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Nutrients variation in the Pacific inflow of the western Arctic Ocean

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Nutrients were analyzed for Bering Strait and Chukchi shelf water samples collected during the 1999, 2003 and 2008 Chinese Arctic Expedition. Concentrations of nutrients were highest in the west part of the strait and decreased dramatically to the east part in summer (25 July-2 August 2003 and 28 July-4 August 2008). These spatial distributions of nutrients were characterized for water masses (Mixed layer, halocline waters, Anadyr current, Alaskan coastal current, Bering shelf current and Anadyr River water), primary production and cyclone. Because of phytoplankton uptake and dilution effect of ice melt water, the concentration of nutrients in the mixed layer (10 m) were lower than the deep layer of the meridian section along 170°W. Below 10m, nutrients concentrations were higher north of 70°N than the southern part of Chukchi Sea because of the Herald shoal and different water mass. Besides physical transport, the variation of organic matter re-mineralization maybe another important factor for the nutrients patterns. We apply the parameter N*(N*= [(DIN-16P+2.98) μM] 0.87) to discuss the loss of fixed nitrogen to N2 via denitrification and anammox processes. The less negative values of N* in the Bering Strait region than waters of Chukchi Sea, suggested that the pacific inflow had been conversion fixed nitrogen to N2 in the Bering Sea shelf. Finally, we can infer from the Negative N* value and lower (Nitrate+Nitrite+Ammonium)/Phosphate ratio of Chukchi Sea that the loss of fixed nitrogen in the water-sediment interface will increase of nitrogen limitation on the Arctic Ocean phytoplankton growth.