

## ***Interactive comment on “Land surface model parameter optimisation using in-situ flux data: comparison of gradient-based versus random search algorithms” by Vladislav Bastrikov et al.***

### **Anonymous Referee #2**

Received and published: 15 September 2018

General evaluation:

The manuscript is of relevance for GMD. The study is solid and I have only few points for additional clarification. The paper is also structured and written well. The amount of tables and figures is restricted to the absolutely necessary. A few more figures could have been included, but in general I like that the number of figures is not so large.

Nevertheless, the introduction could also elaborate on further parameter estimation techniques which also could show a better performance than the ones addressed here, in particular concerning uncertainty characterization (ensemble methods) and handling non-Gaussianity (e.g., particle filter methods or Markov Chain Monte Carlo methods,

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for example the work by Post et al., 2017, JGR-Biogeosciences).

I recommend therefore minor revision of the manuscript.

Specific Comments:

P2, L12, L13, L15: These error sources (vegetation and soil spatial information versus parameter values in model) are partially the same thing? Please clarify.

P5, L7: Could you provide more details? How is the sensitivity study conducted? Reference?

P5, L22: Can you provide more details? How many sites were disregarded?

P6, L31: How automatic was the automatic differentiation? Can you provide more details on the additional coding and time which was required?

P8, Eq. 2: How critical is the Gaussian assumption? Non-Gaussianity of parameters can be expected.

P14, L30: How do you know whether this number (5) is not case dependent? In case of multiple sites, many tests could be carried out, as the parameters need to be determined just once (per PFT of course). Why would one need to impose restrictions, and would it not be better to use a larger number of initial guesses for cases with parameter estimation for multiple sites?

Editorial:

P1, L26: trapped instead of trap.

P10, L25: degrades instead of degrade

P10, L29: skip “a”

P10, L32: “reductions” instead of “reduction”.

P11, L11: “at the same level as” instead of “at the same level than”.

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P11, L25: “maxima” instead of “maximums”. The results are shown in?

P11, L31: “as” instead of “than”.

P13, L5: “minima” instead of “minimum”.

P13, L28: Change to: “the most constraint ones”

P14, L17: “dependent”

P14, L30: change to: “ensures”.

P15, L5: change to “decreased”.

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Interactive comment on Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2018-160>, 2018.