Assessment of a sediment process-based ecosystem model with *in-situ* benthic flux data in Narragansett Bay

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Links between the sediment and overlying water column are a critical mode of particle and solute exchange that can potentially influence coastal ecosystems. A coupled hydrodynamics/lower trophic level (LTL) model of the Narragansett Bay (NB) region has recently been implemented as one component of the "end-to-end" Ocean State Ocean Model (OSOM) in order to provide realistic simulations of LTL ecology. That LTL coupled system uses the Regional Ocean Modeling System (ROMS) and the Carbon Silicate Nitrogen Ecosystem (CoSiNE) sub-models. The CoSiNE model is a complex LTL ecosystem model with 15 state variables, including phytoplankton and zooplankton (2 classes each), four nutrients, particulate material (2 classes), as well as dissolved oxygen, carbon, and alkalinity. Because NB is a relatively shallow system in which sediment diagenetic processes are hypothesized to be important in nutrient budgets, the model has recently been augmented with a coupled benthic/sediment biogeochemical sub-module in which dissolved nutrients are regenerated from particulate matter. We present results from a one-dimensional version of the coupled CoSiNE and sediment processes model applied at several locations in NB. Modeled sediment-water nutrient fluxes are compared with in-situ measurements from NB to validate the performance of the new sediment processes model. Comparisons of model results from different regions of NB indicate that the degree to which sediment processes influence ecosystem function is spatially variable.