

Interactive comment on “Bathypelagic particle flux signatures from a suboxic eddy in the oligotrophic tropical North Atlantic: production, sedimentation and preservation” by G. Fischer et al.

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A. General comments

The formation of mesoscale eddies in the ocean plays an important role in physics (e.g. transporting water, heat) while it impacts local biogeochemistry (transport of nutrients, chemicals) by affecting marine species abundances and community composition. This paper describes particle flux signatures in relation of a suboxic anticyclonic modewater eddy (ACME) recorded in Cape Verde Ocean Observatory for the period 12/2009 – 05/2011. The results are discussed in terms of bulk particle fluxes, community composition (phytoplankton & zooplankton studies), stable isotopes composi-

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tion ($\delta^{15}\text{N}$), and molecular biomarkers (alkenones). Although several processes occur during the passage of the eddy (enhance sedimentation, particles mineralization, changes in community composition) and cannot be fully explained, the authors have made a good job to address the observed phenomena/patterns in relation with their measurements. Overall, the results are well supported by the figures and this study will shed more light to the behavior of eddies in conjunction with biogeochemistry. However, I found the paper too long (maybe this is also due to the numerous parameters measured in this study which is not necessarily bad), especially the discussion section, which I had to read slowly to understand the information the authors were trying to deliver. I believe that this section should be reorganized and shorten along the lines given in summary (page 18284). In fact, I got most of the information by reading the summary and then I went back and read again the discussion. Finally, I believe that although the major outputs of this study are well summarized in Fig.10, the latter figure is only discussed in the summary section. This was really unfortunate as it hampers the possibility to the reader to have an overview of this study along with the discussion of the results. Moreover, I believe that the conclusions and outlook should also be moved to discussion section and elaborated along with the author's results. Please consider my following comments while revising your MS.

B. Minor comments

(1) Abstract: As a general rule it is good idea to give in the abstract the values of the measured parameters so that the reader is not obliged to look for them inside the paper. line 7, page 18255 : give the values of the mass fluxes line 8, page 18255: same for Bsi and organic carbon line 17, page 18255 : same for $\delta^{15}\text{N}$ page 18256, line 6: Give the values of the carbonate fluxes (2) Abstract : line 24, page 18255. Give an example to support your statement. What kind indication do you mean ? (3) Abstract: line 26 page 18255- line 2 page 18256. Please rephrase this sentence, it is not clear. (4) Abstract: lines 10-12, page 18256. The abstract lacks of an overall conclusion of your study. Is this statement your final conclusion ? (5) Introduction,

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page 18256, line 15: There is no need to indicate the name of the stations (BATS, HOT etc) because you indicate Atlantic & Pacific ocean by giving the references as well. Please also delete "e.g." and do not provide an overwhelming amount of references (max 3-4; the most recent by preference). (6) Introduction page 18256, line 17. Delete "e.g." (7) Introduction page 18256 line 21. Delete the coordinates of the EUMELI site, too much info. (8) Introduction page 18257 line 25. We used monthly catches. (Since the experiment is over now use past tense). (9) Introduction page 18257, line 28. Same as above (use past tense). "allowed us" (10) Introduction page 18258 lines 4-9. Please delete. This repeats what is said before in the same paragraph (18257 page, lines 24-). (11) Introduction page 18258, lines 10-15. Does this experiment/project have a name? If so, just mention quickly the name of the project without giving references.

Example: Our work is a contribution to the "X" project that aims to explore ecology, physical processes etc in low oxygen eddies.

As a general rule please shorten your sentences. There is no need for such detail info unless you feel that this is crucial for the readers to understand your context. The above info may alternatively be included in the acknowledgement section.

(12) : Oceanographic, biological and atmospheric setting at the CVOO. This section should be merged and shortened if possible with in the materials & methods (3.1).

(13) Page 18258, line 26: See comment 8. Showed mostly (14) Page 18258, line 27:was observed.... (15) Page 18259, line 1: ...were found... (16) page 18259, line 8: Do you mean "exhibit" here instead of develop? (17) page 18259, line 20. Delete ballast Theory and give only the Armstrong reference. (18) page 18259, line 25. Delete the coordinates of the EUMELI site because you back it up with the reference Bory et al., 2001. (19) Page 18261, line 10: Delete "eg" and for a review. (20) Page 18261, lines 10-12: Please delete this sentence and include the references Boyd and Trull 2007; Berelson... after Buesseler et al., 2007. (21) Next sentence. We used samples collected on roughly.... and March 2011 (Table 1). Delete the next sentence

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(detailed sampling analysis is given....). Please try to make lighter your sentences and avoid repetition. (22) Page 18261, line 19: Large swimmers were removed manually and /or by filtering carefully... (23) Page 18261, line 22: Delete subsequently. (24) Next sentence. Additional methods information is given elsewhere (Fischer & Wefer 1991). (25) Page 18262, lines 14, 16. Use past tense here. (showed, were) (26) 3.4 Coccolithophores studies. -Studies splits ranged from 1/250 to 1/2500 and were filtered.... -delete "schleicher and schuell 47 mm. Only provide the pore size (0.45 mm). -delete the brand of the electron microscope (too much info). (27) 3.5 calcareous zoo studies - delete the brand of the balance and that of the microscope -fluxes mg m⁻² d⁻¹ (28) 3.6 Stable isotope ratios. I believe that it was a missed opportunity to perform $\delta^{13}\text{C}$ measurements as well. As far as I know Carlo Erba mass spectrometers provide measurements of both isotopes. Was there a reason that such measurement were not performed?

In this section you do not need to give all of these details because it is a common place technique. 1-2 references will do the job along with the analytical error of technique.

The purity of gases, the different generated gases by the combustion all this info is unnecessary.

(29) 3.7 Biomarker studies. Same as 3.6. There is no need for such info. Please state very briefly your analytical protocol including the analysis procedure by giving the appropriate references.

(30) Page 18268, line 4. In the head title you indicate "Diatom fluxes" and you start the paragraph : Biogenic silica flux showed (You already provided this info in the mass fluxes section; second paragraph). Please advise.

(31) Page 18271 line 1. The "Giant Cape Blanc filament" and is characterized (32) Page 18276 line 4. Use past tense (showed) (33) Page 18277 line 12. 200 m d⁻¹ (34) Page 18279 line 4. What is CC ?? (35) Page 18281 line 20. 5.1 km d⁻¹. Use everywhere d⁻¹.

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(36) Conclusions and outlook. Although I enjoyed this part of the paper I believe it is out place and should be moved to discussion section and discussed along with your results. For example how your research did advance the state of the art and addressed the questions in this section ?

Interactive comment on Biogeosciences Discuss., 12, 18253, 2015.

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