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Land-ocean linkages of environmental change in the late Quaternary Bering Sea

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The reconstruction of terrigenous sediment provenance and dispersal from a sediment record from the northwestern Bering Sea margin (1100 m water depth) provides insights into land-ocean linkages of regional environmental change. The findings are based on clay mineralogy and grain-size measurements. During the last glacial stage (30-16 ka BP), the depositional environment was characterized by hemipelagic background sedimentation with overregional sediment sources. A meltwater pulse appeared during late Heinrich Event 1 (16.0 - 14.7 ka BP), documented by the sudden influx of clay-laden meltwaters from Northern Alaska. For the subsequent deglacial Bølling-Allerød interval, meltwater supply changed from glacial-fluvial to more fluvial, caused by warming that probably led to increased snow melt and permafrost thaw. Enhanced nutrient supply fertilized biological productivity. At the same time, a sustained fresh-water lid might have eased local overturning ventilation in the Bering Sea water that promoted the deposition of laminated sediments and the preservation of organic matter until the onset of the Younger Dryas cooling spell (12.6 to 11.4 ka BP). During early Holocene sea-level rise, the shore line moved far away from the site and reduced terrigenous sediment influx. Strong contour currents established in connection with the opening of the Bering Strait and led to the winnowing of sediments and caused residual sand enrichment.

