**Geoscientific
Model Development
Discussions**

Interactive comment on "Models of soil organic matter decomposition: the SOILR package, version 1.0" *by* C. A.Sierra et al.

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We thank the reviewer for her comments on our manuscript and our implementation of SOILR. We followed all suggestions carefully and made several changes on the manuscript and SOILR code. A point by point answer to all comments is provided below:

1 Main comments

- SIMECOL and SOILR

  Unfortunately, we were not aware of the package SIMECOL when we started the

  development of SOILR. However, based on this comment, we made an extensive review of this package and compared the main differences in implementation design. We found important differences between SIMECOL and SOILR, and made important changes in our implementation based on this comparison. Therefore, we implemented missing features in SOILR, completely rewrote the description of class `Model` in the paper, and added an appendix discussing our design decisions in more technical detail. This appendix also includes a comparison between SIMECOL and SOILR.

- Output generation

  The comment about the missing accessor functions was extremely useful because it pointed out that this omission forced the user to use the `@` operator on our `Model` objects, which is something we absolutely do not want to encourage and invested a fair amount of effort to avoid. As described in the newly added appendix, we instead overloaded `[]` and `$` for our class, which makes output generation extremely flexible and clean while conserving full access control to the developers. It also fully solves the problem of an accidentally altered"times" variable since this can now (as anything else computable) be included in the output.

  Although we will not support structured output we will implement `plot` and `summary` methods for class `Model` itself.

- Package vignette on MS Windows

  This error was fixed and the current version available on CRAN and R-Forge includes the pdf of this vignette.

- Help File

  This help file is already included in the current release. It can be accessed by typing `?SoilR`.

2 Minor comments

- page 999. Change made as suggested. We now called model (3) a different version of a two-pool model.

- page 1000. In this equation we were trying to generalize the formulation of different models as systems of differential equations. For each pool there would be a different function that relates the decomposition and transfer of carbon between different pools. What was missing was an index on the f function to indicate that the function is different for the different pools, but the state variables within each function may still be the same. We added this change to the document.

- page 1002. We included a check for γ_i in the functions `TwopParallelModel`, `TwopParallelModel14`, `ThreepParallelModel`, and `ThreepParallelModel14`. This check makes sure that $0 \leq \sum \gamma_i \leq 1$ and all γ_i are positive.

- Equation 12. We are following standard notation for vectors, matrices, and scalars. In this equation we are consistent with the idea of representing the vector of carbon release in lower-case bold-face as r, the matrix of release coefficients in upper-case bold-face as R, and the scalars within this matrix in lower-case as r_j. Since all of them are different representations of carbon release we prefer the use of the letter R (r).

- Page 1007. Fixed typos.

- Page 1007, line 26. We modified this sentence. The matrix A needs to be implemented as a function because of its time dependence and not because a requirement of the ODE solver.

- Page 1012, l 8. Fixed typo and reworded the sentence.

- Page 1012, l 18. Added comma required to run the code.

- Page 1017. It should be k_j. Change made in the document.

- Page 1019, l 19. Sentence deleted.

- Page 995, l 15. Reworded sentence.

- Page 1007, l 9. Deleted sentence for clarity.

- Appendix. We agree, the appendix is not really necessary. This analytical solution can be found also in ODE text books. We therefore removed this appendix and replaced with a technical discussion on implementation design.