

## ***Interactive comment on “Modification of the RothC model to simulate soil C mineralization of exogenous organic matter” by Claudio Mondini et al.***

### **Anonymous Referee #2**

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This manuscript presents a modification of the RothC model to simulate the addition and subsequent dynamics of exogenous organic matter. I found compelling the arguments that motivated this change in model structure, but I feel the authors need to do a better job in convincing why this change is necessary. I will explain this better below. Also, the manuscript is relatively long, and in many places it deviates from the main point, which is the modification of the model structure. The manuscript deviates to other topics related to SOM modeling and short- versus long-term incubations that are somewhat irrelevant to the main point of the manuscript.

My main issue with the current version of this manuscript is that the authors do not formally show an analysis that justify the modification of the current structure of RothC.

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The authors do mention some preliminary work (lines 335-336, 358-360) in this direction, but concrete results are not presented in the manuscript. I think it is very important that the authors show how a simple modification of the DPM/RPM ratio is not enough to predict C mineralization from incubations with added EOM. Further, I think it would be important that the authors provide an analysis of the added benefit of a more complex model structure through calculation of common indexes such as Akaike Information Criteria, which would be helpful in deciding if a more complex model structure with more parameters increases predicted power or whether the simpler more parsimonious model structure is preferred.

Two minor points:

- System of equations on page 7 is missing an equation for the IOM pool. I know that this pool doesn't do anything, but for consistency with figure 2, you should add this pool.
- The problem you describe in section 4.4.2 is formally called equifinality or non-identifiability. It is well discussed for this type of models in Sierra et al. (2015, Soil Biol Biochem 90:197).

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