CC34D-1339 Using oxygen isotopes and a high-resolution ocean model to investigate the influence of bottom water temperature on *Arctica islandica* growth on the continental shelf of the northeastern United States

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Abstract:

Arctica islandica (ocean quahog), a commercially-important, long-lived bivalve species, is abundant on much of the northeastern United States continental shelf. Several recent studies have noted increases in growth rates of these clams over the last 200 years at some locations in the southern Mid-Atlantic Bight region whereas growth rates at sites farther north have remained constant through time. It has been suggested that these changes in growth rate are related to warming in the more southerly sites. However, a direct comparison between site-specific bottom-water temperatures and *A. islandica* growth rates has not been done.

We present oxygen isotope data measured in *Arctica islandica* shells, a proxy for seawater temperature, paired with simulated temperature from high-resolution ocean model output to investigate the relationship between *A. islandica* shell growth rate and bottom water temperatures throughout the northeastern United States continental shelf. The relationship between oxygen isotopes and growth rate in *A. islandica* is assessed at several locations, including the continental shelf offshore New Jersey and Long Island, and the Georges Bank region. Bottom water temperature trends at these locations are further assessed using the VIKING20X ocean model, which uses JRA55-do (55-year Japanese Atmospheric Reanalysis for driving ocean-sea-ice models) atmospheric forcing from 1958 to present and nests a 1/20° Atlantic Ocean in a 1/4° global domain.

The results of this work have implications for the ocean quahog fishery, in particular as water temperatures off the eastern coast of the United States are predicted to continue to increase in response to global climate change. Additionally, this research lends insights into the use of *A. islandica* growth as a paleoclimate proxy for bottom water temperature.