

Overall, the authors took the comments by both reviewers seriously, and worked on improving the manuscript along suggested lines. I indeed think that the manuscript has improved considerably, and could be accepted with relatively minor adjustments. As I read it, my main comments on this version is that the authors in several instances sound a bit more positive than justified by the data (need to insert words such as ‘possibly’ or ‘potentially’ or even ‘probably’. Along similar lines, the authors (see e.g. comment on line 35, below) use sentences containing statements such as ‘Rayleigh-type enrichment, Mg exclusion, and element-specific transport processes’ – without making it clear whether they want to invoke one of these processes, or all of them, or are just uncertain and it could be either or several of them combined. I suggest that they make clear whether they have an opinion whether one of these is more probably involved, or whether they leave this fully open.

A minor irritant for me (though many authors do this): the use of ‘El/Ca ratio’: El/Ca IS a ratio, thus one should use ‘El/Ca’, or ‘El/Ca value’, but not ‘El/Ca ratio’.

In my earlier review I commented on a lack of environmental data; these are now included (to some extent).

However, the authors in my opinion do not sufficiently address the question of composition of equilibrium calcite under such conditions. How far off are the biogenic calcites investigated here?

I like the compilation of published (supplement), but still miss seeing a reference to Blackmon and Todd 1959 (J of Paleontology 33, 1-15), in my opinion a groundbreaking discussion of Mg/Ca including in miliolids.

34: “rare earth elements (REEs) with order of magnitude differences (up to 45 times), and moderate but systematic **differences** for other elements (e.g., Zn, Cd, Fe).” Suggest to insert ‘differences’ before ‘for other elements’.

35: “This dichotomy likely reflects fundamental differences in biomineralization pathways between the two orders, **potentially including differences in calcifying-fluid regulation, Rayleigh-type enrichment, Mg exclusion, and element-specific transport processes.**” I do not think we know that all the elements of ‘calcifying fluid regulation’ listed are involved in the specific differences in El/Ca, so maybe add ‘potentially’ before ‘including’?

43: “The direct coupling between ambient seawater chemistry, **temperature** and the biomineralization pathways that **leads** to the precipitation”: ‘leads’, not ‘lead’ (subject is singular)

54: “with miliolids and rotaliids” **presently**” representing the most widespread and ecologically dominant calcifying orders characterized by multichambered tests (de Nooijer et al., 2023; Pawlowski et al., 2013).” Suggest to insert ‘presently’, since this has differed over geological time (or ‘since the Middle Cretaceous’)

154-155: I do not like this sentence ‘**More moderate miliolid enrichments, up to fourfold, are observed for Cd, Mg, Cu, and As.**’, because for Mg/Ca there is a small group of values in rotaliids which is as high as that in miliolids. It thus is not always true that miliolids show moderate enrichment relative to rotaliids (although it is true for many cases). It seems to me from Figure 2 that this puts Mg/Ca in a category by itself.

Caption fig. 4: “**Distribution of El/Ca between different taxa**”. Suggest to insert ‘of’ after ‘Distribution’.

254: “probably evolved under different oceanic conditions (Loeblich and Tappan, 1987), **possibly** leading to calcification mechanisms adapted to distinct seawater chemistries”. This is a very positive statement, but I personally do not think that there is truly convincing evidence that seawater composition at the time of origin of a taxon fully defines its calcification mechanisms, and the data in this paper could be used to argue against that hypothesis – and you indeed argue so (e.g., section 4.2; and the sentence in line 357: ‘This pattern suggests that rotaliid calcification should **not be treated as a single uniform mechanism**’, and line 372: ‘Although Mg/Ca has been proposed to reflect evolutionary adaptation to changing seawater composition (de Nooijer et al., 2023; and your discussion of Amphistegina-Pararotalia – lines 372-375), **our data suggest that species-specific biological regulation exerts a dominant control**’) After all, there are considerable differences between rotaliids – do you want to argue that the origin of a species or a genus (or whatever other taxonomic level) reflects sea water composition at time of origin? Maybe insert ‘possibly’ before ‘leading to’ to indicate some uncertainty as to this point?

335: “For example, the relatively low Mg/Ca in *Lachlanella* sp. compared to other miliolids has previously been interpreted as a record of colder winter temperatures (Titelboim et al., 2017).” I do not follow this argument – are you arguing here that the different miliolids dominantly calcify at different times of the year? Please make that clear.

343: “Published data from both rotaliids and some miliolids show a broad range of Mn/Ca values, typically spanning from <1 to ~300 mmol/mol, with *Lachlanella* sp. representing a notable high-end outlier (van Dijk et al., 2020) and in the current study (Fig. 4).” Something missing in the underlined part of the sentence: do you mean ‘**also** in the present study’?

351: “Thus, *Lachlanella* sp. illustrates how the general miliolid enrichment pattern can be further amplified or modified by microhabitat conditions, particularly for redox-sensitive elements.” To me, this reads like a plausible hypothesis, for which some evidence is presented, but it is in my opinion not definite that indeed microhabitat defines EI/Ca; different explanations are still possible.