

Interactive comment on “Developing a Decision Support Tool for Assessing Land Use Change and BMPs in Large Ungauged Watersheds” by Junyu Qi et al.

Anonymous Referee #2

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this study is a very interesting and important question for water resources management. However, I think this manuscript is not well prepared and is subjected to major revision for publication. I am reporting below some general comments and specific remarks, which I hope are useful. General comments: (1) The decision support tool should be established with readily available and measured variables only. Or, some advantages claimed in this study are not realistic. For instance, (a) anyone want to apply this method/framework to another catchment, they have to set up and calibrate the SWAT model first; (b) some of the explanatory variables might be catchment (sub-basin, or HRU) scale values and are un-observable, e.g. SOL_K, so regressed equation depends on the performance of the calibrated SWAT model. I suggest au-

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thors to set up the tool independently with the SWAT model. Then, using the SWAT model to support the validity and to identify the advantages/disadvantages of the established tool. I think this is the way we usually do in operation, i.e. regressed and physically-based models are complementary and independent with each other for decision making. (2) I don't agree with the conclusion "DST and SWAT are equally well". The performance of DST and SWAT are "equally", which is not surprise as they are dependent, but not "well", which should be concluded on comparison with observations. Results did not well support "well". For the applications in the whole watershed, it is hard to say model was well established (or, it is just a numeric modelling experiment). (3) What is relationship of this study with four published studies of Qi et al. in term of modelling results of SWAT? If there is no new modification, set-up and calibration of the SWAT model, that is fine. But you have to say it explicitly and reduce the length of model introduction significantly. (4) Some general comments on the writing. Many abbreviations were used without full names where it was appeared firstly. Language should be edited carefully. Length should be reduced significantly (too many tables and figures). Suggest to separate the results and discussions. Subplots of all the figures should be labelled in order of (a), (b), . . . consistently. Specific comments: (1) Line 111: too many abbreviations in this flow chart. Consider move down to end of this section, or provide more specific information, or extend the caption. (2) Line 131: Provide information of all the abbreviations used in the figure in the captions. (3) Line 132: name of weather station should be consistent in form rather than one is "#08" and another one is "St. Leonard". (4) Line 139: The word "used by SWAT" is misleading. Land use and soil classes used by the SWAT model are much lesser (section 2.3) than these shown in this figure as many small patches of land cover and soil types are dissolved during the generation of HRUs. I suggest authors to provide the "real" and relevant information used by the SWAT (including information in table 3) rather than these maps/values based on raw datasets. (5) Line 148: what does "St. Quentin" mean? A type of soil? (6) Line 176-177: "It is believed that . . . even without calibration". How do I believe it? (7) Line 180: These two references are not the most relevant ones. (8) Line 193:

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whether freeze-thaw cycles are considered here? Results said modelling error of sediment load was resulted from not considering freeze-thaw cycles in winter (line 507). (9) Line 193-194: what are “following changes”? How do I know the accuracy was improved? (10) Line 209: use four digital for the year consistently. (11) Line 313: delete “(LBAT)”. (12) Line 350: what is (3)? (13) Line 484: In this section: it seems that results do not well support “increasing cell size increased sediment loading”. Additionally, more explanations/discussions should be provided. (14) Line 486: Figure 13, where it is? (15) Line 508: “48” should be “48%”. (16) Line 556: R2 should be included in this table.

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