Biogeosciences Discuss.,
https://doi.org/10.5194/bg-2017-573-RC1, 2018

Biogeosciences Discussions
Open Access
EGU

Interactive comment on "Mesozooplankton structure and functioning in the western tropical South Pacific along the 20 parallel south during the OUTPACE survey (February–April 2015)" *by* François Carlotti et al.

Anonymous Referee #1

Received and published: 7 May 2018

General comments

This manuscript describes a number of measurements characterizing mesozooplankton communities along a productivity gradient in the tropical Pacific. It contains a significant number of new observations that will help to understand trophic dynamics and biogeochemical fluxes in this region. At first the manuscript seems inappropriate for Biogeochemistry, as the objectives are formulated as pure descriptions of mainly the description of the taxonomical composition and biomass of the communities, with only minor part dealing with biogeochemical fluxes. However, this manuscript apparently

Printer-friendly version

Discussion paper

contains results supporting other accompanying manuscripts derived from the same cruise and more focused in biogeochemistry. Only for this reason the manuscript could be accepted for publication in the same journal but after fixing several issues detailed below.

Specific comments

1) The present style is purely descriptive. The objectives are formulated as mere descriptions of zooplankton communities along a transect. There are no explicit hypotheses behind their formulation. The need for more data in the study region is a poor justification for attracting readers in this journal. This is reflected in a long abstract ending without a clear conclusion. In addition, these valuable data need to be accessible to other future users by storage in a data repository (e.g. PANGAEA). The authors need to consider this later point and add the appropriate reference to data storage in the revised version. 2) Because of the descriptive conception of the manuscript the writing is wordy, with a poor synthesis reflected by a large number of tables and figures in the main text. There is an unbalanced treatment of the objectives: much detail in the description of zooplankton communities (5 tables and 9 figures) but only one table and one figure to present the results for the second objective. This treatment confounds the reader and loses the focus on the implication of the different composition of the communities for the biogeochemistry of this region. The authors must consider reducing the description of the communities to a lower number of tables and figures. For instance focusing in multivariate analyses and leaving complementary indicators (as rank and diversity index) to supplementary materials, will help to understand the second objective. In addition, there are some results not clearly justified from the beginning. For instance, the record of zooplankton swimmers in the traps seems a bit odd in a general description of communities (unless it is used as an indicator of the migratory activity or of the potential for degradation of the sedimented matter). 3) The overall style of the manuscript indicates careless writing, with a number of mistakes and poor editing. This poor presentation greatly difficult the review process and affects

Printer-friendly version

Discussion paper

the understanding of the authors' interpretations. Particular attention must be taken with the use of acronyms (requiring definition at first use) and species names (see some specific corrections required below). 4) Methods (p 5, L 18): indicate sampling time (day or night) for the "regular" zooplankton stations. This is an important information as changes in day and night abundance and biomass have been found in the 5d-sampled stations. 5) Methods (p 7, L 7). Indicate analytical and measurement error for isotopic determinations. 6) Methods (p7, L 8). Indicate type of filters and volume filtered for seston determinations. 7) Methods (p7, L 28): define UVP (CTD may be acceptable without definition because of generalized use) 8) Methods (p8, L 12). Indicate the methods used for determining C, N, and P in zooplankton samples. 9) Methods (P9, L 8): why using only these variables for the PCA. Where other variables (e.g. nutrient concentrations) available? 10) Methods (p9, L 15) and thereafter: Spearman rank correlations are generally expressed with the Greek letter rho (ïĄš). I suggest using this letter instead of "Rs". 11) Results (P10, L10). I assume that differences between means were first studied by ANOVA as described but later paired differences were analysed with some kind of 'a posteriori' test. Indicate the type of test used and mark significant means in Table 1 for clarity (e.g. with different letters). 12) Results (P11, L6 and thereafter). Mean values and variability are mentioned several times in the text. In some cases the variability is defined as SD (standard deviation). I suggest defining this form in the first use and then use always the same format (mean±sd). Take into account that SD is also part of the code of some stations and its continued use in the text may confound the reader (e.g. P11, L31). 13) Results (P12, L29): use only full genus and species names at the first apparition in the text. Macrosetella gracilis is first cited in P 12, L17. Therefore it must be cited as M. gracilis thereafter (e.g. P12, L 29). Check that all species are cited in this way through the text. 14) Results (P13, L9) and Methods (P9, L24). Why using multiple regression to link environmental variables to NMDS first two dimensions? Justify the use of this method in preference to other alternatives (e.g. the BEST procedure in PRIMER V6). 15) Results (P14, L5-20). Consider expanding the description of the results related to the trophic interaction be-

tween phyto- and zooplankton, as this section appears to be the main link between the related manuscripts of the same cruise and contains the main biogeochemically relevant results. At the same time avoid repeating the text of the table heading in the main text (P14, L11-13) and use subscripts and superscripts for ammonium and phosphate (P14, L11). 16) Discussion. Consider reducing the length of the section dedicated to the description of communities (section 4.2) and, in general the titles of the subsections (e.g. 4.1. Characterization of biogeochemical regions; 4.2. Bottom-up control of zooplankton communities, 4.4. Top-down control of zooplankton on phytoplankton. 17) Discussion (P15, L22-23): Rephrase the description of correlations. Use "positive" and "negative" (instead of "good" and "inverse"). 18) Discussion (P15, L24-34). Explain better the causes of the change in the correlations between Chla and zooplankton variables. Only the eddy dynamics affect to the mismatch between phyto- and zooplankton? Consider also the different turnover time of phyto and zooplankton organisms (i.e. zooplankton integrate over longer periods). 19) Discussion (P16, L 12). Here is the first time that the study of swimmers is justified as an indicator of activity. It would be appropriate to state this justification earlier in the manuscript (e.g. in the introduction). 20) Discussion (P19, L10-13). Confuse and repetitive sentence. Rephrase to clarify the meaning: covariation of Chla with both N2-fixation and zooplankton variables suggest a link of N2-fixation with zooplankton. Also in P 19, L19: "...correlations between key species and diazotroph distributions..." 21) Discussion (P19, L21-34). All the trophic interpretation of the link between zooplankton consumers and N-fixers is made by direct grazing of filaments or particles. However, zooplankton can acquire diazotrophic N through microbial food webs, as the excreted DON can be taken up by bacteria, subsequently consumed by protozoans and metazoans (Mulholland, 2007), as interpreted in other studies (e.g. McCarthy et al. 2007; Mompeán et al., 2013). 22) Discussion (P20, L1): remove italics for Thecosomata. 23) Discussion (P20, L17) define DDA 24) Discussion (section 4.4). I find this the most interesting part of the manuscript, dealing with the top-down effect of zooplankton on the primary production. However several key issues were not mentioned. For instance, does the estimates of zooplankton graz-

Printer-friendly version

Discussion paper

ing match with the export (measured by the traps)? Is feasible to measure any export when zooplankton consumption accounts by >100% of primary production? Other important process to take into account is the zooplankton respiration. It can be assumed that zooplankton respiration would be high also when grazing and excretion is high, thus affecting the net carbon budget (P21, L1). Even when the estimations made from biomass and using equations from the literature (as in this case) only provide gross estimates of the real processes, they can be useful to detect future research needs and bottlenecks. A list of recommendations derived from the analysis of the fluxes in Table 7 would be appropriate. 25) The last sentence of the discussion (P21, L33-34) is not a conclusion and needs further clarification (tuna marine food web?). Because of the large number of results presented and discussed the final section of the manuscript would benefit from having the main conclusions summarized in a synthetic way. For instance, bottom-up and top-down control variability in the different regions.

Additional references: McCarthy, M.D., Benner, R., Lee, C., Fogel, M.L., 2007. Amino acid nitrogen isotopic fractionation patterns as indicators of heterotrophy in plankton, particulate, and dissolved organic matter. Geochimica et Cosmochimica Acta 71, 4727-4744. Mompeán, C., Bode, A., Benítez-Barrios, V.M., Domínguez-Yanes, J.F., Escánez, J., Fraile-Nuez, E., 2013. Spatial patterns of plankton biomass and stable isotopes reflect the influence of the nitrogen-fixer Trichodesmium along the subtropical North Atlantic. J. Plankton Res. 35(3), 513-525. Mulholland, M.R., 2007. The fate of nitrogen fixed by diazotrophs in the ocean. Biogeosciences 4(1), 37-51.

Interactive comment on Biogeosciences Discuss., https://doi.org/10.5194/bg-2017-573, 2018.

Printer-friendly version

Discussion paper