

## Validating OSOM Modeling for Rhode Island Sound

Jack Lawrence, Christopher Kincaid & David Ullman

*University of Rhode Island*

The Narragansett Bay ecosystem is an important economic engine for Rhode Island that relies on healthy connections with Rhode Island Sound (RIS) and adjacent waters. Proper management of these waters requires understanding of physical, chemical, and biological processes. This study is the first part of a larger effort to understand circulation processes within RIS and how they influence the well-being of NB. We report on results using the Ocean State Ocean Model (OSOM), an application of the Regional Ocean Modeling System (ROMS) using a grid that includes both NB and RIS. Computer models like OSOM are powerful tools for understanding circulation and predicting changes under a variety of circumstances, but the models must be validated against real world data. Many years of data have been gathered on RIS using moored and underway acoustic doppler current profilers (ADCPs), Lagrangian drifters, and moored conductivity-temperature-depth (CTD) sensors. These data show a robust anticyclonic coastal current during summer/stratified periods, occurrences of system-altering shelf intrusions, and seasonal break downs in stratification. Studies using the ROMS model have a) revealed which wind conditions favor RIS-to-NB intrusions and b) suggested the coastal current is largely driven by tidal rectification. Our results represent the first detailed comparisons for OSOM versus spatially and temporally detailed current meter data along the RIS-ocean boundaries and within the northern coastal water of RIS. Preliminary results for summer/stratified periods show OSOM can represent time-average trends in the coastal current. However, analysis of residual current versus tidal range shows important differences between measured and modeled data. Ongoing efforts aim to statistically quantify coastal current strength versus tidal range, winds (magnitude, direction, duration) and density differences and to use Lagrangian floats and dyes to characterize patterns in long term transport within RIS and between RIS key sub-estuaries of NB and Buzzards Bay.