

## ***Interactive comment on “Validation of SWAT simulated streamflow in the Eastern Nile and sensitivity to climate change” by D. T. Mengistu and A. Sorteberg***

**Anonymous Referee #2**

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The authors present an interesting study which considers validation of SWAT simulated stream-flow in the Eastern Nile, and sensitivity to climate change. The simulations are based on the application of SWAT, which is one of the most widely used models on aspects of hydrology and climate change. The work presented represents the application of available methods and, although is neither innovative nor ground-breaking, does represent research that is clearly of importance to water management in the region. Furthermore, the lack of long-term reliable hydrological data in some of the regions of study justifies the application of hydrological modeling technique applied here.

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(1) However, the methods chosen and applied should be better justified, particularly with respect to their application in such area, and not only within the concerned Ethiopian Regions. Reference to more recent studies which have adopted the empirical equations, most importantly, the climatic change scenarios are very imperative in this respect, especially if one is to have confidence in the results. (2) Considering the title as it stands, I suggest that a better one be found. I have in mind limiting the topic to something like “Sensitivity of SWAT simulated stream flow to climatic changes within the Eastern Nile River Basin”. This, however, would suggest that the authors perform an inclusive overhaul in terms of the references, methods, results and discussion. Many of such studies do exist in the Nile River basins, and the author can draw lessons from such references as: 10.5194/hess-15-209-2011. (3) The authors should try to capture corresponding details in the abstract, with summarized aspects of purpose of study, methodology, results and conclusions, and perhaps some recommendations. As it exists now, a lot of content seems thrown around and about. According to the present title, the authors have two aspects which can be precisely captured in the abstract: (a) Calibration and Validation, and (b) Sensitivity to climate change. Both of them are very interesting to the readers. (4) Generally, the language in the entire text is wanting and requires revision. Perhaps involving, an experienced authority in the language may be necessary. For instance, the authors should explain what he means by total average flow in line 4 of the introduction, or what he means by simple hydrological model in line 7 of the introduction. My experience is that sometimes what appears simple may not be so always. (5) Kindly check the references, and their structuring. I.e. Mohammed et al. (2005) ... (and again) ... (Mohammed et al. 2005) at the end of the sentences. Also check reference section for overall consistency. (6) I would suggest the introduction to focus more on studies and justification of the existing methods for purposes of identifying the objective of this particular study. For example, an introduction to the GCM and their application not only within the Ethiopian region, but also elsewhere of good proximity is important for the title. What come out as it presently exists is that the author only applied reverse approach i.e. the capabilities within SWAT, which may

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not be true. (7) Could the locations of the study area be more precisely described? What about the morphometrics in a table? Kindly choose one name to use for the tributaries instead of putting them in bracket always. Normally, a common name is better, with the subsidiary being bracketed for the very first time. If possible, summarize and describe the details of each tributary in a paragraph in a consistent manner. (8) Use conventional colors for the GIS layers in Figure 1 (i.e. blue for rivers etc). Also check the Map Scale. It does not look very realist as it stand now. If it does, then kindly check the scale of the datasets (land use and soils etc). Somehow, something may be missing somewhere. Choose a good interval for the DEM. Maybe you avoid no data legend as it is the same as the last interval. Generally, properly structure the map contents for balanced visibility in all the figures. (9) In the methods and materials section, generally check the language used please i.e. Explain what you mean by the word extracted? Also, some texts in the section (i.e. in section 3.5) look like results unless properly re-packaged. To avoid redundancies, avoid repeating within the text what is already illustrated by the figures. Again, avoid all the generalities since SWAT details can be found online nowadays. Confine yourself to what you did for your study area. (10) The first part of the results looks like part of literature review. Explain what you mean by verification? Generally, add more study specific content on the results since some of the staff here are general for SWAT. Discuss into details and specifically the results obtained. My personal opinion is that you should add more details into the climate change part through a more professional discussion and justification. (11) In the summary and conclusion, try to relate the model estimates to other work in the region. Sharpen the language for enhanced readership. The last paragraph in the section is somehow confusing.

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