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Climate of the Past Discussions

Interactive comment on "Correcting mean and extremes in monthly precipitation from 8 regional climate models over Europe" *by* B. Kurnik et al.

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Reply to the comments of the referee 1

Answer to general comments

The referee (C. M. Goodess) prepared extensive comments which are essential for enhancing the paper prior potential publishing in the CP. In this reply we will address these comments in the most detailed way.

At the end of second paragraph referee states the paper is likely to be of limited interest because it focuses only on monthly precipitation. The main motivations of the paper (as presented in introduction) are; bias corrected precipitation fields are made for potential use as an input to drought studies (e.g SPI). In order to update the paper with recent

literature we will add also finding from recently available papers (like Dosio and Paruolo 2011, and Rojas et al 2011). In addition the suggested literature will be used in the potential update and introduction will be enhanced with IPCC SREX findings and in the discussion part we will include additional text concerning time independency of the biases.

Detailed response:

Referee pointed out the need for clarifying thresholds 200 and 400 mm. As said in the paper the main purpose was to correct unrealistic high values of precipitation produced by selected RCMs. These thresholds were selected in order to capture sufficient number of grid cell with high (extreme) observed precipitation amounts for having statistically significant results. These values could also be slightly different (example 250 and 390 mm) but this would not change the main message. Similarly in the case of zero precipitation RCMs are constantly producing unrealistic daily precipitation – so called drizzles – which are then reflected in monthly precipitations with grids where monthly precipitation amount is much above observed one. Here also, as suggested by referee, would be also appropriated to consider consecutive dry months as proxy for drought persistence. This is valid point and will be included into potentially revised paper.

The high number of figures is supporting the complexity of the problem, since we are correcting dry and wet extremes using 8 RCMs capturing whole Europe. This number can be potentially reduced, since some of the results will be presented in the text and not by figures. Here we need to clarify referee's question about figures 10 to 12. Figures are presenting areal differences between modelled and observed precipitation fulfilling certain criteria. For example in figure 10, corDM1 simulates in average 1.5 % more area in Europe with dry months than is observed and simDM1 simulates 4.5 % differences. In the potentially revised version we will consider to present these findings in relative terms, differences between model and observations relative to observation.

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To questions, why ETH correction in case of extremes fails (Figure 8) in more cases than for other models and why in some regions (Figure 9) correction performs better than in other, we cannot give simple answers, since we did not deeply analysed RCMs. The purpose of this work was to present BC methodology, applied in the same way to 8 RCMs and analysed differences in BC performance. Results show that correction depends from each individual RCM and varies from region to region. We showed that we cannot simply apply the same methodology for all models and regions. The main message (maybe not clearly written in the text) is to the user of the impact models, who is applying the same BC methodology to different RCMs in various regions. We showed, after applying same BC to different RCMs the performance of the correction will vary, depending from RCMs and region. The paper is simplified guidance about using BC of RCMs for simple impact studies, like droughts.

Interactive comment on Clim. Past Discuss., 8, 953, 2012.