

## Comment on bg-2022-183

Anonymous Referee #2

---

Referee comment on "Particulate organic matter in the Lena River and its delta: from the permafrost catchment to the Arctic Ocean " by Olga Ogneva et al., Biogeosciences Discuss., <https://doi.org/10.5194/bg-2022-183-RC2>, 2022

---

This paper reports majorly the measurement of TSM, POC,  $\delta^{13}\text{C}$  and  $^{14}\text{C}$  in the Lima River during 2019, a year that represented "lower-than-average" TSM exports and showcased a strong positive influence on phytoplankton growth. The paper highlights the importance of deltaic processes. Findings are potentially important because they inform how climate change may influence Arctic carbon fluxes to the ocean. However, the paper has a few areas that require improvement. The authors fail to provide a discharge time series for the year of data collection and ArcticGRO sampling period to put their findings in context. The paper can be improved if the following changes are made:

- In the introduction section, explain the importance of Lena River and why it is important to study it in 3 sub-sections (as mentioned in lines 180-183). Further, add statements about the research gap and focus of the current study.
- Figure 1: Include the information on the sample number in the caption. Also, try to showcase three divisions of sample groups for easy understanding
- Figure 2: Edit and add mean values of your results and ArcticGRO which you are discussing in Sections 3.2.2 to 3.2.4
- Show the river discharge time series data relative to ArcticGRO. It is necessary to fully interpret these results.
- Lines 301-302 mention that 2019 was a year of lower-than-average TSM export. Discuss the variation in TSM and POC on a large timescale and present a plot of temporal variation for better clarity.
- Lines 309-310: Provide a figure or table comparing the POC variation with the published data
- Also utilize discharge data to calculate the flux of TSM, and POC and compare it with previous reports.
- Section 4.1.1 and 4.1.2: Again, it would be helpful to see the discharge time series for the ArcticGRO period of sampling vs other years such as 2019. These variations in POC% are hard to interpret without seeing the discharge time series. Further, it is often helpful to calculate the ratio of the coefficient of variation (CV) of your parameter (e.g., POC%) to the CV for Q;  $\text{CV}_c/\text{CV}_q$  to determine how much discharge is affecting the variation.
- Minor comment: Check the mention of the figure numbers in the text. There is no figure 3c

- Lines 420-421: Provide a reason for not analyzing  $\delta^{13}\text{C}$  of DIC. Additionally, you need to provide reasons why you considered that low  $\delta^{13}\text{C}$  of POC suggests a  $^{13}\text{C}$  depleted DIC pool with more references.
- Line 420:  $\delta^{13}\text{C}$  of DIC was found to be negatively correlated with DOC concentration. Is this the observation of Brunet (2005)? If yes, please rewrite the sentence with the proper citation.
- General comment. Do your data suggest any influence of lakes on your TSM and POC concentration? How do you rule them out?