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Interactive comment on "Controls on microalgal community structures in cryoconite holes upon high Arctic glaciers, Svalbard" *by* T. R. Vonnahme et al.

T. R. Vonnahme et al.

tvonnahm@mpi-bremen.de

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Reviewer: The presented study investigates in good detail the control of microalgal communities in cryoconite holes on glaciers in Svalbard. The study is performed with great care at numerous sampling sites (62 cryoconite holes) on three different glaciers and provides new insights into the algal/cyanbacterial communities and is therefore recommended to be published in Biogeoscience. Most interesting is the lack of any significant negative correlation of grazers with the eukaryotic algal communities, more predictable the algal/cyanobacterial communities in relation to nutrient supply.

Authors: We want to thank the anonymous referee #2 for the time for this detailed

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review and the comments that will help to improve the final manuscript.

Reviewer: A few minor inaccuracies should be corrected before final acceptance of the study: p. 11752, l 12: when talking about 'large colonies' a cell number of < 10 cells appears rather small. (the same again in the discussion on p. 11771)

Authors: With large colonies we refer to a colony size that exceeds the maximum food size for possible grazers in the system. But we agree that the term is a bit misleading in this context. We will remove the term "large" in the corrected version.

Reviewer: p. 11757, l 2+10: avoid the term 'big' ciliates; rather 'large'

Authors: Thanks for the comment, we will change it in the corrected manuscript.

Reviewer: p. 11757, l 12: give an explanation why only moving individuals were counted – as estimate for their viability?

Authors: Only moving individuals were counted because they were active and most important in a cryoconite food web. In this sense it was an estimate for their viability/ activity. We will add this information in the corrected manuscript.

Reviewer: p. 11757, l 16: . . .estimated by epifluorescence microscopy for cyanobacteria and light microscopy for. . .

Authors: We will change this sentence accordingly.

Reviewer: p. 11758, l 15: the results on 16S rRNA sequencing come suddenly, they were obtained earlier (in 2012) and likely from similar, but not the same sampling sites. Have these studies been published before? if so give a citation, if not explain that they were used only as a comparison for genus distribution and give a citation for the methods used (MiSeq Illumina sequencing); as it stands no, the reader does not have enough information to judge on significance of this comparison.

Authors: We will add a detailed description and the accession number of the 16S rRNA sequencing in the corrected version of the manuscript. The data are not unpublished.

BGD
12, C8670–C8673, 2015

We will add the required information why it was used and where the samples were taken. The detailed method description can be found in the reply for referee #1.

Reviewer: p. 11761 l. 16: see above, if this is an integral part of this study, more information is needed – similar sampling sites etc. otherwise no direct comparison is possible.

Authors: The sampling sites for the 16S rRNA sequencing are near the other sampling sites. We will add their coordinates and distance to the closest cryoconite hole for microalgae and grazer quantification.

Reviewer: p. 11765, l 10: should it not read: . . . bird colonies with high nitrogen levels?

Authors: Yes you are right. We will correct this mistake in the corrected version.

Reviewer: p. 11765, l 23: not sure if 'trichomes' of Oscillatoriales is correct, the author rather mean 'trichal' Oscillatoriales; (the same again in the discussion on p. 11771)

Authors: We will correct this term in the corrected version.

Reviewer: p. 11772, l 4 Green microalgae . . .occur mainly as single cells – this is likely too general e.g. filamentous Zygnemales (like Ancylonema) never occur as single cells.

Authors: We agree that this statement it too general in the context of this section and we will change it here. We did have quite some filaments of Ancylonema, but we also found a lot of single cellular Zygnemales. The Chlorococcales were never filamentous.

Reviewer: p. 11792 Fig. 3 c it is not clear which column is for Hørbyebreen (Hørbye.1) and Norden.1 (in the figure only the respective .2 are marked? what is the middle column??

Authors: The middle column refers to Nordenskiöldbreen. But we agree that this is not clear from the current plot. We will correct the plot for the corrected version of the

BGD

12, C8670–C8673, 2015

manuscript.

Reviewer: p. 11795 Fig. 6 Rotifers were separated in bdelloid (rotifers). . . and Encentrum sp.: the latter not in the graph visible.

Authors: Only bdelloid rotifers occurred in high abundances and were considered for the shown rda. Due to the rare occurrence of Encentrum, their abundances were estimated with a rather large uncertainty and thus not used for statistical tests. We will add this information in the corrected manuscript.

Interactive comment on Biogeosciences Discuss., 12, 11751, 2015.