

Interactive comment on “Precipitation ensembles conforming to natural variations derived from Regional Climate Model using a new bias correction scheme” by K. B. Kim et al.

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Received and published: 9 November 2015

General comment This study presents a new bias correction method for Regional Climate Model precipitation for a specific catchment. The authors argue that a conventional bias correction does not preserve the model variability and instead smoothens any uncertainty to match a single observation set. Their proposed method on the other hand gives the opportunity to maintain up to a point the model variability by restricting it within the natural variability, i.e. the variability obtain from the observations. The study is promising, with interesting results, well written and has a very understandable structure and flow. I suggest that the paper is accepted for publication after moderated

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corrections/additions.

â€” The study is applied in a single catchment since the argument is that the regional model are used in impact studies. However, it is not demonstrated how this bias correction will influence an impact study. I am suggesting that an hydrological application is presented to make the bias correction stronger. â€” A recent published study by Addor N. and Fischer E. M. shows the influence of natural variability on bias characterization in RCM simulations. They show that different methods of estimating natural variability give different measures, depending on the method, season, and time scale of your observation record. This in return will influence the bias correction. I think it will add value to the study if the authors will comment on this and then justify the procedure to generate the natural variability. For example the authors used a resampling of the 30 years by 100000 times using the parameters of the observations but did you use any maximum stopping point? The aforementioned study suggest that also the number of times one that the resampling occurs should be maximized for each case. How was the resampling procedure optimized then?

Specific comments â€” Fig 6a shows the probability density function of daily observed and the 11-member precipitation before any bias correction. From this figure I would say that a bias correction is not necessary. On the other hand, Fig. 9a shows the bias on a monthly scale; how about the bias in a daily scale? Also at page 10267, line 13, it is stated that the goal is to obtain monthly bias corrected precipitation and not daily. Explain why the preference on monthly data, why the correction is done on a daily scale instead of a monthly scale, and it is interesting to see that daily natural variability improves monthly means. Also explain if the by the 11-member precipitation series you mean a mean of the 11 member. â€” Page 10270 line 15: Step 4 is unclear on the “move to the centre” procedure. Please explain briefly how this is done. â€” Improve caption for Fig. 1. The grid box in red represents the entire catchment? â€” Fig.10 is misleading. It is stated that this plot is an example of the use of a one transfer function thus an example of the conventional bias correction. However, Fig. 7b is also

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a result from the conventional bias correction but has totally different behavior. Please explain if I misunderstood. Also maybe add at in the discussion section a paragraph on the actual results you presented and discussing the physical meaning of the proposed bias correction. Addor, N. and Fischer, E.M: The influence of natural variability and interpolation errors on bias correction in RCM simulations. Journal of Geophysical Research, doi: 10.1002/2014JD022824, 2015

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 10261, 2015.

HESD

12, C4750–C4752, 2015

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