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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Modelling the water balance of Lake Victoria (East Africa), part 2: future projections" *by* Inne Vanderkelen et al.

Anonymous Referee #2

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General comments:

The paper presents an interesting study, very relevant from the point of view of future management of the Lake Victoria system. Messages of relevance are formulated in the paper. However, it is relatively difficult to discover these messages, as the paper unnecessarily focuses on the process of arriving at them rather than on the messages themselves. The focus on the process is not really justified, as no new approaches are used, nor methodologies are developed. The value of the paper is in the messages, description of methodology is necessary only to the extent that makes the messages defensible.

There is an important consequence to the above. It is well known that GCMs and RCMs have biases. The purpose of the paper is not to evaluate performance of a set of RCMs

in the Victoria Lake Basin, but to assess impacts of future climate on Lake Victoria's water balance. A large section of the paper, however, deals with RCM biases and evaluation of RCM performance in LVB. In my opinion, that section should be presented only if the results of evaluation were used to select a subset of models/simulations to be used in further analyses.

Bias correction based on 12 years of data is not appropriate, unless the authors are able to show that in the studied region decadal and multidecadal variability is very low.

The reason to consider the four outflow scenarios should be described better. They are not compatible with each other in that they represent totally different management approaches rather than a quantitative modification of a particular approach. It would make sense to present them if the authors were targeting a question of most efficient or effective or robust management approach under changing climate. But they are not. The justification of using the four is actually very weak and conceptually incorrect. The fact that in the past Agreed Curve was not adhered to does not mean that the other three are preferred alternatives.

Specific comments: 1)PERSIANN rainfall, and COSMO-CLM are hardly what one would understand as "observations". Aren't there "real" observational data available? Rain gauges? Met stations? if not - then why these products were chosen? why not CHIRPS? or TRMM/GPM?

2) there is no need to show the HIRHAM discrepancy in the appendix. It's enough if it is stated clearly in the text. 3) what is the outer polygon in Figure 1? NB. a study area map showing the lake, main rivers, catchment and location of dams would be beneficial. 4) fig 6: in the caption, climate change signal is described as a difference between historical and future. In such a case, is change with positive sign an increase into the future? or a decrease into the future? 5) fig 6 and fig 7 show essentially the same information. Only fig 7 could be used. Bias correction could change signal, but only under very specific conditions. Also, showing 95% confidence interval would help

assessing the strength of signal. 6) Changes in precipitation and evaporation should be expressed as a percent (relative change), not as a difference (absolute change). Change expressed as difference in a situation of strong biases (offsets) may result in obtaining negative values when that change is compared to observations. 7) Table 1 is not necessary, and values of coefficient "a" shown in it seem unrealistic. If model has shown no bias, value of a would be 0. Table 1 has values in the order of 10000000. 8) what is Pm in eq. 3? 9) pg. 13, line 11: uncertainties as represented by the spread of the analysed ensemble do not result just from model deficiencies, but are also due to initial condition uncertainty.

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