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Hydrology and Earth System Sciences Discussions

Interactive comment on "A channel transmission losses model for different dryland rivers" *by* A. C. Costa et al.

Anonymous Referee #1

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In general terms the paper makes a contribution to a very difficult topic in hydrological science. However, there are a number of problems with the presentation of the paper (and particularly the results) that suggest to me that the paper needs to be improved before it is worthy of publication.

I understand that the authors need to include the equations, but I found that I got more and more confused as I read this section and started to lose sight of what the model is trying to achieve. I did not find the information provided in Fig.1 very helpful, although Fig. 2 does help to clarify some parts of the model. One gets the impression of a very complex model with many parameters that might be expected to be very difficult to apply in data scarce areas. On page 8919 refernce is made to accumulation in

depressions followed by evaporation, but I am not clear how this would be handled inside the model, nor where the data to parameterise this would come from without a very detailed DEM. I am also a bit confused about how incremental flows along a river reach are accounted for in the model and the examples used.

The abstract and the conclusions refer to reliable predictions, but I do not think that the various results presented confirm that the model can predict reliably. First of all there are some cases where the model clearly has not performed very well (e.g. substantial routing delay problems in Fig. 5c and Fig. 9) and there are not enough events and sites used in the study to reach a conclusion about reliability of the model. The authors also evaluate different forms of the model (Figs. 5a to 5c) and conclude that the more complex model is the best. While this may be the case, there are many problems with the best model compared to the observed data. I am therefore doubtful if the reliability of the model has been demonstrated sufficiently for it to be considered relaible and therefore applicable in an ungauged situation.

The model formulations are presented in a lot of detail, but the sensitivity results are not discussed in very much detail at all and the reader might be confused about how the model is likely to perform when there are no (or not enough) data to go through a parameter estimation exercise (i.e. calibration).

My main comment is therefore that the discussion of the results and the conclusions should be more critical and a better reflection of the limited sample size as well as the limitations of the results.

Detailed corrections: P8905: There is a great deal of repetetive refrencing in the the introduction. P8906, L9: lose not loss. P8908, L10: replace 'from the first behaviour to the former one and vice-versa, too.' with 'from the former to the latter and vice-versa'. P8908, L15 (and elsewhere): replace 'controls a catchment area' with 'drains a catchment area'. Page8909, L2: 'influential for channel..' Page8910, L8: '.. flows are hydraulically..' Page8910, L20: remove 'in fact' (see other parts of the text where this un-

necessary type of wording is used). Page8913, L9: '..head at the surface..' Page8920, L18: 'dominant' not 'dominated'. Page8922, L13: '..losses are certainly...' Page8922, L19-22: This sentence is rather clumsy and needs to be re-phrased. Page8923, L19 (and elsewhere): I am sure there is a better way of presenting 'laboratorial-experiments based tables' - why not just refer to 'empirical tables'? Page8926, L13-15: I could not understand this sentence at all? Just below this a triangular channel X-section is referred to - is this a reasonable assumption and would it make any difference to the results if a different channel shape was used? Page8927, L14-16: I assume there is something missing here as there is no reference to Figs 9 and 10. Page8928, L1: Change to 'The sensitivity did not vary with changes of soil...'. Page8929, L8: I am not sure what the part of the sentence ' which preserves similar scale..' means? Page8929, L19: (and elsewhere): Re-phrase the 'saturated-part-based parameters' with something that is clearer. Page8929, L23: '..should take into..' Page8930, L15: Remove the unneccesary word 'actual'. Page8934: Spelling of Mitzow (see text).

All of the sentivity diagrams would be a lot clearer if the axes labels were on the bottom and left axes rather than in the middle of the graph.

Fig 6a refers to the sensitivity of 3 factors (porosity, soil moisture at FC and initial soil moisture), but there is only one set of sensitivity graphs - I am very confused by this.

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