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Hydrology and Earth System Sciences Discussions

Interactive comment on "Assessing climate change impacts on daily streamflow in California: the utility of daily large-scale climate data" *by* E. P. Maurer et al.

Anonymous Referee #1

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Summary

The paper describes a new downscaling/bias-correction method that uses daily large scale GCM data instead of monthly GCM data. The method is a combination of the existing downscaling and bias-correction methods BCSD and CA (Maurer and Hidalgo, 2008). NCEP/NCAR reanalysis data is used as surrogate for GCM data. The downscaling methods are applied to a catchment in California. The downscaled datasets are used to drive the hydrological model VIC and results are compared with results of a VIC run based on meteorological observations. Results show the added value of the new BCCA method.

Overall comment

The relevance of this study is very clearly described in the introduction. The study is a follow up of a previous studies of Maurer and Hidalgo and it can't be read without Maurer and Hidalgo (2008). The result is a compact description of a study that provides new results of interest for HESS in the scope of hydrological climate impact studies.

I feel the following points still need to be addressed:

1. In the introduction it is stated that the BCSD method works under the assumption that climatological intra-monthly variability does not change, while in reality it does change. In the evaluation of the different methods the focus is on low-flow, peak-flow and change in regime. But how well is the inter-annual and inter-monthly variability reproduced by the different methods. Might this be another criteria to confirm that the BCCA method outperforms the other methods?

2. page 1220, line 14-15: "the constructed analogues are than developed on absolute values". Although the CA method is clearly described in the cited paper (Maurer and Hidalgo, 2008), it would be helpful to give a short explanation of this step to make the BCCA method better understandable.

3. In the CA part of the BCCA method a relation is made to large-scale predictors. Are predictant values of a single day related to predictor values of the same day, or has a period of multiple days been considered? One could expect that the value of the predictor influences the predictant value a few days ahead. Is it more important to take into account multiple time-steps when working with day-values instead of month values?

4. In section 3.2, page 1224, line 20 the suggestion is made that the difficulty in matching low flows is related to bias in the large-scale reanalysis. Does the author have any idea which variables this concerns and why these biases are not accommodated by both methods?

Minor comments:

5. Table 1. It would be interesting to see the elevation of the gauges to get an impression of snow influence, otherwise use a map that shows the elevations in Fig. 1.

6. page 1211, line 17, typo: should read ‘the downscaling procedure is’

7. page1214, line 21, typo: should read: ‘In addition, the data’

8. page 1215, line 9, typo: should read ‘comparable to recent GMCs’

9. page 1216, line 3, typo: should read ‘there are also changes’

10. page 1216, line 23: patterns iso patters

11. page 1218, line 1: should read ‘large scale skill is well established’

12. page 1222, line 24: is this correct “4.5 6oC” ?

13. Fig. 7 and 9: Please repeat legends in figure and skip links to Fig. 7 in Fig. 9.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 7, 1209, 2010.