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Geoscientific Model Development Discussions

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

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It is not always easy to find willing referee for these types of technical papers, so I would like to thank the referee for taking the time to review the manuscript and scripts. I would also like to thank the referee for consulting the review of the other referee, thereby taking advantage of the discussion aspect of GMD.

I agree with the referee that not everyone has access to the Matlab environment (especially those in developing countries) and I will strive to make the simulation Octave compatible if possible. While Octave is not pre-installed on most computers, it is free to download. (Similarly, anybody with python pre-installed would need to additionally download e.g. numpy). In future the model could be ported to another language and/or

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a GUI front end could be constructed, seeing as programming is not widespread within the palaeo community, as the referee notes. The model is of course published open source so I'd be open to a python specialist helping me create a python fork. Personally I am keeping an eye on the Julia language at the moment, but it doesn't seem to be fully mature yet.

Referee comment: "Is there scope for turning the virtual picking simulator the other way round, i.e. use this approach to tell the user how many individuals they should be picking ahead of time? I appreciate that this can be achieved by playing around with the model, but it would be a simple addition to the code, which I would again anticipate would increase the audience for this work."

By number of individuals I assume the referee means the minimum number of individuals that should be picked to result in a discrete-depth mean reproducibility that would be equal or better than the machine measurement uncertainty. This would of course depend upon the particular proxy method being used. I will look into this. I'd reiterate, though, that one of the main motivations of creating the SEAMUS model was to highlight the fact that the spread of values contained within a particular core depth can be much greater than the machine error. As is written (near line 361): "With advances in mass spectrometry making the analysis of single specimens ever more routine and cost-effective, the ideal approach in the future may involve exclusively analysing single specimens, with single specimen values from discrete depths used to both estimate the signal distribution and calculate a downcore mean signal, thus facilitating a 'best of both worlds' approach."

A small discussion about the possible generation of downcore artefacts can also be included. Thank you for this suggestion. It may be in there already but should be brought more to the fore.

I will improve Figure 2 (add a colour bar and make a better caption).

Thanks again for your helpful review.

a+ Bryan Lougheed

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