

## ***Interactive comment on “FAME (v1.0): a simple module to simulate the effect of planktonic foraminifer species-specific habitat on their oxygen isotopic content” by Didier M. Roche et al.***

### **Anonymous Referee #2**

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The manuscript by Roche et al. summarises a noble and interesting attempt to improve our understanding of foram-based oxygen isotope data. The authors present a module (‘FAME’ – Foraminifers As Modeled Entities) they developed in order to predict changes in the oxygen isotope composition of the tests of different foraminifera species in response to changing climatic conditions. The model is forced by hydrographic data alone and incorporates a limited number of species-specific parameters, based on culture experiments, for each of five foraminifera species to describe their growth and habitat. Essentially, the model attempts to account for the effect of foraminifera depth habitat on their oxygen isotope composition, and to predict their oxygen isotope composition accordingly, as well as their presence/absence. To test their model they apply

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its methodology to reference datasets, namely the MARGO Late Holocene dataset. It is an interesting and concise presentation of their work and well-structured. I believe it will greatly contribute to research within the foraminifera and palaeoclimate community.

When such models are developed it's important to have some measure of their sensitivity. For that reason, I believe that error propagation in the model should be addressed given that several of the input parameters have errors associated with them.

Secondly, and this may sound pedantic but the authors may consider changing *Globigineroides sacculifer* to *Trilobatus sacculifer* as per its genus reassignment by Spezzaferri et al. (2015). I will leave this to the authors' discretion as there are arguments for retaining *G. sacculifer* given that this is still the most commonly used name for this species. However, over time this will obviously change and the authors may want to introduce the new (and more taxonomically up-to-date) name.

In terms of convention, there are several instances where the author refers to oxygen isotopes incorrectly. For example, p1, line 16, the authors describe the 'oxygen-18 value', or in line 21, 'calcite oxygen-18', or elsewhere as 'species' oxygen-18' (e.g. p3, line 1). This is very picky but there are quite strict guidelines for isotopic notation. I suggest the authors double check their usage and perhaps refer to ratios rather than oxygen-18 content/signal as it's more in line with the literature.

On page 7, line 16-17, you describe how you used a 0.1 per mil 'encrustation term'. Could you possibly elaborate as to where that value came from? It would make it easier for the reader as it seems a little arbitrary at present.

Also, the authors should mention wherever necessary that species with symbionts e.g. *G. sacculifer* (*T. sacculifer*) cannot live at depths greater than the photic zone, as is hinted at on page 7, line 20.

Some more specific comments: Page 1, line 17. Perhaps use 'reflected' rather than 'favoured'. Line 20. Use 'throughout the year' rather than 'along the year' as this

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makes more grammatical sense. Page 2, line 7. I would consider adding a few more references here as several other studies have been done looking at carbonate ion and symbiotic effects. Pearson et al. (2012) gives a good summary of work up to that point. Line 26. Change 'being' to 'to be' Page 3, line 19. Italicise *N. pachyderma*. Page 5, line 21. Change 'weighs' to 'weight'? Page 8, line 2. Use a different word to 'ascertain' as this doesn't make sense in the context.\

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Interactive comment on Geosci. Model Dev. Discuss., <https://doi.org/10.5194/gmd-2017-251>, 2017.

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