

## ***Interactive comment on “Calibration and evaluation of a semi-distributed watershed model of sub-Saharan Africa using GRACE data” by H. Xie et al.***

### **Anonymous Referee #2**

Received and published: 19 April 2012

#### General Comments

The manuscript presents the calibration and validation of a semi-distributed hydrological model of the Sub-Saharan Africa region, for modeling proposes the region was divided in 10 sub-regions. The area to be model is vast and with limited data availability, authors used global databases and satellite data for the setting up, calibration and validation of the model. Outputs from the model were evaluated with river discharge from the GRDC and total water storage from GRACE. Results indicated that the model was able to reproduce well total water storage in the Sub-Saharan regions

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that have semi-arid and sub-humid climates, being this region's the major crop land intensity regions in Africa. The paper present the use of global satellite data for modeling proposes in areas with scarce data availability, which can be also use in other regions with these problems, like South America. For publication the paper needs minor corrections, at current condition it meet journal scopes, which are related with the study of the spatial and temporal characteristics of the global water resources and related budgets, specifically with global hydrology in this case.

### Specific Comments

1. Page 2073, line 8, authors should revise the last IPCC reports, and update the reference.
2. Page 2074, GRACE has to be explained in more details, have they been use before? Where? For what? Are they being validated? Which is the error comparing with real data?
3. Page 2075, line 24, in the case of the 28 river basins, are some of them also include in this study? Are the results good? I suggest that in the author discuss if the results they got are similar that the one obtained by Werth et al. (2009 and 2010).
4. Page 2075, line 28, which is the typical temporal scale that is use when using GRACE? Is it the same that was use in this research?
5. Page 2076, line 7, include how many rivers/watersheds were modeled.
6. Page 2077, line 11, re-aggregation procedure has to be explained.
7. Page 2078, last paragraph should be put before.
8. Page 2081, line 20, it is not clear how mean of the TWSt over the GRACE data period is obtained. Explain in more detail.
9. Page 2083, line 6, TWSVi ,j,t,SWAT is the same as TWSt?

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10. Page 2083, line 8, explain in more detail how you obtain  $w$ .

11. Page 2084, line 1, multi-year average basis, what does it mean, explain in the paper.

12. Page 2084, line 1, last paragraph, it is not clear how the authors calculate  $w_i$ , this should be explained in more detail in the text.

Technical corrections 1. Page 2084, line 5, there is a comma mixing after size.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 2071, 2012.

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