HYDROL44601: Editor's decision

CC: nandita.basu@uwaterloo.ca

Ref.: "Identification of watershed priority management areas based on landscape positions" (Dr. Liang-Jun Zhu)

Dear Dr. Zhu,

I very much regret to have to tell you that publication entitled, "Identification of watershed priority management areas based on landscape positions" (Dr. Liang-Jun Zhu) in our journal is not recommended.

We would, however, consider as a new submission for review a substantially revised version of this paper that addresses all of the reviewers' comments. Should you choose to submit such a revised manuscript please refer to the present manuscript number, provide a detailed point-by-point reply to all of the reviewers' comments, and state how the revised manuscript addresses these.

An explanation for this decision is given in the attached review reports (and on https://www.editorialmanager.com/hydrol/). I hope that the comments contained therein will be of use to you.

Thank you for your interest in our journal.

With kind regards,

Nandita Basu
Editor
Journal of Hydrology

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Important note: If a reviewer has provided a review or other materials as attachments, those items will not be in this letter. Please ensure therefore that you log on to the journal site and check if any attachments have been provided.

Note: While submitting the revised manuscript, please double check the author names provided in the submission so that authorship related changes are made in the revision stage. If your manuscript is accepted, any authorship change will involve approval from co-authors and respective editor handling the submission and this may cause a significant delay in publishing your manuscript.

COMMENTS FROM EDITORS AND REVIEWERS:

Dear authors: two referees have provided feedback on your manuscript. Both reviewers agree that this topic is interesting and a good fit for the journal. However, both have suggested major revisions before this manuscript can be accepted for publication. One of the major concerns of both reviewers was the fact that this new approach was only reviewed for one watershed with results that may or may not represent a significant improvement; therefore, this weakness should be addressed should you choose to revise and resubmit.

Reviewer #1: I'm very glad to review such a manuscript identifying PMAs based on landscape positions. The innovation of this study is the identification of PMAs based on LSU through the characteristics of SWAT+ model. The Markov chain method is very common in watershed NPS management. The first controversial point of this study is how the promotion of the introduction of SWAT+ model for PMAs identification. It is undeniable that a more detailed characterization of watershed processes would improve the reliability of identification rather than traditional SWAT model. Modifying Markov chain based on mechanistic model was the idea of many researchers five years ago. However, the researchers found that relying solely on water quality indicators to quantify PMAs resulted in a lack of reliability in actual watershed management. More studies at present focus on the comprehensive assessment PMAs between different indicators, such as pollutant load, intensity, cost, ecology, etc.
Therefore, I think there is a limitation of research dimension in this study. The second controversial point is the allocation from upland to floodplain and channel. I would like to see more distribution based on different hydrological condition or physical mechanism rather than area ratio (Line 141). In addition, this research is more suitable as a case study, so it is suggested to modify the title appropriately.

Reviewer #2: Summary:
The authors apply an alternative classification of hillslope to the SWAT model in an effort to improve outputs related to defining key management areas described as priority management areas.

Report:
Improving upon models is always a good objective. In this instance, refining the landscape unit in the SWAT model to better reflect a key parameter, hillslope, is a good objective. Overall, the authors show how the refinement of the slope parameterization from a coarse sub-basin unit to a finer landscape position unit changes the SWAT model output. The result is interesting and a good first step to improving the tool for managers; however, this version of the analyses and manuscript are not ready for publication in a peer reviewed journal. Here are some key things that need to be addressed:
(1) To test the model's effectiveness, many catchments that represent varied landscapes (slope profiles and positions in the landscape) need to be assessed and compared. The use of a single catchment shows the model may have improved, but it doesn't tell us if this is universal or specific to a certain type of landscape, i.e., the one tested (and among many other catchment characteristics intertwined in the real process, and the SWAT modelling).
(2) The language (English) will need some investment of time and effort. The sentence and paragraph structure require improvement. Some words are used incorrectly. (But an excellent effort from authors who are clearly far advanced in their non-native language skills.)
(3) The structure of the manuscript doesn't meet the standards expected, e.g., an introduction with clear goals and objectives, methods, results, discussion.
(4) The referencing is disjoint. In some cases, the statements of the authors and the provided citations don't agree. I found myself reading the citation papers and then citation papers therein in an attempt to understand what the authors were trying to connect. As an example, 'priority management area' (PMA) introduced in the first sentence is given two references and neither speak to PMAs. I searched these references and then the references therein and the definition of a PMA was not there (it is circularly cited among the manuscript authors). A PMA is intuitive and sometimes called a critical management unit or area. It is acceptable to introduce it and speak to others using the term, but it isn't widely accepted at this time and the language of the text should reflect the

reality. A better approach would be to build on the idea that refining the spatial delineation of areas and degree of pollution (from coarse to finer scales) is the more effective approach for managers because it allows them to prioritize management actions, e.g., best management practices.

(5) As a modeler I understand the excitement of seeing an improvement in a model's predictions. However, the modelling output change to 68.34% from 56.17% and from 31.76% to 39.66% is undoubtedly not statistically significant which can only be tested by using many catchments as stated previously. Also, the reporting of 2-significant digits doesn't reflect the reality of the model outputs which are rampant with uncertainty. I point this out because modelers often get lost in the trivia of the mathematics and forget that the real value of their work is the effectiveness and acceptance of their hypotheses (the model).

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