Glider-based observations reveal seasonal pH and aragonite saturation state variability in coastal U.S. Mid-Atlantic shellfishery zones

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Introduction

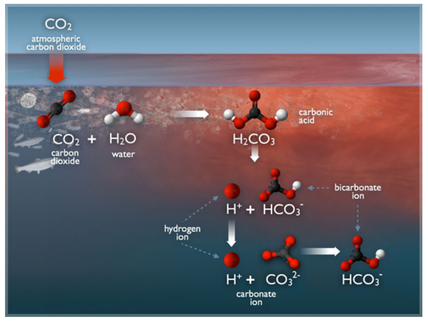
Few high-resolution measurements exist to track the existence of low pH water and resolve ocean carbonate chemistry. Here, we use a glider-integrated ISFET pH sensor to observe seasonal pH and aragonite saturation state off the coast of New Jersey.

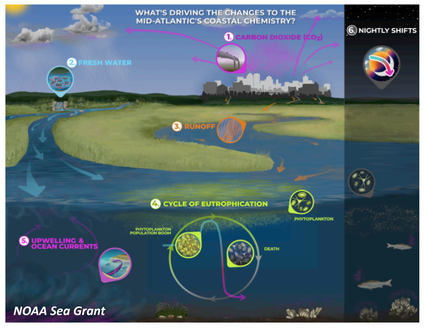
Project Goals

- Use a recently developed pH glider to investigate temporal and spatial pH dynamics in the coastal ocean
- Understand seasonal variability in carbonate chemistry
- Link observations to important commercial shellfishery management zones

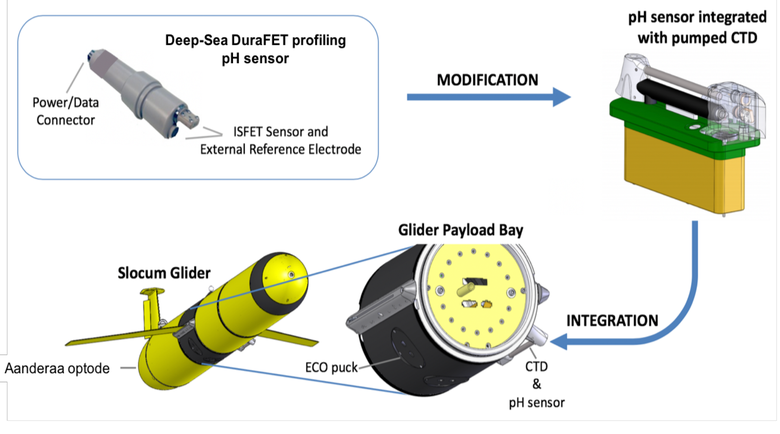
Ocean and Coastal Acidification

Ocean and coastal acidification caused by anthropogenic inputs have significant ramifications. Acidification decreases shellfish survivability, causing economic losses and ecological degradation.





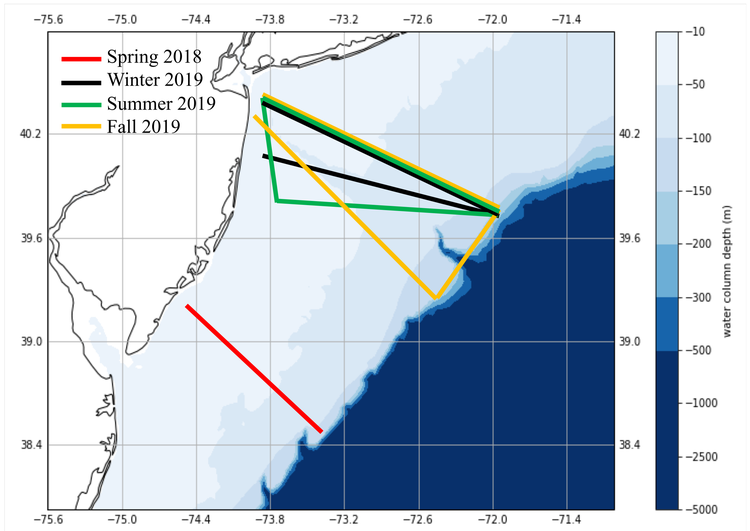
pH Sensor Integration



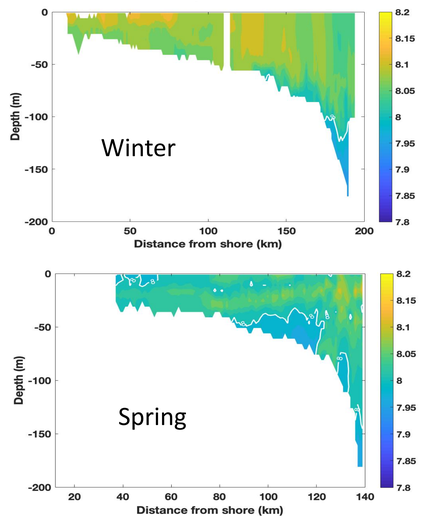
Seasonality of Carbonate Chemistry in the Mid-Atlantic

We have deployed the pH glider on four seasonal deployments (February, May, July, and October). These deployments provide high-resolution seasonal pH and aragonite saturation state data in important fishery habitat in the Mid-Atlantic Bight.

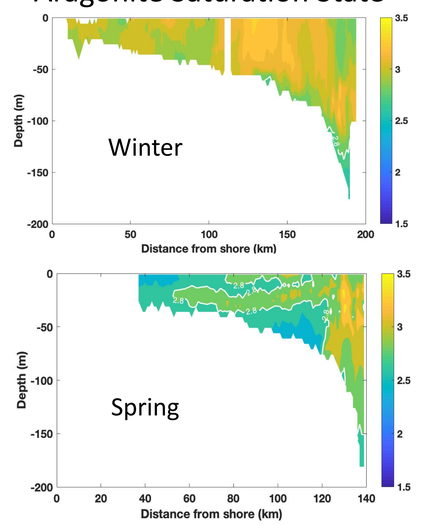
Seasonal Glider Deployment Tracks



pH



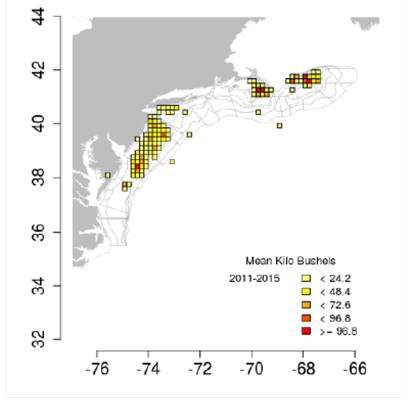
Aragonite Saturation State



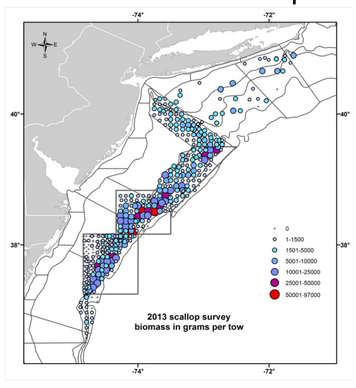
Commercial Shellfish Distributions

The Mid-Atlantic Bight (MAB) is a primary harvest area for the Atlantic sea scallop (*Placopecten magellanicus*), one of the most economically important shellfish in the United States (fishery valued at $465 million in 2013). The Atlantic surf clam (*Spisula solidissima*), another commercially significant shellfish (fishery valued at $28 million in 2015), is highly abundant along the MAB. Our seasonal glider deployments fly through important habitat for these shellfisheries.

Atlantic Surfclam



Atlantic Sea Scallop



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