Glider-based observation of seasonal pH and saturation state variability in commercial shellfishery management zones in the Mid-Atlantic Bight

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Abstract (Poster)

Ocean acidification alters the oceanic carbonate system, resulting in ecological, economic, and cultural losses. Currently, few high-resolution ocean carbonate system measurement tools exist. To improve acidification monitoring efforts, we modified and integrated a Deep-Sea Ion Sensitive Field Effect Transistor (ISFET) pH sensor into a Slocum G2 profiling ocean glider. The deep ISFET glider sensor is a new, cost-effective technology that can routinely provide high-resolution water column carbonate system data. In this project, we utilize the pH glider to elucidate seasonal dynamics of ocean pH in commercial shellfishery management zones in the Mid-Atlantic Bight (MAB). The seasonal transition from spring to summer in the MAB coincides with the formation of a distinctive mass of cold bottom water (<8 °C) called the Cold Pool. The Cold Pool was recently identified as having low pH and aragonite saturation state. It also has been linked to distribution and recruitment of several commercially important fin and shellfish species. Four seasonal pH glider deployments will provide a baseline understanding of physical and chemical ocean dynamics in this vital economic zone. Understanding pH dynamics in shellfish larval dispersal and settlement zones is necessary to predict the impacts of climate change on shellfish success. Using this data along with shellfish stock assessments and larval dispersal models, we will identify times and locations where these stocks may be at high risk of acidification.