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Interactive comment on "ORCHIMIC (v1.0), a microbe-driven model for soil organic matter decomposition designed for large-scale applications" *by* Ye Huang et al.

Anonymous Referee #1

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The authors integrated the state-of-the-art knowledge into a microbe-enabled soil C-N model (ORCHIMIC) with four microbial functional groups and a dynamic enzyme production approach. I acknowledge the authors for a comprehensive comparison of their results to literature and observations in terms of parameter values and pool sizes. To my understanding, the "dynamic enzyme production mechanism" is a vital improvement over existing models. Thus I would like the authors, if possible, to address this feature in a separate sub-section in "Discussion". My second suggestion is to show the simulated C:N ratios in major organic matter and microbial pools (you may include them as supplementary information) as ORCHIMIC is a C-N coupled model. One more suggestion for this paper is to use simple notations in most of the equations. For

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Discussion paper

example, you may use the notation (F(T)) for the temperature functions in Eqs. (20-24) and add one more equation for F(T) as you did for Eq. (15-19). In addition, it is negotiable whether it is appropriate to specifically address "large-scale applications" in the title, as it was only tested with lab-incubation data in this paper, although it is known that ORCHIMIC may be coupled to large-scale models. Other minor comments: Abstract: Page 1, Line 32: I think "the model" refers to the ORCHIMIC model, please explicitly use the model name.

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