Nd isotopes of the Bering Sea deep water recording boundary exchange over the last 2.4 Myr

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Records of deepwater neodymium isotope ratio (ε_{Nd}) trace the past mixing between northern and southern component waters in the Atlantic. In the Pacific, the situation is different with no significant deepwater formation at present. We measured the ε_{Nd} of authigenic and detrial fractions at site U1343 (57°33'N, 175°49'W; water depth 1,950 m) on the Bering Slope. Seven different extraction methods were evaluated in order to recover the authentic seawater signal.

The average ε_{Nd} over the last 2.4 Myrs of authigenic and detrital fractions were -3.1±1.2 (1σ, n = 142) and -6.6±1.6 (1σ, n = 50), respectively, with large temporal variations. We infer that the ε_{Nd} of the water mass that was advected into the Bering Sea from the North Pacific probably did not vary much, since the ε_{Nd} of Fe-Mn crust in the N. Pacific stayed relatively constant over ~2.3 Myr. Deep water formation in the Bering Sea can also be ruled out, except for one event at 660 ka, based on the comparison of $\delta^{18}O_{bf}$ records of sites U1343 and U1342 (54˚50'N, 176˚55'E; 818 m water depth) and the LR04 stack, as well as the abundance of freshwater-dwelling *Actinocyclus spp.* Preferential release of radiogenic Nd during boundary exchange seems to have led to the temporal variations in authigenic ε_{Nd} at site U1343, generating more radiogenic seawater compared to the detrital fraction.

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