

Paleoclimate reconstruction of the Gulf of Maine during the recent Holocene (past 5000 years) using archaeological mollusk shells

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The paleoclimate of the Gulf of Maine (GOM) during the recent Holocene can be examined through archaeological shell middens in Maine (Turner Farm) and Nantucket Island, MA. We reconstructed the ocean conditions across the Holocene occupation at these sites (~ 5000 years) using trace element chemistry of eastern oyster (*Crassostrea virginica*), soft-shell and hard-shell clams (*Mya arenaria* and *Mercenaria mercenaria*), and blue mussel (*Mytilus edulis*). The location of each site is at the extreme north and south of the GOM providing boundary conditions for the ocean chemistry across this time period. We analyzed trace element composition along the growth axis using laser ablation inductively coupled plasma mass spectrometry (LA-ICP-MS). Moreover, since the midden species are extant in these regions, it is possible for us to ground-truth temperature, salinity, and pH proxy data with modern specimens.

Paleoenvironmental reconstruction and the study of events associated with human-environment interactions shapes our understanding of future climate change. Preliminary results indicate whether variations in trace element composition of archaeological midden shells can be used to reconstruct the recent Holocene climate of the GOM. This research helps further our understanding of long term trends in shellfish population distributions and the interactions between humans and natural resources.