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Interactive comment on “Phytoplankton distribution in unusually low sea ice cover over the Pacific Arctic” by P. Coupel et al.

Anonymous Referee #2

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This manuscript provides valuable phytoplankton taxonomy and pigment data for a region of the Pacific Arctic during summer of 2008. The comparison of microscopy and HPLC data is particularly interesting, since it reveals discrepancies that may be overlooked in other studies in which only HPLC is used. However, several aspects of the work should be improved. Some comments follow. The microscopy and HPLC data for the different regions are described in detail but a general framework is lacking. There should be an effort to integrate the findings into an overall picture of what is known of the seasonal and spatial variability of the phytoplankton in the area. Similarly, the comparison with previous cruises should also consider what could be the role of differences in timing and of spatial heterogeneity in accounting for the encountered differences (in this context, there should be more information on the dates and position of the stations of the other cruises). Potential discrepancies due to variations in

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the methodology should be discussed more deeply. In general, the conclusions of the work are plausible, but some statements need better justification. For example, “microplankton and picoplankton declined in surface waters as compared to 1994 . . .” but “nanoplankton does not show significant changes between 2008 and 1994, seemingly because of better adaptation to ice retreat” (lines 27-30 of page 2074 and 1-3 of page 2075). The authors could discuss why should nanoplankton show better adaptation than pico- and microplankton and if there could be other explanations (see comments above). In the same way, the question of whether ice retreat would result in increased PP or in reduced phytoplankton growth (lines 25-30, page 2076) is quite interesting, but would need a deeper consideration of the physical data than that presented in the manuscript. Other comments In general, the manuscript is well written, but the amount of detail makes it difficult to follow some sections of the results and discussion. Given that the data can be found in Table 1 and the figures, perhaps the text could be streamlined to highlight the main findings, instead of repeating too many numbers. Table 1. Explain what are the numbers given within parentheses in the first column. Line 19 of page 2066 mentions 930 cells ml⁻¹ in the SCM and 640 cells ml⁻¹ in surface waters, but these precise numbers are not found in the table. There should be a brief account, in the main text, of the assignment of determined pigments to the eight phytoplankton classes and of procedure followed to distinguish phytoplankton size classes based on pigment data. The assignment of size classes to pigments given in the supplementary table 1 needs deeper discussion. Pyramimonas, for example is a frequent chlorophyll b-containing prasinophyte but does not fit into the picoplankton size class.

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9, C1732–C1733, 2012

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