

## ***Interactive comment on “Upper Arctic Ocean water masses harbor distinct communities of heterotrophic flagellates” by A. Monier et al.***

**Anonymous Referee #2**

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This is a study on the composition of the pelagic community of heterotrophic flagellates (HF) in the Arctic, using 454 tag-sequencing of the V8 region of the 18SRNA gene.

As the presumed grazers of the picoplankton compartment of the pelagic food web, the HF community is likely to be central in top-down control of both the C-flow and the biodiversity in the prokaryotic compartment. With an extra supply of DOC from the rivers, this may be a particularly important issue in the changing Arctic Ocean. Relative to the phytoplankton and prokaryote communities, it is probably also fair to say to the HF community is an understudied functional component of the pelagic food web. The ms therefore contains important data of interest to the readership of Biogeosciences. The authors also manage to take the discussion a bit beyond the pure descriptive stage, e.g. by linking the apparent absence of the MAST-4 clade to the absence of

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picocyanobacteria in the Arctic water. The main weakness of the study is in the identification of sequences belonging to the functional group of HF. This is done by excluding sequences not known to belong to organisms from this group. Since this excludes an unknown part of the community, at the same time as it seems to me that one easily could include photosynthetic members with similar V8 regions (?) it seems difficult to know whether there is an over- or under-estimation of diversity. I also could not find a discussion of the fundamental conceptual problem of dividing the flagellate community in two separate parts, as either hetero- or auto-trophs. There is an increasing literature on mixotrophy in the Arctic, with the underlying intriguing question of whether mixotrophy is important in systems with a long dark season. Since two reasons for mixotrophy have been proposed, either the need for energy /carbon or the advantage of taking up limiting nutrients in “pelleted” form, this aspect seems relevant to the differences reported in this manuscript between communities above, in and below the deep chlorophyll max (usually associated both with the nutricline and the transition to the aphotic zone). The discussion on these technical and conceptual problems should be more visible than in the present manuscript.

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