

Ocean Sci. Discuss., referee comment RC1
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Comment on os-2021-74

Anonymous Referee #1

Referee comment on "Carbon and nitrogen dynamics in the coastal Sea of Japan inferred from 15 years of measurements of stable isotope ratios of *Calanus sinicus*" by Ken-ichi Nakamura et al., Ocean Sci. Discuss., <https://doi.org/10.5194/os-2021-74-RC1>, 2021

General comments

In the introduction the authors mentioned quite extensively the anthropogenic impact on coastal seas, but it seems the data and consequently the results do not directly link to this topic. Although, they bring up interesting ideas (partly supported by literature) of possible links in the discussion.

In my opinion, the objectives presented at the end of the introduction are a bit too vague and it would help if the authors could present some of their expectations (they kind of do in the abstract) regarding the isotope values and mechanisms behind. It seems that the authors talk a lot about anthropogenic impacts but their aims and data are a bit vague to the subject. Similarly, they talk about lower-trophic-level ecosystems but never bounce back on this idea with their data analysis and results and only briefly brings it back to the discussion. For this reason, the introduction and discussion felt a bit disconnected from the data and their results.

The environmental data that have measured while sampling copepods are temperature, salinity and chlorophyll. The analysis they performed on this data (I have no complaints about it) are somehow disconnected from context (and aims) of 1) showing copepods isotope ratio would record anthropogenic impacts (as written in the abstract) and 2) of a shift/change in lower trophic level. I would have expected other proxies for anthropogenic impact (e.g., nutrients concentrations) and trophic level estimation (i.e., isotope signal of POM) to support such hypotheses in relationship with copepod's isotope data. From the literature cited in discussion, it seems such data are available (at least POM isotope signal, Antonio et al 2012) which they could have used in some analyses to strengthen their says in discussion.

To me there is also a conceptual problem of using copepods to mirror anthropogenic changes due to their relatively short life cycle, mobile nature and fast tissue turnover. I

would expect those to reflect seasonal variability in their food source and eventually anthropogenic activities. A direct link to such variables would thus be appreciated.

I also think the structure of the results could be improved by following the objective(s) and the methods (in the methods it is clear which equation the authors used to test their questions, but the questions are unclear in intro and do not appear in results). Results should be restructured to mirror the objectives and analyses for instance from the temporal aspect (long term and seasonal) and spatial (comparing stations) so it doesn't read as a report or a textbook. As an example, 3.3. currently named 'Generalized linear models' should absolutely be changed (and maybe split in different sections) to something more informative such as 'temporal trends' or 'seasonal patterns in copepods isotopes' ... the idea is to better connect aims with the statistical analyses the authors chose and to the results they found. Again, I would recommend the author to consider some kind of data analyses more directly related to anthropogenic impacts and to trophic level estimation to better support their say in discussion and the general thematic of the introduction.

The discussion is well documented and the author explored different explanation they bring up. However, some statements would need a bit more in depth connexion with the literature they cite and also with the data. It seems sometimes some statements are disconnected from the results.

A last remark, I am not myself a native speaker but the manuscript was not so smooth to read through. Even though the manuscript has been revised by professional editors, one being a native speaker, it reads odd in some parts and there is a lot of repetitive sentences around one same idea/say that could be condensed for a better reading flow (see examples in detailed comments).

Detailed comments

Abstract & introduction

L 12-13. Move 'during the last half century' at the beginning of the sentence.

L 19. high $\delta^{13}\text{C}$ values in copepods were associated...

L 27-31. These three sentences read odd and feel a bit repetitive... human activities is repeated three times over two lines.

L37-46. This selection of lines should be a paragraph all together, talking about stable isotopes. Lines 45-46 are redundant with lines 37-38.

L 47. 'in this study' this should be the beginning of a paragraph in itself talking about Calanus.

L 65. The aim of the study should be clearer and it would be great that the authors give some expectations regarding the results. For instance, their expectations of isotope changes in copepods regarding anthropogenic activities.

L 66. The spatiotemporal variations of lower-trophic levels ... variation of what ? chemistry ? food quality ? trophic interactions ? food web structure ?

Material and methods

L 84. Remove 'a temperature below'

L 100-103. Unclear how copepods were collected, pooled. 94 nets but 274 dried samples ? Please clarify this section.

L 103-104. At some stations [...] data from the same station. This sentence should be in data analysis section.

L 113-114. An example of sentence to rewrite. It is confusing the way it is currently written, especially mentioning twice the 'database' that was not introduced before. Maybe something like this could be an option: 'The amounts of carbon and nitrogen in each sample were also measured from which the C/N ratio of *C. sinicus* was calculated, however, this information was missing for 69 samples.'

L 166. Cite which environmental parameters.

In the 2.3. you mention what each equation is meant to test. Please keep the same idea of a structure in the way to present the results.

L 128. Interannual variations of stable isotope at every station

L 141. Note that we considered ...

Results

L 146. 3.1. Environmental variables, not factors

L 147. Please write fully the acronyms SST SSS SSC at the beginning of each section (here results section).

L 149. Why giving the range of SST and SSC and not SSS ? Or at least an average and sd ?

L 157. It is unclear if you describe the ANOVA in the methods.

L 173. This section could have its own title.

L 182. 3.3. title of this section should reflect the findings or objectives and not mention the type of analysis. From line 173 to the end of the results, it would be very nice to link it with objectives of the study (e.g. spatial patterns, temporal patterns, link with environmental data).

For instance, l 196, this is the beginning of the temporal aspect it seems.

Discussion

L 227. This statement needs more support or explanations.

L 229. Carbon and nitrogen in copepod tissues

L 240-244. This is typically an example of redundant sentences that makes the manuscript hard to read. Please condense, rephrase or reorganize.

L 251-252. This statement can be tested with POM isotope values (for one given year for instance depending on available data).

L 260-261. This statement needs more support.

L 277-278. I do not agree with this statement. It doesn't seem that your data support this local hypothesis or need to be explained in a clearer way (that you have local differences in isotope signal of copepods, then have a spatial hypothesis to be tested). It needs stronger evidences.

L 280-284. This needs to be brought up in the introduction.