

Interactive comment on “Constraining model parameters on remotely sensed evaporation: justification for distribution in ungauged basins?”
by H. C. Winsemius et al.

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We are glad that Referee 2 is happy with the content of our manuscript. We are happy to address the comments below:

Referee: 1. The paper is concise and efficient, while I found the abstract rather heavy to read and scarcely attractive. I would suggest to the authors to reformulate it by concentrating on what is really new in the paper, leaving to the next sections the technical details of the method and application. Authors: Indeed the abstract is quite lengthy and perhaps not completely to the point. We will leave out suggestions about the type of applications and keep descriptions of the methodology shorter to strengthen the focus

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of the paper.

Referee: 2. In the introduction two references are made to the SEBAL model (P 2297 lines 2 and 28) that are difficult to understand for the reader who doesn't know the model already. Consider the possibility to move these comments after section 3.1. Authors: In this section, we will replace "SEBAL evaporation" for "evaporation estimates, based on thermal infrared satellite information", and keep the description of SEBAL for a later stage of the paper.

Referee: 3. When the semi-distributed conceptual model is introduced, the authors state that the unsaturated soil zone is completely equal to the HBV soil zone and then mention the names of the analogous parameters in the two schemes. I would leave aside these details and concentrate more on the meaning of these parameters. Authors: The same was suggested by the first referee. We will follow up this comment by adding a table with model parameters, units and physical meaning and focus on the description of the model processes related to them.

Referee: 4. In the discussion section a posterior likelihood function is defined. It is unclear to me how this particular form is obtained. Authors: Eq. 11 is a transformation of all likelihood functions $L(\theta_i)$ that are behavioural (assuming that the best 2 % of the models is behavioural). The transformation is such that the the sum of all transformed performances, $L_s(\theta_i)$ is equal to 1 so that the results from each model unit can easily be combined in one graph.

Referee: 5. Results for the four model units are shown in Figure 4, where possible fuzzy regions that could be applied as parameter constraints are also suggested: - I believe there is a mistake in the label name of the x-axis of the right column: L instead of I_p . In the text no mention is made to the method used to determine these regions. Provide a short description of the procedure. Authors: There is indeed a mistake in the axis label which will be corrected in the final manuscript. The form of the fuzzy membership is chosen trapezoidal, to ensure that models that are less likely

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are not immediately excluded from further analysis. For instance: employing these measures in an optimization when more data comes available, would mean that we know that models that are on the down-facing slopes of the trapezoid are less well representing the evaporation regime, which is a serious constraint in semi-arid areas. We do not however immediately exclude them, which would happen if we would simply have chosen a uniform posterior distribution. The slopes and offsets are chosen more or less arbitrarily. We will add this to the final manuscript.

Referee: 6. In the same section (P 2340 lines 11-12) the authors refer to Figure 5, where an example of a well-performing model is given for each land cover. Which parameter sets lead to these results? Are they plausible for the unit they refer to? The dash-dotted line in Figure 5 is not very readable, can you change the style of this line? Authors: We will add the parameter values and will change the dash-dotted line into a solid line.

Referee: 7. In the final discussion the authors comment on the results referring to the results in the panels of Figure 4. Each situation is critically described, exception made for the top right panel. I would suggest to add some comment on this, since it seems rather evident the presence of two different populations. Do you have an explanation for this behaviour? To improve the readability of the paragraph I would also suggest to mark each panel with a letter and to make reference to this letter in the text.

Authors: This bi-modal character means that there is still some spatial variability in land cover between the different model units assigned as ‘riverine’. It is however less extreme than with the ‘forested’; model units, which is why we mentioned ‘forested’ as model unit where a higher spatial variability could be considered if more information about this variability would be available. We will refer to the subfigures with letters in the final manuscript.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 2293, 2008.

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