

Interactive comment on “Springtime phytoplankton dynamics in the Arctic Krossfjorden and Kongsfjorden (Spitsbergen) as a function of glacier proximity” by A. M.-T. Piquet et al.

Anonymous Referee #1

Received and published: 30 November 2013

Piquet et al. Biogeosciences Discuss This paper aims presents the dynamic and composition of springtime phytoplankton communities in response to prevailing water mass properties, glacier vicinity and meltwater release in Kongsfjorden, Svalbard. They hypothesize that during the spring bloom period, phytoplankton is already affected by glacial meltwater input, in particular at inshore locations. The paper is generally well assembled, although very detailed, which makes it difficult to extract the important findings. However, all the values and rates given should be useful for future modeling work. Cyanobacterial abundance The samples from inner part of the fjord, near glaciers, sug-

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gested high relative contribution of cyanobacteria, with up to 25% of total phytoplankton community. This is indeed very high, and the proposed explanation is that regular Atlantic water incursions might have contributed to transport of cyanobacterial species from the milder Atlantic currents into Kongsfjorden. Cyanobacterial presence was further proposed as an Atlantic water marker. Maybe cyanobacteria are also abundant in arctic or local water masses? Supposedly, they are generally absent from polar waters, although more recently a few studies have observed cyanobacteria in Arctic waters (as mentioned). Particularly in the inner parts of glacial fjords, the bacterial abundance could be enhanced by glacial-related mortality of organisms (Weslawski, J.M. and J. Legezynska. 1998. Glacier caused zooplankton mortality? J. Plankt. Res. 20: 1233-1240. Zajaczkowski, M.J., and J. Legezynska. 2001. Estimation of zooplankton mortality caused by an Arctic glacier outflow. Oceanologia 43: 341-351.) or feeding and egestion/excretion by upper trophic levels, seabirds and marine mammals (Lydersen, C., P. Assmy, S. Falk-Petersen, J. Kohler, K.M. Kovacs, M. Reigstad, H. Steen, H. Strøm, A. Sundfjord, Ø. Varpe, W. Walczowski, J.M. Weslawski, and M. Zajaczkowski. 2014. The importance of tidewater glaciers for marine mammals and seabirds in Svalbard, Norway. J. Mar. Syst. 129:452–471). Seasonal plankton development Plankton development in fjords reflects the recent history of water masses and ice conditions, which vary between years. In this study, early spring (9-12 April) samples were from 2008 and late spring (22 May – 25 June) samples were from 2007. Give differences between years, it is therefore difficult to interpret phytoplankton development based on parts from two years, and with more than one month lacking (mid-April to mid-May). Both are presented in Fig. 5, but these events are not sequential and the discussion becomes a mix of differences between early-late season and years. Some of the explanation was rescued only by comparing with other studies conducted in this fjord during the same years (e.g. Hegseth and Tverberg, 2013, with data from 2006-2008). In a future study, it would be nice to get sequential measurements from the over the entire early-late spring season from a single year. Then it would be easier to interpret the progression of the bloom with respective peaks of diatoms and flagellates, as well

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as the microbial community. A couple of specific comments are: References in text should be listed chronologically (not always done here) Italic should only be used for Latin names (genus, species) and not for higher taxa (e.g. families, classes, p. 15535)

Interactive comment on Biogeosciences Discuss., 10, 15519, 2013.

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