

## ***Interactive comment on “Simulated Hydrologic Response to Projected Changes in Precipitation and Temperature in the Congo River Basin” by N. Aloysius and J. Saiers***

**Anonymous Referee #1**

Received and published: 4 May 2016

This manuscript aims to elucidate the spatiotemporal variability of runoff under the climate changes in the Congo River Basin, where long-term data are currently unavailable. Output of 25 global climate models (GCMs) for two representative concentration pathways (RCPs), combined with downscaling method, are used as input of Soil Water Assessment Tool (SWAT) model. This paper is a valuable contribution to existing literature and also suitable for the HESS scope. However, the resolutions of the topography, precipitation, temperature, land use and soil data used for the modelling with SWAT are not clear in current manuscript. A detailed description of the basin in its current stage (land use, climatic conditions, soil, topography etc.) is needed. The bias-corrected precipitation is slightly over-estimated by the statistical

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method proposed by Li et al. (2010), what about the bias- temperature? Why have these two RCP scenarios (RCP 8.5 and RCP 4.5) been selected? Why not including the other two RCP scenarios as well (RCP 2.6 and RCP 6.0)? The language could be polished in various places in order to facilitate understanding.

Specific comments

Page2 Line 25: “with the projected decrease” should be “with the projected decrease in accessible runoff”??

Page3 Line41: “due the region’s heavy...” should be “due to the region’s heavy...”

Page6 Line92: “~41,000km<sup>3</sup>/s” should be “~41,000m<sup>3</sup>/s”

Page6 Line96: “a strong dry and wat seasons” or “a strong dry and wet season”? Please check it.

Page8 Line 135: “The Curve Number and ... to predict the first two”. This is not clear.

Page8 Line136-137: “A power law relationship is employed to simulate to the lake area-volume-discharge”. Reference?

Page9 Line164: “W m<sup>-2</sup>”; “m<sup>3</sup>/s” should be used by negative exponents. Units should be displayed using exponential formatting.

Page11 Line190: “1,450 mm/year” should be “1,450 mm”

Page11 Line194: The linear-regression slope (1.16) should be illustrated in Figure 2.

Page11 Line195: “show that” should be “shows that”

Page11 Line197: “and within the four regions identified in Figure 1 (SI Table S3)”. I could not draw the conclusion from SI Table S3.

Page11 Line204-205: “Seventeen of the 30 gages show NSE greater than or equal to 0.5” This sentence is not clear.

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Page12 Line212: "indicating the hydrology model's skill in simulating runoff satisfactorily over a wide range in watershed areas". ?? This sentence is not clear.

Page13 Line239: "vary" should be "varies"

Page13 Line243: delete ", with indications of spatial patterns"

Page14 Line249-250: "Most GCMs (>15) predict ... in the SE". I could not draw the conclusion from all figures in the manuscript and the supplemental material. A figure showing the percentage agreement in the increase runoff at each unit would be helpful. The percentage of ensemble members that agree on the sign of change for projected change in runoff could be calculated.

Page14 Line267: "Although northern and equatorial CRB" should be "Although the northern and equatorial CRB"

Page15 Line274: "The variability is larger NC and SE ... during the rainy seasons." This sentence is not clear.

Page15 Line278: "in SE" should be "in the SE"

Page15 Line282: "most part of EQ" should be "most part of the EQ"

Page15 Line287: "produce compatible ... and provide their ..." should be "produces compatible ... and provides their ..."

Page17 Line316-317: "Figure 8 also shows moderate increase in the SW to decrease or no-change in the SE during the rainy season (DJF)." should be "Figure 8 also shows moderate increase in the SW and decrease or no-change in the SE during the rainy season (DJF)."

Page18 Line349: "reveal" should be "reveals"

Page21 Line393: ";" should be ";

Page21 Line394-395: "... of Historical and Future Simulations of Precipitation and

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Temperature in Central Africa from CMIP5 Climate Models". The initial letters should be lowercase.

Page21 Line400: "GLC2000: a" should be "GLC2000: A"

Page21 Line405: "World agriculture: towards 2015/2030: an FAO perspective" should be "World agriculture: Towards 2015/2030: An FAO perspective"

Page22 Line430: "Giorgetta, M. A., et al." Please add all authors.

Page22 Line441: "cycle: mechanisms ..." should be "cycle: Mechanisms ..."

Page22 Line452: "Nature Clim. Change" Please do not use the abbreviation of the journal.

Page23 Line461-464: The initial letters of the paper title should be lowercase. And please do not use the abbreviation of the journal.

Page23 Line469; Page24 Line501; Page25 Line549 and Line 558: Please do not use the abbreviation of the journal.

Page23 Line477-478: "Climate Change Projections in CESM1(CAM5) Compared to CCSM4" should be "Climate change projections in CESM1(CAM5) compared to CCSM4"

Page23 Line479: "life: a" should be "life: A"

Page23 Line482; Page24 Line503 and Line508; Page25 Line550 and Line558: "et al." Please add all authors.

Page24 Line496: "The Seasonal Evolution of the Atmospheric Circulation over West Africa and Equatorial Africa" should be "The seasonal evolution of the atmospheric circulation over west Africa and equatorial Africa"

Page24 Line508: "The Global Land Data Assimilation System" should be "The global land data assimilation system"

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Page24 Line519: "scheme: linking" should be "scheme: Linking"

Page24 Line521: "Hydrological Cycles over the Congo and Upper Blue Nile Basins: Evaluation of General Circulation Model Simulations and Reanalysis Products" should be "Hydrological cycles over the Congo and Upper Blue Nile Basins: Evaluation of general circulation model simulations and reanalysis products"

Page25 Line550: "model: description" should be "model: Description"

Page25 Line556: "climatology: can" should be "climatology: Can"

Page25 Line 559-560: The initial letters of the paper title should be lowercase except the first word.

Page30 Line582: "water yield" is the same as "runoff"??

Page30 Line585: "show" should be "shows"

Page37 Line606 and Page40 Line624: "Figure 1A" don't exist. Please check it.

Page38: What the unit of Figure 8 is??

Some specific comments in the supplemental material

Page1 Line11: "H Lehner et al." should be "Lehner"

Page1 Line17; Page9 Line77; Page10 Line84; Page14 Line100; Page15 Line104; Page17 Line109; Page19 Line119 and 121: "Figure 1A" don't exist. Please check it.

Page9 Line76; Page10 Line83; Page11 Line89: "projected" should be "Projected"

Page13: What the unit of Figure S1 is??

Page16 Line104: "(D) Sep-Oct-Nov)." should be "(D) Sep-Oct-Nov."

Page18: The legend in each sub-figure could be deleted.

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Page19 Line119: "accessible" should be "Accessible"

Page21 Line128: "GLC2000: a new" should be "GLC2000: A new"

Page21 Line 141: The initial letters of the paper title should be lowercase except the first word.

Page21 Line149: "et al." Please add all authors.

Page21 Line153-154: The initial letters of the paper title should be lowercase. And please do not use the abbreviation of the journal.

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/hess-2016-152/hess-2016-152-RC1-supplement.pdf>

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., doi:10.5194/hess-2016-152, 2016.

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