possible to collect this data with an active bed environment because the relative depth of the probe changes even during a relatively short measurement period.

Paragraph 3 – I removed the confusing text, which appeared before the statistical results were discussed.

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Paragraph 4 – The maximum depth of the pool was consistently located along the pool centerline. However, the location of the riffle crest did vary laterally as indicated. Because repeat topographic surveys of the entire channel were not conducted, it was not possible to provide repeat measurements of the riffle crest position for each run. We also did not measure water-surface elevations. These limitations of the data are better explained in the article.

Volume of scour and deposition are now included.

Paragraph 5 – I modified and simplified both sentences as requested.

Discussion 4.1 – We deleted some text to avoid repetition and present a more concise discussion.

Editorial comments (We apologize for the lack of line numbers, but these do appear on the online version).

Abstract 2 – corrected as requested; 2/ corrected throughout 3/3 changed as requested 7/1 comma removed 7/6 changed to ensure 7/6 changed as requested 8/13 reworded as requested 8/17 reworded as requested 9/6 reworded and condensed as requested.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 1945, 2010.