Interactive comment on "Diatoms as paleoproductivity proxy in the NW Iberian coastal upwelling system (NE Atlantic)" *by* Diana Zúñiga et al.

L.J. de Nooijer (Editor)

lennart.de.nooijer@nioz.nl

Review of BG-2016-201

Dear Dr Zuñiga and co-authors,

I have read the updated version of your manuscript. It has improved considerably, although after some close reading of mine, my opinion remains that you need to make some more thorough changes to the manuscript before acceptance in Biogeosciences. First of all, in my previous assessment, I asked you to use your results to improve paleoceanographic reconstructions using diatoms. One of the reasons for asking this, is that approximately half of the introduction focusses on the use of diatoms for paleoceano-

graphic reconstructions. Could paleosamples be included as 'additional' samples to the CCA (figure 8) to determine what past conditions were (given those included here in the analysis). What would roughly be the uncertainty related to such an approach and what could be done to further improve the applicability of diatoms as reconstruction tools?

Second, and as stated earlier by one of the reviewers, the results presented here should be more directly be compared to the results of previous studies reporting (long-term) monitoring studies. Issues that need to be discussed include: are total fluxes comparable to those of other studies? What are the (dis)similarities between the relative abundances reported here and those of other studies? The CCA shows the correlation between some species and some environmental parameters: is this also reported in other studies? And if there are (large) discrepancies, what could have caused them? Are there environmental parameters that were not included in the analysis that are known from other studies to have a large influence on diatom distribution?

Below, I have added some more, minor comments that may help to improve the manuscript.

Abstract

The first sentence of the abstract is a bit confusing: it is difficult to see how "diatom species could determine the primary production signal...". I think this reads better as something like: "...how the community composition of diatoms reflects sea surface conditions..." Or something similar. This would also make the second sentence of the abstract redundant. Line 17: remove "was used" Line 18 and throughout the text: "2.2 ± 5.6 106" is a bit confusing. "2.2 (± 5.6) * 106" would be more clear. Line 19: remove "strong" Line 19-20: discrepancies usually refer to unexpected/ unusual differences between multiple items. I guess here the authors imply discrepancies between different sediment trap samples, although that may be better described as "variability". Or do the authors imply that there is a real discrepancy between the totality of the sediment

trap samples and another dataset? Line 25-26: it is unclear what is supposed to correlate... Absolute numbers are not correlated to what exactly? Lines 25-30: it should become clear that sediment trap-data were compared to diatoms retrieved from core-top material. Line 32: the use of "Further" is inappropriate here. Line 33: please write "vs." in full.

Introduction Line 5-8: the end of this paragraph suggests that this study will somehow deal with the global contribution of diatoms in exporting carbon and Si to the seafloor, which it doesn't. These sentences should reflect the overall aim of this study and should connect to the main conclusions. It also doesn't link to the first sentence of the second paragraph. Line 9-15: it is not clear from the text why there should be a need for regional calibrations. Probably best to rephrase this paragraph: there are numerous long-term studies, which have shown that there are considerable differences between regions. Then, why is it particularly interesting/ necessary to study the Iberian Margin? Are regions with clear seasonal upwelling not covered in the listed long-term studies? Line 20-22: so, if other authors already showed that diatoms from core-top samples reflect those that are found in the overlying water column, what is the need of this particular study?

Material and methods

External forcing Line 13-14: replace "accessed via" by "available through". Line 25: not all readers may be familiar with "Puertos del Estado". Please explain what this is.

Water column Line 27: replace "on board" by "by". Line 29: assuming that the Niskin bottles are made of PVC and have a volume of 10 liters, please put a space after the "L" in "10-LPVC". Line 7: from what depths were the samples taken for determining the diatom abundances? Were these depths sampled every single time? Were the samples combined before analysis of the diatom species assemblage? If not, did the authors find consistent differences between water depths? Line 13-14: this sentence is redundant: it also appears at the end of section 3.3

Surface sediments Line 13-17: how was the sample taken? To what depth was the box core sampled? Do the authors have an idea about the sedimentation rate in this area and thereby, have an idea about the age that the diatoms may cover? Was there only one sample taken? If this is the case, could the authors make clear why there is no influence of spatial variability?

Statistical data analysis Line 19: please remove the second "between".

Results

Environmental conditions Line 8-22: please add a description of the variability between years. I.e. are the observed trends consistent between years? Line 15-16: what exactly is the uncertainty here? Is this the standard deviation? If this is the case, the variability between samples must be very high and there should be a report here of minimum and maximum values in addition to the average values. Line 16-17: what do "exceptionally" and "relevant" mean here? Line 18: should be "lead" instead of "leaded"

Sinking particulate material Line 24-5: the description does not mention (variability in) absolute numbers as found in the samples, only the relative numbers. A brief description of the trends in absolute numbers should also be included. Line 25: should be "followed".

Relationships between sediment trap main diatom groups Line 11-22: why are the samples from the water column not added to the CCA?

Discussion

Sediment trap diatom assemblage Line 19: "One additional evidence" is not correct English. Please rephrase. Line 9-28: this section lacks a thorough comparison to previous (long-term) monitoring studies on diatom assemblages, which needs to be included in the discussion.

Seasonal succession of diatom species As stated before, this section (or an entire new one) needs to make clear what this dataset can add to the use of diatom assem-

blages as reconstruction tools. With the statistical analysis presented in this section, the authors should be able to propose a (quantitative) use of such assemblages to reconstruct upwelling/ downwelling conditions.

Figures The lighter two colors are difficult to distinguish in figure 4. Figure 8 can be improved too by enhancing the contrast in the symbols used. The captions of figures 3-7 should explicitly state whether the figure displays CTD- or sediment trap samples.

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