

# ***Interactive comment on “Modelling canopy and litter interception in commercial forest plantations in South Africa” by H. H. Bulcock and G. P. W. Jewitt***

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Thank you for the valuable comments!

General comments

The “variable storage Gash model” presented in this paper shows good results for modelling canopy and litter interception. However, I am pretty curious how the original Gash model would have performed, can the authors comment on that?

Response: A comparison between the original Gash model and the variable storage Gash model has been added in the results and discussion section.

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The captions of most of the tables and figures are a bit short and therefore, not always comprehensive without the explanation in the article itself.

Response: The captions have been expanded where applicable.

Finally, for someone who is not working on interception daily, the terms used are a bit confusing. Especially the different terms used for rainfall rate and gross precipitation (see specific comments for examples). Also the differences between stocks and fluxes are not always very clear. Using the same terms for the same processes would make the paper easier to read.

Response: These points have been addressed as suggested in the specific comments.

Specific comments

8295: L7-9: the other symbols are explained in a sentence. It would be more consistent to do that for this explanation as well, instead of an explanation as an enumeration

Corrected

8295: L23: In Valente et al. (1997) the P in the first equation is aR, this makes more sense, as the symbol P is not explained in the text

Corrected: Should both be “R”

8296: L1: in equation 3 Sf is presented as a stock and not as a flux; however, the explanation stemflow seems to indicate that it actually represents a flux.

Corrected: Sf (mm.h<sup>-1</sup>) is a flux. Units have been added to clarify this.

8298: L9: canopy storage capacity (instead of canopy capacity)

Corrected

8299: L26: I think it is good to write down the full name of CSIR the first time it is used

Corrected: Council for Scientific and Industrial Research.

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8300: L18: placing 'but introduces an additional assumption i.e. that,' on a new line, makes the enumeration easier to read

Corrected

8300: L20: to be concise: gross rainfall intensities instead of rainfall intensities

Corrected

8301: L10: the first 'and' should be replaced by a comma

Corrected

8301: L12-13: It seems to me that this sentence is better located in the introduction

Not corrected: A table is placed here highlighting the different versions of the Gash model referred to in this section, which is all about the model description.

8301: L17: I would place a reference here to the original equation

Corrected: Reference added (Gash, 1979)

8301: L18: this formula would be more clear when the nominator and denominator of the fractions are placed above each other instead of next to each other

Corrected

8301: L20-21: This sentences is not correctly formulated

Corrected: (comma removed)

8302: L25: t in St should be subscript

Corrected: St

8304: L3: why free throughfall coefficient? In the introduction it is throughfall coefficient

Corrected: removed "free" to be consistent.

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8304: L7-8: this sentence might need some reformulation

Corrected: An often ignored factor when modelling or measuring canopy interception is the drop size, which has been incorporated into the “variable storage Gash model”.

8304: L15: parameterised in the model by the drop retention number ( $q$ ) (reverse the description and the symbol)

Corrected

8305: L20:  $R$  = gross rainfall rate or intensity (instead of  $R$  – rainfall rate or intensity)

Corrected

8305: L21-22: this sentence might need some reformulation

Corrected: “In order to operate the model for a particular vegetation type, two vegetation specific parameters  $S_{cmax}$  and  $S_{emax}$  are required.”

8306: L14: gross rainfall intensity ( $R$ ) instead of mean rainfall rate

Corrected

8308: L14-16: this sentence might need some reformulation

Corrected: “One was for the *A. mearnsii* and *E. grandis* sites which is situated on a tower above the canopy and the other for the *P. patula* site is situated in the open, but not above the canopy, but is closer to the study site”.

8309: L1-2: does not the mosquito net create a sort of new layer of litter interception?

Corrected: A correction factor for each trough was derived from laboratory measurements to account for the “initial abstraction” from the netting.

8309: L3-7: these sentences might need some reformulation

Corrected: “Because the trough represents a linear and continuous sampling surface, the length scale variation of leaves, branches, and tree crown are assumed to be a

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representative integral of the throughfall caught (Cuartus et al.,2007).”

8309: L20: I think that the reference should be to table 3 and 5 and not to fig. 3 and 5  
Corrected

8310: L3-5: this sentence might need some reformulation

Corrected: “The results of this study show that the modelled canopy interception ranges from 16.9% to 26.6% for *E. grandis* and *A. mearnsii* respectively, and 23.3% of gross precipitation is intercepted by *P. patula*.”

8310: L6: a comma before summarized and after 3 makes this sentence easier to read  
Corrected

8310: L26: I think it is better to use or gross precipitation or gross rainfall in the entire paper

Corrected

8311: L10-12: this sentence might need some reformulation

Corrected: “The worst performing being *P. patula* with a R2 and Root Mean Square Error (RMSE) of 0.56 and 0.54 respectively.”

8314: L2: It might be clearer if a time period is mentioned with these percentages:probably they are values for the total modelled period

Corrected

8319: For the overview of the complexity of the different models, it might be useful to also add the parameters used for each model in this table.

The number of parameters were added to Table 1

8330/8332/8333: there is almost no difference between the two lines in these figures when printed in black and white

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Response: The document is going to be published in colour.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 8293, 2012.

**HESSD**

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