

General comments:

This paper is a welcome contribution to dealing with the difficult problem of finding optimal parameters for Bartlett-Lewis rectangular pulse models. The paper focuses upon the two issues of choice of numerical method and choice of objective function. I particularly welcome the authors' attempt to be comprehensive in including the Particle Swarm Optimisation model among the selected methods. And the results show its potential (which I would be inclined to evaluate slightly more positively than the authors' overall conclusion does).

In terms of the objective function, it is interesting that OF3 underperformed. Current work at University College London suggests that OF3 is to be preferred on theoretical grounds (and this agrees with the intuition that the inverse of the variance of a property is an appropriate weight for it). This theoretical result does not mean however that, in terms of reproducing certain key statistics of the rainfall process, this will necessarily be the best method. And indeed, this is what the authors show (at least for Uccle rainfall).

A question of clarification: on what data was the Kruskal-Wallis test performed? Is it on simulated and observed data, or on some set of statistics thereof?

A comment: it might have been interesting to include an analysis of how these algorithms and objective functions perform when simulations from a Bartlett-Lewis model are substituted for observed data. Although this would not be sufficient as it would not tell us how well algorithms cope with the difficulty of calibrating a model to real "messy" data, it would have helped evaluate the algorithms and objective functions' ability to find the known "true" values of the parameters.

Otherwise, the paper is very useful and will no doubt be a healthy reminder to all of us of the potential which lies in evolutionary algorithms (Shuffled Complex) and in swarm behaviour methods.

Page line comment

9711 26 The description of the models as 'deterministic' is misleading. The authors probably meant something like 'with fully identifiable parameters'. But the meaning of the sentence is also not clear.

The authors could also add that it is not possible to obtain a likelihood function in a closed form, so maximum likelihood is not available as a parameter estimation method.

9717 24 'constrains' would be better than 'enforces'

9718 5 'process'