

RC1: ['Comment on egusphere-2023-2595'](#), Anonymous Referee #1, 14 Dec 2023 [reply](#)

General comment

The manuscript “Distribution and source attribution of alkalinity in the Dutch Wadden Sea” examines spatial and temporal alkalinity dynamics in the Dutch Wadden Sea. The topic is timely and fits the scope of Ocean Science. The study design is appropriate, and the data set sufficient to answer the stated research questions. However, the manuscript is hard to follow and should be streamlined. The entire manuscript should have 3 to 5 well-structured paragraphs per page that address one specific topic. The introduction reads more like a study site description and does not give a broader context or demonstrates the need for this study. It would be helpful to put some of the results (e.g., most subplots of Figure 2 and Table 1) into a supplementary information and decrease the overall word count by focusing only on most relevant findings. The authors should pick up to three key messages on which they focus through the manuscript. The figures need some improvements. I suggest accepting the article after major revision.

AC: Dear reviewer, thank you very much for your positive and helpful comments, which have really improved our manuscript. In line with your suggestions, we have revised the Introduction, restructured the Methods and Results sections and also revised and improved the figures. Our detailed responses can be found below. As the study of TA generation and its possible pathways is a complex topic, greatly reducing the word count and removing parts of the manuscript would result in an incomplete study approach. We think that using at least all the parameters/stoichiometries we have completes the approach to identify TA-generating pathways. Even if this leads to a more complex and complicated discussion, we would like to stick to this more complex approach. However, we have revised some of the sentences in the discussion to make them more understandable.

Specific comments

Consider a more interesting and specific title.

AC: Done. We have adjusted the title in a shorter and more specific version.

L12 remove: “and compared it with earlier data”.

AC: We would like to stick to the announcement of the data comparison in the Abstract. However, we have rearranged the sentence in line with RC2 and changed the term “earlier” to “historical” data.

L19-22. This sentence is hard to follow and has too many citations. Consider splitting your sentences into two if they span over several lines and only cite most relevant literature for each statement.

AC: We have revised the Introduction and some sentences, such as the one mentioned above.

L64 – 66 Add dates.

AC: Done.

L75 Which kind of carbon measurements?

AC: We have replaced carbon with the specific carbon terms TA and DIC.

L137 Remove first sentence of caption.

AC: Done.

L201 Remove sentence. Avoid writing “various parameters “through the manuscript and list parameters instead. Try to be more specific.

AC: We have deleted the sentence you suggested and clarified the parameters where it makes sense to do so.

L204-205 Explain how you get to this conclusion.

AC: This sentence is based on plots not shown. We have edited the sentence.

L309 Faber studied mangroves. There is probably a study that is more similar to your study site.

AC: It is true that the study site in the reference is different from ours. However, what is interesting here is not the location, but the use of a tracer, in this case radon, to identify the source of higher TA values in pore water discharge, for which we used silicate instead of radon.

It is very hard to follow your discussion. Suggest reducing to the most interesting findings. Condense the information as much as possible.

AC: As mentioned in our first statement above, we would like to stick to all parts of our discussion. However, we agree with the complexity and have revised some sentences of the Discussion to make it more understandable.

Figures and tables:

Fig 1: Remove ESRI source code (in all figures).

AC: In accordance with the Ocean Science’s submission guidelines, we would like to stick to the ESRI source code in Fig. 1. However, Fig. 2 has been fully edited and created in R instead.

Fig. 2: This figure is too big. Show only one figure per page. Choose only most important parameters and put rest into the SI. You could plot all parameters against salinity and/or distance to the coast in one graph with subplots and discuss trends.

AC: We would like to stay with the spatial representation, but we have revised Fig. 2 and included most of the parameters in the Appendix according to your suggestion.

Fig. 4 and 5: Increase font size and point size. Axes should be aligned. Salinity looks strange in Fig 4d.

AC: Fig. 4 has been revised for better readability.

Put Table 1 in SI. Could add averages and standard deviations.

AC: Table 1 has been moved to the Appendix. As Table 1 contains individual observations, average values and standard deviations are irrelevant.

Technical corrections

When you reference two or more citations, the single citations are separated by a semicolon without any spaces. This looks strange. Please double check the citation guideline of the journal.

AC: The citation was made using the reference manager EndNote and the Copernicus style file “Copernicus Publications” as output style, as indicated on the Ocean Science submission website.

Avoid paragraphs with only one or two sentences.

AC: We have deleted some very short paragraphs and also restructured the section on methods section a little.

L81 Remove “.” before citation.

AC: Done.

L191 TA was defined before.

AC: We are not sure what you mean by this comment, as L191 contained Table 1 in the previous version of the manuscript.

L198 Rephrase this sentence, “arrived” does not make sense in this context.

AC: Thank you. We have changed “arrived” to “obtained”.

Do not overuse the term “shed light on...”

AC: Some of the terms have been revised to reduce the use of “shed light on”.

The reference list needs to be edited. E.g. CO₂ with subscript and uniform styles for titles. Include volume and page numbers for all references.

AC: We have revised the reference list.