

***Interactive comment on* “Spatial stochastic and analytical approaches to describe the complex hydraulic variability inherent channel geometry” by N. Hadadin**

Anonymous Referee #2

Received and published: 12 September 2011

Thank you for the opportunity to review the manuscript titled “Spatial stochastic and analytical approaches to describe the complex hydraulic variability inherent channel geometry.” Whereas the topic of the manuscript is important, unfortunately, I feel the manuscript should not be published in its current form and I believe the manuscript requires such substantial revision that it should be rejected. I would encourage the author to address the issues raised in this review and resubmit.

There are several major reasons for my assessment of this manuscript, which I address in the context of the criteria that the journal asks reviewers to consider.

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1. Does the paper address relevant scientific questions within the scope of HESS? Yes. The manuscript does address the important topic of estimating properties of channel geometry for stream restoration and other hydrologic applications.

2. Does the paper present novel concepts, ideas, tools, or data? No. The idea of relating drainage area to characteristics of channel geometry is not new and there are other publications that use this approach. The author needs include these references in the manuscript and explain how this manuscript offers a new and unique contribution to this topic. Examples of similar publications include:

Moyer, D.L., and Bennett, M.R., 2007, Development of relations of stream stage to channel geometry and discharge for stream segments simulated with Hydrologic Simulation Program–Fortran (HSPF), Chesapeake Bay Watershed and adjacent parts of Virginia, Maryland, and Delaware: U.S. Geological Survey Scientific Investigations Report 2007–5135, 83 p.

Lotspeich, R.R., 2009, Regional curves of bankfull channel geometry for non-urban streams in the Piedmont Physiographic Province, Virginia: U.S. Geological Survey Scientific Investigations Report 2009–5206, 51 p.

Wohl, E., J.N. Kuzma, N.E. Brown, 2004, Reach-scale channel geometry of a mountain river, *Earth Surf. Process. Landforms* 29, 969–981.

3. Are substantial conclusions reached? No. The manuscript does not include a results section and skips from a methods section to a discussion and conclusions section. Furthermore, the regression equations shown on figures 2 through 9 have fairly weak relations between drainage area and channel characteristics. No validation experiments are performed to show how these equations would work in a predictive mode at ungauged basins, which is the primary motivation for the work. Furthermore, the author does not present prediction intervals around the regression equations to address their uncertainty.

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4. Are the scientific methods and assumptions valid and clearly outlined? The use of linear regression to relate channel geometry to basin characteristics is a valid approach, although not novel.

5. Are the results sufficient to support the interpretations and conclusions? No. Please see the answer to question (3). In order to understand the predictive power of the regression equations, the author must include prediction intervals or present cross-validation results. There is limited interpretation of the results other than reporting basic regression statistics.

6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? The author does not describe how the channel geometry features were computed. Were the features computed from field observation? If so, please cite the relevant field protocols. Other than this question, I believe the results could be reproduced based on the data and descriptions presented.

7. Do the author give proper credit to related work and clearly indicate their own new/original contribution? No. Please see the answer to question (1). The author does not make reference to other publications that relate properties of channel geometry to basin characteristics and, therefore, the manuscript is not put into the context of other work in this area. The author needs to mention if only unimpacted locations were used and explain the reasons why the Yazoo Basin was selected for this study. The author also needs to explain the significance of the Type I-V reaches and why this demarcation is important to this study.

8. Does the title clearly reflect the contents of the paper? No. The title of the manuscript does not reflect the contents of the manuscript, particularly the use of the terms “stochastic” and “analytical.” It is unclear where in the manuscript these two properties are addressed in the author’s approach and these terms are not used anywhere else in the manuscript in a meaningful way. From what is presented in the text, the author uses

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linear regression to relate drainage area to characteristics of channel geometry, which is neither “stochastic” nor “analytical.”

9. Does the abstract provide a concise and complete summary? No. The abstract is too long and does not discuss the unique contributions of the manuscript. I also do not believe the regression results show a “good fit” (p. 6968; line 15). This is not shown in the manuscript.

10. Is the overall presentation well structured and clear? No. The manuscript lacks a results section and the introduction lacks a clear problem statement and hypothesis. Results are buried in the methods and discussion sections. It should be noted that the abstract and introduction are the longest sections of the manuscript. There is also no study map presented, which is particularly relevant given that this is an international journal.

11. Is the language fluent and precise? No. The author needs to better organize the manuscript and be clear about the unique contribution of this work. Relevant literature needs to be cited and the abstract and introduction need to be shortened and made more concise.

12. Are mathematical formulae, symbols, abbreviations, and units correctly defined and used? Figures 3-9 need to define the symbols Q , W , A , d .

13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced, combined, or eliminated? There are more substantive issues with the manuscript that need to be addressed before this can be evaluated.

14. Are the number and quality of references appropriate? No. Please see answers to questions (1) and (7).

15. Is the amount and quality of supplementary material appropriate? There is no supplementary material presented.

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