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Discussions
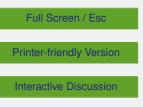
Interactive
Comment

Interactive comment on "Indirect downscaling of global circulation model data based on atmospheric circulation and temperature for projections of future precipitation in hourly resolution" *by* F. Beck and A. Bárdossy

Anonymous Referee #1

Received and published: 26 August 2013

General comments

The topic of the paper is interesting since the direct estimation of future precipitation with GCMs is still difficult. The paper is promising but unclear at this stage. Indeed, data and methods are not clearly presented and results are not enough explained for me. Moreover, to my mind, some crucial points are not fully developed ate this stage. I would appreciate some important revisions to make the paper clear for publication. Please find my comments below:

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Major comments

. Why using NCEP data instead of the new ERA-interim dataset extended back to 1987 that offer a better resolution. Is there a reason of preferring NCEP dataset?

. CPs are extracted on the 1960-2003 period and the validation with rainfall is made on the 1991-2003 period. To my mind, results would be more robust if you compute the CP only on the 1991-2003 period. Otherwise, you might show that CPs are similar if you consider 1960-2003 and 1991-2003 (but It's not sure).

. I don't really understand if you compute CPs on the whole year and then consider the summer and winter or if you compute CP separately for winter and for summer. This is very important because circulations patterns are seasonally different and it's usually better to compute CP separately for winter and for summer.

. Why using temperature for subdivision? Is there a physical reason? Could you explain why? Moreover, what is the added value of a subdivision with temperature? It would be nice to compare results with CP derived from SLP only and then show the added value of the subdivision with temperature.

. Why considering 12 CPs, is there a physical or a statistical reason?

. Using only one GCM and/or one run for future is not very robust. E.g. many other GCMs and runs are available (for free) in CMIP5. To my mind, it could be nice to use other GCMs (I know that it means a lot of extra work and computation but it could really improve the paper).

. Did you validate the spatial structure of the CP extracted from ECHAM? It would be interesting to show the spatial structure of the CPs computed with ECHAM in order to validate if the GCM is able to well reproduce the CPs you computed with NCEP.

. At the end, It's a bit strange because you show that trends is CPs frequency are not well simulated by ECHAM on the 1960-2003 period. If the model is not able to simulate observed trends, it's not possible to use the model to analyze and discuss future trends,

right? Once again, using several models or an ensemble mean could make the result more robust and could also change the result. I don't know how to express it clearly but I don't really understand what is the aim of analyzing and discussing the future if the model is not really able to simulate the present.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 8841, 2013.