

Presentation Type:

Poster Preferred, but platform acceptable

Track:

Environmental or Analytical Chemistry

Session:

Innovative methods for the monitoring, measurement, or characterization of environmental samples.

Abstract Title:

Historical assessment of hypoxia in Narragansett Bay using geochemical markers

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Abstract:

Eutrophication due to anthropogenic activities has affected aquatic ecosystems globally. Increased inputs of nitrogen and other nutrients to estuarine and marine ecosystems as a result of agricultural practices, urbanization and suburbanization have resulted in degradation of water quality, including increased frequency and severity of hypoxia and concomitant ecological effects, such as reductions in ecological diversity. While much work has been conducted in recent years to characterize the spatial and temporal extent of hypoxia in coastal systems, the historical record of hypoxia in such systems is much less well known. The work presented here examines the historical prevalence of hypoxia in Narragansett Bay, an urbanized estuary in the northeastern U.S., by determining the vertical profiles of molybdenum (Mo), a geochemical marker of hypoxia, in sediments in the Bay. Sediment cores collected from seven sites distributed within upper Narragansett Bay were analyzed for ^{210}Pb to determine sedimentation rates and estimate ages of core horizons; dates of core bottoms varied among sites between the mid-19th to the mid-20th centuries. Analysis of profiles of contaminants (e.g., lead) were used to validate the core chronologies. Profiles of authigenic Mo in the cores are compared with the ^{210}Pb chronology to determine temporal variation and trends in the frequency and spatial extent of hypoxia in the upper bay. Overall, this work reflects the impact of anthropogenic influences, such as land use and management practices and decisions, on the prevalence of hypoxia in Narragansett Bay and may inform decisions about potential recovery of coastal water bodies resulting from reduced loadings of nitrogen.