

## ***Interactive comment on “Modelling field scale water partitioning using on-site observations in sub-Saharan rainfed agriculture” by H. Makurira et al.***

**H. Makurira et al.**

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Received and published: 22 September 2009

The authors would like to thank the referee for taking time to comment on the paper. We will consider all minor/specific comments while revising the paper, but with this reply we would like to address the main concern of the reviewer: Estimation of model parameters and the associated uncertainty of the water balance model.

Indeed some assumed values were used in the model namely,  $p$  (soil moisture depletion factor),  $k$  (residence time of water within soil profile above field capacity),  $D$  (Interception threshold),  $kc$  (crop coefficients) and  $kp$  (pan factor).

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$kc$  and  $kp$  values are obtained from standard guidelines and hence cannot be treated as strictly assumed values. Also  $p$  cannot vary much away from the generally recommended value of 0.6.  $k$  (residence time above field capacity) does not affect the water balance and only helps to show how fast the soil drains above field capacity. This only leaves the interception threshold as an important parameter to be tested in a sensitivity analysis. In the model it is reported that  $D$  ranges between 2-5 mm/d (after De Groen and Savenije, 2006).

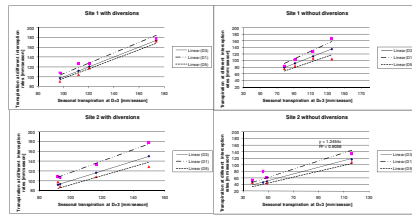
The authors have taken note of this and will include a section on model sensitivity analysis in the final paper. Here we present a preliminary analysis in the graphs below. They demonstrate that  $D$  is not a sensitive parameter for the calculation of transpiration values. Figure 1 shows graphs of total seasonal transpiration values obtained for interception values ranging between 1-5 mm/d, and a comparison of the values with the 3 mm/d interception threshold used in the model. Seasonal transpiration for  $D$  values of 1, 3 and 5 mm/d ( $D1$ ,  $D3$  and  $D5$ , respectively) are plotted against the value used in the model,  $D3$  (i.e. a change in  $D$  of 67%).

The deviation from the  $D3$  graph is less than 20% in all cases (See Figure 1) which shows an inelastic relationship of 0.3 and hence confirms that  $D$  is not a very sensitive parameter.

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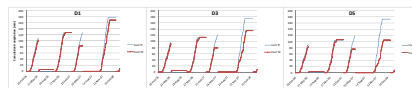
Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 6, 5537, 2009.

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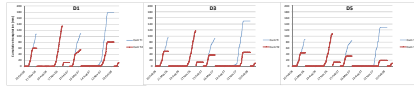
**Fig. 1.** Figure 1: Comparison of seasonal transpiration values for different interception thresholds

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**Fig. 2.** Figure 2: Comparison of seasonal transpiration with total water available at different interception thresholds, D, for Site 1

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**Fig. 3.** Figure 3: Comparison of seasonal transpiration with total water available at different interception thresholds, D, for Site2