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# Integrated study of the carbon budget of the continental shelf of the Mid-Atlantic and South Atlantic Bights

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The U.S. Eastern Continental Shelf Carbon Budget (U.S. ECoS) Program, which began in summer 2004, is funded as part of the NASA Interdisciplinary Science Program. The overall goal of this project is to develop carbon budgets for the Mid-Atlantic Bight (MAB) and South Atlantic Bight (SAB) along the eastern U.S. coast. The U.S. ECoS program is structured around five themes which are focused on: 1) implementation of circulation, biogeochemistry, and carbon cycling models for the east coast of the U.S.; 2) analyses of historical in situ measurements and satellite-derived data; 3) acquiring limited field measurements designed to provide inputs to the biogeochemistry and carbon cycling models; 4) implementation of data assimilative biogeochemical and carbon cycling models; and 5) interfacing the circulation, biogeochemistry and carbon cycling models with climate models.

The U.S. ECoS program has implemented a coupled circulation-biogeochemical-carbon model for the MAB and SAB. The carbon model includes land-based and ocean carbon sources and is linked to a model of nitrogen cycling. Initial simulations are focused on understanding the basic physical and biological processes that contribute to and control carbon cycling in the SAB and MAB. Particular emphasis has been given to quantification of air-sea gas exchange of carbon dioxide and deposition of carbon on the MAB and SAB continental shelf. The simulation results are being used to develop a carbon budget model for the MAB. Concurrent analyses of historical satellite-derived ocean color data sets provide insight into patterns of variability of chlorophyll, primary production, particulate organic carbon, and dissolved organic carbon for MAB and SAB continental shelf waters. Carbon cycling processes in U.S. east coast continental shelf waters will be discussed in the context of results from the coupled model simulations, satellite data analyses, and model-data comparisons.