

## ***Interactive comment on “A multi basin SWAT model analysis of runoff and sedimentation in the Blue Nile, Ethiopia” by Z. M. Easton et al.***

**Anonymous Referee #2**

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### General Comments:

The paper presents an interesting examination of the application of saturation excess runoff generation mechanism for Blue Nile Basin. The authors seem to hypothesize Ashagre's finding (Page 3840/41 line 28-29); the study supported by Liu et al. (2008) and others (Page 3841 line 22-26) which were used as the basis for developing/applying the modified version of SWAT code (SWAT-WB). It is interesting that the paper has managed to show the ability of the revised model (SWAT-WB) to reproduce the streamflow and sediment transport in Blue Nile Basin. The manuscript then goes on further explaining about erosion processes and dynamics of erosion. But the paper consists some critical shortcomings that need to be addressed before publication es-

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pecially in structuring what one wants to convey and what has been found/done. The paper can be a good contribution for the understanding of hydrology of the Blue Nile.

Specific Comments: Here are the areas that need to be revised prior to publication: -

1. Define the focus of the study: It was not clear whether the authors were reporting the development of the modified SWAT version or application of the code for run-off and sediment prediction in the Blue Nile. The paper seem to introduce the development of new SWAT code at some point and then a paper by the main author (Easton et al. 2008) was also cited in the manuscript as a source of report of the development of the SWAT-WB code.
2. Ashagre's finding: Is this really the case of the Blue Nile Basin as a whole? Or it is based on study conducted on specific places. It is hard to believe the generalization of that major run off generation process in BNB is saturation excess. The problem here is; this generalization can lead to a point that overland flow occurs most often at the bottom of hillsides in the BNB but this may not be the case. Had this been true, all of the severely eroded hill slopes in Ethiopian high lands could have shown different story today (less erosion and productive hill slopes). I strongly suggest the authors to give more perspective to the previous studies.
3. Can we conclude the dominance of saturation excess runoff generation mechanism based on the fact that we have got good performance of SWAT-WB simulation of streamflow prediction? If so, how does CN based SWAT model perform in the Blue Nile?
4. Page 3841 line 21: Are you sure about it? Monsoon rain is rather known for its variable intensity. It looks that the authors are trying to make strong argument for the saturated excess runoff generation dominance in the region. It could be very good if you provide some justification or references to those kinds of remarks.
5. The conclusion that upland erosion is dominant in the early part of growing season

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is obvious. The temperature fluctuation (day and night) over long dry period on the surface soil, trampling effects of live stock and the disturbances caused by farmers (tillage) which basically starts before the onset of the rainy season are the factors to blame for more soil erosion at the early stage of the rainy period. If SWAT result has shown this it could be appropriate to present the results in clear way.

6. Page 3840 line 5 and page 3856 line 23-reread the sentences for spell-check.

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/7/C1605/2010/hessd-7-C1605-2010-supplement.pdf>

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