**Hydrology and
Earth System
Sciences
Discussions**

Interactive comment on "Sediment management modelling in Blue Nile Basin using SWAT model" *by* G. D. Betrie et al.

Anonymous Referee #2

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Abstract: pg 5498, line 19-20: This sentence is very broad. The impact of the work can still be made clear and probably be more meaningful if it is stated more specifically.

For scenario-2 is SLSUBBSN changed by HRU or subbasin? Changing it by HRU would be the most appropriate, I think, in this situation. However, it is not clear in the text how it was done. It needs to be explicitly stated how it was done since the "default" method is to do it by subbasin.

I would like to see the statistical calculations for the monthly average values (compiled from the daily results) as well. This would make for more equal comparison within the literature. Also, flow calculations should be split between the two seasons so they can be considered in conjunction with the sediment calculations.

Pg 5508, line 9: did you check the input data to see if that was the cause of the peak mismatch? Is it? If not, what are other possible causes?

Correct the actual number of years in the calibration and validation periods: twice it is stated that there are 14 years total. However, 1990-1996 is at most 7 years and 1998-2003, minus 2001, is at most 5 years.

Pg 5509, line 5-9: how did you determine the erosion categories?

Pg 5509, line 10-20: What happens when you combine one or more of the BMPs in a single scenario?

How realistic is it to add these BMPs? Is it something that land managers would be willing to do, or would it involve a major change in management/equipment/profit/ etc. All of the BMPs take land out of production and involve labor for installation and maintenance.

What is the impact of the small scale of the BMPs relative to the basin size modeled (filter width of 1m and locally built stone bunds versus 90 m GIS cells)? What is your HRU size range? What about subbasin size range? Do you think the differences in the scenario results are reflecting the effects of the BMPs accurately? What happens if you model one of the subbasins with the same scenarios but at a finer DEM resolution?

Pg 5509, line 20-30: why was reduction greater on some subbasins than others? What generalizations of BMP effect can be drawn based on characteristics of the subbasins you studied?

A map of landuse as related to the BMPS would be very helpful as well as discussion (possibly with a table or figure) on the % of land placed in BMP as compared to the effectiveness % of the BMP, probably by subbasin. Is the reduction per ha of each BMP consistent across the entire basin or is it more effective to put the BMP in certain subbasins?

The Conclusion section should state the main findings and resulting impacts or poten-

tial impacts of the study. The study design and statistical results do not need to be restated.

Table 3 lists more than 14 variables but the text states that 14 variables were found sensitive. This needs to be corrected. Also, is there any order to the list for Table 4 (it is not obvious). Finally, if the listed "Fitted parameter values" are actually the values that were used in SWAT, then there needs to be some explanation of and justification of parameter values that are outside physically realistic boundaries.

Table 4 & 5 are restated in the text. Unless the text changes, the tables are not needed.

Figure 4: It would be helpful to indicate the outlet and stream network and to make the subbasin numbers larger and bolder.

Figure 5: It would be helpful to indicate which subbasin contains the outlet.

——————— The paper could be substantially improved in the areas of English grammar, sentence structure, and word choice. Words like "demanded", "understand", "contentious", "employed", "eschewed" are used in places where their basic meanings are correct but the context is odd for the more subtle meanings or proper usages of those words. In many cases words that are normally used in reference to an animate, thinking creature are used in reference to a simulation model or other inanimate object. Below are a few specific suggestions, but the entire manuscript should be proofread for additional issues.

"top soil", "south-western", "through out" , and "miss match" are each one nonhyphenated word in the places they are used. Hyphens are occasionally used in "buffer strip" and "stone bund" where I don't think they are needed. "Whereas" and "Therefore" seem to be used in an attempt to connect sentences based on a learned rule instead of a context-specific need to bridge two ideas; they can largely, if not completely, be removed.

pg 5499, ln 4: "is prevailing and induced. . ." this sentence is not clearly written.

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Pg 5501, line 20: add "Soil Loss" between "Modified Universal" and "Equation"; "HRUs soil erosion" reads more clearly as "HRU-level soil erosion"

Pg 5502, line 25: delete "together". It is redundant in this context.

Pg 5502, line 27: replace "enhance" with a more accurate word, such as "decrease"

Pg 5506, line 1-5: you don't need ", including base scenario". Also, it would be clearer to describe the scenarios as various representations of the basin. "was implemented without BMPs" and "was implemented on agricultural HRUs" imply more than simply describing the scenarios – which, I think, is the intent of this paragraph. Try, for example, "In Scenario-1, buffer strips are placed on all agricultural HRUs that are . . ."

Pg 5506, line 25-30: "supplanted" and "adapted" are not the correct words here. This paragraph is a good example of where the strength of the research and scientific thinking are being masked by lack of clarity in the English writing.

Table 1: change "dominated of" to "dominated by"; the description for water body is not clear in terms of how much of the area must be covered before the land is placed in this category.

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