

***Interactive comment on “Geochemical and microstructural characterisation of two species of cool-water bivalves (*Fulvia tenuicostata* and *Soletellina biradiata*) from Western Australia” by Liza M. Roger et al.***

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This is a very well prepared study that has been effectively communicated. In a general sense, the physical and chemical properties of microstructures in biocarbonates need to be better characterized in order for workers to best utilize these potential proxies. Recent advancements (including this study) in this area are facilitating a more comprehensive understanding of calcification processes including elemental uptake. Hence, this study is very appropriate for Biogeosciences and I think it will be of broad interest to many who work on biomineralization or those who use mollusk geochemical proxies

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for their research.

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The study is technically sound and warrants publication in BG.

Minor considerations:

p-values- perhaps it might be better to use a threshold of 95% or 99%, instead of such small values like  $2.2 \times 10^{-16}$ . Something like  $p < 0.01$  or  $p < 0.001$ .

Figures 10/11- it is hard to see the uncertainty estimates in the elemental ratios. It might be useful to mention in the Figure caption text the uncertainty and that the uncertainty is generally smaller than the symbols.

Figure 12 could be improved by putting on 95% confidence intervals for each biplot. And make sure that the text is not covered by data (i.e., Sr/P and Mg/P in the top panel).

Line- 12- ocean quahogs (add Butler et al., 2013)

Butler, P.G., Wanamaker, A.D., Scourse, J.D., Richardson, C.A., Reynolds, D.J., 2013. Variability of marine climate on the North Icelandic Shelf in a 1357-year proxy archive based on growth increments in the bivalve *Arctica islandica*. *Palaeogeogr Palaeocl* 373, 141-151.

Line 15- the references for bivalve shell records used in environmental variability are a bit old- I might consider adding a few other references here from work in the last couple of years. For example:

Mette, M.J., Wanamaker, A.D., Carroll, M.L., Ambrose, W.G., Retelle, M.J., (2016) Linking large-scale climate variability with *Arctica islandica* shell growth and geochemistry in northern Norway. *Limnology and Oceanography*, 61(2), 784-764, doi:10.1002/lo.10252.

Reynolds, D.J., Scourse, J.D., Halloran, P.R., Nederbragt, A.J., Wanamaker, A.D., Butler, P.G., Richardson, C.A., Heinemeier, J., Eiríksson, J., Knudsen, K.L., Hall, I.R.,

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(2016) Annually resolved North Atlantic marine climate over the last millennium, *Nature Communications*, 7, 13502, doi:10.1038/ncomms13502.

Reynolds, D.R., Butler, P.G., Williams, S.M., Richardson, C.A., Scourse, J.D., Wanamaker, A.D., Jr., Austin, W.E.N., Cage, A.G., and Sayer, M., (2013), A multiproxy reconstruction of Hebridean (NW Scotland) spring sea surface temperatures between AD 1805 and 2010, *Palaeogeography, Palaeoclimatology, Palaeoecology*, 386, 275-285, doi:10.1016/j.palaeo.2013.05.029.

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