Interactive comment on "Assimilation of SMOS soil moisture into a distributed hydrological model and impacts on the water cycle variables over the Ouémé catchment in Benin" *by* D. J. Leroux et al.

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This is an interesting work, illustrating how satellite observation of rainfall and soil moisture can be complementary. However the objective of the work should be better explained and the choice of using only non-adjusted (or RT) satellite rainfall products should be better justified. If the objective of this work is to propose an alternative bias-correction method for RT satellite rainfall than the operationnal advantage of the proposed method should be developped. If the objective is to show how combining information on both rainfall and soil moisture can help a better understanding/modelling of hydrological processes, than the point would be strenghened by adding post-adjusted products (such as 3B42V7) in the study.

-is the SMOS based bias correction potentially available with better delay than what is currently done based on gauges (for instance to correct 3B42RT into 3B42v7) ? what are the current/future perspective on soil moisture monitoring and would the expected sampling allow for using soil moisture based bias correction to be used operationnally ? -One of the tested product (PERSIANN) has been shown by many previous authors (cited in the present paper) to have a large and steady positive bias over the region. Simple method (like pdf matching based on gauges series used by Thiemig et al, among others) can remove such steady bias. What is the quantitative advantage of the SMOS based method compared to such simple methods ? .

If the known/steady bias on rainfall was removed before assimilating soil moisture in the model, couldn't the complementarity between the high resolution rainfall information provided by the satellite products and the soil moisture information be better exploited ?

The improvement of the discharge simulation is very low in the case of TRMM based forcing (because the first order correction, i.e. strong bias removal, is not relevant in this case). In this case, what is the effect of moisture assimilation on other variables (ground water etc...) ; is the space/time distribution of water within the basin improved ? .

I believe this work would be more convincing if the post-adjusted version of TRMM 3B42v7 was also included and the questions above explored.

Note that bias corrected versions of PERSIANN (persiann-CDR) and Cmorph (v1) are also available for the study period and could be easily used in the present study for comparison.