

RED TIDES AND HYPERSPECTRAL IOP'S ON THE WEST FLORIDA SHELF

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The West Florida Shelf (WFS) is the site of frequently occurring "red tide" blooms of the toxic dinoflagellate *Gymnodinium breve*. The bloom of this species is a function of multiple ecological interactions between various functional groups of phytoplankton and the combined mechanisms of "top-down" and "bottom-up" control of the composition of the phytoplankton assemblage. We explore the impacts of phytoplankton species succession on red tides and vertical structure of hyperspectral Inherent Optical Properties (IOPs) on the WFS with a 2-dimensional version of the Ecological Simulation 2.0 (EcoSim 2.0). Critical to the results of this simulation are the time-dependent changes in the particle-specific optical properties, the vertical migration of individual functional groups, and the differential seasonal supply of multiple limiting nutrients. The 2-dimensional simulation allows us to explore the competing hypotheses of seasonal lateral boundary conditions and Loop Current intrusions versus aeolian iron supplies to nitrogen-fixing cyanobacteria as the driving mechanism for nutrient supply to red tides on the WFS. We demonstrate that simulations of water clarity and remote sensing reflectance will require accurate resolution of the vertical structure of the water column IOPs, and that this vertical structure requires resolving the time-dependent changes of particle-specific optical properties.