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Interactive comment on “Spring molybdenum enrichment in scallop shells: a potential tracer of diatom productivity in coastal temperate environments (Brittany, NW France)?” by A. Barats et al.

Anonymous Referee #2

Received and published: 23 September 2009

General: This ms. describes the Mo/Ca ratios in shells records of juvenile scallops (*Pecten maximus*) mostly from the Bay of Brest, Brittany. These records consistently show strong transient spring-time excursions of Mo/Ca ratios against very low background values. The consistency of this signal is studied by analyzing shells collected over a 7 year period. Enrichment of Mo by diatoms and settling of diatoms on the sea floor, where scallops thrive, followed by microbial decomposition and release of Mo are thought to represent the source pathway of the high Mo levels in the shells. While highlighting the usefulness of this trace element as a proxy for diatom productivity (the

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most convincing part in the discussion section), the work also reveals that Mo is not behaving conservatively in these coastal environments.

While this study completes other published work by the first author and co-authors on Mn and Ba in scallop shells and is a valuable contribution to the domain of paleo-proxy validation, the manuscript, however, is poorly written and therefore difficult to read. Furthermore, a serious effort is required to improve the English. Therefore, in its present state this ms is not acceptable for publication in BG.

Some specific comments:

M&M Though not essential, a schematic showing how the shell slab was cut would be a nice addition, even if shown in earlier papers.

No details are given about the applied statistical analysis

No details are given about the analysis of dissolved Mo

Measuring Mo concentrations 1m above the seafloor to assess the SWI gradient is not meaningful, considering that the true concentration gradient likely stretches over the cm scale rather than m scale

p8045, Line 5: write SWI in full at first use of acronym p8048, Line 1: Ca concentration in the shell: write as 400 mg g-1 rather than 40% and state that it is assumed that the Ca concentration in the shell remains constant p8048; Line14: Provide position of the SOMLIT station relative to the shell collection sites

Results Reproducibility: Considering an uncertainty of about 3 days for the deduced time scale how would this affect the correlation between the Mo/Ca profiles (Table 1)?

The 5 successive peaks of Mo/Ca are more clearly seen when inspecting Figure 1a rather than Figure 1b, as stated in the text.

Inter-annual study: it is stated (8051; lines 19-21) that Table 1 shows an inter-shell comparison over 7 years. This information can not be found in Table 1 as stated ($r^2 >$

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(?) 0.37 ; $p < 0.05$; $n > 60$); unclear where $n > 60$ comes from.

p8049, Line20: Fig 2b should be Fig 1b p8051, Line 9: Comptopallium Radula should be written as Comptopallium radula

Section 3.2.1 is poorly written onwards of Line 7 p8052; Line 11: PSNZ =??? don't use but write Peudonitzschia p8052; lines 15 to 19: "studied period" – "3 different integrated periods" ... absolutely unclear what is meant here

Section 3.2.2; p8053; Line 8: diss. Mo was measured in bottom seawater at 1m above seafloor, but in the text this is presented as diss Mo at the SWI, which is misleading. Also, the Mo/Ca ratio 1m above seafloor is probably not the ratio 'seen' by the scallops thriving on the seafloor. In such circumstances a 'single drastic spring increase' does not mean much. There are no details given on the sampling and the method used for diss. Mo. ...

Discussion Many examples of poor writing in this section and Results and Discussion sections are not well resolved.

Section 4.1; p8055; Lines 3 -11: Unclear which differences there are between Wadden Sea and Bay of Brest; p8058; Lines 15 to 17: scavenging of what ? large cell size enhances scavenging ? (scavenging efficiency is related to surface/volume ratio rather than size); density enhances scavenging ?

Table 1: heading of the (Mo/Ca)shell column should read atom ratios ($\mu\text{mol/mol}$), not concentrations ($\mu\text{mol/mol}$) as stated

Fig 5: salinity data should be given without units

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