

***Interactive comment on “Technical Note:  
Monte-Carlo genetic algorithm (MCGA) for model  
analysis of multiphase chemical kinetics to  
determine transport and reaction rate coefficients  
using multiple experimental data sets” by Thomas  
Berkemeier et al.***

**Anonymous Referee #2**

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The manuscript describes the principles of the Monte-Carlo genetic algorithm (MCGA) and how it can be used to constrain various model input parameters for multiphase chemical kinetic systems.

The manuscript is very well written and it is relatively straightforward to understand the general idea, advantages and limitations of the MC genetic algorithm despite the complex topic. I especially like the examples given in Figure 3 concerning why model input parameter can remain unconstrained. I have very little additional to add apart

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from what reviewer 1 already pointed out. I recommend the manuscript to be published after a minor revision where you consider the comments from reviewer 1, which I fully agree with, and my very minor additional comments given below.

On p. 2, L33-34: Do you really mean that the MCGA algorithm itself should be portable to any numerical model with similar computational expense and extent of the fitting parameter space or do you mean that the results (the constrained parameters) can be implemented in these models?

On p. 5, L87-90: This sentence is long and I had to read it several times before I understood the full meaning of it. Is it possible to reformulate it? Maybe: Furthermore, experiments covering a broad range of conditions must be conducted to achieve observables that are controlled by (a) as many model input parameters as possible across all experimental conditions, but (b) by as few model input parameters as possible for a specific experimental condition (i.e. limiting cases).

On p. 5, L92: I am not sure if I understand what you want to say with “in the required breath”. Do you mean that because of technical limitations or transient behaviour it may not be possible to sample all required input parameters at the same time?

I agree with referee 1 that some additional information needs to be provided about the advantages of the reseeding and migration approach vs. repetition of the MCGA approach? Have you used the reseeding and migration approach for any of the results presented in the article? If I understand it correctly you used the repeated execution approach when you generated the results presented in Figure 3.

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Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2017-45, 2017.

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