

Interactive comment on “Inorganic carbon fluxes on the Mackenzie Shelf of the Beaufort Sea” by Jacoba Mol et al.

Anonymous Referee #2

Received and published: 29 September 2017

This manuscript reports on carbonate system conditions on the Mackenzie Shelf of the Beaufort Sea during the summer of 2014. A three-component mixing model is used to estimate proportions of TA and $\delta^{18}\text{O}$ originating from meteoric and riverine water, sea ice and Pacific water and this is cast within the context of a working circulation model (NEMO). They seek to understand the processes involved that regulate carbonate parameters on the shelf's mixed layer with the goal of quantifying shelf export. They find that upwelling, which was present prior to the cruise, and subsequent downwelling play important roles in controlling carbonate parameters.

The manuscript is well written and logically builds upon a growing body of observations and methods that have employed for interpretation of processes on the Arctic Shelves. They certainly did a lot with a sparse data set, which was taken during one cruise.

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Nevertheless, using their data, prior literature values and models allows a reasonable means to interpret the dataset.

I recommend a revision addressing prior comments as well as those below.

- 1) The manuscript becomes poorly organized starting with the results. Some of what is reported in there (e.g. Wind Forcing 3.3) should probably go in a background section.
- 2) Pg. 2, L 16. The comment that, “N flux from the MacKenzie has little impact on NPP” should be cited.
- 3) Pg. 2, L 16. What happens to DON/PON? Is it totally refractory? A citation would help
- 4) Pg 6 L10-15. A diagram would be useful for the reader.
- 5) Pg 6 “Calculation uncertainty”: Please clarify measurement uncertainty and methods. It’s confusing. Where exactly did the standard deviations come from? How do you know the sensor or instrument errors? Also your approach requires that the errors be normally distributed. Is this the case?
- 6) Advertise your main findings in the abstract and quantify them in the conclusions. A casual reader will not get the results of your efforts.
- 7) Several other edits picked up by reviewer 1 definitely need to be addressed.

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2017-318>, 2017.

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