**Biogeosciences
Discussions**

Interactive comment on "Modeling the vertical soil organic matter profile using Bayesian parameter estimation" *by* M. C. Braakhekke et al.

Anonymous Referee #3

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1. General comments

Braakhekke et al. presents results of modeling soil organic matter profile with depth, using a Bayesian calibration. Thanks to observations, including radioisotope, the model SOMPROF was calibrated at two sites. After describing the results, they made an interesting interpretation of them, while giving advices for problems with Bayesian calibration.

I tried to keep only comments that differ from comments from other reviewers.

2. Specific comments:

P 11249, L21-24 You built an average annual cycle. It is not clear to me why you did that instead of simply using the three complete years data set. By doing so, you neglect

climate variability effect. The reasons for making an average climate, should be clearly specified.

P 11249, L18-19, Where does the choice of a two-terms equation comes from? From my point of view, the authors should consider explaining what support such a choice of equation, and probably giving the reference to data which were used to regress this equation.

3. Technical corrections:

P 11245 L 9-11, it is explained later, but may be the authors could simply give the idea that the choice of the number of years is to represent somehow history of the site.

P 11245 equation 1, and P11246 equation 2 : the variable "L_i" and "$F_{i \rightarrow j}$" are not clearly defined.

P 11247 L13-15 What about lower boundary?

P 11282 table2 If upper bound is specified then lower bound for transport parameters should be also specified in the tab or in the paper.

P 11284 the Figure 1 seems to suggest that diffusion only occur downward, which is not coherent with the description of mechanisms.

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