

Interactive comment on “Timing of sea ice retreat can alter phytoplankton community structure in the western Arctic Ocean” by A. Fujiwara et al.

Anonymous Referee #2

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General comments

This paper is about the spatial distribution of phytoplankton communities in the Arctic Ocean under different sea ice conditions as observed in 2008, 2009 and 2010. The phytoplankton community structure were infer from pigments determine using HPLC. The authors focussed on the surface water (5 m) and examined the spatial distribution of the phytoplankton communities in relation with environmental conditions such as temperature, nutrients and sea ice. The main finding is the evidence of a new phytoplankton structure dominated by haptophytes during low ice condition in waters usually dominated by prasinophytes (i.e. micromonas pusilla). This is an important result that deserve publication in BG, after some improvements of the paper.

Coupel et al 2012 published a paper in 2012 in BG on Phytoplankton distribution in

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unusually low sea ice cover over the Pacific Arctic. The sampling was in August 2008 in the same region; hence many stations are comparable. Interestingly, their sampling was about one month before the RV Mirai cruise. Coupel reported HPLC data together with taxonomic observations. It is surprising not to cite this particular study. When the Coupel et al results are considered, two issues come up:

The cluster 3, dominated by haptophytes, only occurred in September 2008 in the Canadian Basin. Coupel et al observed that this area was dominated by prasinophytes in August 2008. This means that the longer growing season of 2008 permits the appearance of a phytoplankton community that usually do not dominate under a normal ice season. This new community structure occurred at the very end of the productive season (September) when incident light has already declined very much. It is not clear in the current version of the paper what the authors mean by a shift in phytoplankton community structure. It seems to be a seasonal (temporal) shift since prasinophytes still the dominant species in earlier in season (in August). In other words, haptophytes probably dominate only for a few weeks in late season. The implications may be important, may be not so important. At the end of the summer in the oligotrophic waters of the deep Arctic basin, most of the primary production occurs in the subsurface chlorophyll maximum (SCM) between 40 to 60 meter depth (Hill et al., Prog. Oceanogr. 2013; Ardyna et al., BG 2013). The species composition actually differ in the SCM relative to the surface (Coupel et al., 2012). So future studies should consider the whole water column to evaluate the impact of species shift or succession community structure on the marine ecosystems. The authors must discuss this limitation

Specific comments

Please see the annotated PDF attached for all comments and corrections

Please also note the supplement to this comment:

<http://www.biogeosciences-discuss.net/10/C7805/2014/bgd-10-C7805-2014-supplement.pdf>

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