Hydrol. Earth Syst. Sci. Discuss., 6, C2232–C2234, 2009
www.hydrol-earth-syst-sci-discuss.net/6/C2232/2009/
© Author(s) 2009. This work is distributed under
the Creative Commons Attribute 3.0 License.

Hydrology and Earth System Sciences Discussions

Interactive comment on "Bias correction of temperature and precipitation data for regional climate model application to the Rhine basin" *by* W. Terink et al.

Anonymous Referee #3

Received and published: 1 October 2009

The paper describes a study that bias corrects the outputs of ERA15 data prior as a preprocessing step prior to the use of the precipitation and temperature fields in the VIC hydrologic model. The paper is well written and addresses an important problem i.e. that the outputs of regional climate models still have significant biases in fields of importance for water resources assessments. However it seems to me that the study is mainly an application of the methodology of Leander and Buishand (2007) applied to a different basin. The authors need to make the contributions of their study much clearer.

I would like to see the performance of the bias correction method on a period for which the parameters were not calibrated e.g. the methodology of Maurer and Hidalgo (2008) who examine the bias correction of NCEP reanalysis by dividing the data period into two and using the latter period to test the model performance. This would provide a more rigorous test of the bias correction.

Specific comments:

The introduction seems to me to have too much information on different types of rainfall-runoff models, particularly given that the hydrologic modelling is not reported in this paper. I think this section should be rewritten and some of the information could be moved to the Models and Data section.

Page 5380 Line 4 – what do you mean by "skill scores" here – do you have a particular metric in mind when assessing model skill under current climate? If not I suggest rewording to remove the word "scores".

Page 5382 lines 6 to 12 It is unclear what the impact of bias correcting some variables while leaving other variables uncorrected would be. It would be good if the authors could comment on this as it would seem for example that humidity, temperature and precipitation are related and if there are biases in precipitation and temperature then surely there would also be biases in humidity. Maybe the authors can provide some suggestions on how this might be addressed in the future.

Section 4.2 – have the authors considered spatial correlations in the bias correction?

Section 4.3 – why is the power law correction not appropriate to use for the temperature bias correction? I can see why the method that you have used for the temperatures may lead to negative values for precipitation, but wonder why the power law method does not work for temperature. Is it because the temperatures are closer to a normal distribution – if so this could be explained in this section.

Section 5 – as mentioned above, I would be interested to see the results discussed

HESSD

6, C2232–C2234, 2009

in section 5 for a time period different from that used for calculating the correction parameters.

Section 5.3.2 – I think that this section needs to be rewritten to make it clearer to the reader what the purpose is. Figure 8 doesn't really answer the questions that you pose before mentioning the figure so it seems to be a bit confusing to the reader. Then when I read further on I realised what you were trying to achieve with Figure 8 but it seems to me that subbasin 1 is not very representative of the other basins since the "a" value is much larger than "b" wheres for most basins this is the other way around. I feel that your conclusion that most of the uncertainty is in the 'a' parameter needs to be checked against more sub-basins or all of them ideally to strengthen it.

There are a lot of figures in the manuscript. Maybe some of them can be combined or deleted – e.g. do you really need both figure 4 and figure 5? And Figure 6 and 7 could be combined as a multi-panel plot.

The conclusion and discussion section is quite long. I would suggest separating some of the discussion into the previous section and including a succinct conclusion summarising the main findings and future work.

References

MAURER, E. P. & HIDALGO, H. G. (2008) Utility of daily vs. monthly large-scale climate data: an intercomparison of two statistical downscaling methods. Hydrol. Earth Syst. Sci., 12, 551.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 5377, 2009.