

## ***Interactive comment on “Projected Climate Change Impacts on Future Streamflow of the Yarlung Tsangpo-Brahmaputra River” by Ran Xu et al.***

### **Anonymous Referee #1**

Received and published: 12 June 2018

**General Comments** The work displays a clear and replicable framework to assess variations in streamflows under the potential effect of climate changes. In this regard, the uncertainties associated to different elements of simulation chains (climate models, bias correction approaches) are properly taken into account. Finally, the findings are compared with those retrievable on the same area in an effective way. Nevertheless, some details should be clarified as reported in specific comments to permit the publication. In my opinion, they may contribute to define in clear way all the benefits and constraints associated to adopted framework and in which ways it could be improved.

**Specific Comments:** L42: at the moment, several models provide data up to 12 km

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(e.g. EURO-CORDEX); please add details about them

L49: please prefer “weather” to “climatic”

L58: please mention also several works in which constraints and weaknesses of Bias Correction approaches are clearly stressed (e.g. Ehret et al., 2012)

Ehret, U., Zehe, E., Wulfmeyer, V., Warrach-Sagi, K., and Liebert, J.: HESS Opinions "Should we apply bias correction to global and regional climate model data?", Hydrol. Earth Syst. Sci., 16, 3391-3404, <https://doi.org/10.5194/hess-16-3391-2012>, 2012.

Figure 1: please another colour for the borders

L108: I suggest you introducing in this context Figure 3 where observed monthly data are displayed

L111: please report the resolution of the dataset also in the text and not only in Table 1

L115: please report brief notes about how calculating PET

L119: do you consider snow cover as an input data for the modelling?

L120: are you sure that land use is not strongly changed moving from reference period (1980-2001) to the period used for inputs?

L135: please refer to RCP as “concentration” and not “emission” scenarios

L137: why do you use 16 years for the future? According WMO indications, 30 years should be the standard to properly taken into account interannual variability. Moreover, on the reference current period 20 years are used

L141-145: the climate simulation chains are the only available under CORDEX initiative on the area of interest? What is the domain?

Equation (1): how PET<sub>0</sub> is computed?

L163: brief details about the approach should be included for Hock (2003)

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L176: please add references about the method for Bias Correction? Are they able to maintain the climate signal as provided by raw climate simulations?

L188: in which way, are they weighted?

Table 3: the soil in unsaturated and saturated zones is the same or does it have only the same saturated hydraulic conductivity? Why soils characterized by very different porosities have the same hydraulic conductivities? Why do you assume that water table has fixed depth? Which literature method do you use for assessing infiltration and exfiltration capacities?

Figure 3: according your view, why the findings after bias correction are not so good in several months for RCM5? JBCt approach returns in some cases poor performances (worse than the raw climate modelling chains). Given the relevance of precipitation in hydrological modelling, do you consider that it could affect in relevant way the analysis?

Figure 5 (a-b): in terms of peaks, the analysis is not able to properly reproduce them; in my view, it is due to use of gridded datasets at low resolution; what is your opinion? Are there some weaknesses in parameterizations for hydrological modelling inducing them?

Figure 5 (c-d) are missing

L287: please prefer "weather" to "meteorological"

Figure 6: you should report also results by using WFD as input data for hydrological modelling; indeed, they represent your reference data to understand in which way climate simulation chains can affect the proper reproduction of observed patterns

Figure 8: for precipitation percentage anomaly could be added to have higher information content; moreover anomalies detected by raw climate simulations should be included; indeed maintaining the signal provided by them represent a key issue when adopting bias correction approaches (the same also for temperature in Figure 9)

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Table 6: probably, as in many cases, raw data have performances comparable to BC ones; could they be included in BMA according your view?

L304: it should be stressed the most significant variations among scenarios are expected in the end of the century while you consider medium time horizon

L312: please use "projections" and not "predictions"

L341-342: please add details on these issue (how snow and glacier melting processes can affect the processes

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2018-251>, 2018.

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