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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Riparian forest and permanent groundwater: a key coupling for balancing the hillslope water budget in Sudanian West Africa" *by* A. Richard et al.

Anonymous Referee #2

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General comments: The title is acceptable but I feel it could be better as it is a bit clumsy. A possible suggestion: Quantifying the importance of riparian forest transpiration and permanent groundwater in the hillslope hydrology of Sudanian West Africa.

The subject of riparian area water-use is critical and very relevant and I believe this paper could make a useful contribution to our broader thinking if the English were improved and the critical contribution of the paper be made more apparent.

I like the strategy of using the different modelling scenarios to quantify the role of the riparian forest transpiration with root access to the permanent groundwater. However,

many papers have already shown the importance of the riparian area to streamflow. This paper quantifies the riparian forest transpiration in terms of the water balance at this site and reiterates its importance concluding that we need to model the riparian forests and the permanent groundwater in mesoscale hydrological models better. Some of the resulting suggestions are however stretching the limits of your results. For example I don't think the suggestion that an entire slope of forest, when felled would not change the flow regime. These trees on the slope could have roots down to the water table and what about canopy and litter interception? Without having actually modelled this, it is not a good idea to guess.

I found the introduction confusing and I would like to see this restructured so that it is clearer. I found the remaining sections reasonably clear in terms of thought process but a simpler structure would be beneficial. The standard: Intro., methodology, discussion, results would work well for this paper I think.

I am not convinced that narrow strips of riparian forest influence the monsoon dynamics. Supply references showing this or prove it!

I would like some references to other studies that investigate riparian water use and impact on hillslope hydrology and some indication of how your results fit with the results from other studies. This may help you identify what is unique about your particular study.

Unfortunately the English grammar is poor and really detracts from the quality of the paper which is at times difficult to understand because of sentence structure. A thorough revision is required before this paper could be considered for publication. Some notes on the grammar:

The tense is incorrect just about throughout the paper. Most of it should be in past tense as you are describing work which has been done. Where 'is' or 'are' exist, they should in most cases be 'was' or 'were' respectively. You would also say that the data 'showed' and not 'show'.

Some phrases are repeatedly incorrect: Use ‘in contrast’ instead of ‘in the opposite’

Numbers below 10 should be written out in full. Three and not 3.

What do you mean when you say, ‘By construction’? (Page 5661, line 14)

You abbreviate simulated evapotranspiration to ET, but then fail to use the abbreviation most of the time.

There is inconsistency: In figures especially you sometimes have ET0 and other times ET0. P age 5658 lines 7-8. Second section and then sect. 3 and then Section 4.

An example of grammatical corrections can be found in the abstract of the supplement

Hydrological data: I don’t see how the LAS data contributes to the study. In Fig. 2 all you show is a single location for a LAS. Is this the transmitter or receiver? What vegetation does it cover? Is it a valid comparison in Fig. 6?

There is not enough detail about the type of sensors you use and the measurement interval. I would like to get the impression when reading the paper that the authors know what the field measurements were about!

References: Well done. All references in the text were listed but further references of other similar studies should be added.

In Table 3 I would prefer that you show percentages to be 0% rather than a - which indicated not applicable to me.

Fig. 5. Move the box showing which line is measured/observed to near the top of the figure.

Fig. 7. State somewhere that this is simulated.

Fig. 11. What is the vertical exaggeration? I would say just saprolite and not saprolitic soil. It is implied.

Please also note the supplement to this comment:
http://www.hydrol-earth-syst-sci-discuss.net/10/C2240/2013/hessd-10-C2240-2013-supplement.pdf

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 5643, 2013.