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SPATIAL DISTRIBUTIONS OF NUTRIENTS, DISSOLVED ORGANIC CARBON AND NITROGEN IN THE CHUKCHI AND BEAUFORT SEAS

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The Arctic Ocean is currently experiencing rapid environmental change due to natural and anthropogenic factors that include warming, sea-ice loss, and other physical changes as well as biology and ecosystem structure changes. It is therefore necessary to examine how these physical, chemical and biological processes may contribute to and be altered by the environmental change. However, the influence of these changes on the Arctic Ocean is not fully understood due to limited data. To investigate spatial distributions of nutrients (ammonium, nitrite, nitrate, phosphate and silicate), dissolved organic carbon (DOC), dissolved organic nitrogen (DON) and chlorophyll-a, seawater samples were collected in the Bering Strait including distributed biological observatory (DBO) line 3, across the Chukchi shelf, and over the Chukchi and Beaufort Seas during the ARA04B (25 August 2013–1 September 2013), ARA04C (7 September 2013–28 September 2013) and ARA05B (31 July 2014–25 August 2014) cruises aboard Korean icebreaker R/V Araon as a part of Korea-Polar Ocean in Rapid Transition project. A total of 52 CTD/rosette stations were occupied during the cruises. There was a west-east gradient in water mass properties in the DBO-3, with high nutrient concentrations, high salinities and low temperatures occurring in the west, and low nutrient values, low salinities and high temperatures tending to occur in the Alaskan side of the DBO-3, suggesting the inflow of the Anadry Water and the Alaska Coastal Water through the Bering Strait. The highest DOC and DON concentrations were observed in polar surface layer, suggesting the large contributions of terrigenous dissolved organic matter from Arctic rivers. In addition, DOC showed a significant inverse relationship with salinity. Compared to the relationship between DOC and salinity observed in other regions (e.g., the Eurasian Arctic), the difference in the zero-salinity intercepts suggested substantial removal of terrigenous DOC in the western Arctic Ocean (Hansell et al., 2004).

¹ Hansell, D. A., Kadko, D., Bates, N. R., 2004. Degradation of terrigenous dissolved organic carbon in the western Arctic Ocean. *Science* 304, 858–861.