

Interactive comment on “Comparing bias correction methods in downscaling meteorological variables for hydrologic impact study in an arid area in China” by G. H. Fang et al.

Anonymous Referee #1

Received and published: 8 December 2014

This paper presents the performances of the most widely used bias-correction methods in correcting raw RCM outputs in hydrologic impact assessment. This is a good paper, which is conducted in the Kaidu River Basin, an important headwater of the largest inland river - Tarim River in China. It is an interesting application and the results are important. Two different kinds of indices (frequency based indices and time series based indices) are introduced and applied to meteorological variables and simulated streamflow. The main finding of the paper is that precipitation correction methods have more significant influence than temperature on streamflow simulation, with PT and QM perform equally best for frequency based indices while LOCI performs best for time

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series based indices.

General comments: The paper is generally well structured and written, and it firmly demonstrates the performances of bias correction methods in correcting temperature, precipitation and the resulting streamflow. The questions driving are interesting. Further, it is instructive to conduct the sensitivity analysis (Sobol') on meteorological inputs in impact assessment of climate change.

I have, as follows, several specific comments, most of which are for presentation. Hope it improves part of the manuscript.

Specific comments: 1. Since the raw RCM simulation is greatly biased, it is necessary to give some explanation on the data reliability. 2. P12666 Line 16: what do you mean by "bias correction methods were conducted on a monthly basis", since the inputs required for SWAT is normally daily climate data. 3. Table 6 could be improved if you provide the MAE (mean absolute error) or RMSE value, so the readers could quickly acquire the relative errors that are still existed in the corrected meteorological data and can compare with other studies easily. 4. P12663 line 24: The "precipitation falls as rain from May to September", therefore, the hydrological regime is different among seasons. It is advisable to alter Figure 5 and Figure 6 to demonstrate the differences of performances. 5. Present some discussion on the differences of bias-correction method applied in the arid area and humid area. Technical corrections 6. Some expressions should stay consistent throughout the paper, e.g., P12667 line 18 Capital the first letter "Transformation". Also, some items are confusing, e.g., RCM-simulations, RCM outputs, climate variables from the RCMs, RCM output. I think they all indicate the RCM simulated climate variables, why not use one expression?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 11, 12659, 2014.

HESSD

11, C5552–C5553, 2014

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