Decade-Scale Patterns and Trends in the Transport and Transformation of Oxygen, Carbon, and Nutrients in Chesapeake Bay – Jeremy Testa, UMCES

We analyzed a 30-year data set of nutrient, chlorophyll-a, and oxygen vertical profiles at ~20 stations in the main stem of Chesapeake Bay with a salt- and water-balance box model. A "box model" computes regional and seasonal-scale estimates of advective and non-advective transport terms from freshwater inputs fluxes and salinity distributions. When coupled to nutrient distributions, these transport terms can be used to compute nutrient flux and transport for fixed regional volumes, allowing for budget analyses and computations of net biogeochemical transformations. The goal of this effort is to understand how nutrient and oxygen transport is related to both inter- and intra-annual distributions of chlorophyll-a, oxygen demand, and nutrient transformation. This analysis has found large seasonal and regional changes in chlorophyll-a distributions, as well as long-term changes in later-summer oxygen and inorganic nitrogen concentrations that suggest a shift in the phenology of oxygen uptake and nutrient availability in Chesapeake Bay.