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Interactive comment on "Propagation of biases in humidity in the estimation of global irrigational water" *by* Y. Masaki et al.

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In their manuscript "propagation of biases in humidity in the estimation of global irrigational water" the authors addressed the important question how biases in the input data affect the profiles of evapotranspiration and irrigation water abstraction. This is crucial to assess uncertainties in future projections, for example, of irrigation demands. In particular, the study contributes to a better understanding of the sensitivity of different GHM with regard to atmospheric input data.

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Interactive Discussion
Discussion Paper

The manuscript is well structured with multiple subsections. A set of bias corrected outputs from 5 GCM was used to drive a GHM where relative humidity was the only variable that was not bias corrected in advance. In a sensitivity experiment with reasonable artificial bias added to the humidity data the authors estimated the overall uncertainty in irrigational water. Moreover, they showed that even a very basic bias correction of the monthly humidity averages reduces the uncertainty in the GHM output significantly. The scientific methods and assumptions for the uncertainty estimation are clearly outlined and relevant literature was cited. However, I have two comments on the bias correction of humidity:

1) For the bias correction the author selected an additive approach. This is per se valid. It should, however, be noted that the other variables used as input (except for temperature) where corrected with a multiplicative approach. The latter preserves the relative trend in monthly data rather than the absolute one.

2) A general problem of correcting relative humidity is that the values shall be bounded to the interval 0 to 1. Question is how to tried values out of this range. The authors decided to just cut this values. Althogh it is not mentioned explictly, I suppose this means setting values <0% to 0% and thoses >100% to 100%. This is a common precedure, but it should be noted somewhere how often thoses cuts are required (percentage of cutted values relativ to all

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bias corrected values). Moreover, values above 100% are not necessarily unphysical. Supersaturation does to some extend occur in individual GCMs. It should be checked and noted for the 5 GCMs used here how often supersaturation occured already in the not bias corrected data sets.

Interactive comment on Earth Syst. Dynam. Discuss., 6, 81, 2015.