Revision of "Mechanisms of soil organic carbon and nitrogen stabilization in mineral associated organic matter – Insights from modelling in phase space" by Manzoni and Cotrufo.

General Comments

Manzoni and Cotrufo responded clearly to the reviewers' questions and comments, and took them into account when revising the manuscript. They added respective parts to their manuscript and changed figures accordingly. This justifies assumptions and following derivations, which makes it easier to follow the methods, and clarifies the results. Mentioning and discussing critical points increases the reliability of the study. In cases, where the authors decided not to change the manuscript, the decisions are clearly explained. Overall, I'm satisfied with the work that the authors have done, especially with the text edits, but I wondered about some figure changes, which I report in more detail below.

Text edits:

I especially like the added section 4.2 about model limitations, which show that the authors considered the reviewers' concerns about the study and potential limitations, and I would like to highlight the manifold clarifications in section 2, which justify assumptions and thus support understanding the equations. Also, the replacement of "and" by "+" when speaking about POM + residues, which was not requested by any reviewer as far as I see, improves readability. Additionally, being more precise about the actual number of studies, which are used for each step, instead of mentioning a vague number (around 40), makes the study more reliable.

Figure edits:

The authors have made a huge effort in editing the figures in response to the reviewers' comments and suggestions, which in general improves the figures, simplifies their interpretation and strengthen their messages. I'm especially happy with the added baseline plots in figure 2 that help to understand general model behavior and thus to interpret changes, and the added time trajectory plots in figure 4, which clearly show the advantage of analyzing within the phase space instead of time trajectories. I also like the simplification of figure 5 by only showing the boxplots instead of all values, because this makes the message much clearer. However, I find the discretizing of data sources (fig. 3b, color bar) hard to see. Not sure, if it would help to either use a wider range of colors (e.g. by adding reddish colors, which may be problematic for color blind people), or by using discrete intervals (1-5, 6-10, 11-15,…) instead of having one color for each number, or to leave out numbers that are not used, e.g. if for example the values 2, 6, 14,… are not used, they could appear black, to save colors for numbers that are actually used. And I'm wondering about the changes in figure 6. E.g. the changed numbers in panel A, and the differences in SOC median (previous version: 0.016) and 50th percentile (revised version: 0.013) in panel B. However, my concerns may root in the fact that I have seen the previous version of the manuscript, but not prevent a new reader from getting the points, and I really like the visualization of the actual data points in panels B and C.