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Hydrology and Earth System Sciences
Discussions

# *Interactive comment on* "Hydrologic modeling of a Himalayan mountain basin by using the SWAT mode" *by* Sharad K. Jain et al.

**Anonymous Referee #2**

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The manuscript entitled "Hydrologic modeling of a Himalayan mountain basin by using the SWAT model" presents an application of a hydrologic model to simulate historical streamflow in a topographically complex and data scarce Himalayan mountain system. The authors are putting their great efforts in this study. This type of research issue can help for making better informed decisions regarding future water management strategies of the Himalayan mountain regions. However, I have some critical comments as given below, and want the authors to address thoroughly before considering this manuscript for further processes.

My major comments are: (1) I don't find a concrete innovation in modeling technique to publish in this journal. The introduction section is too lengthy including very general statements and it seems like a review paper. This should be concise based on the overall study objectives. (2) The methods section should be revised thoroughly



since it contains the equations which are explained in details in SWAT documentation and in several previous research papers. The abstract section says that the authors have used manual calibration approach but as I understand from methods section, they have explained the application of SWAT-CUP SUFI-2 approach for model calibration. This is very confusing to the audience. (3) One of my critical comments is regarding the study of uncertainty analysis in this paper. In Abstract section, the authors have stated that they have done quantification of uncertainty analysis but not mentioned in details in the text. This is very important aspect of model simulation studies so this should be accounted very properly in the paper. (4) The paper is lacking supporting references in many places. It also contains several technical errors. Specific suggestions about the paper are listed below: Title: Since the study is primarily focused for calibration and validation of Ganga River Basin SWAT model, the Title should be modified "should use different terms instead of using hydrologic modeling". Abstract section, lines 10-13: I am not convinced with these statements. There are several studies conducted in several Himalaya Mountain basins. I suggest the authors to see a few of the following examples: 1. Neupane, R. P., Yao, J., & White, J. D. (2014). Estimating the effects of climate change on the intensification of monsoonalâĂŘdriven stream discharge in a Himalayan watershed. Hydrological Processes, 28(26), 6236-6250. 2. Neupane, R. P., White, J. D., & Alexander, S. E. (2015). Projected hydrologic changes in monsoon-dominated Himalaya Mountain basins with changing climate and deforestation. Journal of Hydrology, 525, 216-230. 3. Nepal, S., & Shrestha, A. B. (2015). Impact of climate change on the hydrological regime of the Indus, Ganges and Brahmaputra river basins: a review of the literature. International Journal of Water Resources Development, 31(2), 201-218. Abstract section, line 16: Should be clear in manual and automatic calibration approaches in the paper. Abstract section, line 20: "between 13-20%" > should have clear explanation of estimating these numbers in the text. Introduction section: The first sentence is not so clear. Introduction section, lines 28-33: Authors should provide proper references to support these statements. Introduction section, 2nd paragraph: The first sentence is not clear and should be

re-written. Introduction section, lines 50-52: Provide the reason of getting better NS value in monthly basis with reference. Introduction section, paragraphs 3 and 4: These paragraphs mostly include literature reviews regarding water quality issues. This is not appropriate since the paper is focused for water quantity issues. So, these should be removed. Introduction section, lines 106-107: provide supporting reference for this data. Authors should trim the introduction section based on research objectives. Page 4, line 143: “computes” > compute. Page 7, line 236: “km2and” > km2 and Page 7, line 236: “7785 m” > 7785 m mean above sea level (masl) (should be consistent throughout the paper). Page 7, lines 244-248: These are very important information of the basin and should have supporting references. Page 7, lines 249-250: Why these two sentences are separate? can be merged with below paragraph. Page 8, lines 276-277: This sentence should be merged with below paragraph. Page 8, line 288: “.To obtain” > Should have space after full stop (.) (this should be corrected throughout the paper. Page 8, lines 288-290: What is the basis for these threshold values? Page 8, lines 294-295: The sentence is not correct and what is the basis of selecting hydrologic parameters for this study? Page 9, line 325: “was” > were Conclusions section: The first sentence is not complete, using what? Table 1: I suggest to include the dates of data derived to use for land use, streamflow, and weather information. Table 3: This should be re-constructed separating calibration and validation sections properly. Figure 1: The caption is not complete. This should explain every details of the figure and should be followed for all the figures. The “Location of what?” in the Legend. Figures 4 and 5 can be merged in Figure 1. In summary, the paper has both scientific and technical flaws as mentioned above, so I would ask authors for a comprehensive revision based on the above-mentioned comments to better improve from the present form.

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