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Biogeosciences Discussions

# *Interactive comment on* "Stable carbon isotope deviations in benthic foraminifera as proxy for organic carbon fluxes in the Mediterranean Sea" *by* Marc Theodor et al.

**Anonymous Referee #2**

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Theodor et al. 'Stable carbon isotope deviations in benthic foraminifera as proxy for organic carbon fluxes in the Mediterranean Sea

Theodor et al. are utilizing stable carbon isotope gradients between epifaunal and shallow infaunal foraminifera as a proxy for organic matter flux rates to the sediments in the Mediterranean Sea. Their work is novel; being able to predict/measure organic carbon fluxes to sediment in the past is a big unknown in Paleoceanography. The work clearly outlines caveats and limitations, and I recommend publication after some minor corrections. Specifically the abstract should reflect the main text better (e.g. in the discussion the authors make it clear that Cibicidoides pachyderma likely occupies a very shallow infaunal habitat and that it's d13C has a pore-water influence, which is also reiterated



in the conclusions). Please also check your figures and captions and provide details of how certain values (d13C DIC bottom water, Fig. 2) were calcualted/estimated.

Abstract: Lines 29-30 'Because... evalution.' place before line 27-29 'The...sites.'. Lines 38-39 change 'considering' to taking into account?

Introduction: Correction for ontogenetic effects (line 123-124)? Restricting to measurements from the size fraction >600 um is not really a correction procedure...

Material and methods: Line 159 'with a micrometer of an accuracy of 10 um?' not sure what this is meant to say.

Discussion: Lines 242-245. Strange way of putting it as a fact and then dismissing this claim later? Lines 245 - 247. Why are these data not plotted in the Figures? Line 262 change 'on' to 'at'. Lines 404-405: Lateral input of organic matter through submarine canyons.. could such process also bring in juvenile benthic foraminifera from different water depth/environment and be a suitable explanation for lines 354 and onwards?

Conclusion: Line 456 allochtonous tests? This should be discussed much more thoroughly in the discussion and not appear as a slight statement at the end in the conclusions (e.g. see comment above for lines 404-405 etc).

Figures Figure 2: Is estimated d13Cepi the same as approx. DIC bottom water? If so please use the same terminology to avoid confusion. Provide details of how the estimated d13Cepi/ approx. DIC bottom water values are calculated? It is not possible to decipher different symbol sizes from a (they all look the same size), so please remove Line 889 about symbol sizes indicating different test sizes. Put Mediterranean water mass endmember d13C DIC values in 2b.

Figure 3: I presume this Figure shows the d13C difference between the d13Cepi/approx. DIC bottom water and U. mediterranea, and does not include C. pachyderma d13C? Please make this clear in the Figure caption.

Figure 4: Same as 3. Why do only some stations have uncertainties plotted for their

Median Living Depth. Do you know uncertainties relating to the other parameters (redox boundary depth, export)?

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