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Hydrology and Earth System Sciences Discussions

Interactive comment on "Calibration of the modified Bartlett-Lewis model using global optimization techniques and alternative objective functions" *by* W. J. Vanhaute et al.

Anonymous Referee #1

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The paper compares four global optimisation strategies and three objective functions for estimating parameters of the modified Bartlett-Lewis single site rainfall model. Estimation of the parameters of this class of rainfall model is a topical issue, and the paper is generally well written. However, the study is based on a long record from a single site, for which there seems to be a relatively clear optimum parameter set, and there is no evidence that the results generalise to other sites.

The study is limited inasmuch as it does not consider the fit of extreme values in the assessment. It would be interesting if the fit to extremes were to be included in the

objective function. This would be computationally intensive and the efficiency of the algorithms would become more pertinent.

Another general criticism is that the authors do not mention spatial versions of the clustered point process rainfall models.

Specific criticisms are: P9709,26 The parameter eta is not defined, and when it is introduced on P9710 it is as a random variable. Furthermore, the reason given for introducing dimensionless parameters is not convincing as eta cancels in the ratio (line 29).

P9710, I can only find 5 parameters. What about the distribution of cell depth?

P9711,26 I think that describing stochastic models as deterministic when there is no hyper-distribution for the parameters is misleading.

P9714 ,5 How is the variance of the observed statistic calculated?

P9714,8 Chandler (2004) is a somewhat inconvenient reference for the standard result of generalised least squares.

Section 4 Implementation of the optimization methods

This is specific to the Uccle site. It may provide good advice for fitting the B-L model in general, but this is not demonstrated. In Figure 1 the cooling rate scale is incorrect. The grey scale doesn't work well on my copy, but the three white squares surrounded by dark squares look rather odd.

Section 5 Comparison of optimisation methods

P9728,15 How do the 30 repetitions vary? I guess in the initial parameter sets, but details should be given. In Table 3, the duration of DSM is an order of magnitude less than for the other optimisation methods. If multiple starting points are used, more such starts would likely lead to lower minima.

P9729,29 Why are identifiability issues important for a conceptual model? It wouldn't matter if a good fit were obtained with one or two parameters fixed in advance. P9730,1 A reference for "mentioned as a stumbling block in the lieteraure" would be useful.

6 Comparison of objective functions

P9733, 12 How long are the simulations?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 9707, 2011.