Oceanographic Variability in the Rapidly Warming Coastal Mid-Atlantic (USA) over the last 200 years: Insights from Shell-Based Geochemistry and Growth Histories

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Warming in recent decades in the North Atlantic Ocean has been heterogeneous, with locations along the northwestern Atlantic experiencing some of the largest and fastest warming in the last 100 years. This region is important for fisheries but has limited spatial and temporal hydrographic instrumental series extending beyond the past decades, especially along the coastal United States portion of the northwestern Atlantic, thus impacting our understanding of past climatic variability. To provide a longer temporal context for these changes, we constructed a continuous master shell growth chronology spanning the last two centuries and provided geochemical records from the Mid-Atlantic region using the long-lived marine bivalve *Arctica islandica*. Shells were collected on the outer shelf region off Ocean City, Maryland, in ~ 60 m water depth. This region is sensitive to large-scale North Atlantic Ocean dynamics, including the Atlantic Meridional Overturning Circulation (AMOC) and Gulf Stream eddies. Based on growth histories and shell oxygen isotopes, we provide evidence of hydrographic variability beyond the relatively short instrumental period and evaluate the likely causes for these changes. These data allow us to better characterize recent and past oceanographic changes in the Mid-Atlantic region, synthesize the new results with previously developed paleo-records in the northwestern Atlantic, and provide guidance for the management of fisheries in this region.