Biogeosciences Discussions

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Comment on bg-2021-45 Stable isotope ratios in seawater nitrate reflect the influence of Pacific water along the Northwest Atlantic margin by Sherwood et al.

Anonymous Referee #1

Referee comment on "Stable isotope ratios in seawater nitrate reflect the influence of Pacific water along the northwest Atlantic margin" by Owen A. Sherwood et al., Biogeosciences Discuss., https://doi.org/10.5194/bg-2021-45-RC1, 2021

This study presents an extensive dataset focusing on N-dynamics along the NW Atlantic margin where water masses play an important role in nutrient distribution. The topic fits with the objectives of *Biogeosciences* even though there is the minimum amount of biology mentioned. Nitrogen and related nutrient dynamics are crucial elements to improve our understanding of biogeochemistry in the marine realm. Therefore, I think this study is an important input to our current knowledge on N-cycling.

The manuscript is well-written, figures and tables are structured nicely and representative enough. The dataset is extensive and the structure chosen here for results & discussion complicates the reading a little bit. However, I am aware that such extensive information is difficult to present. Accordingly, I have few suggestions to improve the MS for the different target audiences (e.g., ecologists, paleoceanographers) and to make it a bit more reader-friendly.

- Appendix with all the abbreviations used in the MS. Table 1 is really helpful, but if it fits with the journal regulations a list of all the abbreviations used would be nice.
- Additional figure showing water masses in-depth with characteristics; e.g., NE-SW transect along the margin vs water depth showing á°□^{15}N NO^-_3 (or other parameters to visualize the water masses in-depth and latitude). I am aware that Figure 3 aims and shows that, but I think such a transect would make it easier to visualize the different water mass dynamics and geographic distribution of stations for such a region. Station names could be also be shown on this transect figure.
- Ignore the use of sentences like "Figure XX shows this" e.g., lines 324 and 418. A reference to figures within the text should be sufficient.
- Accordingly, figure captions can be more informative and descriptive.
- Do authors plan to store the dataset on a public platform? I highly encourage this.

Abstract: Line 20: change N/P to N:P

Introduction:

I recommend changing the structure of the introduction. If the target audience is ecologists and paleoceanographers, I would start with a short introduction of the use of 15N in these fields and then focus on the region; why here? And later on, give this regional information that is now at the start of the section.

The current structure of the introduction; starting right away with water masses in the study area, also requires a reference to Figure 1. For someone interested in N, particularly in such a dynamic system, I find the current structure of the introduction is distracting.

The last paragraph of the section (starting from line 74): This part needs more information on the overall objectives of the MS including ecologic perspective as well as mentioned in the beginnings of sections 3.4 and 3.5 for instance.

Results & Discussion:

Full of information and well-designed in terms of structure. As I mentioned above, the description of figures shouldn't be given in the text though. If the figure captions are improved then such sentences (Line 324-326) could be removed from this part and the overall text can be simplified.

Does "near-surface" mentioned in subsections always consider the same water depths? E.g., in section 3.2.1 I am missing the information on Zp.

Why are á°□$^{18}O_{NO3}$ results not shown at all? I think it is worth mentioning them in the supplementary material.