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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Can global precipitation datasets benefit the estimation of the area to be cropped in irrigated agriculture?" *by* Alexander Kaune et al.

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We thank the reviewer for taking the time to review the manuscript and for the helpful comments and suggestions. Here we provide answers to the specific comments and indications of how propose to improve the manuscript to address the issues raised by the reviewer.

General comments [Referee] This paper presents a study on the usefulness of two global precipitation datasets (CHIRPS and MSWEP data) and in-situ data for the estimation of surface water availability for cropped area irrigation planning. A hydrological model forced by those datasets simulates river discharges which are then used to es-

timate potential irrigated/cropped areas and their relative utility values. The authors show by period-sampling from the available 30 years data the added value of having an extended data records from global datasets. They conclude that this approach permits better calibration of the hydrological model and hence reduces the spread of the so called pooled relative utility value. The paper is overall well-structured and represents a significant development effort. Nevertheless, I do see few points in the paper that prevent it from reaching its full potential. I therefore recommend publication of this manuscript with minor revision: âĂć Being the main driver of the study, I would recommend developing more the hydro-meteorological data section with extended description/comparison of the two global precipitation datasets including a proven conclusion on their quality over the study area.

Reply: This was also raised by the first reviewer and we developed a more in depth hydro-meteorological data section with extended description and comparison and quality evaluation of the global precipitation datasets. We added an evaluation of the global precipitation datasets as a preliminary step. We compared global precipitation datasets (CHIRPS and MSWEP) against in situ data in the selected basin. We used performance indicators KGE, percentage of bias (Pbias) and Pearson correlation (r). The evaluation was done for multi-annual monthly precipitation for the selected period 1983-2012 (new Figure 4).

Figure 4. KGE, Pbias and r performance metric for monthly CHIRPS and MSWEP precipitation in the Coello basin for 30 years (1983-2012).

KGE results show that MSWEP performs better than CHIRPS from October to May. Only in July, MSWEP performs poorly (KGE=-0.1, Pbias=100%). We cannot discard the use of MSWEP neither of CHIRPS. At this stage, we can recommend the use of each dataset for specific months.

Specific comments [Referee] I see a direct link between the hydrological model parameter (evapotranspiration efficiency) and the reduction in evapotranspiration used in the

FAO water production function (eq 6) I would recommend the authors to try to establish that link or at least to explain it better.

Reply: We agree that these could be considered linked concepts. However, the hydrological model parameter is a parameter used to simulate the surface water availability in the basin. This is used to derive the water availability to the district for irrigation. The reduction in evapotranspiration is used to characterise the crop yield response due to water shortage in the irrigation district. We will add a sentence to the manuscript to comment on the conceptual link, but also underline the difference.

The authors tend to use long sentences, making it sometime hard to follow, I would recommend rephrasing long sentences into few smaller ones (ex in p3 lines1-3).

Reply: We will improve the readability by reducing the length of the sentences and rephrasing where possible/appropriate.

Figure S3: colour scheme should be revised

Reply: We will revise the colour scheme in Figure S3.

Please also note the supplement to this comment:
https://www.hydrol-earth-syst-sci-discuss.net/hess-2018-331/hess-2018-331-AC2-supplement.pdf

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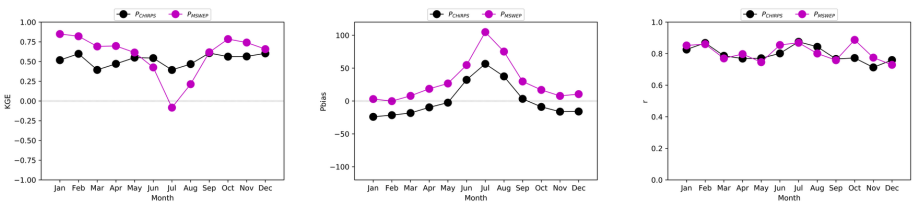

Fig. 1.