

Biogeosciences Discuss., referee comment RC2
<https://doi.org/10.5194/bg-2021-202-RC2>, 2021
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Comment on bg-2021-202

Anonymous Referee #3

Referee comment on "Testing the effect of bioturbation and species abundance upon discrete-depth individual foraminifera analysis" by Bryan C. Lougheed and Brett Metcalfe, Biogeosciences Discuss., <https://doi.org/10.5194/bg-2021-202-RC2>, 2021

Tasting the effect of bioturbation and species abundance upon discrete-depth individual foraminifera analysis, by Lougheed and Metcalfe.

The paper is very well written and well presented. The content should be of large interest for the relevant scientific community. Their results may be seen as provoking if you work on IFA, however they clearly express strengths and limitations of the work they present, and stress the need for evaluating the conditions (SAR, BD, foraminiferal abundance) at the given sites investigated. Overall, I find it to be a very good paper, more or less ready for publication. I only have a few minor comments.

Consider to reduce the number of abbreviations used to ease the reading.

Add some information on the choice of site, and the real-life conditions you could expect at this site. The selected site is from a site where it would be great to have reconstructions, but where there is little foraminiferal material available for investigation.

SST is defined twice in the abstract (L13 and L16).

L63: not intuitively clear sentence. Suspect you refer to absolute abundance? and/or relative? Both will change through time.

L217: if 5 cm/ka is more realistic for the area, why put the main focus on the 10cm/ka scenario? I read this as a theoretical paper with an idealized approach, forcing the foraminiferal model with modelled SSTs that again are used to verify the modelled IFA

response. I see the argument for choosing this location, being a sensitive area in the modelled SST fields, does it really matter for your result what the realistic sed rate is in the area?

L230: calculated as a by - delete as a

L280: delete is

L327: delete also?

Could you consider different species and how responses may vary between species, or is the result species independent and more a general representation of the effects of SAR/BD on the IFA?

I see that it would be out of the scope for this manuscript, but I have one suggestion for a future study that I would love to see and that I think would strengthen the message in the end. It would be very nice to see how this tool and analysis would compare to a "real" IFA study, given that the conclusion put strong constraints to the IFA approach. E.g., a study where the modelled data was from a location and a time interval where IFA have been/could be done, and from where the temperature is well known (for instance instrumental constraints on temperature, lead or marker horizons constrained ages and hence sedimentation/accumulation rates, stained foraminifera for information on living dept, if not BD). I think such a study would provide a more approachable message for many working on these issues since this paper presents a quite technical and theoretical approach to IFA analysis and results. And given that the message would be the same, further emphasis the potential issues that exists with respect to IFA approaches.