September 13th, 2022

To Geoscientific Model Development (GMD)

Dear Editor,

First of all, we would like to thank you very much for the efforts put in our manuscript. We are pleased to submit a revised version that addresses all the minor revisions demanded on September 11th, 2022. Please find in this response letter the following content:

On behalf of the other authors, I thank you again for your time and consideration. Please feel free to contact me during the revision process if necessary.

Yours sincerely,

Arthur Nicolaus Fendrich

Université Paris-Saclay
Joint Research Centre

1.   Comments from Referees

1.1.   Carlos A. Sierra

" Dear authors,

Thanks for preparing a revised version of the manuscript addressing reviewers' comments. This new version addresses well most of these comments, however, there are still issues related to mathematical notation that needs revision. These are:

- The use of k is still confusing. You use k for the depth layer as in d_k, but also for the output rate from the pool in equation 1. In Table 1 you use \kappa to denote 'turnover rates', which also adds confusion. I suggest that instead of using k in equation 1, you use \kappa as in Table 1, but you improve the explanation of \kappa in this table. When i = j, \kappa represents an output rate from the pool. When i \neq j, \kappa represents a transfer rate between pool i and j. I would avoid the term 'turnover' in this context because it is not clear about its interpretation when connecting two pools (i and j). Instead, transfer rate should be the most appropriate term.

- In line 131, it is not clear the role of the asterisk in I. This eventually becomes clear later on, but should be clarified here.

- The transfer among neighbor cells using the notation b \to t, or t \to b is also confusing giving that t represents time in the notation introduced earlier. Can you use a different notation for bottom and top?

- Please review again the text carefully for minor typos. I found a few of them, e.g. in lines 151 and 242.

Once you address these minor issues, your manuscript could be accepted for publication.

Regards,

Carlos A. Sierra"

2.   Authors' response and changes in the manuscript

2.1.   To Carlos A. Sierra

Dear Dr. Sierra,

We would like to thank you very much for all the comments and suggestions made in our work. In order to address the aforementioned confusion in the notation, we:

- As suggested, changed the k to \kappa in Equation 1, as well as improved the description of \kappa in Table 1. We also standardized all fields in Table 1 as ending with a dot, as suggested previously by Dr. Metzler.
- We clarified the meaning of the asterisk in Line 131, and added reference to the corresponding subsubsection and Equation.
- We corrected some grammar mistakes and typos (e.g., Line 30, Line 85, Line 117, Line 152 etc.), and replace the "t -> b" flux by "T -> B" as suggested by the Editor.
- We corrected Figures 1 and 2 to be consistent with the rest of the text.

We hope that such modifications suffice for the publication of our work at GMD.