

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

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We wish to thank the referee for accepting reviewing our manuscript. Our responses to the comments are listed below.

Referee’s comment: 1. Modern *O. edulis* specimens were only measured from one location, therefore there is no information on any differences in REY compositions in different locations for this species.

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

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differences between both species. As requested, we added in 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: 2. Only *O. edulis* specimens were measured in the archeological sites and, as stated above, these could only be compared with modern *O. edulis* from a single location.

Author's reply: *Crassostrea gigas* first appeared on the French coastlines during the 20th century. We are sorry we omitted this rather important fact in our initial manuscript. The addition of a second modern locality with *O. edulis* specimens confirms our previous interpretations: *O. edulis* specimens from all modern and ancient localities present the same composition in REE, while *C. gigas* shells have a distribution (using t-SNE) gathering in clusters depending on their origin.

Referee's comment: 3. There is no information about the measured or expected REY in the seawater at the different coastal sites and therefore it is unclear if measurable differences should be expected.

Authors' reply: We have no seawater available for the localities, but we do not see the benefit for our study. We wish to present differences in REE shell incorporation processes between oyster species that have been reared on the exact same locality and conditions (and hence, same seawater composition). We added a supplementary picture (Appendix A) to show the direct proximity of both species bred on sites. In the Methods section, we present the type of geological substrate for each watershed as an indication of sources of REE in addition to oceanic seawater. For example, the Leucate locality has only low-REE content carbonates, while the watershed of Baie des Veys contains magmatic rocks. We discuss the Y/Ho ratio from the literature, which is based on the assumption of different local REE content. Also, even without known seawater composition, our results indicate a strong locality influence for *C. gigas* specimens.

Referee's comment: 4. The authors attribute the similarities in REY compositions be-

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tween the ancient *O.edulis* specimens to vital effects. This conclusion cannot be validated without addressing points 1 and 3 above.

Authors' reply: As requested, we now present measurements from a second modern locality. We agree with Referee #2 that seawater composition measurements are unnecessary and probably inadequate. We hope that the changes made on this revised manuscript and the added explanations are satisfactory.

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