

## Coupled circulation/lower trophic level ecosystem modeling of Narragansett Bay

David Ullman & Jongsun Kim

*University of Rhode Island*

Over the course of the RI C-AIM project, a lower trophic level ecosystem model was coupled to the Ocean State Ocean Model (OSOM), a 3-dimensional circulation/hydrography model of Narragansett Bay (NB) and Rhode Island Sound. The Carbon, Silicon and Nitrogen Ecosystem (CoSiNE) model used for modeling the lower trophic level ecology simulates 4 nutrients, 2 classes each of phytoplankton and zooplankton, and 2 detrital pools, as well as dissolved oxygen and chlorophyll concentrations. A shortcoming of the original CoSiNE formulation (originally developed for open ocean pelagic systems) for the NB system was the lack of coupling with sediment processes. The relatively shallow depth in much of NB (8 m mean depth) suggests that exchanges of organic matter and dissolved nutrients between the sediment and water column could be significant to the NB ecosystem. This motivated the addition, in RI C-AIM year-5, of a sediment processes module to the OSOM/CoSiNE model. Tuning of the sediment model and the evaluation of model results including the sediment processes are presently underway. Ongoing, externally funded (Rhode Island Sea Grant) work with the OSOM/CoSiNE/Sediments model includes the expansion of CoSiNE to include a 3rd phytoplankton class that will represent *Pseudo-nitzschia*, a harmful algal bloom genus that has become more abundant and problematic in NB waters during recent years.