

Interactive comment on “Regional and temporal variability of sinking organic matter in the subtropical northeast Atlantic Ocean: a biomarker diagnosis” by I. J. Alonso-González et al.

Anonymous Referee #2

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Regional and temporal variability of sinking organic matter in the subtropical northeast Atlantic Ocean: a biomarker diagnosis. By I. J. Alonso-Gonzalez et al.

General comments:

Vertical flux of organic matter such as POC, PON, pigments and amino acids were determined in the Canary Current region. The authors discussed the source and freshness of sinking particle from the variation of organic composition. The discussion using the pigment composition of settling particles includes novel interpretation. Although this paper has a merit to publication, it needs some modifications and amendments as described below.

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Scientific comments:

The discussion largely depended on the regional and temporal difference in the composition and abundance of microorganisms, including phytoplankton and zooplankton population and abundance of bacteria, though a little observation has been carried out. Since this affects the reliability of discussion, more information concerning with microbial population in key stations should be necessary. Although physical condition of each station has been shown, chemical condition such as nutrient concentrations are not available. The nutrient concentration deeply concern with the composition of organic matter produced by phytoplankton as well as primary production rate. The presentation of nutrient concentration is useful to compare the biogeochemical processes in eddy and open ocean stations. The contribution of amino acid-carbon (AA-C) to POC is useful parameter to assess the freshness of sinking particulate matter as well as C/N ratio. I recommend calculating AA-C/POC, because the detail amino acid composition is available. Further, the calculation of AA-C/POC and AA-N/PON and the comparison with the values have reported are seems necessary to assess the reliability of these values.

Detailed comments:

Introduction includes short review of the studies on the biogeochemistry in eddies and the clear statement of the object of the present study. Thus, this section is generally good.

p.11093, lines13-14: the length of the trap cylinder should be shown, because it is well known that the ratio of diameter/length concern with the correction efficiency of sinking particles.

p.11094, lines 2-6: the effect of DOC adsorption to determination of POC concentration, such as the contribution of DOC adsorption to POC measured as well as absolute value (03-1.6 μ molC), is useful to readers asses the possible overestimation quantitatively.

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p.11096, lines 3-5: although the precision of determination of dissolved oxygen concentration has been stated, the precision in the GPP calculated at each depth is also important.

p.11097, lines 5-7: it is better to state clearly that the comparison of isotherm depth is the seasonal difference.

p.11098, lines 4-5: mmol N m⁻² d⁻¹ instead of mmol C m⁻² d⁻¹.

p.11099, lines 14-15: the relation of the concentration of pheophorbide-a and grazing activity of zooplankton is unclear. It should be stated clearly with the reference.

p.11100-11101: the authors compared the mole% of individual amino acids among stations, but the differences are not distinct. The statistical analysis is necessary to conclude the difference in AA composition.

p.11102, lines 17-19: the paper(s) showing the relation of the abundance of pheophorbide-a and pyropheophorbide-a, and the grazing activity of mesozooplankton, should be cited here.

p.11103, lines 3-5: the comparison of AA-C/POC may direct information on the contribution of AA to POC.

p.11103, lines 18-23: the study(ies) showing the relation of AA composition and the phytoplankton group or degradation state, should be cited.

p.11103, lines 26-28: the authors discussed that the effect of grazing by mesozooplankton is minimum both FF and eddy-field stations (p.11102, lines 27-29). The description here is inconsistent.

p.11104, lines 14-15: the composition of phytoplankton is key information to the discussion of this paper. More detail data is necessary instead of the short statement as "CE1 was relatively enriched in diatoms"

p.11105-11106: it is difficult to explain that total AA flux in CE1 was higher than

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that in AE1 by 3 times, though the PON fluxes were comparable. Considering that the pigment flux was higher in AE1 than CE1, I would doubt the reliability of AA data in CE1 or AE1. Are the AA-C/POC or AA-N/PON values of the trap samples consistent with the previous studies?

p.11106, lines 19-20: is the enrichment of aspartic and glutamic acids in anticyclonic eddies statistically significant?

p.11106, line 20-22: the reference(s) is(are) necessary concerning the enrichment of aspartic and glutamic acids in coccolithophorids.

p.11108, lines 9-29: these discussions largely depend on the "expected" structure of microbial community. Are there any "observational" results?

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