

Response to Anonymous Referee #1

The reviewer's original statement is copied below and highlighted by underline. Our response follows in plain text (no underline).

For more detail, see separate upload of pdf document (bg-2021-181-RC1-response.pdf) where we respond directly to the all comments by the reviewer.

General comments

This paper describes a study relating glacier meltwater with chlorophyll concentrations around Svalbard. The authors use most (if not all) of the relevant bibliography in a study focused on an important theme in these times of rapid warming of the Arctic regions. Their methods combine coupled atmospheric and glacier runoff modeling and, satellite derived ocean data, which are appropriate methods to the spatial scale of the study. They conclude about a positive association between glacier runoff and chlorophyll concentration in 7 out of 14 hydrological regions within ~10 km from the shore. This conclusion is in line with related studies in Greenland and emphasizes the potential role of glacier runoff in stimulating primary production in adjacent coastal areas and it further contributes to the capacity of the scientific community to foresee the impacts of warming on the Arctic and Antarctic marine ecosystems.

The is an excellent and well written paper about an important topic. Therefore, I believe it should be accepted for publication after a minor revision. I made some suggestions directly on the pdf manuscript file which I attach. Please note that these suggestions should not be seen from my side as a necessary condition for paper acceptance.

Reviewer 1 spotted several typos and highlighted some text passages that would benefit from clarifications. The revised manuscript will accommodate all of those.

Specific suggestions by reviewer 1 (see annotated pdf file) that will be addressed, include:

- Provision of direct link to CHL a dataset used in this study, i.e.
https://resources.marine.copernicus.eu/?option=com_csw&view=details&product_id=OCEANCOLOUR_ARC_CHL_L4_REP_OBSERVATIONS_009_088
 - o please note that this is an updated version (after Dec 2019) of the original 8-day dataset used in our study
- "Perhaps it would be informative to compare regions with and without a significant runoff effect based on the tide water associated specific-runoffs?"
 - o This would be an interesting point to follow up. However, our timeseries of regional glacier runoff does not distinguish between runoff from land or marine-terminating glaciers.
- Fig.2 could include contour lines of 10, 20 and 50 km distance to coast
 - o We will include contour lines if this improves readability. The various marine zones (depending on distance from the coast) are already visualized through the colour-shaded polygons.