

Interactive comment on “Factors Influencing Porosity in Planktonic Foraminifera” by Janet E. Burke et al.

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We would like to thank Dr. Rathburn for his constructive and complimentary remarks on this manuscript and address the questions posed in the Reviewer Comment:

Comment: The term “porosity” has different meanings in geoscience. I think it might be best to use “surface area of pores” at least in the abstract, if not the title, to make it clearer what you are referring to.

Response: We agree that the general term porosity can be confusing, and will be more specific in the abstract and the title. We will change the title to “Factors Influencing Test Porosity in Planktonic Foraminifera” and introduce the term porosity as “. . . porosity (the total percentage of a test wall that is open pore space) . . .” on line 20 in the

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abstract.

Comment: What role does food availability play in the size and metabolism of planktonic foraminifera?

Response: This is a good question, as food availability has been shown to effect terminal sizes and morphologies in laboratory culture (i.e. Lombard et al., 2011, Biogeosciences). There are two ways in which we might include the influence of food availability in our results: i) what is the influence of food availability on the individuals in the core top samples; ii) what is the influence of food availability on the culturing results? We begin with the second, as it helps inform our consideration of the first.

In culture, we fed individuals at what might be the upper end of their natural food intake: one large *Artemia* per day. It is notable in this context that the individuals cultured at near ambient temperatures (25°C), had culture porosities that were statistically indistinguishable from pre-culture values. This might suggest that food intake has a relatively modest effect on porosity.

However, perhaps we just happened to be feeding cultured individuals at comparable rates, amounts, and dietary compositions as their natural environment! We certainly did not directly test for an effect of food available on culture porosity.

Differences in major dietary factors (food type, symbiont status) may provide some additional insight into the influence of this food availability on porosity. In this context, it is notable that our morphogroups do roughly correspond with major food groups. For example, species in the globorotalid group are asymbiotic and species in the globigerinoid group have dinoflagellate symbionts. Also, we do find an effect of morphogroup on pore density, the number of pores in a unit of area.

However, this doesn't account for the difference in feeding frequency during an individual life span or in different spatially or temporally disparate populations of the same species. Given this, we will mention food availability as an important unknown and

target for future research in the discussion. At Line 309 we will insert a sentence that says: “Another environmental factor that may influence terminal sizes and metabolic function is the availability of food sources. Feeding frequency has been shown to influence terminal size and morphology (Bé, 1982; Hemleben et al., 1989), and can thus be expected to influence porosity as well. This factor is difficult to estimate for core top assemblages, but can be tested with simple culture experiments and subsequent imaging.”

Comment: Technical Corrections 373 Should be “. . .Scripps Institution. . .”

Response: This correction will be made and reflected in future versions of the manuscript.

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