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Environmental controls on spatial variability of summer phytoplankton structure and biomass in the Bering Sea

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Abstract: The subarctic Bering Sea, one of the most productive regions of the world's oceans, is undergoing significant ecological shifts possibly linked to global climate change. During the Fourth Chinese National Arctic Research Expedition (CHINARE) from July 10 to 20 of 2010, phytoplankton community structure, species diversity, spatial distribution, community types, abundance and biomass variations were investigated in a large scale study extending from the Bering Strait into the open waters down to the subarctic Pacific. These patterns were linked to potential environmental drivers, including effects of water masses and seasonal sea ice retreat. Results showed a marked spatial zonation in the taxonomic composition, abundance and biomass. A total of 149 phytoplankton taxa distributed among 57 genera of 5 phyla were identified, characterized into three ecological groups, namely Arctic, Boreal-temperate and cosmopolitan species. Phytoplankton included 101 species of diatoms, 44 species of dinoflagellates, 2 species of Chrysophyta, 1 species of each Chlorophyta and Euglenophyta. Both abundance and biomass were highest in the Bering Shelf, moderate on the Bering Slope, and lowest on the Bering Basin. Chlorophyll *a* were found highest in the subsurface chlorophyll maxima (SCM) close to the thermocline and halocline layers but its depth varied regionally. Multi-dimensional scaling (MDS) revealed two types of assemblages, one a deep-sea assemblage associated with the Bering Basin and a neritic assemblage found in the Bering Slope and Shelf. Average abundance

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