

We thank the anonymous reviewers for their comments in this second round of evaluation which have helped further improve the manuscript. Here we include responses to all comments as follows: (1) Reviewer's comment, (2) Author's comment and (3) Suggested changes to the manuscript.

(1). The sub-sectioning in the 'introduction' is still a bit odd and this disrupts my reading. The latter two subsections could be considered to be integrated into the preceding paragraphs in the introduction, the 2.1 section, and the appendix. A concise introduction would allow the reader to move more quickly to the core of the results.

(2). **Response:** We agree with the reviewer.

(3). **Action:** We have integrated subsection 1.1 into section 3.1 on environmental setting (lines 160- 211) and we have moved subsection 1.2 to the end of appendix C (lines 933- 955).

(1). Lines 89-93 All these sentences are about the purpose of the article, please combine them. ("aims to...", "The purpose of...")

(2). **Response:** We agree with the reviewer.

(3). **Action:** Done. See lines 88- 92.

(1). Line 137 "...possibly nutrient limitation in Rijpfjorden" More complete nutrient consumption (as you summarize in table 2) in Kongsfjorden may contradict this sentence?

(2). **Response:** We agree with the reviewer.

(3). **Action:** We have now re-phrased this sentence for clarification. See lines 209- 211.

(1). Line 142 Casciotti et al., 2002 about oxygen isotope measurement should be cited. Casciotti, K.L., D.M. Sigman, M.G. Hastings, J.K. Böhlke, and A. Hilkert. 2002. "Measurement of the Oxygen Isotopic Composition of Nitrate in Seawater and Freshwater Using the Denitrifier Method". Analytical Chemistry 74: 4905-12. doi:10.1021/ac020113w.

(2). **Response:** We agree with the reviewer.

(3). **Action:** Done. See line 934.

(1). Lines 187-188 "The denitrifier method for..." move this sentence into Line 194. Lines 190-193 Move this paragraph after line 210.

(2). **Response:** We agree with the reviewer.

(3). **Action:** Done. See lines 119-120 and 138-140.

(1). Fig. 1 There seems to be errors in the latitude and longitude of Fig. 1a, please confirm.

Please double-check the latitude and longitude of the other figures as well. The y-axis of Fig. 1b is partially obscured

(2). **Response:** We agree with the reviewer. Thanks for the correction, Fig. 1a indeed showed errors in latitude and longitude caused by the polar projection. All other maps have Mercator projection and thus the latitude and longitude shown in figures are correct.

(3). **Action:** Done. See line 710.

(1). Fig. 3 Missing x-label in Fig. 3d (Distance (km)). Fig. 7-8 Phosphate should be PO₄³⁻ instead of PO₄²⁻.

(2). **Response:** We agree with the reviewer.

(3). **Action:** Done. See lines 735, 790 and 805.

(1). Fig. 11-12 A space should be added before the brackets (e.g., in x-labels and y-labels).

(2). **Response:** We agree with the reviewer.

(3). **Action:** Done. See lines 835 and 850.