Changes in provenance of terrigenous sediments on the Bering Slope over ~530 kyrs as derived from neodymium and hafnium isotopes

KWANGCHUL JANG[1] AND YOUNGSOOK HUH[1]

[1]School of Earth and Environmental Sciences, Seoul National University, Seoul 151-747, Korea
wkdrhkd3@snu.ac.kr, yhuh@snu.ac.kr

The dominant sources of sediment in the Bering Sea are (1) terrigenous material from the Yukon and Kuskokwim rivers in Alaska and from the Anadyr River in northeastern Siberia, (2) volcanic material from the Aleutian Arc and (3) biogenic opal. The sediment composition is sensitive to the sea-ice extent, especially on the Bering Slope which at present coincides with the maximum sea-ice extent. The sea-ice extent in turn varies with climate, and thus reconstructing past sediment provenance can be informative for understanding the paleoclimate of the Bering Sea. Samples were obtained at site U1345 (60°9.1917'N, 179°28.2036'W, water depth 1,008 m) on the Bering Slope during Integrated Ocean Drilling Project Expedition 323. To identify sediment provenance, we measured neodymium and hafnium isotope ratios of the detrital component. The average ε_{Nd} and ε_{Hf} values over last ~530 ka BP were -7.8 ± 1.8 (2σ, n=50) and -5.8 ± 5.3 (2σ, n=30), respectively. The ε_{Nd}-ε_{Hf} data set falls broadly on the Terrestrial Array [1], but inter-elemental correlation is poor. The core-top ε_{Nd} value of -7.5± 0.2 (2σ) shows that the present-day detritus at this site mainly consists of terrigenous material from the Yukon River (ε_{Nd} =-8~-9) with a minor contribution from the Aleutian Arc. Temporal variations of ε_{Nd} and ε_{Hf} were observed: Non-radiogenic ε_{Nd} excursions (down to ε_{Nd} =-10.3), for example during the last deglacial period, infer stronger input of Yukon River material than at present. Radiogenic ε_{Nd} excursions (up to ε_{Nd} =-5.7), for instance during MIS 4, indicate enhanced sediment transport from the Aleutian Arc and weakened N. American riverine influence.

[1] Vervoort *et al* (2011) *Geochim. Cosmochim. Acta* **75**, 5903-5926