

***Interactive comment on “Field data collection and analysis of canopy and litter interception in commercial forest plantations in the KwaZulu-Natal Midlands, South Africa” by H. H. Bulcock and G. P. W. Jewitt***

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Referee: M. Coenders-Gerrits

Referee: P8258 L12: The litter interception percentages are also as a percentage of gross precipitation?

Response: Corrected: Yes. “. . .of gross precipitation” has been added to the sentence.

Referee: P8258 L19: You may add Gerrits et al, 2010 as a reference for the importance  
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of litter interception.

Response: Corrected: added reference, Gerrits et al. (2010)

Referee: P8258 L23: Remove ‘therefore’.

Response: Corrected:

Referee: Change sentence to “The amount of canopy interception depends on climatic factors like..”.

Response: Corrected: “The amount of canopy interception depends on climatic factors such as the rainfall characteristics, as well as factors affecting evaporation, including temperature, wind speed, solar radiation and humidity”.

Referee: P8259 L15: Remove ‘therefore’. Response: Corrected:

Referee: P8259 L23: You may add Gerrits et al, 2010 as a reference for the importance of litter interception.

Response: Corrected: added reference, Gerrits et al. (2010)

Referee: P8260 L9: You may add Tsiko et al (2011 in press) and De Groen, 2002 (or De Groen et al, 2006) for other interception studies in (southern) Africa.

Response: Corrected: reference added “. . . More recently, Tsiko et al., (2012) found canopy interception in a savannah ecosystem in Zimbabwe to be 25% of gross precipitation. . .”

Referee: P8260 L9-16: Add location of the mentioned studies.

Response: Corrected:

Referee: P8260 L17: Change order text. The authors seem to be interested in *Acacia mearnsii*, but it is not clear from the text why they are interested in this specie. This is explained later in the text.

Response: not corrected: it is explained a few lines after this statement and the authors feel this fits better in the paper..

Referee: P8262 L23: Explain what is meant by an 'energy balance weather station'.

Response: Corrected: ...An "energy balance" weather station was situated between the A. mearnsii and E. grandis sites and was mounted on a tower above the canopy. It is termed an "energy balance" weather station because it includes net radiation and soil heat flux, which are not included on a standard weather station...

Referee: P8263 L2: Change unit for rainfall from 0.1mm into mm. Or add accuracy of other equipment as well.

Response: Corrected: removed the "0.1mm" and made it "mm"

Referee: P8263 L3: It is not clear what measuring interval is used. Please clarify.

Response: Corrected: "...The automatic weather station measured solar irradiance (W.m<sup>-2</sup>), ambient temperature (°C), relative humidity (%), rainfall (mm), windspeed (m.s<sup>-1</sup>) and direction (°) at 10min, 20min and hourly intervals and calculated reference evaporation hourly and daily. The energy balance automatic weather station located on the tower measured net irradiance (W.m<sup>-2</sup>), air temperature (°C), relative humidity (%), rainfall (mm), windspeed (m.s<sup>-1</sup>) and direction (°), soil temperature (°C) at 20 mm and 60mm, and soil heat flux at 80 mm (W.m<sup>-2</sup>) at 10min, 20min and hourly intervals (Clulow, 2007)..."

Referee: P8263 L6: Change unit for rainfall from 0.1mm into mm. Or add accuracy of other equipment as well.

Response: Corrected: removed the "0.1mm" and made it "mm"

Referee: P8265 L17-20: It is not clear how the litter device is exactly working. The water from the lower basin is measured by a Davis tipping bucket and the water that would have drained into the soil by a Hobo. But is this not the same? Maybe clarify this

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by adding in Fig 4 the position of the tipping buckets.

Response: Corrected: Sorry, it was badly worded. The sentence has been changed to "...The water that was collected in the lower basin, which is the water that would have drained to the soil, is measured with a Davis tipping bucket (Davis Instruments, 2001) and each tip was recorded with a HOBO<sup>®</sup> pendant event logger (Onset Computer Corporation, 2005).

Referee: P8266 L25: Is Figure 6 the correct reference?

Response: Corrected: Should be Fig. 4.

Referee: Section 2.6.1: Were there no problems with clogging of the tipping buckets?

Response: Not corrected: Reply to statement: There were no problems with clogging of the raingauges for the litter interception experiments (as opposed to the canopy interception experiments where clogging was a problem) because the fine material was retained by the geotextile, and any insects that got into the raingauge were caught by the sieve.

Referee: P8267 L11: What were the lengths of the events?

Response: Corrected: Response: the events were of varying lengths. In this study, rainfall events are defined as discrete events separated by period of greater than one hour (As corrected for Anonymous Referee #1)

Referee: P8272 L16: How can the threshold process being seen from the presented results?

Response: Corrected:the following comment was added: "...Interception not only reduces net precipitation but it is also a threshold process, as a certain amount of water is required before successive processes such as infiltration and runoff can take place. This is evident in the litter interception results as shown by the circled values closest to the y-axis which represent the increasing litter interception with increasing through-

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fall. These are events that are smaller than antecedent litter moisture deficit and only once this litter moisture content exceeds than the storage capacity of the litter, can subsequent processes such as infiltration take place...”

Referee: P8273 L4: Correct reference to Fig14-16 Response: Corrected:

Referee: P8273 L21: Correct reference to Fig13.

Response: Corrected:

Referee: Table7: Would be good to also add the values for canopy and litter interception.

Response: Corrected: canopy and litter interception values added.

Referee: Fig1: Add scale.

Response: Corrected: scale added.

Referee: Fig 4c: Add position of tipping buckets.

Response: Corrected: tipping bucket added to diagram.

Referee: Fig 5 6: Change order of Fig 5 and 6, since one needs Fig 6 to understand 5. Or explain in the manuscript that Sc can also be derived from the point where the observations start deviating from the 1:1 line from the origin.

Response: Corrected: the order of Figs 5 and 6 as well as the corresponding text have been changed accordingly.

Using the “mean method” of Klaasens et al. (1998) to estimate the canopy storage capacity, only those events that were separated by at least one day of no rainfall were used in the analysis to try eliminate the possibility of a partially wetted canopy. The Klaasens et al. (1998) “mean method” estimates the canopy storage capacity as the y-intercept of the linear regression line of gross rainfall and interception. Using the Klaasens et al. (1998) “mean method”, the maximum storage capacities for *E. grandis*,

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*A. mearnsii* and *P. patula* were 0.41mm, 1.07mm and 0.92mm respectively.

Referee: Fig 9: Very important figure, but too small for clear reading. Please enlarge.

Response: The figures were made smaller when being typeset by HESS. I will request that they are made bigger.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 8257, 2012.

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