

## ***Interactive comment on “Rare Earth Elements in oyster shells: provenance discrimination and potential vital effects” by Vincent Mouchi et al.***

**Vincent Mouchi et al.**

vmouchi@gmail.com

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First of all, we wish to thank the Referee for accepting to review our manuscript. Our replies are listed below.

Referee’s comment: 1. As mentioned by the first anonymous reviewer, a significant conclusion made by the authors of this manuscript was that *O. edulis* could not be discriminated spatially because of a lack of intraspecific variation in REE and Y concentrations. Yet, the authors did not test this between spatially disparate locations of the same age. I therefore do not believe this conclusion can be supported at this point.

Authors’ reply: We have added to the dataset a new site, Marennes-Oléron, with modern specimens from both species. Our new results are in accordance with our previous

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interpretations.

Referee's comment: 2. In contrast to reviewer #1 I do not believe it necessary to gather water samples to elucidate whether a difference in REE and Y will be likely. Water samples will only provide a snapshot of site-specific conc. at any given time/place and inferences could not be made of the REE and Y concentrations within the slow forming carbonate shells. However, I would agree with reviewer #1 that the conclusions made surrounding *O. edulis* and vital effects here are not supported due to the limited number of sites assessed of the same time.

Authors' reply: Initially, our manuscript used only one modern site with both species, and several archaeological groups of *O. edulis* shells. We aimed at highlighting the similarities between *O. edulis* shells from several modern and ancient localities, and, separately, between *C. gigas* shells from several (modern) localities, as well as the differences between both species. As requested, we added in this revised version a new modern locality on the Atlantic Ocean coastline with both species. The results and interpretations are the same than those of our initial manuscript.

Referee's comment: 3. I believe from the outset, the aims of this study are not immediately clear. More emphasis could be placed in the introduction on the rationale for this study, where it fits within seafood traceability or in regulatory capacity. Again, the implications of the authors' findings are also not well established in the discussion. The authors place a significant focus on the results at hand, which is of course important, but some emphasis should be placed on where this research now fits within its field (i.e. uses, pros, pitfalls and directions from here).

Authors' reply: Changes have been made to clarify our goals and conclusions. In particular, we now put more emphasis on seafood traceability, which is relevant to both modern and archaeological contexts.

Referee's comment: 4. Overall, I found the presentation of results somewhat challenging to follow. For example, I found myself having to refer back to Table 1 often to remind

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myself of the 'Groups' - site, species and age of the specimens. Simple adjustments could streamline this, making it more user friendly for the reader (i.e. no. for site, code for time, code for species).

Authors' reply: We have changed the names of the groups in the text and on the figures. As suggested by the reviewer, we now use a code indicating modern (Mod-) or ancient (Anc-) specimens as well as the locality and species names. Modern localities are now presented in the Method sections and in the figures from North to South.

Referee's comment: 5. More information should be provided for quality assurance. Lines 163-167 provide details of this. I would encourage the authors to retain this section but also include a quality assurance table of obtained vs. expected for certified reference material (CRMs) used for simple reference.

Authors' reply: We have added these details in Appendix B.

Referee's comment: 6. The authors introduce too many abbreviations. REE is fine, but REY for Rare Earth Elements and yttrium is superfluous. Consider REE and Y instead. Same for HREE and LREE, Heavy REE reads fine.

Authors' reply: We have removed all occurrences of REY, HREE and LREE from the manuscript.

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