

Interactive comment on “A strategy for “constraint-based” parameter specification for environmental models” by S. Gharari et al.

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The authors have done very interesting work in this paper, which describes a strategy to constrain the parameter to be consist with physical meanings or expert knowledge. This paper is novel and worthy of being published, but I think it should be merged with hess-2013-519 because they are actually talking about the same thing and presenting the same approach.

If the authors really feel two papers are warranted, they should make one full research paper and one technical note. I suggest: (1) the method should be presented in the full research paper, along with two or even more case studies. (2) Describe the technical details for implementing the method in the technical note. It should be a comprehensive

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guide for readers to apply your method to their own models. For an instance, give a list of how to constrain interceptions, ET, runoff coefficients ... in a table. Here is an example.

(1) Parameter Constraints

1.1 Series Type: $0 < a < b < c < \dots < 1$

1.2 Linear Type: $a = b_1 \cdot c_1 + b_2 \cdot c_2$

1.3 Mixture Type: $a_1 + a_2 + a_3 + \dots = 1$

Etc.

(2) Processes Constraints

2.1 Magnitude constrain: ET, runoff

2.2 relationship constrain, e.g. Budyko curve, runoff coefficient

Etc.

I would like to see a generalizeable list like this in the revised technical note. The outline in this paper is just over-simplified.

To establish a new method, one typical way is to design a synthetic study. Let me suggest three.

(1) A 2-d area like Fig1. Given a uniformly distributed sample covering P' (the yellow one), the proposed method can generate a sample set that can uniformly cover the area of P (the green one).

(2) Three parameters a , b and c , satisfying $0 < a < b < c < 1$. Given a uniformly distributed (a,b,c) , the proposed method can generate a sample set satisfying the inequality.

(3) Suggest two parameters a and b , and two functions $f(a,b)$ and $g(a,b)$.

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$C1 < f(a,b)/g(a,b) < C2$. Given a uniformly distributed (a,b) , the proposed method can give the constrained (a,b) . Plot the constrained (a,b) may be very interesting.

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