



EGUsphere, referee comment RC2
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Comment on egusphere-2022-584

Anonymous Referee #2

Referee comment on "Nitrate isotope investigations reveal future impacts of climate change on nitrogen inputs and cycling in Arctic fjords: Kongsfjorden and Rijpfjorden (Svalbard)" by Marta Santos-Garcia et al., EGU sphere,
<https://doi.org/10.5194/egusphere-2022-584-RC2>, 2022

Santos-Garcia et al. through their manuscript have presented sources of nutrients and their cycling at two Svalbard fjords. Their analysis is detailed and employs a multi-fold approach. They did their best to present a (first) quantitative account of terrestrial contribution to the nitrate pool. The study also relates these processes to climate change and provides a convincing account of its future trends under a warming scenario. High Arctic fjords and Kongsfjorden in particular have become centers of multi-disciplinary research on the impact of warming and climate change in the Arctic. This study will surely benefit other aspects of the research being conducted at these sites. While I support its publication, there are a few concerns, comments, and suggestion that needs to be addressed.

- While I feel all the visualizations (both in-text and supplementary plots) to be appealing, uncluttered, and informative, the opposite is true for the text presented in the manuscript. Most of the sentences and sections are unnecessarily cluttered and difficult to read. English usage and grammar need a major overhaul throughout the manuscript in my opinion.
- Get rid of the equations in section 1.1. You may include them as a supplementary note. Reduce the number of sentences and also words within a sentence to better convey these ideas.
- A1 is very good as it contains all the information/ideas (of section 1.1) one needs to follow the rest of the manuscript. The authors may move this inside the main text and move the equations to the supplementary file. This will enhance the reading experience.
- Why a particular water-mass classification scheme was adopted? Why not widely used Cottier et al., 2005?
- The x-axis of Fig 8 and several others (distance) is not clear. Please mark this distance as a line in Fig 2.
- Lines (260-265): Water mass structures are dynamic. You may like to add the sampling period in parenthesis. This approach may be followed throughout the text.
- Lines (321-323): Why incomplete nutrient utilization? Wouldn't stratification enhance

relative nutrient utilization?

- Lines (349-353): What about low nutrient uptake close to glacier front and inner fjord in general. Instead of solely attributing the cause to plume discharge, I would also see the prevailing axial productivity gradient (see Kumar et al., 2016) as a potential reason. Perhaps it's a combination of both these factors.
- Line 474: You may check a modified form of this equation, which uses more representative sampling (Tiwari et al., 2018, doi: 10.1016/j.gsf.2017.12.007).