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Interactive comment on "Are we using the right fuel to drive hydrological models? A climate impact study in the Upper Blue Nile" *by* Stefan Liersch et al.

Anonymous Referee #1

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This is a well-written and well-structured paper analysing the impacts of climate change on the streamflow of the Blue Nile at Diem from recent global and regional climate model simulations. While doing so, the authors attempt to examine the performance of bias-correction and its impact on the hydrological simulations.

There are two relatively weak points in the paper that require the attention of the authors" 1. There is no analysis of how evapotranspiration (ET) is handled by the hydrological model and how is it impacted by climate change. ET represents 70-80% of the water balance of the UBN and it deserves some discussion and assessment. It may also explain some of the differences between the generally positive trend shown in this paper and the more negative trends shown by others (e.g. Elshamy et al., 2009 and

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Beyenne et al., 2010) especially for the 2080s period. 2. The use of a non-standard metric to evaluate the suitability of climate simulations (defined as R^2) is confusing. When introducing a new metric, some discussion of its range and suitability for the purpose should follow and, in particular, why is it preferred to other know metrics such as NSE (which is also used in the paper for calibration and validation) or the direct use of the coefficient of determination as a measure of correlation.

Another general comment is to make Tables and Figures self-explanatory by addition of notes that usually in the text under these as comments/notes. Some examples are given in the annotated supplement attached. Other typos, comments, and suggestions are to be found in the attached supplement. There is one additional reference suggested as (Elshamy et al. 2013) with details given below. There are also some recent RCM studies of the Nile Basin conducted by DHI-UKMet for the Nile Basin Initiative (NBI) that could be of value to the authors - It is a UNEP project called "Adapting to climate change induced water stress in the Nile River Basin". Unfortunately, I could not locate the online version of the report on UNEP website but the contributors recently published this conference paper (https://www.researchgate.net/publication/309224099_A_regional_approach_to_climate_adaptation_in_the_Nile_Basin) which may guide the authors on the study.

References: Elshamy, M., Baldassarre, G.D. and Griensven, A.v. (2013) Characterizing Climate Model Uncertainty Using an Informal Bayesian Framework: Application to the River Nile. Journal of Hydrologic Engineering 18(5), 582-589.

Please also note the supplement to this comment:
http://www.hydrol-earth-syst-sci-discuss.net/hess-2016-422/hess-2016-422-RC1-supplement.pdf

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