

## ***Interactive comment on “A trend-preserving bias correction – the ISI-MIP approach” by S. Hempel et al.***

### **Anonymous Referee #1**

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I have enjoyed reading this article. It proposes to solve the trend preserving problems which affected old bias correction methodologies (for example the one presented in Piani et al 2010). The authors succeed quite well in this. I find that the new methodology is clearly presented in the paper, though I would specify early on that the authors are referring to the trend in ‘absolute’ values of temperature but ‘relative’ values of precipitation.

My only comment is that the authors do not seem to cross-validate. When comparing the performance of bias correction methodologies, it makes little sense to compare observations and corrected GCM output in the reference (or calibration) period. In the reference period the corrections work by construction and positive results are trivial. Surely the authors are aware of this. To validate a new bias correction scheme the

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authors should calculate the bias correction parameters with one part (time period) of the observations (WFD) and correct the simulation of another time period which can then be compared with the relevant observations. How else do they know the scheme works?

I certainly expect the scheme to work, since it is a straight forward improvement on Piani et al. 2010 and Haerter et al. 2011, but performance comparisons in the reference period are of little meaning. Consequently I find this paper acceptable after major revisions and I ask the authors to either conduct a proper cross-validation, using two separate time sections of the WFD, or remove claims in their paper regarding performance. As I said, I certainly expect the new method to perform well in a proper cross-validation setting and I hope the authors will chose to do this.

I also have one minor comment regarding the references. The authors refer to Piani et al. 2010 but the paper listed in the references is the wrong Piani et al. 2010. The proper reference is:

Piani, C., GP Weedon, M Best, SM Gomes, P Viterbo, S Hagemann, JO Haerter, Statistical bias correction of global simulated daily precipitation and temperature for the application of hydrological models. *Journal of Hydrology* 395 (3), 199-215, 2010.

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