

Nutrient Dynamics Affecting Phytoplankton Distributions in the Pacific Arctic Region

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The Chukchi Sea and Canada Basin are areas in the Pacific Arctic characterized by northward advection and spreading of Pacific-origin water that transports nutrients into the Arctic Ocean, and thus plays an important role in phytoplankton distributions. In this study, we examined ship-based and mooring data to understand nutrient dynamics and its influence on phytoplankton distributions. In the southern Chukchi Sea, our data suggest that, in contrast to spring blooms that are caused by a nutrient supply with the advection of Pacific-origin water, autumn blooms there are maintained by regenerated nutrients from the bottom of the shallow sea where particulate organic matters are largely accumulated in autumn. On the other hand, large-scale ocean circulation controls nutrient distributions in the Canada Basin where sea ice reduction in recent years has changed the ocean circulation and thus impacts on the nutrient and phytoplankton dynamics. We found that oceanographic and biological responses to the sea ice loss are quite different between the Alaskan and Siberian sides of the region. On the Alaskan side, eddies also play an important role in the nutrient and phytoplankton distributions. However, on the Siberian side, data are still lacking and various biogeochemical processes should be clarified in future studies.

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