

Interactive comment on “Disinformative data in large-scale hydrological modelling” by A. Kauffeldt et al.

Anonymous Referee #3

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This paper is very interesting, especially for “global” hydrologist. The problem of the representativity of global data used to force or to evaluate large-scale hydrological models is of primary importance. The conclusions of the paper are well balanced.

However, one affirmation of this study is that “basins exhibiting too-high runoff coefficients were abundant in areas where precipitation data were likely affected by snow undercatch” (cf abstract and page 500 lines 5-9). However, WATCH precipitation data takes account for wind-induced precipitation undercatch by applying a correction based on Adam and Lettenmaier (2003). If you are not agree with that, see Weedon et al (2011), the WATCH technical report number 22 (<http://www.eu-watch.org/publications/technical-reports/3> ; Weedon, G.P., Gomes, S., Viterbo, P., Österle, H., Adam, J.C., Bellouin, N., Boucher, O., and Best, M., February 26, 2010)

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or compare original GPCC data to WATCH total precipitation.

If your affirmation is correct, the spatial pattern of runoff coefficient for WATCH precipitation should be improved compared to CRU (Figure 7). In other words, this affirmation must be proved (and discussed) or removed. So, I recommend that the paper could be published in HESS only if this major revision is taken into account.

In global hydrological modeling, the most important source of uncertainty is linked to the quality of the precipitation, especially the good monthly cumulative quantity. Indeed, Fekete et al. (2003) and/or Decharme and Douville (2006) pointed out that the uncertainty in precipitation generally translates to at least the same and typically much greater uncertainty in total runoff (generated by a global model). These “important” studies should be referenced in your introduction.

Page 490 lines 17: this affirmation is not correct: “GHMs typically operate at a spatial resolution of 0.5×0.5 longitude and latitude”. GHM typically operate at 0.5° resolution as well as 1° resolution (many studies during the last 20 years, eg. Alkama et al 2010).

Finally, I am generally ok with remarks of other reviewers.

Publications:

Fekete BM, Vorosmarty CJ, Rodd JO, Willmott CJ (2003), Uncertainties in Precipitation and their impacts on runoff estimates. *J Clim* 17:294–304

Alkama, R; Decharme, B; Douville, H; Becker, M; Cazenave, A; Sheffield, J; Voldoire, A; Tyteca, S; Le Moigne, P, 2010, Global Evaluation of the ISBA–TRIP Continental Hydrological System. Part I: Comparison to GRACE Terrestrial Water Storage Estimates and In Situ River Discharges. *J. Hydrometeorol*, 11 (3): 583–600

Decharme B and Douville H (2006) Uncertainties in the GSWP-2 precipitation forcing and their impacts on regional and global hydrological simulations. *J Clim* 27:695–713