Hydrol. Earth Syst. Sci. Discuss., 10, C1155–C1159, 2013
www.hydrol-earth-syst-sci-discuss.net/10/C1155/2013/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Errors in climate model daily precipitation and temperature output: time invariance and implications for bias correction" *by* E. P. Maurer et al.

E. P. Maurer et al.

emaurer@engr.scu.edu

Received and published: 27 April 2013

We are grateful to the two reviewers for their careful reading and thoughtful comments on this manuscript. Our responses to their comments are included below.

Reviewer 1:

We appreciate the encouraging comments on the potential utility of the approach and findings. We are looking forward to expanding this analysis with newer, more extensive datasets.

Reviewer 2:

The major concern expressed here, that the relatively small 25-year pool of years from which base sets are drawn produces less independent sets as the base set length increases, is a very good point. While extended gridded daily observational data sets are still in review/production (reference will be made in the revised manuscript to the new Livneh et al. daily data set, which extends back to 1915 for the conterminous U.S.), and limited CMIP3 daily data are archived for an extended period, we do perform additional analysis to explore this concern.

To test the extent to which this concern might affect the results presented in the manuscript, we did the following: For the GCMs included in the study, 2 of them (GFDL, PCM) had daily historical precipitation, maximum and minimum temperature data archived at the PCMDI for 1915-1999, which we obtained. We aggregated the Livneh et al. precipitation, maximum and minimum temperature data to a 2-degree spatial resolution for the 2 grid cells featured in Figures 9 and 10 in the manuscript. This means the pool of years from which the base set is drawn includes 42 years. We conducted the same analysis as with the original data, to produce two additional plots, shown below.

Figure 11 shows similar results to Figure 9 for Tmax; Tmin and Pr are similar for the GFDL model, but appear worse for PCM. Base set lengths above about 12 years, as with Figure 9, appear to provide limited additional benefit in characterizing bias. Figure 12 is very similar to Figure 10 for both GCMs and all 3 variables, both in the magnitude of the R values and the rate of decline in mean R value as the base set length increases. While limited in extent, this comparison between time invariance of biases using a shorter and an extended base data set suggests that the analysis appears relatively robust with regard to the finding that base set lengths longer than about 12 years provide small marginal benefit.

These two additional figures and interpretation will be added to the revised manuscript,

HESSD

10, C1155–C1159, 2013

as this is an important extension to the effort.

We agree with both reviewers that a new analysis using CMIP5 GCM output and the new extended observational data set (once officially released) will be very interesting and useful. We are in the process of outlining that effort now and look forward to applying this framework to the new GCM output.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 1657, 2013.

HESSD
10, C1155–C1159, 2013

Interactive Comment

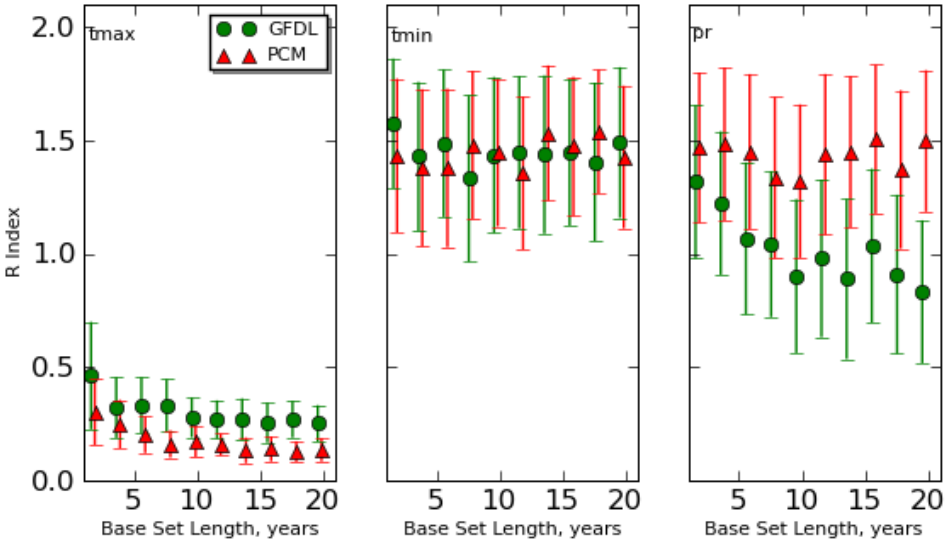

Fig. 1. (Figure 11 in revised paper) - Similar to Figure 9, but using the 1915-1999 extended observational data set and extended historical GCM output

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

HESSD
10, C1155–C1159, 2013

Interactive Comment

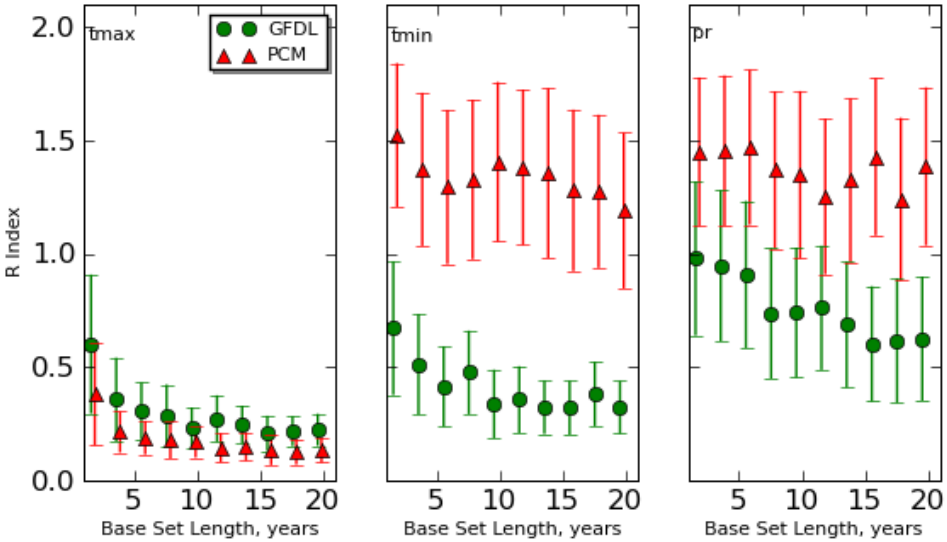

Fig. 2. (Figure 12 in revised paper) - Similar to Figure 10, but using the 1915-1999 extended observational data set and extended historical GCM output.

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper