RESPONSE TO REFEREE COMMENT BY ANONYMOUS #3

General comment: "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."

Response: We would like to thank the referee for the positive comments on the manuscript, and appreciate the specific comments that helped us in the revision of the paper.

COMMENT #	*COMMENT AND RESPONSE*
1	"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.euwatch. 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) 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." **Response:** We had overlooked to mention these corrections in the manuscript. This has now been rectified by a better description of the datasets (see also comment #2 by Dr. Yamazaki). The $WATCH_{GPCC}$ precipitation product exhibits the least number of basins with RCs higher than unity, and $WATCH_{CRU}$ performs worse than GPCC in this respect, which can be seen in Figure 7 in the revised version of the paper). Direct comparisons between CRU and $WATCH_{CRU}$ and between $WATCH_{GPCC}$ and GPCC should be avoided since the bias corrections were done using different versions of CRU and GPCC than used in this study. Despite the gauge-measurement corrections applied to the WATCH data, the spatial patterns are similar to CRU and GPCC, with Alaska standing out as a problematic area. We do not agree with the referee that the statement would be undermined by the fact that solid-undercatch corrections have been applied to the WATCH data. Rather, the results are an indication that those corrections might not be sufficient, if the discharge data can be trusted. Even so, the referee pointed out that this important discussion was lacking in the manuscript and we have added it to section 5.2.
2	"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." **Response:** The suggested references examine the effect of precipitation uncertainties on the global scale and we have added them to the introduction.
3	"Page 490 lines 17: this affirmation is not correct: "GHMs typically operate at a spatial resolution of 0.5 x 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)." **Response:** We are aware that there are models working on 1° resolution (one was mentioned in the original manuscript), and especially if one considers land-surface models like GHMs, many operate at a coarser scale. We have therefore relaxed this statement and pointed out that some models work on even coarser scale.

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