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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.**

**J. Bijma (Referee)**

jbijma@awi-bremerhaven.de

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The paper by Barats et al. investigates possible mechanisms that trigger Mo/Ca peaks observed in scallops. They present evidence that the Mo/Ca peak is not analogous to the Ba/Ca peak which is often associated directly with a spring bloom. Instead, the Mo/Ca peak seems to be related to wintertime silicate loading, the extent of silicate depletion during the spring bloom in combination with the decomposition of the flux at the sediment water interface. Interestingly, the intensity of the Mo/Ca peak seems to be related to the delta silicic acid concentration between winter and spring. The data

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in the paper are fascinating but the authors have not done a good job in putting it all together in a publishable fashion. In fact, the reader gets the impression that this is an early draft that still needs a lot of reworking and an English native speaker to go through the final version of the text. Too many sentences are unclear or sloppy:

Line 20, p. 8043: "... the dynamic of spring diatom blooms..". What do you mean abundance? Timing?

Line 13-15, p. 8044: "... The interpretation of the archived information is however to date lacking of accurate time assignment of the measurements." What is time assignment of the measurements? I guess, I know what you mean but this is not the way to put it.

Line 13-15, p. 8044: "... P. maximus is a non-selective filter feeder ingesting both dissolved seawater and all compartments of particulate matters." The concept of "dissolved seawater" is new to me and what are "all compartments of particulate matters"? I guess size spectrum? See also line 10, p. 8053; "...In 2000, Mo concentrations in dissolved seawater exhibited. . ."

Line 19-20, p. 8045: "...Mo benthic inputs to the SWI can be induced under suboxic diagenetic conditions via the reduction of sedimentary manganese oxides. ...." I suggest to show the equations.

Line 9-11, p. 8046: "...Recently, Dellwig et al. (2007) revealed a non conservative behaviour of Mo in the water column of a coastal environment (Wadden Sea, Germany) (Dellwig et al., 2007)." Take "(Dellwig et al., 2007)" at the end of the sentence out.

Line 5, p. 8048: "...,conducing to the definition of trace element shell profiles." ? What is meant by "conducing to . . ."

Line 29, p. 8052-line 1, p.8053: "...statistical results underline an ecological state of the spring middle period. . ." What is the meant with "ecological state"?

Etc. (I will mail an annotated hardcopy to the corresponding author)

Many abbreviations (SWI, PSNZ, -1W+1W) are used before they are properly defined.

The cleaning procedure (line 13, section 2.1) should be provided.

In section 3.1.1, line 17, one could argue that there are 4 significant peaks, instead of 5 (although its fine with me to go with 5)

The result section contains many parts that need to go to the discussion. On the other hand is the result section, although very long, missing a description of some important characteristics of the figures. For instance, Fig 3. Sometimes (1998, 2000, 2003) Mo/Ca peaks lag the Chl a maximum; Sometimes (1999, 2001) the Mo/Ca peak and the Chl a maximum are co-incident; Sometimes (2002, 2004) the Mo/Ca peak seems to lead the Chl a maximum. At very similar Chl a maximums, the Mo/Ca peak may develop stronger or weaker. All of this seems to point to a strong control of the conditions at the sediment water interface as well as the presence of some threshold.

In section 3.2.2 (line 15-17), the authors state that "...In 2000, this partition coefficient revealed a background averaging  $DMo = 1.5 \times 10^{-4}$  punctuated by a single drastic spring increase (maximum value: 0.081) concomitant to the maximum ( $[Mo]/[Ca]$ ) shell event." However, there is no apparent reason why the partition coefficient should change (as opposed to e.g. Mg/Ca, where we use the ca. 3% change to approximate temperature.

Line 8, p. 8055: "... different hydrologic and climatic conditions of the ecosystem...". What are climatic conditions of the ecosystem?

The bottom line is that, although the data are very exciting, this paper needs significant reworking and can not be published in BG in its present state. Specifically, the result section needs to be screened for parts that have to go to the discussion. Also, the conclusion that the Mo/Ca peak seems to be related to wintertime silicate loading + the extent of silicate depletion during the spring bloom in combination with the decomposition of the flux at the sediment water interface, seems to be a very long chain of

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events. Maybe all of this can be condensed to the observation that the intensity of the Mo/Ca peak seems to be related to the delta silicic acid concentration between winter and spring, which can be linked to the intensity of the biological pump (Si and organic flux) and hence to the redox conditions below the sediment water interface. Maybe there are even data on this? At the end of the day, the intensity of the Mo/Ca peak is related to the mobilization of Mo.

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