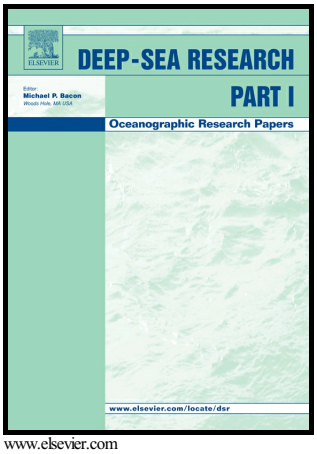

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Seasonal variability in the source and composition of particulate matter in the depositional zone of Baltimore Canyon, U.S. Mid-Atlantic Bight[1]

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Abstract

Submarine canyons are often hotspots of biomass due to enhanced productivity and funneling of organic matter of marine and terrestrial origin. However, most deep-sea canyons remain poorly studied in terms of their role as conduits of terrestrial and marine particles. A multi-tracer geochemical investigation of particles collected yearlong by a sediment trap in Baltimore Canyon on the US Mid-Atlantic Bight (MAB) revealed temporal variability in source, transport, and fate of particulate matter. Both organic biomarker composition (sterol and *n*-alkanes) and bulk characteristics ($\delta^{13}C$, $\Delta^{14}C$, Chl-*a*) suggest that while on average the annual contribution of terrestrial and marine organic matter sources are similar, 42% and 52% respectively, marine sources dominate. Elevated Chlorophyll-*a* and sterol concentrations during the spring sampling period highlight a seasonal influx of relatively fresh phytodetritus. In addition, the contemporaneous increase in the particle reactive micronutrients cadmium (Cd) and molybdenum (Mo) in the spring suggest increased scavenging, aggregation, and sinking of phytodetrital biomass in response to enhanced surface production within the nutricline. While tidally driven currents within the canyon resuspend sediment between 200 and 600 m, resulting in the formation of a nepheloid layer rich in lithogenic material, near-bed sediment remobilization in the canyon depositional zone was minimal. Instead, vertical transport and lateral transport across the continental margin were the dominant processes driving seasonal input of particulate matter. In turn,

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