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Geoscientific Model Development Discussions

Interactive comment on "SEAMUS (v1.0): a $\triangle^{14}$C-enabled, single-specimen sediment accumulation simulator" *by* Bryan C. Lougheed

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I would like to thank reviewer 1 for taking the time to review and run the model and putting it into context with regards to other models. Since a second reviewer has yet to comment, I hereby reply to the first reviewer quickly in the interests of aiding the discussion forum.

The reviewer correctly describes that the main purpose, and unique feature, of the SEAMUS model is the tracking of single foraminifera during the history of a sediment core archive. This, as the reviewer correctly points out, does require more computational resources. I agree with the reviewer that the SEAMUS model has specific applications where it can be especially useful (e.g. single foraminifera analysis), whereas

other models (such as e.g. Sedproxy) might be especially useful in other applications (e.g. rapid and efficient computation of the bioturbated mean downcore signal). Additionally, it might be possible for users to use multiple types of models within a project: e.g. run Sedproxy and/or TURBO2 to rapidly experiment with mean downcore signal bioturbation for many different types of input scenarios, and then use SEAMUS to investigate single foraminifera relationships for specific chosen scenarios.

I would also like to thank the reviewer for taking the time to test run the SEAMUS model in Octave. I had assumed it would be too complex to run in Octave, but apparently it might be possible to get it to run. I will look into this and see if I can update the model so that it is compatible in both Matlab and Octave. In such a case I will update the table in the manuscript to also reflect computing times for Octave (which are usually much slower than Matlab). I agree that Matlab is not accessible for all users and that having an Octave version of SEAMUS would greatly increase availability of the model to the scientific community, especially in, e.g., developing countries. In future I hope to port the SEAMUS model to an open source language that is well optimised for rapid (vectorised) manipulation of very large matrices, such as the Julia language.

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