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Biogeosciences Discussions

Interactive comment on "Seasonal and spatial patterns of primary production in a high-latitude fjord affected by Greenland Ice Sheet run-off" *by* Johnna M. Holding et al.

Anonymous Referee #2

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Summary: This manuscript presents a field based study on primary production in a high-Arctic Greenland fjord influenced by run-off from melting of glaciers. Phytoplankton carbon content and rates was measured on a temporal (summer and fall) and spatial (from fjord head to mouth) grid. The authors found that the overall production in the fjord is low but steady compared to similar fjords. Spatially the inner stations had a lower primary production and chl a concentration compared to the outer stations. These findings were attributed to melting run-off from the glacier, which reduces light (due to sediments) and nutrients. This study provides a very good baseline study for glacier-influenced fjords along the little studied northeast Greenland coast and adds to the growing number of work on primary production studies across the high-Arctic.

Such studies are of particular importance in a time of global change.

Specific comments: The effect of wind is often strong within fjords, both on average through the year and due to storm situations. You mention that a storm did appear during your study and usually strong winds and storms will affect the dynamics of the upper water column. Do you have any data that shows if the physical and primary productive dynamics changed in the water column after the storm?

In this study primarily carbon content, chl a etc. is measured and was shown to vary spatially and temporally. It is known that there is a succession of phytoplankton present through the year and that they have different production rates, are of different sizes etc. I therefore wonder if you have any data on the community of phytoplankton in the different samples/stations?

Technical corrections: Line 67: delete "that". L 97: remove the capital H in high-Arctic. 100 – this general paragraph: just out of curiosity could you add the depth at each of the stations? L 295: remove "a majority of" and replace with "primarily". L 361: remove "is that". Figure 1: Maker the numbers in Fig. 1a larger. The figure is generally small making the numbers difficult to spot. Moreover, is the paper is printed in black and white they become impossible to see.

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