

Interactive comment on “Influence of downscaling methods in projecting climate change impact on hydrological extremes of upper Blue Nile basin” by M. T. Taye and P. Willems

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p 7859 line 2: spell out SST

Response: SST refers to Sea Surface Temperature. This will be included in the revised version

p 7860 last line: “Such approach” what exactly is it?

Response: “Such approach” refers to the applying and comparing of more than one downscaling method in the papers that are referenced. This will be more clearly stated in the revised version

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P 7861 last paragraph: authors emphasized that the study investigated the entire upper Blue Nile. Then the results should be discussed with respect to previous studies that had smaller scope and mentioned in the paragraph. What is the value of doing for the entire basin compared to those for a smaller part? It could be discussed in Section 7.

Response: The value of studying the entire basin compared to the smaller catchments is mainly related to the river's importance to large scale water engineering designs that are planned to undertake in the basin and also because such study provides information for the downstream countries that depend on the same river. This will be added to the Section 7.

P 7862 line 11: rainfall ranging between 800 and 2200 mm specify the time frame.

Response: The period is 1961-2003; this will be included in the revised version

Section 2.2 Observed data: authors used inverse distance weighting for interpolation, but the study area has complex topography. Is it a good choice for such a condition? Also, how much is the evaporation different between Hargreaves and PM methods? A strong correlation is not enough.

Response: It's true that the basin has complex topography. When the interpolation was conducted to estimate missing rainfall records, we made sure to only consider the neighboring stations for each series instead of using all available stations within the basin. This minimizes the effect of the complex topography.

On average for the period 1981-2000 the ETo estimation by Hargreaves method gives overestimation of about 2.8% compared to ETo estimation by FAO PM method. The annual average for the same period is 1480mm (PM) and 1520mm (Hargreaves). We considered this difference to have a minimum effect on the flow simulations. We will include this additional information to the revised version.

P 7863 line 14: describe and spell out SRES P 7865

Response: SRES refers to Special Report on Emission Scenarios. This will be in-

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cluded and explained in the revised version

lines 12-15: the sentence is too long and complex, and grammatically weird. There are several cases throughout the manuscript.

Response: We agree that this sentence needs revision. This and the other complex sentences will be corrected in the revised version

P 7866 line 16: when wet days were added to the observed series, what rainfall values were given?

Response: When wet days were added to the observed series, the threshold value that was used to define a wet day is added. Then based on the perturbation factors obtained from the control and scenario series this value will be adjusted. This information will be included in the revised version

Table 2: the result is based on the QPM method changing wet/dry days?

Response: Yes the results in all the tables are based on the QPM method changing wet/dry days

Section 6.1: please show the calibration/validation results

Response: The calibration/validation plots and NSE results will be included in the revised version

Section 6.2: it seems a table should be referenced here.

Response: We agree table 6 was supposed to be referenced. It will be corrected in the revised version

"Technical corrections" p 7866 line 16: step 4?

Response: When wet days were added to the observed series, the threshold value that was used to define a wet day is added, this step is only to change a dry day to wet day. Afterwards, the perturbation factors obtained from the control and scenario runs

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of the GCMs were applied to the values. This information will be included in the revised version

Tables 2-6: are the numbers in front of the GCM names necessary?

Response: The numbers are not necessary; they will be removed in the revised version

Fig 3: please use signs different enough on black and white printing for each series.

Response: This figure will be updated in the revised version

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