

## ***Interactive comment on “Improving SWAT model performance in the Upper Blue Nile River Basin using meteorological data integration and catchment scaling” by Erwin Isaac Polanco et al.***

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Dear Anonymous Referee #1

Thank you very much for your comments and recommendations to improve the quality of the paper. All the recommended improvements were already done to the document. The title was modified using “sub-catchment discretization”, the structure of the document was improved trying not to mix methods and results, and more literature was included.

On the specific comments:

-The abstract was corrected and the results of SUFI2 were included.

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-The introduction was enriched by adding more information on current hydrological modelling in the region and by comparing the work performed by other studies in the UBNRB.

-The structure of all the citations in the text and in the reference list were corrected to meet the requirements of HESS.

-The reason why CFSR data didn't work for Roth and Lemman (2016) was added.

- Ministry of Water, Irrigation and Electricity was corrected.

-A scatter plot showing the statistical significance of the degree of matching between CFSR and ground data was added. The data shown in this paper is the only data that we were able to collect, therefore comparisons with other probably available stations were not done.

-A better explanation of how the data integration was done was added.

-The description about SUFI2 was improved, and an explanation about p and r-factors was added.

- The phrase “the of quality of SWAT model” was modified, it was meant to be “reliability of the model”

-Yes, the SWAT Error Index is a totally new idea introduced for first time in the region. Since there is no available measured ET, the idea was to use MOD16 with the objective of showing how SEI works. A second test was done in the Ribb catchment and it is shown in this corrected version of the paper. However the results of the ET are still not very good. Since it is very possible that MOD16 is very good in another watershed in the world, it could be good to make another test. However I left this part as further research, improvements and corrections that should be done to this index.

-For the water balance components, more literature review was done and the results from Mengistu (2012) were added to table 1. Although these values were not exactly

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taken as basis for our models, they did help to obtain approximate values.

-Yes, most of the stations are located in the eastern part of the UBNRB, but unfortunately it was not possible to obtain more data, although it might be possible that a few stations for the western region exist.

-Yes, the SEI values between the ground and the integrated dataset are very similar, but the improvement provided by the integrated dataset can be shown on their NS values. The current problem with SEI is that the low NS values provided by a dataset (due to the flow discharge overestimation) is compensated by its better NS (due to a better match with the ET-which is underestimated-). Therefore the second test in the Ribb catchment was aiming to have a better test, and indeed, it did provide a better SEI, however it should be tested in another region where the MOD16 ET is good, but we couldn't find a good sub-catchment in the UBNRB. Therefore further tests should be performed in other watersheds in the world.

-p and r-factors from SUFI2 were included in table 4.

-The conclusion were modified and more recommendations on further studies were given.

-The SWAT models for the UBNRB were again run and the water components values and statistical values of the tables were updated.

-Names of tables and figures were corrected and a vertical axes was added to all the graphs.

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