Elemental carbon contents in the Bering Sea sediments during glacial-interglacial cycles

*Koichi Hirono[1], Yusuke Okazaki[2], Takuma Miyakawa[3], Kana Nagashima[3]

1.Department of Earth and Planetary Sciences, School of Science, Kyushu University, 2.Department of Earth and Planetary Sciences, Graduate School of Science, Kyushu University, 3.Japan Agency for Marine-Earth Science and Technology

Elemental carbon (EC) is produced by incomplete combustion of organic matter. EC can be well-preserved in sediments because of the low volatility and chemically inert compared with organic carbon (OC). Although EC has a potential to be a proxy for paleo-fire, our knowledge on EC change during glacial–interglacial cycle is limited. In this study, we measured EC contents in the Bering Sea sediments for the last 500 kyrs during the glacial-interglacial cycles. In summer 2009 during Integrated Ocean Drilling Program (IODP) Expedition 323, sediment core was drilled at Site U1343 on a bathymetric high near the Bering slope (57°33′N, 175°49′W, water depth: 1950 m). Age model of U1343 cores was established based on oxygen isotope stratigraphy of benthic foraminifera as well as bio- and magneto-stratigraphies. The established age model enables us to identify each glacial and interglacial periods based on Marine Isotope Stage (MIS). Selected sediment samples from typical glacial (MIS 2 and 12) and interglacial (MIS 1, 5, 9, and 11) were used for EC analysis. EC contents were measured by thermal separation method using Semi-Continuous OC-EC Field Analyzer (Sunset Laboratory Inc.). Thermal separation method is one of the carbon component analyses, which distinguish between EC and OC based on volatility. Volatilization temperature of EC is higher than that of OC. Before measurements, carbonate was removed by 20% acetic acid. EC contents at Site U1343 were high in glacial and low in interglacial periods. During glacial periods, vast continental shelves in the Bering Sea near Site U1343 were aerially exposed (Beringia) due to sea-level drop. We suggest that high EC contents during glacial periods were likely due to an increase in transportation of sediment from the Beringia.

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