

Interactive comment on “A two-decades (1988–2009) record of diatom fluxes in the Mauritanian coastal upwelling: Impact of low-frequency forcing and a two-step shift in the species composition” by Oscar E. Romero et al.

Anonymous Referee #1

Received and published: 30 October 2020

The authors present an almost 20-year-long record of diatom fluxes retrieved from the Mauritanian coastal upwelling, a region of high productivity (and therefore economically important region). Authors performed an exhaustive taxonomical analysis of 282 samples, which represents a tremendous effort due to the high diversity of diatom assemblages collected by the traps. The authors grouped diatom assemblages in ecological groups and relate their temporal changes to different environmental parameters with particular emphasis in their relationship with climatic phenomena with multiannual variability such as the Atlantic Multidecadal Oscillation and El Niño–Southern Oscillation

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(ENSO). Authors identified three major intervals throughout the time series based on the changes in the intensity and composition of the diatom fluxes. These intervals are linked with the previously mentioned multiannual climatic phenomena. It is important to highlight that this record probably represents the longest diatom-flux sediment trap ever reported in the global ocean, and that allowed to assess the interannual variability of diatom fluxes in a high productivity region (EBUES). The manuscript is well-written and novel and has high scientific impact. Moreover, the the statistical analysis appropriate and the figures of high quality. There are only a few aspects that require further clarification and discussion before the manuscript can be published in Biogeosciences. Find a list of my comments/suggestions below.

Line 25: Please include AMO between brackets the first time it is mentioned in the text.

Line 91: I believe authors could go a little bit further and state that this is the longest diatom time series sediment trap record of the world's ocean.

Line 108: Authors should be more specific and specify the depth range of the position of the sediment traps during their study in the text (i.e. not only in Table 1).

Material and methods Line 105 Since there are several gaps in the sediment trap record, authors could provide the number of days sampled during the 19-year record (i.e. the proportion of days sampled versus the total number of days). This would help the reader to have a better idea of the gaps in the record.

Line 108 Could authors provide sampling intervals for each deployment in Table 1 and at least a range in the main text?

Line 111. While I agree with this statement, there were two mooring deployments with sediment traps deployed at 700 m and therefore their collection efficiency could have been compromised. Since the collection interval of one of these deployments coincided with an strong ENSO event, it is important that authors discuss in the text the possibility of collection efficiency issues during these intervals.

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Line 156. Could authors provide annual diatom valve estimates for the years with the most complete records? Even a rough estimate of the annual fluxes at this site would be useful for the specialized reader in order to be able to compare the diatom fluxes of this site with other regions of the global ocean.

Results 257 Could authors provide a rough estimation, i.e. average daily and/or annual fluxes, for radiolarian and silicoflagellates fluxes? This would help the reader to understand the contribution of both groups in relation to diatoms. Also, as mentioned before, I would suggest to provide annual estimates in order to facilitate the comparison of the diatom valve fluxes of this site with other regions of the global ocean.

259 Please avoid the use of acronym TDF, i.e. write the name in full.

266 “the highest”

367 “concluded”

Line 385 Please specify/repeat when this change occurs here.

Line 429 “5.1.2 The occurrence of the strong 1997 ENSO and the response of the diatom community off Mauritania” The intense ENSO event registered by the traps coincides with the use of sediment trap record collected at substantially shallower depth than most of the other deployments. According to Table 1 the sediment trap from deployment “CBmeso8 upper” was placed at around 700 m while most of the traps used in the experiment were placed at > 3000 m (with some exceptions). The collection area of the shallower sediment trap and collection efficiency of the “CBmeso8 upper” could be different than the other records, and therefore it could have affected the composition of the diatom assemblage collected during this interval. Authors should discuss this point in the text.

Line 455 Authors could also cite the possible impact of strong ENSO events on the Mediterranean diatom fluxes as reported by Bàrcena et al. (2004) and Rigual-Hernández et al. (2013).

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Figures Figure 4. The graphs in this figure are too small for proper visualization. Please increase the size of the graphs.

References Bárcena, M.A., Flores, J.A., Sierro, F.J., Pérez-Folgado, M., Fabres, J. and Calafat, A., 2004. Planktonic response to main oceanographic changes in the Alboran Sea (Western Mediterranean) as documented in sediment traps and surface sediments. *Marine Micropaleontology*, 53(3-4): 375-398. Rigual-Hernández, A.S., Bárcena, M.A., Jordan, R.W., Sierro, F.J., Flores, J.A., Meier, K.J.S., Beaufort, L. and Heussner, S., 2013. Diatom fluxes in the NW Mediterranean: evidence from a 12-year sediment trap record and surficial sediments. *Journal of Plankton Research*, 35(5): 1109-1125.

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2020-336>, 2020.

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